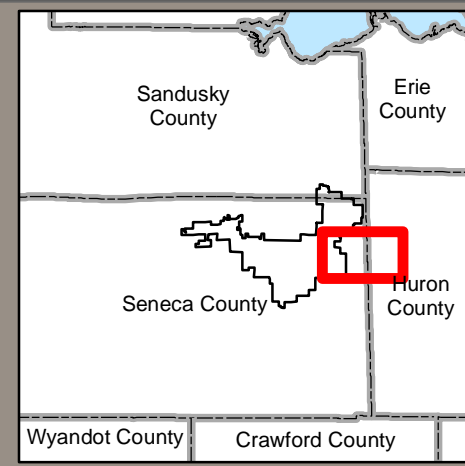


Data Source(s): Apex (2017)
County Boundaries, Railroads:
ESRI Data and Maps (2014)
Township and City Boundaries
Ohio DOT (2010)
Elevation Contours derived
from National Elevation
Dataset: 1/9 Arc Second (2013)
Roads: U.S. Census Bureau Tiger
Files (2016)
Watershed: USDA-NRCS (2014)
Water Classifications: OEPa (2010)
Floodplain, Observation Wells: ODNr

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0 1,000 2,000 3,000 4,000 5,000 Feet
0 500 1,000 1,500 Meters



Map 6 - Water Quality-Floodplain Map (Sheet 6 of 6)

Republic Wind Project
Sandusky and Seneca Counties, Ohio



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Newark, DE 19713
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Republic Wind Project

APPENDIX

B

FULL SOILS TABLE

| Appendix B - Soils within Project Boundary | | | | |
|--|--|---------------|----------------------------|---------------------------|
| Symbol | Description | Hydric Rating | Project Boundary Area (AC) | Project Boundary Area (%) |
| Blg1A1 | Blount silt loam, ground moraine, 0 to 2 percent slopes | 9 | 6,629.42 | 28% |
| Blg1B1 | Blount silt loam, ground moraine, 2 to 4 percent slopes | 9 | 5,351.53 | 22% |
| GwA | Glynwood silt loam, 0 to 2 percent slopes | 6 | 1,553.47 | 7% |
| Gwg1B1 | Glynwood silt loam, ground moraine, 2 to 6 percent slopes | 6 | 1,419.75 | 6% |
| Pa | Pandora silt loam | 92 | 1,234.67 | 5% |
| MnB | Milton silt loam, 2 to 6 percent slopes | 0 | 675.06 | 3% |
| HoA | Hoytville clay loam, 0 to 1 percent slopes | 5 | 533.99 | 2% |
| MnA | Milton silt loam, 0 to 2 percent slopes | 0 | 439.36 | 2% |
| NpA | Nappanee silt loam, 0 to 2 percent slopes | 5 | 437.50 | 2% |
| DmA | Digby loam, 1 to 4 percent slopes | 5 | 408.32 | 2% |
| KbA | Kibbie fine sandy loam, 0 to 2 percent slopes | 5 | 360.59 | 2% |
| HkB | Haskins loam, 2 to 6 percent slopes | 5 | 325.86 | 1% |
| HaB | Haney loam, 2 to 6 percent slopes | 0 | 310.14 | 1% |
| RbA | Randolph silt loam, 0 to 2 percent slopes | 4 | 290.27 | 1% |
| RmB | Rawson loam, 2 to 6 percent slopes | 0 | 287.09 | 1% |
| Gwg5B2 | Glynwood clay loam, ground moraine, 2 to 6 percent slopes, eroded | 6 | 286.01 | 1% |
| GaB | Gallman loam, 2 to 6 percent slopes | 0 | 243.65 | 1% |
| Co | Colwood silt loam | 94 | 242.53 | 1% |
| Pt | Pits, quarries | 0 | 241.52 | 1% |
| HkA | Haskins loam, 0 to 2 percent slopes | 5 | 201.87 | 1% |
| SdA | Seward loamy fine sand, 0 to 2 percent slopes | 0 | 190.37 | 1% |
| Ble1A1 | Blount silt loam, end moraine, 0 to 2 percent slopes | 6 | 162.25 | 1% |
| Gwg5C2 | Glynwood clay loam, ground moraine, 6 to 12 percent slopes, eroded | 7 | 155.63 | 1% |
| Ch | Chagrin silt loam, occasionally flooded | 0 | 147.24 | 1% |
| Sh | Shoals silt loam, 0 to 2 percent slopes, frequently flooded | 8 | 138.60 | 1% |
| Le | Lenawee silty clay loam | 100 | 125.53 | 1% |
| RoB | Rimer loamy fine sand, 1 to 4 percent slopes | 3 | 121.40 | 1% |
| GwB | Glynwood silt loam, 2 to 6 percent slopes | 2 | 119.52 | 1% |
| SpB | Spinks loamy sand, 2 to 6 percent slopes | 0 | 109.55 | 0.46% |
| SoB | Spinks fine sand, 2 to 6 percent slopes | 3 | 106.91 | 0.45% |
| Bp | Bono silty clay, loamy substratum | 100 | 81.37 | 0.34% |
| SdB | Seward loamy fine sand, 2 to 6 percent slopes | 0 | 80.62 | 0.34% |
| CnB | Channahon silt loam, 2 to 6 percent slopes | 0 | 67.92 | 0.28% |
| Mm | Millsdale silty clay loam | 95 | 65.87 | 0.28% |
| BdB | Belmore loam, 2 to 6 percent slopes | 0 | 63.89 | 0.27% |
| BaB | Belmore loam, 2 to 6 percent slopes | 0 | 60.24 | 0.25% |
| Mo | Mermill loam | 96 | 54.86 | 0.23% |
| FcA | Fitchville silt loam, 1 to 4 percent slopes | 2 | 54.62 | 0.23% |
| Pe | Pewamo silty clay loam, 0 to 1 percent slopes | 91 | 46.21 | 0.19% |
| Pm | Pewamo silty clay loam, 0 to 1 percent slopes | 0 | 44.95 | 0.19% |
| Sb | Sebring silt loam | 100 | 41.12 | 0.17% |
| HbB | Haskins sandy loam, 1 to 4 percent slopes | 5 | 39.77 | 0.17% |
| GaA | Gallman loam, 0 to 2 percent slopes | 0 | 35.59 | 0.15% |
| DrB | Dunbridge sandy loam, 1 to 4 percent slopes | 2 | 35.11 | 0.15% |
| HaA | Haney loam, 0 to 2 percent slopes | 0 | 32.31 | 0.14% |
| Ble1B1 | Blount silt loam, end moraine, 2 to 4 percent slopes | 6 | 26.01 | 0.11% |
| MrD2 | Morley silt loam, 12 to 18 percent slopes, eroded | 2 | 25.23 | 0.11% |
| NpB | Nappanee silt loam, 2 to 6 percent slopes | 5 | 24.72 | 0.10% |
| Mf | Millgrove loam | 95 | 23.98 | 0.10% |
| BfF2 | Belmore-Morley complex, 18 to 50 percent slopes, eroded | 0 | 20.34 | 0.09% |

| Appendix B - Soils within Project Boundary | | | | |
|--|---|---------------|----------------------------|---------------------------|
| Symbol | Description | Hydric Rating | Project Boundary Area (AC) | Project Boundary Area (%) |
| DuB | Dunbridge sandy loam, 1 to 4 percent slopes | 2 | 18.87 | 0.08% |
| MrF2 | Morley silt loam, 18 to 50 percent slopes, eroded | 0 | 15.75 | 0.07% |
| Me | Mermill loam | 92 | 13.78 | 0.06% |
| SeB | Seward loamy fine sand, 2 to 6 percent slopes | 0 | 10.09 | 0.04% |
| Pb | Pandora silty clay loam | 95 | 8.95 | 0.04% |
| W | Water | 0 | 8.02 | 0.03% |
| Ru | Ross silt loam, occasionally flooded | 0 | 1.54 | 0.01% |
| TOTAL | | | 23,851.35 | 100% |

Republic Wind Project

APPENDIX

C

RTE SPECIES INFORMATION

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

Sandusky and Seneca counties, 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

Indiana Bat *Myotis sodalis***Endangered**

There is **final** critical habitat for this species. Your location is outside the critical habitat.

<https://ecos.fws.gov/ecp/species/5949>

Northern Long-eared Bat *Myotis septentrionalis***Threatened**

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/9045>

Birds

| NAME | STATUS |
|--|-------------------|
| Kirtland's Warbler <i>Setophaga kirtlandii</i> (= <i>Dendroica kirtlandii</i>) No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8078 | Endangered |
| Piping Plover <i>Charadrius melodus</i> There is final critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/6039 | Endangered |
| Red Knot <i>Calidris canutus rufa</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1864 | Threatened |

Flowering Plants

| NAME | STATUS |
|---|-------------------|
| Eastern Prairie Fringed Orchid <i>Platanthera leucophaea</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/601 | 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.)

American Golden-plover *Pluvialis dominica*

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

Breeds elsewhere

Bald Eagle *Haliaeetus leucocephalus*

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

Black Tern *Chlidonias niger*

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/3093>

Breeds May 15 to Aug 20

Black-billed Cuckoo *Coccyzus erythrophthalmus*

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

<https://ecos.fws.gov/ecp/species/9399>

Breeds May 15 to Oct 10

Bobolink *Dolichonyx oryzivorus*

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

Breeds May 20 to Jul 31

Buff-breasted Sandpiper *Calidris subruficollis*

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

<https://ecos.fws.gov/ecp/species/9488>

Breeds elsewhere

Dunlin *Calidris alpina arctica*

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Breeds elsewhere

Henslow's Sparrow *Ammodramus henslowii*

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

<https://ecos.fws.gov/ecp/species/3941>

Breeds May 1 to Aug 31

Lesser Yellowlegs *Tringa flavipes*

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 *Melanerpes erythrocephalus*

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 *Euphagus carolinus*

Breeds elsewhere

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

Semipalmated Sandpiper *Calidris pusilla*

Breeds elsewhere

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

Short-billed Dowitcher *Limnodromus griseus*

Breeds elsewhere

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

<https://ecos.fws.gov/ecp/species/9480>

Willow Flycatcher *Empidonax traillii*

Breeds May 20 to Aug 31

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>

Wood Thrush *Hylocichla mustelina*

Breeds May 10 to Aug 31

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

Probability of Presence Summary

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

Probability of Presence

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

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

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

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

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

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

Breeding Season (■)

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

Survey Effort (|)

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

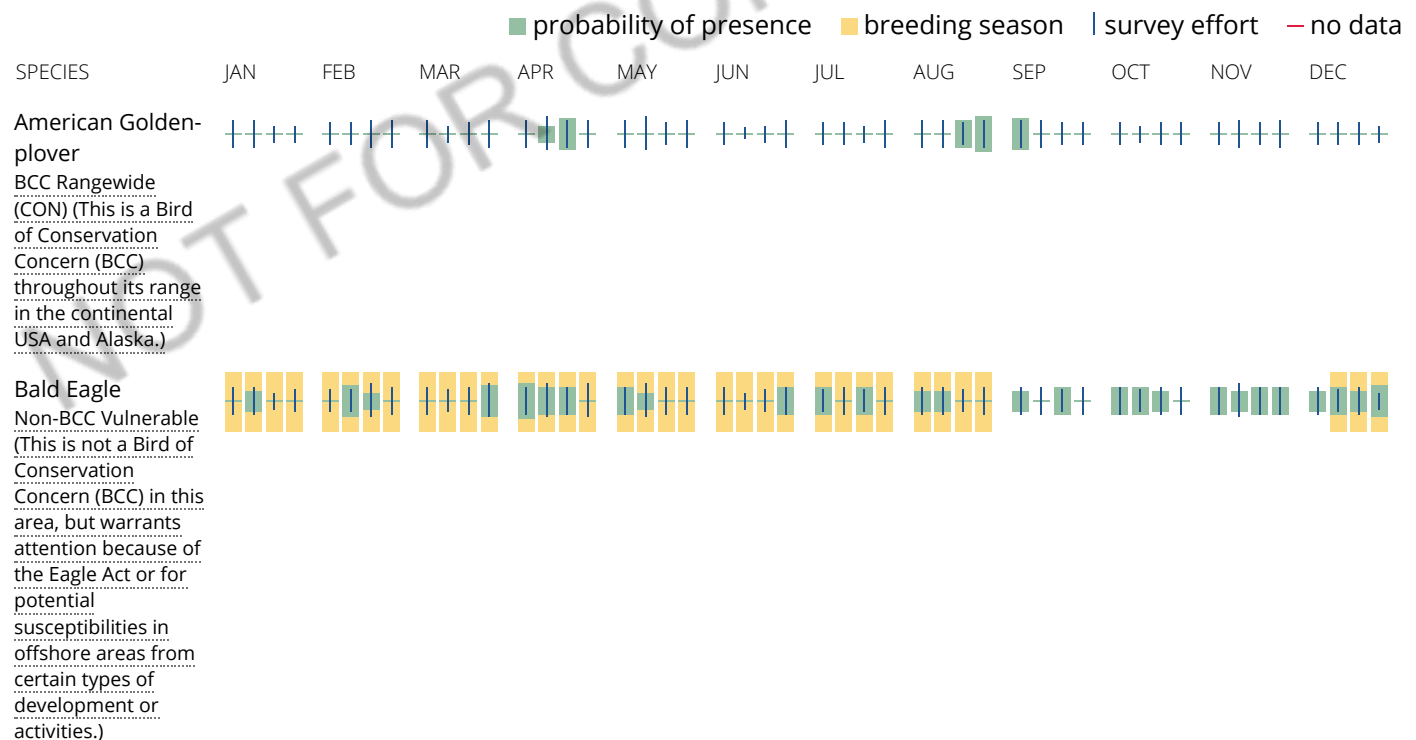
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (—)

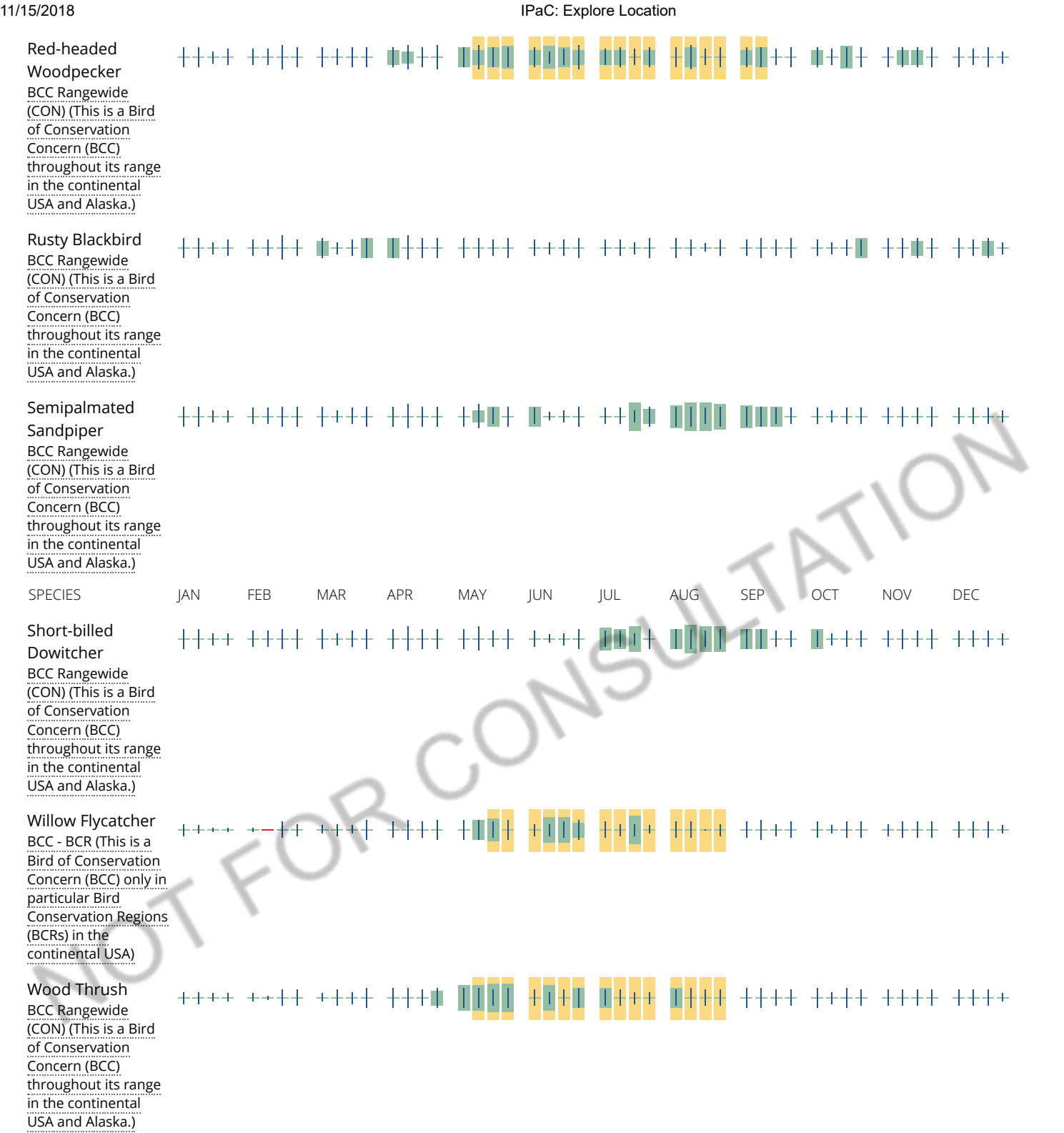
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

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







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

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

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the [NWI map](#) to view wetlands at this location.

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.

SANDUSKY COUNTY

| State Status | Federal Status | County | Category | Species | CommonName | Sensitive Species | Most Recent Record | FWS |
|--------------------|----------------------|----------|-------------------------|-------------------------------------|-----------------------------|-------------------|--------------------|-----|
| Endangered | Endangered | Sandusky | Bird | Bubulcus ibis | Cattle Egret | No | 2004 | |
| Endangered | | Sandusky | Bird | Charadrius melodus | Piping Plover | No | | * |
| Endangered | | Sandusky | Bird | Circus cyaneus | Northern Harrier | No | 1996 | |
| Endangered | Endangered | Sandusky | Bird | Dendroica kirtlandii | Kirtland's Warbler | No | | * |
| Endangered | Endangered | Sandusky | Invert. - fw bivalve | Villosa fabalis | Rayed Bean | No | 1971 | |
| Endangered | Endangered Candidate | Sandusky | Mammal | Myotis sodalis | Indiana Myotis | Yes | | * |
| Endangered | | Sandusky | Reptile - Snake | Sistrurus catenatus catenatus | Eastern Massasauga | Yes | | * |
| Threatened | | Sandusky | Bird | Nycticorax nycticorax | Black-crowned Night-Heron | No | 2002 | |
| Threatened | | Sandusky | Fish | Anguilla rostrata | American Eel | No | 1988 | |
| Threatened | | Sandusky | Fish | Moxostoma valenciennesi | Greater Redhorse | No | 2010 | |
| Threatened | | Sandusky | Insect - moth | Faronta rubripennis | The Pink-streak | No | 1986 | |
| Threatened | | Sandusky | Invert. - fw bivalve | Ligumia recta | Black Sandshell | No | 1999 | |
| Threatened | | Sandusky | Invert. - fw bivalve | Obliquaria reflexa | Threehorn Wartyback | No | 2011 | |
| Threatened | | Sandusky | Invert. - fw bivalve | Unio merus tetralasmus | Pondhorn | No | 2010 | |
| Species of Concern | | Sandusky | Amphibian - Frog / Toad | Acris crepitans crepitans | Eastern Cricket Frog | No | 1999 | |
| Species of Concern | | Sandusky | Bird | Ardea alba | Great Egret | No | 2014 | |
| Species of Concern | | Sandusky | Bird | Cistothorus palustris | Marsh Wren | No | 2013 | |
| Species of Concern | | Sandusky | Bird | Dolichonyx oryzivorus | Bobolink | No | 2013 | |
| Species of Concern | | Sandusky | Bird | Porzana carolina | Sora Rail | No | 2013 | |
| Species of Concern | | Sandusky | Fish | Esox masquinongy | Muskellunge | No | 1999 | |
| Species of Concern | | Sandusky | Fish | Moxostoma carinatum | River Redhorse | No | 2010 | |
| Species of Concern | | Sandusky | Invert. - fw bivalve | Alasmodonta marginata | Elktoe | No | 1995 | |
| Species of Concern | | Sandusky | Invert. - fw bivalve | Cyclonaias tuberculata | Purple Wartyback | No | 1995 | |
| Species of Concern | | Sandusky | Invert. - fw bivalve | Lampsilis fasciola | Wavy-rayed Lampmussel | No | 1992 | |
| Species of Concern | | Sandusky | Invert. - fw bivalve | Pleurobema sintoxia | Round Pigtoe | No | 1994 | |
| Species of Concern | | Sandusky | Invert. - fw bivalve | Ptychobranhus fasciolaris | Kidneyshell | No | 1992 | |
| Species of Concern | | Sandusky | Invert. - fw bivalve | Truncilla truncata | Deertoe | No | 2011 | |
| Species of Concern | | Sandusky | Mammal | Eptesicus fuscus | Big Brown Bat | No | 2007 | |
| Species of Concern | | Sandusky | Mammal | Lasiurus borealis | Red Bat | No | 2007 | |
| Species of Concern | | Sandusky | Mammal | Myotis lucifugus | Little Brown Bat | No | 2007 | |
| Species of Concern | Threatened | Sandusky | Mammal | Myotis septentrionalis | Northern Long-eared Bat | No | | * |
| Species of Concern | | Sandusky | Mammal | Peromyscus maniculatus | Deer Mouse | No | 1968 | |
| Species of Concern | | Sandusky | Mammal | Synaptomys cooperi | Southern Bog Lemming | No | 1938 | |
| Species of Concern | | Sandusky | Mammal | Taxidea taxus | Badger | No | 2007 | |
| Special Interest | | Sandusky | Bird | Anas clypeata | Northern Shoveler | No | 2013 | |
| Special Interest | | Sandusky | Bird | Aythya americana | Redhead | No | 2013 | |
| Special Interest | | Sandusky | Bird | Catharus guttatus | Hermit Thrush | No | 2013 | |
| Special Interest | | Sandusky | Bird | Certhia americana | Brown Creeper | No | 2013 | |
| Special Interest | | Sandusky | Bird | Dendroica caerulescens | Black-throated Blue Warbler | No | 2013 | |
| Special Interest | | Sandusky | Bird | Dendroica magnolia | Magnolia Warbler | No | 2013 | |
| Special Interest | | Sandusky | Bird | Empidonax minimus | Least Flycatcher | No | 2013 | |
| Special Interest | | Sandusky | Bird | Gallinago delicata | Wilson's Snipe | No | 2013 | |
| Special Interest | | Sandusky | Bird | Junco hyemalis | Dark-eyed Junco | No | 2013 | |
| Special Interest | | Sandusky | Bird | Oporornis philadelphia | Mourning Warbler | No | 2013 | |
| Special Interest | | Sandusky | Bird | Regulus satrapa | Golden-crowned Kinglet | No | 2013 | |
| Special Interest | | Sandusky | Bird | Wilsonia canadensis | Canada Warbler | No | 2013 | |
| Extirpated | | Sandusky | Invert. - fw bivalve | Actinonaias ligamentina ligamentina | Mucket | No | 1995 | |



Sandusky County

| Scientific Name | Common Name | Last Observed | State Status | Federal Status |
|---|------------------------|---------------|--------------|----------------|
| <i>Acorus americanus</i> | American Sweet-flag | 2011-06-30 | P | |
| <i>Conyza ramosissima</i> | Bushy Horseweed | 2009-06-30 | P | |
| <i>Cypripedium candidum</i> | White Lady's-slipper | 1995-05-30 | E | |
| <i>Descurainia pinnata</i> | Tansy Mustard | 1960-04-30 | T | |
| <i>Juncus balticus</i> | Baltic Rush | 1960-05-28 | P | |
| <i>Moehringia lateriflora</i> | Grove Sandwort | 1991-07-13 | P | |
| <i>Packera paupercula</i> | Balsam Squaw-weed | 1992-05-19 | T | |
| <i>Platanthera leucophaea</i> | Prairie Fringed Orchid | 2012-06-26 | T | FT |
| <i>Sphenopholis obtusata</i> var. <i>obtusata</i> | Prairie Wedge Grass | 1992-07 | T | |
| <i>Triglochin palustris</i> | Marsh Arrow-grass | 1959-08-12 | P | |
| <i>Viola nephrophylla</i> | Northern Bog Violet | 1967-09 | T | |



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

SENECA COUNTY

| State Status | Federal Status | County | Category | Species | CommonName | Sensitive Species | Most Recent Record | FWS |
|--------------------|-------------------|---------------|----------------------|-------------------------------------|-------------------------|-------------------|--------------------|-----|
| Endangered | | Seneca | Bird | Bartramia longicauda | Upland Sandpiper | No | 1998 | |
| Endangered | | Seneca | Bird | Circus cyaneus | Northern Harrier | No | 2004 | |
| Endangered | | Seneca | Bird | Lanius ludovicianus | Loggerhead Shrike | No | 2000 | |
| Endangered | | Seneca | Insect - odonate | Gomphus externus | Plains Clubtail | No | 2005 | |
| Endangered | Endangered | Seneca | Invert. - fw bivalve | Epioblasma torulosa rangiana | Northern Riffleshell | No | 1976 | |
| Endangered | Endangered | Seneca | Invert. - fw bivalve | Villosa fabalis | Rayed Bean | No | 1971 | |
| Endangered | Endangered | Seneca | Mammal | Myotis sodalis | Indiana Myotis | Yes | | * |
| Threatened | | Seneca | Fish | Moxostoma valenciennesi | Greater Redhorse | No | 2009 | |
| Threatened | | Seneca | Invert. - fw bivalve | Ligumia recta | Black Sandshell | No | 2008 | |
| Species of Concern | | Seneca | Bird | Ammodramus henslowii | Henslow's Sparrow | No | 2014 | |
| Species of Concern | | Seneca | Bird | Ardea alba | Great Egret | No | 2011 | |
| Species of Concern | | Seneca | Bird | Cistothorus palustris | Marsh Wren | No | 1997 | |
| Species of Concern | | Seneca | Bird | Colinus virginianus | Northern Bobwhite | No | 2006 | |
| Species of Concern | | Seneca | Bird | Dolichonyx oryzivorus | Bobolink | No | 2014 | |
| Species of Concern | | Seneca | Fish | Esox masquinongy | Muskellunge | No | 1981 | |
| Species of Concern | | Seneca | Fish | Moxostoma carinatum | River Redhorse | No | 2009 | |
| Species of Concern | | Seneca | Insect - moth | Smerinthus cerisyi | One-Eyed Sphinx | No | 1956 | |
| Species of Concern | | Seneca | Invert. - fw bivalve | Alasmidonta marginata | Elktoe | No | 2008 | |
| Species of Concern | | Seneca | Invert. - fw bivalve | Cyclonaias tuberculata | Purple Wartyback | No | 2009 | |
| Species of Concern | | Seneca | Invert. - fw bivalve | Lampsilis fasciola | Wavy-rayed Lampmussel | No | 1971 | |
| Species of Concern | | Seneca | Invert. - fw bivalve | Lasmigona compressa | Creek Heelsplitter | No | 1936 | |
| Species of Concern | | Seneca | Invert. - fw bivalve | Pleurobema sintoxia | Round Pigtoe | No | 2008 | |
| Species of Concern | | Seneca | Invert. - fw bivalve | Ptychobranhus fasciolaris | Kidneyshell | No | 2008 | |
| Species of Concern | | Seneca | Mammal | Eptesicus fuscus | Big Brown Bat | No | 2012 | |
| Species of Concern | | Seneca | Mammal | Lasiurus borealis | Red Bat | No | 2012 | |
| Species of Concern | | Seneca | Mammal | Lasiurus cinereus | Hoary Bat | No | 2012 | |
| Species of Concern | | Seneca | Mammal | Myotis lucifugus | Little Brown Bat | No | 2012 | |
| Species of Concern | Threatened | Seneca | Mammal | Myotis septentrionalis | Northern Long-eared Bat | No | 2012 | |
| Species of Concern | | Seneca | Mammal | Perimyotis subflavus | Tri-colored Bat | No | 2012 | |
| Species of Concern | | Seneca | Mammal | Peromyscus maniculatus | Deer Mouse | No | 1975 | |
| Species of Concern | | Seneca | Mammal | Synaptomys cooperi | Southern Bog Lemming | No | 1937 | |
| Species of Concern | | Seneca | Mammal | Taxidea taxus | Badger | No | 2007 | |
| Special Interest | | Seneca | Bird | Carpodacus purpureus | Purple Finch | No | 2005 | |
| Extirpated | | Seneca | Invert. - fw bivalve | Actinonaias ligamentina ligamentina | Mucket | No | 1976 | |



Seneca County

| Scientific Name | Common Name | Last Observed | State Status | Federal Status |
|---|-------------------------|---------------|--------------|----------------|
| <i>Betula pumila</i> | Swamp Birch | 1994-05-25 | T | |
| <i>Carex alata</i> | Broad-winged Sedge | 2004-06-22 | P | |
| <i>Carex bebbii</i> | Bebb's Sedge | 1999-07-15 | P | |
| <i>Carex cryptolepis</i> | Little Yellow Sedge | 2007-06-28 | P | |
| <i>Carex lasiocarpa</i> | Slender Sedge | 1993-06-22 | P | |
| <i>Carex pseudocyperus</i> | Northern Bearded Sedge | 2013-08-19 | E | |
| <i>Carex viridula</i> | Little Green Sedge | 1990-05 | T | |
| <i>Collema crispum</i> | Crinkled Jelly Lichen | 1962-07-09 | X | |
| <i>Cypripedium candidum</i> | White Lady's-slipper | 1994-05-25 | E | |
| <i>Eleocharis engelmannii</i> | Engelmann's Spike-rush | 1969-09-09 | E | |
| <i>Eleocharis quinqueflora</i> | Few-flowered Spike-rush | 2013-08-19 | T | |
| <i>Phragmites australis ssp. american</i> | American Reed Grass | 2006-10-18 | P | |
| <i>Potamogeton gramineus</i> | Grass-like Pondweed | 1986-06-05 | E | |
| <i>Rhynchospora alba</i> | White Beak-rush | 2013-08-19 | P | |
| <i>Spiranthes lucida</i> | Shining Ladies'-tresses | 1980-06-06 | P | |



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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 |
|------------------------|-------------------|-------------------|-------------------------------|-----------------------------|-------------------|----------------|
| Mammals | 3 | 2 | 20 | 1 | 10 | 0 |
| Birds | 12 | 6 | 20 | 39 | 6 | 2 |
| Reptiles | 5 | 4 | 11 | 0 | 0 | 0 |
| Amphibians | 5 | 1 | 2 | 0 | 0 | 0 |
| Fishes | 22 | 11 | 8 | 0 | 9 | 2 |
| Mollusks | 24 | 4 | 8 | 0 | 11 | 6 |
| Crayfishes | 0 | 2 | 3 | 0 | 0 | 0 |
| Isopods | 2 | 1 | 0 | 0 | 0 | 0 |
| Pseudoscorpions | 1 | 0 | 0 | 0 | 0 | 0 |
| Dragonflies | 13 | 3 | 1 | 0 | 0 | 0 |
| Damselflies | 3 | 3 | 0 | 0 | 0 | 0 |
| Caddisflies | 3 | 6 | 3 | 0 | 0 | 0 |
| Mayflies | 2 | 0 | 1 | 0 | 0 | 0 |
| Midges | 1 | 3 | 1 | 0 | 0 | 0 |
| Crickets | 0 | 0 | 1 | 0 | 0 | 0 |
| Butterflies | 8 | 1 | 2 | 1 | 1 | 0 |
| Moths | 14 | 4 | 22 | 11 | 0 | 0 |
| Beetles | 3 | 2 | 7 | 0 | 0 | 1 |
| Bees | 1 | 0 | 0 | 0 | 0 | 0 |
| Total | 122 | 53 | 110 | 52 | 37 | 11 |

See page
4

See page
6

See page
7

See page
9

See page
10

See page
10

OHIO's ENDANGERED SPECIES

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

MAMMALS ENDANGERED

| | |
|-------------------|-------------------------|
| Indiana myotis *E | <i>Myotis sodalis</i> |
| Allegheny woodrat | <i>Neotoma magister</i> |
| Black bear | <i>Ursus americanus</i> |

BIRDS ENDANGERED

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

REPTILES ENDANGERED

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

AMPHIBIANS ENDANGERED

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

FISHES ENDANGERED

| | |
|------------------------|-------------------------------------|
| Ohio lamprey | <i>Ichthyomyzon bdellium</i> |
| Northern brook lamprey | <i>Ichthyomyzon fossor</i> |
| Mountain brook lamprey | <i>Ichthyomyzon greeleyi</i> |
| Lake sturgeon | <i>Acipenser fulvescens</i> |
| Shovelnose sturgeon | <i>Scaphirhynchus platyrhynchus</i> |

| | |
|--------------------------|----------------------------------|
| Spotted gar | <i>Lepisosteus oculatus</i> |
| Shortnose gar | <i>Lepisosteus platostomus</i> |
| Cisco (or Lake herring) | <i>Coregonus artedii</i> |
| Goldeye | <i>Hiodon alosoides</i> |
| Shoal chub | <i>Macrhybopsis hyostoma</i> |
| Pugnose minnow | <i>Opsopoeodus emiliae</i> |
| Popeye shiner | <i>Notropis ariommus</i> |
| Longnose sucker | <i>Catostomus catostomus</i> |
| Northern madtom | <i>Noturus stigmosus</i> |
| Scioto madtom *E | <i>Noturus trautmani</i> |
| Pirate perch | <i>Aphredoderus sayanus</i> |
| Western banded killifish | <i>Fundulus diaphanus menona</i> |
| Spotted darter | <i>Etheostoma maculatum</i> |
| Iowa darter | <i>Etheostoma exile</i> |
| Gilt darter | <i>Percina evides</i> |
| Bigeye shiner | <i>Notropis boops</i> |
| Tonguetied minnow | <i>Exoglossum laurae</i> |

MOLLUSKS ENDANGERED

| | |
|-------------------------|--|
| Snuffbox *E | <i>Epioblasma triquetra</i> |
| Ebonysnail | <i>Fusconaia ebanas</i> |
| Fanshell *E | <i>Cyprogenia stegaria</i> |
| Butterfly | <i>Ellipsaria lineolata</i> |
| Elephantear | <i>Elliptio crassidens crassidens</i> |
| Purple catspaw *E | <i>Epioblasma obliquata obliquata</i> |
| White catspaw *E | <i>Epioblasma obliquata perobliqua</i> |
| Northern riffleshell *E | <i>Epioblasma torulosa rangiana</i> |
| Longsolid | <i>Fusconaia subrotunda</i> |
| Pink mucket *E | <i>Lampsilis orbiculata</i> |
| Pocketbook | <i>Lampsilis ovata</i> |
| Yellow sandshell | <i>Lampsilis teres</i> |
| Eastern pondmussel | <i>Ligumia nasuta</i> |
| Washboard | <i>Megalanaia nervosa</i> |
| Sheepnose *E | <i>Pleurobasus cyphus</i> |
| Clubshell *E | <i>Pleurobema clava</i> |
| Ohio pigtoe | <i>Pleurobema cordatum</i> |
| Pyramid pigtoe | <i>Pleurobema rubrum</i> |
| Rabbitsfoot *T | <i>Quadrula cylindrica cylindrica</i> |
| Monkeyface | <i>Quadrula metanevra</i> |

MOLLUSKS (CONT.) ENDANGERED

| | |
|----------------------|--------------------------|
| Wartyback | <i>Quadrula nodulata</i> |
| Purple lilliput | <i>Toxolasma lividum</i> |
| Rayed bean *E | <i>Villosa fabalis</i> |
| Little spectaclecase | <i>Villosa lienosa</i> |

DRAGONFLIES ENDANGERED

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

DAMSELFLIES ENDANGERED

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

CADDISFLIES ENDANGERED

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

MAYFLIES ENDANGERED

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

MIDGES ENDANGERED

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

BUTTERFLIES ENDANGERED

| | |
|--------------------|------------------------|
| Persius dusky wing | <i>Erynnis persius</i> |
|--------------------|------------------------|

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

MOTHS ENDANGERED

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

BEETLES ENDANGERED

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

BEES ENDANGERED

| |
|----------------------------|
| Rusty patched bumblebee *E |
|----------------------------|

ISOPODS ENDANGERED

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

PSEUDOSCORPIONS ENDANGERED

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

OHIO's THREATENED SPECIES

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

MAMMALS THREATENED

| | |
|----------------------------|--------------------------------|
| Eastern harvest mouse | <i>Reithrodontomys humulis</i> |
| Northern long-eared bat *T | <i>Myotis septentrionalis</i> |

BIRDS THREATENED

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

REPTILES THREATENED

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

AMPHIBIANS THREATENED

| | |
|----------------|------------------------------|
| Mud salamander | <i>Pseudotriton montanus</i> |
|----------------|------------------------------|

FISHES THREATENED

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

MOLLUSKS THREATENED

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

CRAYFISHES THREATENED

| | |
|---------------------|----------------------------|
| Sloan's crayfish | <i>Orconectes sloanii</i> |
| Cavespring crayfish | <i>Cambarus tenebrosus</i> |

DRAGONFLIES THREATENED

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

DAMSELFLIES THREATENED

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

CADDISFLIES THREATENED

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

MIDGES THREATENED

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

BUTTERFLIES THREATENED

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

MOTHS THREATENED

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

BEETLES THREATENED

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

ISOPODS THREATENED

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

OHIO's SPECIES of CONCERN

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

MAMMALS SPECIES OF CONCERN

| | |
|----------------------------|----------------------------------|
| Pygmy shrew | <i>Sorex hoyi</i> |
| Star-nosed mole | <i>Condylura cristata</i> |
| Eastern small-footed bat | <i>Myotis leibii</i> |
| Rafinesque's big-eared bat | <i>Corynorhinus rafinesquii</i> |
| Little brown bat | <i>Myotis lucifugus</i> |
| Big brown bat | <i>Eptesicus fuscus</i> |
| Tri-colored bat | <i>Perimyotis subflavus</i> |
| Woodland jumping mouse | <i>Napaeozapus insignis</i> |
| Badger | <i>Taxidea taxus</i> |
| Ermine | <i>Mustela erminea</i> |
| Smoky shrew | <i>Sorex fumerus</i> |
| Deer mouse | <i>Peromyscus maniculatus</i> |
| Prairie vole | <i>Microtus ochrogaster</i> |
| Woodland vole | <i>Microtus pinetorum</i> |
| Southern bog lemming | <i>Synaptomys cooperi</i> |
| Silver-haired bat | <i>Lasionycteris noctivagans</i> |
| Red bat | <i>Lasiurus borealis</i> |
| Hoary bat | <i>Lasiurus cinereus</i> |
| Snowshoe hare | <i>Lepus americanus</i> |
| Gray Fox | <i>Urocyon cinereoargenteus</i> |

BIRDS SPECIES OF CONCERN

| | |
|------------------------|----------------------------------|
| Sharp-shinned hawk | <i>Accipiter striatus</i> |
| Sedge wren | <i>Cistothorus platensis</i> |
| Marsh wren | <i>Cistothorus palustris</i> |
| Henslow's sparrow | <i>Ammodramus henslowii</i> |
| Cerulean warbler | <i>Setophaga cerulea</i> |
| Prothonotary warbler | <i>Protonotaria citrea</i> |
| Bobolink | <i>Dolichonyx oryzivorus</i> |
| Northern bobwhite | <i>Colinus virginianus</i> |
| Common moorhen | <i>Gallinula chloropus</i> |
| Great egret | <i>Ardea alba</i> |
| Sora rail | <i>Porzana carolina</i> |
| Virginia rail | <i>Rallus limicola</i> |
| Ruffed grouse | <i>Bonasa umbellus</i> |
| American coot | <i>Fulica americana</i> |
| Black-billed cuckoo | <i>Coccyzus erythrophthalmus</i> |
| Common nighthawk | <i>Chordeiles minor</i> |
| Eastern whip-poor-will | <i>Caprimugus vaciferus</i> |

| | |
|-----------------------|-----------------------------------|
| Red-headed woodpecker | <i>Melanerpes erythrocephalus</i> |
| Vesper sparrow | <i>Pooecetes gramineus</i> |
| Grasshopper sparrow | <i>Ammodramus savannarum</i> |

MOLLUSKS SPECIES OF CONCERN

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

REPTILES SPECIES OF CONCERN

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

AMPHIBIANS SPECIES OF CONCERN

| | |
|----------------------|----------------------------------|
| Four-toed salamander | <i>Hemidactylium scutatum</i> |
| Eastern cricket frog | <i>Acris crepitans crepitans</i> |

FISHES SPECIES OF CONCERN

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

CRAYFISHES SPECIES OF CONCERN

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

DRAGONFLIES SPECIES OF CONCERN

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

MAYFLIES SPECIES OF CONCERN

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

MIDGES SPECIES OF CONCERN

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

CADDISFLIES SPECIES OF CONCERN

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

BUTTERFLIES SPECIES OF CONCERN

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

MOTHS SPECIES OF CONCERN

| | |
|----------------------|--------------------------------|
| Milnei's looper moth | <i>Euchlaena milnei</i> |
| Buck moth | <i>Hemileuca maia</i> |
| One-eyed sphinx | <i>Smerinthus cerisyi</i> |
| Precious underwing | <i>Catocala pretiosa</i> |
| – | <i>Macrochilo bivittata</i> |
| – | <i>Phalaenostola hanhami</i> |
| – | <i>Paectes abrostolella</i> |
| – | <i>Capis curvata</i> |
| – | <i>Tarachidia binocula</i> |
| – | <i>Apamea mixta</i> |
| – | <i>Agroperina lutosa</i> |
| Columbine borer | <i>Papaipema leucostigma</i> |
| Bracken borer moth | <i>Papaipema pterisii</i> |
| Osmunda borer moth | <i>Papaipema speciosissima</i> |
| – | <i>Chytonix sensilis</i> |
| – | <i>Amolita roseola</i> |
| Goat sawfly | <i>Homoglaea hircina</i> |
| – | <i>Brachylomia algens</i> |

| | |
|---------------|------------------------------|
| Purple arches | <i>Polia purpurissata</i> |
| Scurfy quaker | <i>Homorthodes furfurata</i> |
| – | <i>Trichosilia manifesta</i> |
| – | <i>Agonopterix pteleae</i> |

BEETLES SPECIES OF CONCERN

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

CRICKETS SPECIES OF CONCERN

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

OHIO's SPECIAL INTEREST

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

MAMMALS SPECIAL INTEREST

| | |
|-------------|-----------------------------|
| Evening bat | <i>Nycticeius humeralis</i> |
|-------------|-----------------------------|

BIRDS SPECIAL INTEREST

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

| | |
|--------------------------|------------------------------|
| Yellow-bellied sapsucker | <i>Sphyrapicus varius</i> |
| Golden-winged warbler | <i>Vermivora chrysoptera</i> |
| Blue-headed vireo | <i>Vireo solitarius</i> |

BUTTERFLIES SPECIAL INTEREST

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

MOTHS SPECIAL INTEREST

| | |
|---------------------------|---------------------------------|
| Slender clearwing | <i>Hemaris gracilis</i> |
| — | <i>Sphinx lucitiosa</i> |
| — | <i>Tathorhynchus exsiccatus</i> |
| — | <i>Catocala marmorata</i> |
| — | <i>Catocala maestosa</i> |
| Subflava sedge borer moth | <i>Archana subflava</i> |
| — | <i>Caradrina meralis</i> |
| — | <i>Calophasia lunula</i> |
| — | <i>Leucania insueta</i> |
| — | <i>Protorthodes incincta</i> |
| Variegated orange moth | <i>Epelis truncataria</i> |

OHIO's EXTIRPATED SPECIES

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

MAMMALS EXTIRPATED

| | |
|--------------------------|------------------------------|
| Rice rat | <i>Oryzomys palustris</i> |
| Porcupine | <i>Erethizon dorsatum</i> |
| Timber wolf | <i>Canis lupus</i> |
| Marten | <i>Martes americanus</i> |
| Fisher | <i>Martes pennanti</i> |
| Mountain lion | <i>Puma concolor</i> |
| Lynx | <i>Lynx canadensis</i> |
| Wapiti (Elk) | <i>Cervus elaphus</i> |
| Bison | <i>Bison bison</i> |
| Southern red-backed vole | <i>Clethrionomys gapperi</i> |

BIRDS EXTIRPATED

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

FISHES EXTIRPATED

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

MOLLUSKS EXTIRPATED

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

BUTTERFLIES EXTIRPATED

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

OHIO's EXTINCT SPECIES

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

BIRDS EXTINCT

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

BEETLES EXTINCT

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

Republic Wind Project

APPENDIX

D

AGENCY CORRESPONDENCE



Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR

DAVID M. STINE, DIRECTOR

Ohio Division of Wildlife

Vicki J. Mountz, Acting Chief
2045 Morse Rd., Bldg. G
Columbus, OH 43229-6693
Phone: (614) 265-6300

January 25, 2011

To all interested parties,

Based upon the project boundary map received on 24 January 2011, the Ohio Department of Natural Resources Division of Wildlife (DOW) has prepared these survey recommendations for Nordex's proposed project located in Seneca County.

Currently the project falls within regions that DOW has identified as needing moderate (where applicable) monitoring efforts. If the developer decides to amend the boundaries, the DOW will revise our survey recommendations.

The table below was created based upon a review of the project maps provided and summarizes the types and level of effort recommended by the DOW. Results from these studies will help the Department of Natural Resources assess the potential impact these turbines may pose, and influence our recommendations to the Ohio Power Siting Board. Monitoring should follow those criteria listed within the "On-shore Bird and Bat Pre-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio."

For additional ODNR comments, including information on the potential presence of threatened and endangered species within or adjacent to your project area, please contact Brian Mitch at (614) 265-6378 or brian.mitch@dnr.state.oh.us

Project

| Survey type | |
|------------------------|---|
| Breeding bird | Breeding bird surveys should be conducted at all sites. The number of survey points may be based on the amount of available habitat, or twice the maximum number of turbines proposed for the site. Because agricultural land is not considered to be suitable nesting habitat for most species of bird, turbines placed within these types of habitat are exempt of this recommendation. |
| Raptor nest searches | Nest searches should occur on, and within a 1-mile buffer of the proposed facility. |
| Raptor nest monitoring | There is 1 eagle nest located on or within the 2 miles of the proposed project. This pair should be monitored to assess their daily movement patterns. Should any additional nests of a protected species of raptor be located during nest searches, monitoring should commence as outlined within the on-shore protocols. |



Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR

DAVID MUSTINE, DIRECTOR

| | |
|--|---|
| Bat acoustic monitoring | To be conducted at all meteorological towers. |
| Passerine migration (# of survey points) | 11 |
| Diurnal bird/raptor migration (# of survey point) | 1 |
| Sandhill crane migration (same points as raptor migration) | NS |
| Owl playback survey points | NS |
| Barn owl surveys | NS |
| Bat mist-netting (# of survey points) | 15 |
| Nocturnal marsh bird survey points | NS |
| Waterfowl survey points | NS |
| Shorebird migration points | NS |
| Radar monitoring locations | NS |

NS = Not required based on the lack of suitable habitat.

If you have any questions, please feel free to contact me.

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Ms. Megan Seymour, United States Fish and Wildlife Service
Mr. Brian Mitch, Ohio Department of Natural Resources

Republic Wind Project

APPENDIX

E

PRE-CONSTRUCTION WILDLIFE
SURVEYS



May 2011

**RAPTOR NEST SURVEY
REPUBLIC WIND FARM
SENECA COUNTY, OHIO**

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TABLE OF CONTENTS

| | |
|--|---|
| EXECUTIVE SUMMARY | 1 |
| 1.0 INTRODUCTION | 2 |
| 2.0 METHODS | 2 |
| 3.0 RESULTS | 4 |
| 4.0 DISCUSSION..... | 4 |
| 5.0 CONCLUSIONS AND RECOMMENDATIONS..... | 7 |
| 6.0 LITERATURE CITED | 8 |

TABLE

Table 1. Raptor nest and great blue heron breeding colony locations, tree species, nest height, and tree diameter at breast height (DBH) at the Republic Wind, LLC, Republic Wind Farm Project Area and 2-mile buffer surrounding the Project Area boundaries, Seneca County, Ohio.

FIGURE

Figure 1. Locations of raptor nests and great blue heron breeding colony at the Republic Wind, LLC, Republic Wind Farm Project Area and 2-mile buffer surrounding the Project Area boundaries, Seneca County, Ohio.

APPENDIX

Appendix A. Photographs of representative raptor nests and great blue heron breeding colony at the Republic Wind, LLC, Republic Wind Farm Project Area and 2-mile buffer surrounding the Project Area boundaries, Seneca County, Ohio.

EXECUTIVE SUMMARY

BHE Environmental, Inc. (BHE) was contracted to complete a three-day raptor nest survey following methods described in the *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* ("Ohio Protocol") issued by the Ohio Department of Natural Resources (ODNR), Division of Wildlife in May, 2009. This report provides data and analysis of results of the Raptor Nest Survey conducted March 17-25, 2011 by BHE at the Republic Wind, LLC, (Republic) Republic Wind Farm ("Project Area") in Seneca County, Ohio and the 2-mile surrounding area.

A total of eleven raptor nests and one great blue heron (*Ardea herodias*) breeding colony were identified within the survey area. Two nests had red-tailed hawks (*Buteo jamaicensis*) perched nearby and may have been in the early stages of nesting (i.e., nest construction, egg laying); the same may have been true for a third nest seen with a red-tailed hawk circling above. The remaining eight nests (species unknown) appeared to be inactive.

BHE found no nests of listed or sensitive species within the Project Area or the 2-mile buffer surrounding the Project Area boundaries; therefore, according to the Ohio Protocol, no additional raptor nest monitoring should be required. Monitoring will take place of Bald Eagles at two nest locations just beyond two miles from the site boundary, which will be the subject of a further report. There are no requirements in the Ohio Protocol that specifically address heron breeding colonies. The Diurnal Bird/Raptor Migration Survey currently being conducted by BHE may also provide information regarding great blue heron use of the Project Area, if any. If they are found to be using the Project Area (e.g., as a travel corridor) we recommend further coordination with the ODNR to determine the appropriate next steps. We also recommend that Republic notify ODNR of the presence of the colony, and based upon initial study results, perhaps consider establishing a protective buffer around the colony, at a distance that is consistent with what has been approved at other wind farms in Ohio.

1.0 INTRODUCTION

Republic Wind, LLC (Republic) proposes to install wind turbines on the approximately 12,141 hectare (ha; 30,000 acres [ac]) Republic Wind Farm ("Project Area") in Seneca County, Ohio (Figure 1). The actual area occupied by the turbines and access roads that will comprise the facility will be a very small percentage of the Project Area.

Interactions between wind turbines and raptors have been cause for concern since an unexpectedly large number of raptors were documented as fatalities at one of the first wind turbine facilities in Altamont, California (Hoover and Morrison 2005; Orloff and Flannery 1992; Smallwood and Thelander 2005). Although subsequent Raptor collision rates at modern wind farms have declined significantly, raptors may be affected by wind power development in several ways, including: a) collisions with operating turbine rotors; b) habitat disturbance resulting from construction or new infrastructure on site; and, c) disturbance from increased human activity in the vicinity of the turbines. Collision mortalities associated with wind turbines could have potentially substantial effects on raptor populations because raptors are not numerous and typically reproduce and mature slowly; thus, in contrast to passerine species, raptors cannot absorb mortalities and recover from losses on an annual basis easily (Kuvlesky et al. 2007).

BHE was contracted by Republic to conduct a three-day raptor nest survey of the proposed Project Area according to specifications outlined in the Ohio Department of Natural Resources (ODNR) *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio, An Addendum to the Ohio Department of Natural Resource's Voluntary Cooperative Agreement* (Ohio Protocol). The purpose of this report is to document locations of nesting raptors found during the survey in relation to the Project Area.

2.0 METHODS

In accordance with specifications of the Ohio Protocol, a survey for raptor nests was conducted March 17 - 25, 2011. Observed species and locations of nests were marked on U.S. Geological Survey (USGS) 1:24,000 topographic quadrangles. The survey focused on the location of stick nests. The Ohio Protocol specifies raptor nest surveys should occur between February 1 and March 31 because the majority of deciduous trees are without leaves and nests can be most easily seen at this time. The survey included the proposed Project Area and a 2-mile buffer surrounding the Project Area boundaries. In addition to marking the locations of nest sites on USGS 1:24,000 topographic quadrangles, the BHE biologist recorded the nest location on a global positioning system (GPS) device (if access to the nest location was available) for mapping and potential future nest visits. If access to the nest was not available, the BHE biologist used a GPS to record the location from the nearest publically accessible area and then estimated the distance and bearing to the nest for mapping. The nests were photographed (Appendix A). At the time of the survey, access had been secured for three woodlots in the southern portion of the Project Area, which were searched on foot. The remainder of the survey was conducted by automobile from public roads.

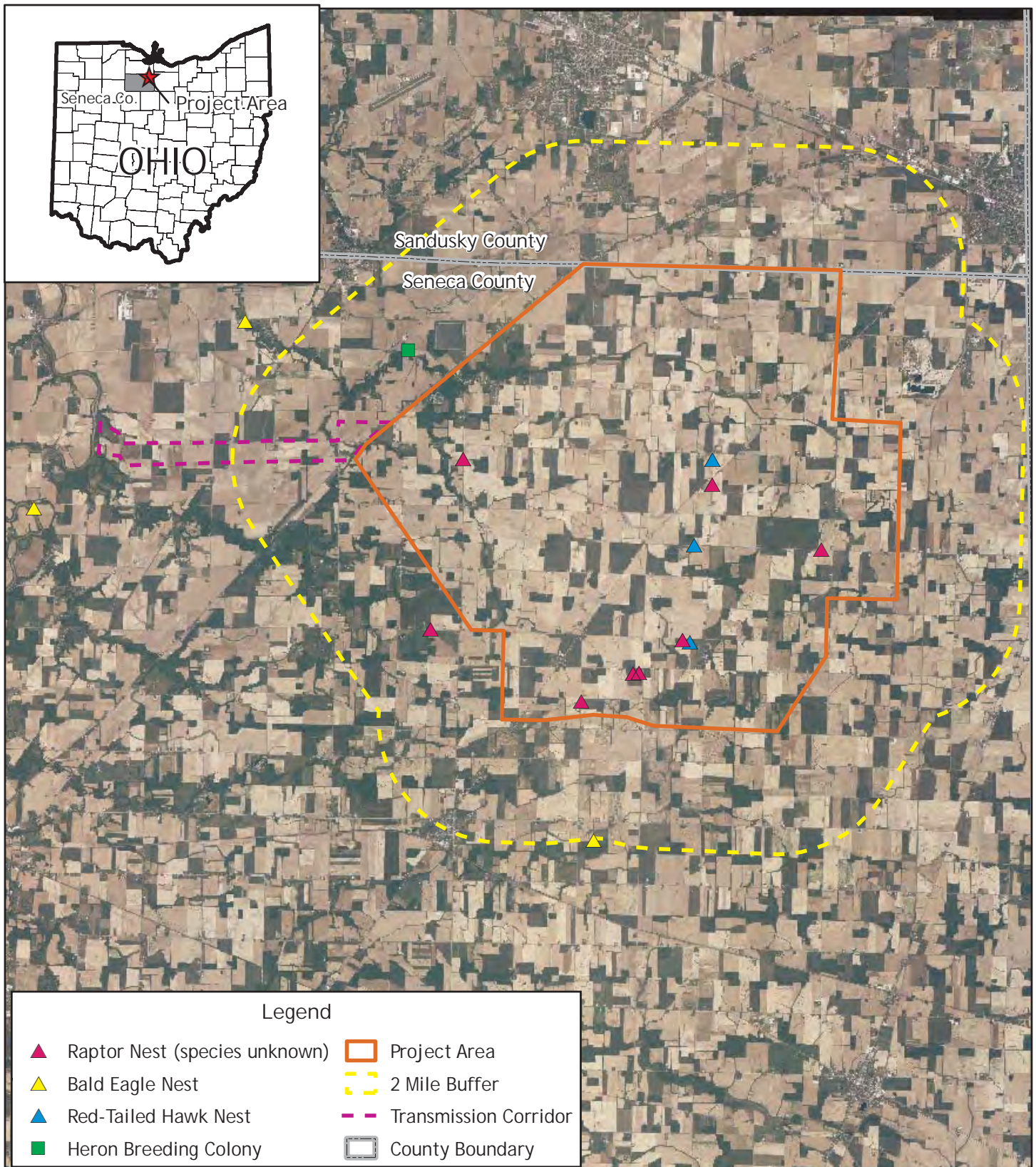


Figure 1. Raptor Nest Locations and Heron Breeding Colony within the Republic Wind, LLC, Republic Wind Farm Project Area and Surrounding 2-Mile Buffer, Seneca County, Ohio.

3.0 RESULTS

Eleven raptor nests and one great blue heron breeding colony were identified during the Survey (Figure 1, Table 1). Two nests had red-tailed hawks (*Buteo jamaicensis*) perched nearby and may have been in the early stages of nesting (i.e., nest construction, egg laying); the same may have been true for a third nest seen with a red-tailed hawk circling above. The remaining eight nests appeared to be inactive and the species associated with these nests are unknown.

A great blue heron breeding colony was located outside the Project Area but within the 2-mile buffer (approximately 0.75 mile west of the northwestern portion of the Project Area), and included 12 to 15 nests; each with an adult great blue heron perched nearby.

4.0 DISCUSSION

The red-tailed hawk is one of the most widespread and commonly observed birds of prey in North America (Preston and Beane 2009). The species occupies a large range in North and Central America and exhibits increasing or stable populations in most areas of the U.S. and Canada (NatureServe 2010, Suaer et al. 2011). In an early assessment of the impact that wind turbines were having on local raptor populations at the Altamont Pass Wind Resource Area (APWRA) in Alameda, California, red-tailed hawks were found to be the raptor species most commonly killed by collisions with wind turbines (Orloff and Flannery 1992). While they were the most commonly observed raptor species at the APWRA, immature red-tailed hawks were killed by colliding with turbines more frequently than would have been predicted by their relative abundance in the population (Orloff and Flannery 1992), suggesting a disproportionately high risk of impact to young of this species.

Mortality studies at operational wind farms outside of California, however, have shown relatively low raptor fatality rates (NRC 2007, NWCC 2010). Of the studies reviewed by the NRC (2007), 14 were conducted using a survey protocol for all seasons of occupancy for a one-year period and incorporated scavenging and searcher-efficiency biases into estimates. The combined average raptor mortality for the 14 studies was 0.03 birds/turbine/year and 0.04 birds/megawatt/year. In a review of bird collisions documented in 31 studies at wind-energy facilities outside California, Erickson et al. (2001) reported that diurnal raptors comprised 2.7 percent of avian fatalities, while 78 percent of birds killed were protected songbirds. In a 3-year study conducted at a 354-turbine facility in Buffalo Ridge, Minnesota, Johnson et al. (2002) found that of 55 documented fatalities only one was a raptor (red-tailed hawk; 1.8 percent of fatalities; .0009/turbine/year). When examined by region (East, Midwest, Pacific Northwest, and Rocky Mountain), raptor fatalities resulting from collision with wind turbines were found to be lowest in the Midwest (NRC 2007).

This reduction in raptor mortality rates may be due to advances in wind turbine technology which have made turbines less likely to impact birds. Specifically, modern wind turbines of the type proposed for the Project Area are on monopole tower structures which, unlike the lattice towers formerly used in California, and do not provide roosting opportunities for avifauna. Further, modern wind turbine blades have a much slower rotational speed which may aid birds in avoiding a collision.

Great blue herons (*Ardea herodias*) will sometimes breed in lone pairs but more often they may be found breeding in colonies ranging in size from several to hundreds of pairs (Butler 1992). The great blue heron is one of the most widespread and adaptable wading birds in North America (NatureServe 2010). Populations generally are stable or increasing in most areas (NatureServe 2010, Suaer et al. 2011). Great blue herons will often fly more than 20

miles from their nest to reach favored feeding areas, typically located in slow moving or calm freshwater. The Sandusky River is located approximately 5.5 miles to the west of the Project Area and many small tributaries are located in the immediate vicinity of the colony, north and west of the Project Area. In addition, the southwestern shores of Lake Erie are located approximately 13.7 miles north-northeast of the Project Area. Great blue herons from the breeding colony would not have to cross the Project Area to access these potential feeding areas.

Table 1. Raptor nest and great blue heron breeding colony locations, tree species, nest height, and tree diameter at breast height (DBH) at the Republic Wind Farm Project Area and 2-mile buffer surrounding the Project Area boundaries, Seneca County, Ohio.

| Date | Nest Identification | Latitude | Longitude | Species | Height | Width | Additional Notes |
|-----------|-------------------------|----------|-----------|-------------------|-------------|----------|--|
| 3/17/2011 | RAP-1-Ped ^a | 41.15299 | -82.97667 | Quercus rubra | 30 - 40 ft | 24 - 36" | Red-tailed hawk attending nest |
| 3/23/2011 | RAP-2-Ped | 41.16756 | -82.94311 | Q. rubra | 60 - 80 ft | 20 - 24" | Red-tailed hawk seen nearby |
| 3/23/2011 | RAP-3 -Ped | 41.16808 | -82.94546 | Carya Cordiformes | 60 - 80 ft | 20 - 30" | |
| 3/23/2011 | RAP-4 -Ped | 41.16007 | -82.96008 | C. ovata | 80 - 100 ft | 20 - 24" | Approximately 200 ft east of RAP #5 |
| 3/23/2011 | RAP-5 -Ped | 41.15997 | -82.96055 | C. ovata | 80 - 100 ft | 20 - 30" | Approximately 200 ft west of RAP #4 |
| 3/25/2011 | RAP-6-Auto ^b | 41.19009 | -82.90284 | Unknown | 80 - 100 ft | Unknown | |
| 3/25/2011 | RAP-7-Auto | 41.21069 | -82.93734 | Unknown | 70 - 90 ft | Unknown | Red-tailed hawk attending nest |
| 3/25/2011 | RAP-8 -Auto | 41.20956 | -83.01514 | Unknown | Unknown | Unknown | |
| 3/25/2011 | RAP-9 -Auto | 41.1693 | -83.02404 | Unknown | Unknown | Unknown | |
| 3/25/2011 | RAP-10 -Auto | 41.1904 | -82.9425 | Unknown | Unknown | Unknown | |
| 3/25/2011 | RAP-11 -Auto | 41.2048 | -82.93726 | Unknown | Unknown | Unknown | |
| 3/25/2011 | NDX-GBH -Auto | 41.23491 | -83.03299 | Unknown | Unknown | Unknown | Approximately 12 to 15 adults observed perched on and nearby nests |

^a Ped suffix indicates pedestrian survey.

^b Auto suffix indicates survey conducted from automobile via public roads.

5.0 CONCLUSIONS AND RECOMMENDATIONS

BHE found no nests of listed or sensitive species of raptors within the Project Area or a 2-mile buffer surrounding the Project Area boundaries; therefore, according to the Ohio Protocol, no additional raptor nest monitoring will be required.

There are no requirements stated in the Ohio Protocol regarding heron breeding colonies. ODNR's Division of Natural Areas and Preserves maintains the Ohio Biodiversity Database, a source of information regarding rare and endangered plants and animals, outstanding natural communities and special geological features in the state. Though the great blue heron is a common and widespread species, heron breeding colonies are less common and, thus, are included in the Ohio Biodiversity Database as a breeding concentration area. However, there are no monitoring requirements specifically stated in the Ohio Protocol regarding these breeding colonies. We recommend that Republic notify ODNR of the presence of the colony to identify any potential agency considerations for this resource. A possible approach to address the presence of the great blue heron breeding colony could include establishing a protective buffer around the colony, at a distance that is consistent with what has been approved at other wind farms in Ohio.

The Diurnal Bird/Raptor Migration Survey currently being conducted by BHE may also provide information regarding great blue heron use of the Project Area, if any. If they are found to be using the Project Area (e.g., as a travel corridor) we recommend further coordination with the ODNR to determine appropriate next steps.

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APPENDIX A

Photographs of raptor nests and great blue heron breeding colony at the Republic Wind Farm Project Area and 2-mile buffer surrounding the Project Area boundaries, Seneca County, Ohio



Red-tailed hawk nest (adults away from nest at the time photo was taken) approximately 30-40 feet above ground in a red oak (*Quercus rubra*). Nest found during pedestrian survey of woodlot in southern portion of the Project Area.



Red-tailed hawk nest (note adult in nest) found during survey conducted from an automobile on public roads. Nest was located 70-90 feet above ground in a woodlot approximately 200 feet from Township Road 79 (tree species unidentified).



Raptor nest (species unknown) found during survey conducted from an automobile on public roads. Nest was located 80-100 feet above ground in a woodlot approximately 400 feet from County Road 46 (tree species unidentified).



Great blue heron breeding colony located nearest to Township Road 180, approximately 0.75 mile northwest of the Project Area boundary but within the surveyed 2-mile buffer.



Closer view of great blue heron breeding colony in which adults may be seen attending nests.



Adult great blue herons in full breeding plumage attending nests in breeding colony.



August 2011

**BREEDING BIRD SURVEY
FOR THE
REPUBLIC WIND, LLC
SENECA AND SANDUSKY COUNTIES, OHIO**

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TABLE OF CONTENTS

| | |
|--|-----------|
| EXECUTIVE SUMMARY | 1 |
| 1.0 INTRODUCTION | 2 |
| 1.1 PROPOSED PROJECT | 2 |
| 1.2 TOPOGRAPHIC/PHYSIOGRAPHIC AND HABITAT DESCRIPTION | 2 |
| 2.0 METHODS | 4 |
| 3.0 RESULTS | 8 |
| 3.1 LITERATURE REVIEW | 8 |
| 3.1.1 USGS Breeding Bird Survey | 8 |
| 3.1.2 Breeding Bird Atlas | 8 |
| 3.1.3 Important Bird Areas, Federal and State Wildlife Refuges, and Private Protected Areas | 12 |
| 3.2 BREEDING BIRD SURVEY RESULTS | 13 |
| 3.2.1 Avian Species Composition | 13 |
| 3.2.2 Avian Individual Abundance | 13 |
| 3.2.3 Listed Bird Species..... | 15 |
| 3.2.4 Bald Eagles..... | 15 |
| 4.0 DISCUSSION..... | 16 |
| 5.0 CONCLUSIONS..... | 17 |
| 6.0 LITERATURE CITED | 18 |

TABLES

| | | |
|----------|--|----|
| Table 1. | National land use/land cover acreages in the Republic Wind, LLC Project Area, Seneca and Sandusky Counties Ohio. | 4 |
| Table 2. | Breeding bird data sources accessed to review the Republic Wind, LLC Project Area. | 7 |
| Table 3. | Bird species and individuals observed during the Breeding Bird Survey of the Republic Wind, LLC Project Area, May, June, and July 2011..... | 9 |
| Table 4. | Incidental observations of Ohio-listed bird species observed during summer breeding season at the Republic Wind, LLC Project Area, Seneca and Sandusky counties, Ohio, May, June, and July 2011..... | 11 |

FIGURES

| | | |
|-----------|---|----|
| Figure 1. | Breeding Bird Point Count Locations for the Republic Wind, LLC Project Area, Seneca and Sandusky Counties, Ohio. | 3 |
| Figure 2. | Land Uses Within the Republic Wind, LLC Project Area, Seneca and Sandusky Counties, Ohio. | 5 |
| Figure 3. | Breeding Bird Survey Routes and Breeding Bird Atlas Locations Near the Republic Wind, LLC Project Area, Seneca and Sandusky Counties, Ohio. | 6 |
| Figure 4. | Raptor Nest Locations and Heron Breeding Colony Found in 2011 Within the Republic Wind, LLC, Project Area, Seneca and Sandusky Counties, Ohio. | 14 |

APPENDICES

| | | |
|-------------|--|--|
| Appendix A. | Republic Wind, LLC Project Area Agency Coordination. | |
| Appendix B. | Republic Wind, LLC Project Area Site Photographs. | |
| Appendix C. | Birds Observed at Republic Wind, LLC Project Area, Seneca and Sandusky Counties, Ohio, During Breeding Bird Surveys in May, June, and July 2011. | |

EXECUTIVE SUMMARY

The Republic Wind, LLC Project Area spans approximately 39,627 acres (ac; 16,036 hectares [ha]) northeast of the town of Republic, Ohio. The Project Area includes land for turbine development and a transmission line. Breeding Bird Survey (BBS) observations on the Project Area yielded a total of 1,359 individual birds of 64 species. Most of the species were birds of open country, as 51.6% of the documented species were classified as open woodland (31.3%) and grassland birds (20.3%) using the Cornell Lab of Ornithology (2011) classification. Many of the open woodland bird species are ubiquitous and highly adaptable species such as the American robin, American crow, common grackle, northern cardinal, and mourning dove. Four out of five of the most numerous grassland species observed were also common birds adaptable to open settings, including intensively managed agricultural lands, i.e., horned lark, savannah sparrow, brown-headed cowbird, and killdeer.

Six species of the 64 documented species (9.3%) comprised just over 50% of all individual birds observed. Species with the greatest number of observed individuals were, in order of abundance, the common grackle, American crow, European starling, red-winged blackbird, house sparrow, and mourning dove.

A single bald eagle was incidentally observed within the Project Area during the BBS of the Project Area. No bald eagle nests are located in the Project Area. Three bald eagle nests are located within 2.25 miles of the Project Area, although only one nest was successful in producing eaglets in 2011. This nest was near the proposed powerline, but over 5 miles from the nearest proposed turbine location. In addition, the US Fish and Wildlife Service (USFWS) records indicate 20 bald eagle nests have been documented within 10 miles of the Project boundary. Additional studies on potential eagle use of the Project Area are ongoing.

Elevated topography, river corridors, forest cover, scrublands, water, wetlands, and large grasslands are the types of features associated with diverse breeding bird populations. These characteristics are generally lacking in the Project Area. The results of the Republic BBS are consistent with habitats that lack diversity or important resources attractive to breeding birds.

The BBS of the Project Area suggests that the potential for breeding bird displacement or collision caused by the proposed Republic turbines should be similar to other Midwestern wind farms where the landscape is dominated by row crop agriculture. The BBS data shows few Ohio sensitive bird species use the Project Area. No federally listed bird species were observed breeding in or near the proposed Project Area and none have been documented according to data query results from USFWS and the Ohio Department of Natural Resources.

1.0 INTRODUCTION

1.1 PROPOSED PROJECT

Republic Wind, LLC (Republic) proposes construction of the Republic Wind Farm (Project or Project Area) wind energy generation facility in Seneca and Sandusky counties, Ohio (Figure 1). The purpose of the Republic Breeding Bird Survey (BBS) was to document the bird species observed in the Project Area during the 2011 summer and late-summer breeding season to support assessment of avian impacts for an Ohio Power Siting Board Siting Certificate Application.

The Project spans approximately 39,627 acres (ac; 16,036 hectares [ha]) northeast of the town of Republic, Ohio. The Project Area represents the maximum area considered for placement of turbines and facility infrastructure. The layout and number of turbines has not yet been selected; however, the actual area disturbed by the turbines and access roads that will comprise the facility will be a very small percentage of the Project Area (less than 2 percent [%]).

The turbines will be lit with red strobe-like or incandescent flashing lights. Lighting will be limited to the minimum number required by the Federal Aviation Administration (FAA) for aircraft safety. Each turbine tower will be set upon a concrete pad. Crops and other vegetation will be cleared during construction in an area not expected to exceed 3 ac for each pad. Infrastructure (access roads, cabling, substations) will also require land disturbance. Tree removal will be minimized.

1.2 TOPOGRAPHIC/PHYSIOGRAPHIC AND HABITAT DESCRIPTION

Habitat in the Project Area can be broadly characterized through a review of the ecoregion type. An ecoregion is an area with similar or related physiography, where communities or associations of plants and animals, both common and rare, have adapted to that particular environment. Climate, soils, drainage, and anthropogenic factors may have an effect on biological communities and ecoregions.

The Project lies in Ecoregion Section 222I - Erie and Ontario Lake Plain. Ecoregion Section 222I comprises part of the Central Lowlands geomorphic province and is characterized by level to gently rolling till-plain and shallow entrenchment of drainages. Section 222I is a combination of Wisconsinan glacial till and lacustrine deposits. Dominant soils include Udalfs and Aqualfs (US Forest Service [USFS] 1994).

The potential natural vegetation of Section 222I includes northern hardwood forest, beech-maple forest, and elm-ash forest. Beech-maple mesic forest (north), maple-basswood forest, hemlock-northern forest, oak openings, and pitch pine-heath barrens make up the other regionally defining important vegetation. Approximately 50% of the land in Section 222I is agricultural with farm woodlot forest lands comprising 30% of the area (USFS 1994).

Precipitation averages 700 to 1,150 millimeters (mm; 27 to 45 inches) per year. Mean annual temperature is approximately 7 to 11°C (45 to 52°F). The growing season ranges from 140 to 160 days (USFS 1994).

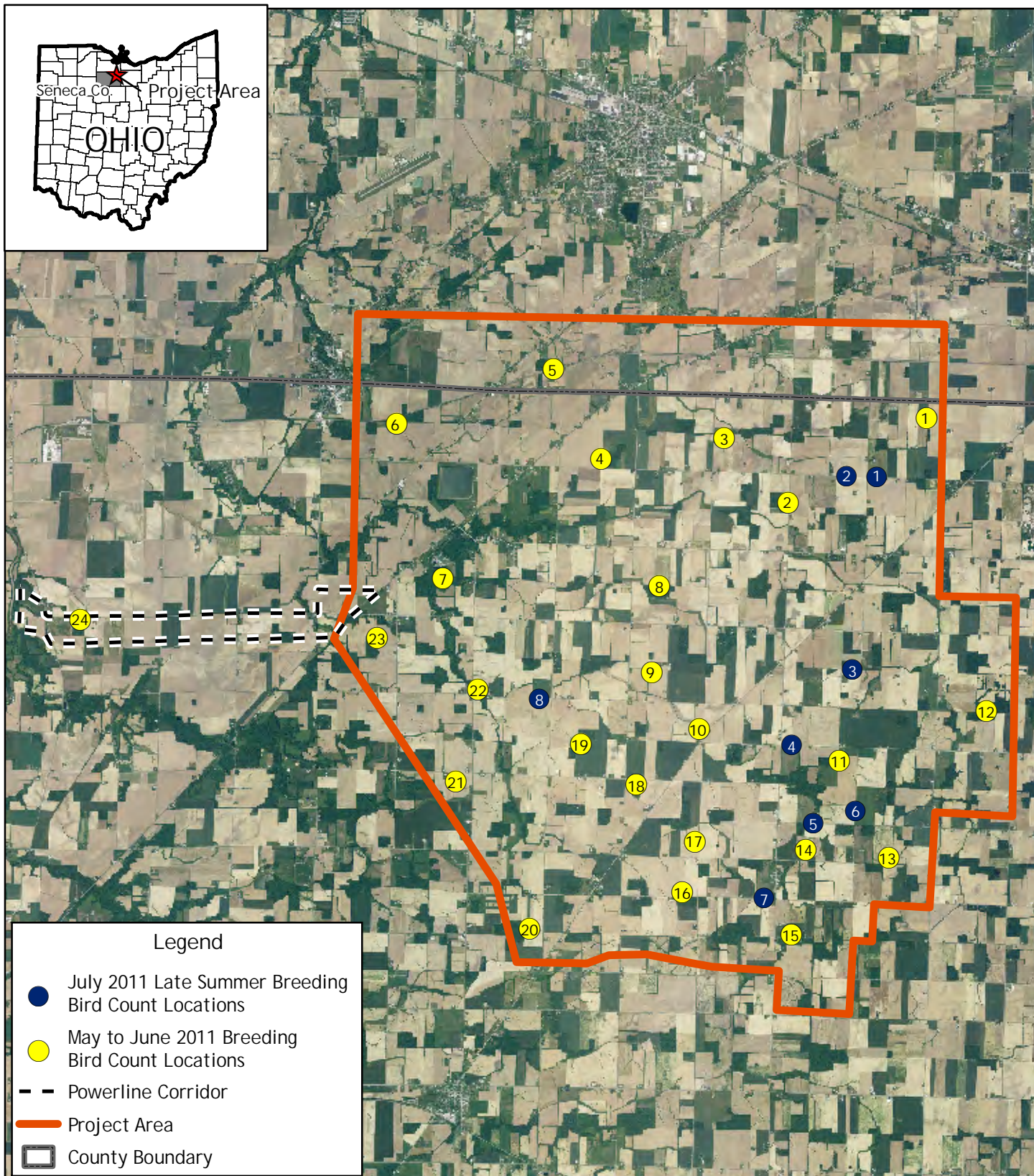
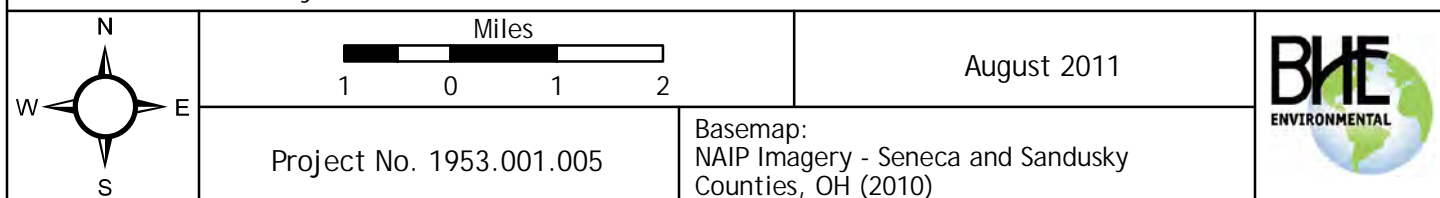


Figure 1. Breeding Bird Point Count Locations for the Republic Wind, LLC Project Area, Seneca and Sandusky Counties, Ohio.



The Project Area is heavily influenced by agricultural practices that have drained natural wetlands and cleared forests. Over 84.7% of the Republic Project Area is devoted to intensive row crop agriculture production with occasional woodlots that comprise 7.6% of the Project Area (Table 1; Figure 2).

Table 1. National land use/land cover acreages in the Republic Wind, LLC Project Area, Seneca and Sandusky Counties Ohio.

| Land Use | Acres | Percent |
|------------------------------|-----------------|---------------|
| Cultivated Crops | 33,571.5 | 84.7% |
| Deciduous Forest | 3,012.7 | 7.6% |
| Developed, Open Space | 2,101.0 | 5.3% |
| Hay/Pasture | 425.0 | 1.1% |
| Herbaceous | 209.96 | 0.5% |
| Developed, Low Intensity | 136.6 | 0.3% |
| Open Water | 116.1 | 0.3% |
| Woody Wetlands | 32.0 | 0.1% |
| Emergent Herbaceous Wetlands | 10.5 | <0.1% |
| Developed, Medium Intensity | 8.3 | <0.1% |
| Evergreen Forest | 3.2 | <0.1% |
| Total | 39,626.6 | 100.0% |

2.0 METHODS

Literature and database searches were completed, including a review of relevant printed, published, unpublished, and electronic material such as US Geological Survey (USGS) Breeding Bird Survey, Ohio Breeding Bird Atlas, Ohio Natural Heritage Inventory, Ohio Department of Natural Resources (ODNR) information, US Fish and Wildlife Service (USFWS) information, and other sources of information concerning breeding birds that may breed in the Project Area (Figure 3; Table 2).

Coordination was sought from the ODNR and USFWS. Field investigation methods were based upon agency input, study intensity maps included within the ODNR "On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio," and queries of agency databases (Appendix A).

A total of 24 BBS points were established within the Project Area for the summer BBS and another 8 points were established for the late-summer BBS in accordance with the recommendations of the ODNR (Figure 1). Photographs (Appendix B) and global positioning system (GPS) coordinates were collected at each survey point. The BBS of the Project Area was conducted in May, June, and July 2011 using the ODNR Protocol. Just prior to the July survey, the grasslands had been mowed.

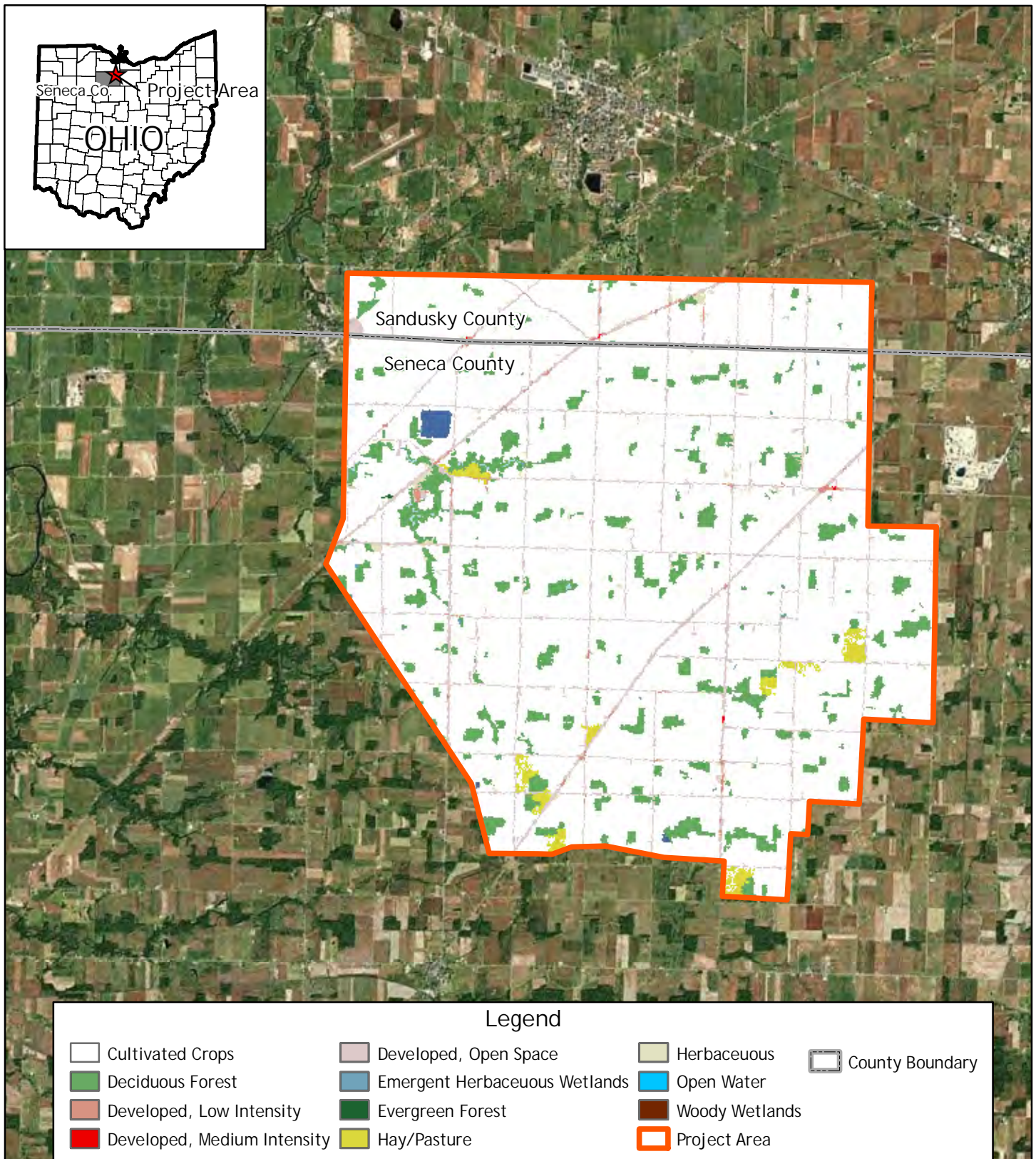


Figure 2. Land Uses Within the Republic Wind, LLC Project Area, Seneca and Sandusky Counties, Ohio.

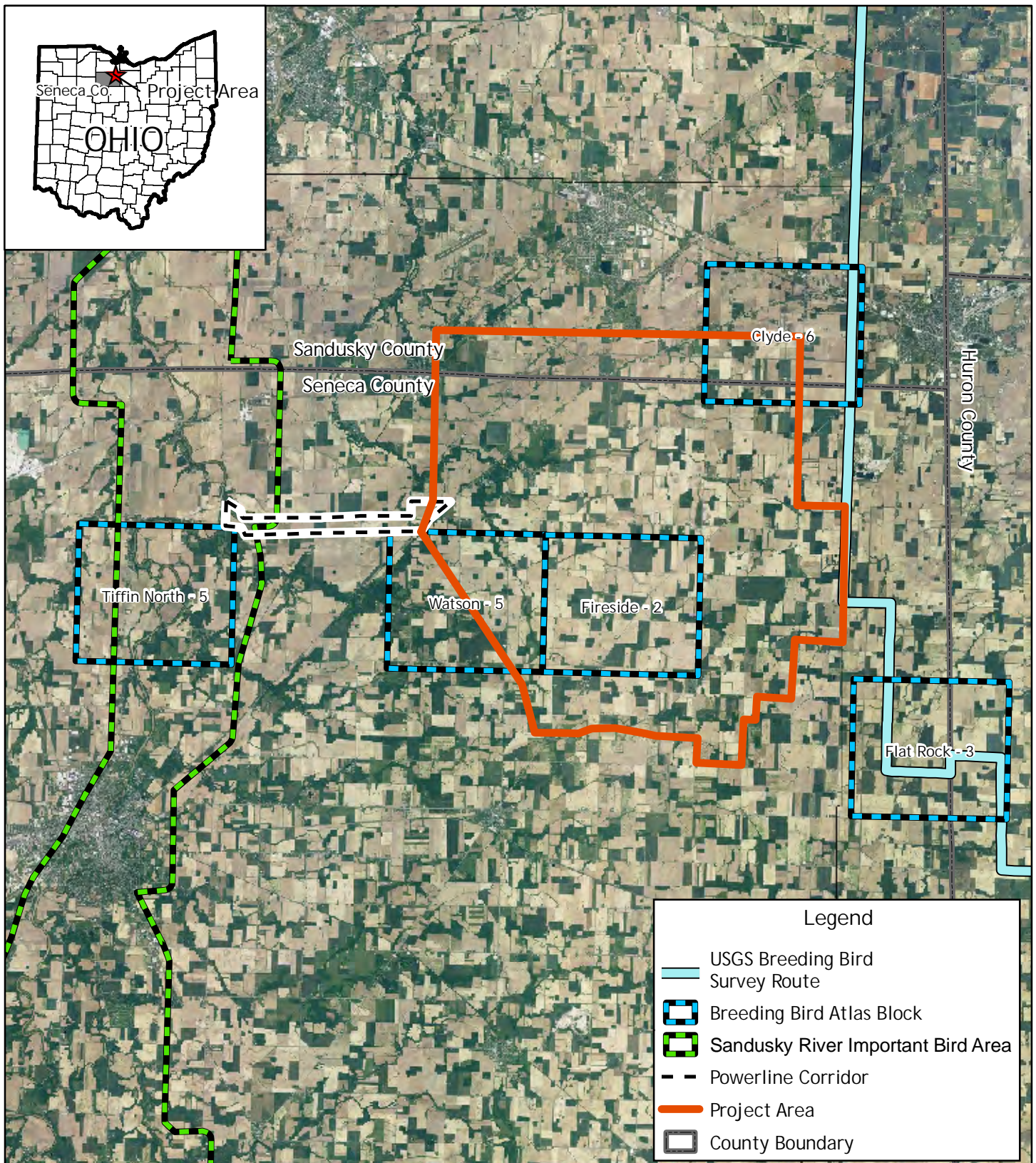


Figure 3. Breeding Bird Survey Routes and Breeding Bird Atlas Locations Near the Republic Wind, LLC Project Area, Seneca and Sandusky Counties, Ohio.

Table 2. Breeding bird data sources accessed to review the Republic Wind, LLC Project Area.

| Subject | Database link | Source | Area Evaluated |
|---|---|---------------------------------------|--------------------------------------|
| Breeding Bird Survey | http://www.mbr-pwrc.usgs.gov/cgi-bin/rtena07a.pl?66 | USGS | Nearest surveys to Project Area |
| Ohio Breeding Bird Atlas | http://bird.atlasing.org/Atlas/OH/Main | Ohio State University/ODNR | Nearest atlas blocks to Project Area |
| Ohio Natural Heritage Inventory | N/A: Letter query | ODNR-Div. Natural Areas and Preserves | Project Area plus 5 mi buffer |
| State and Federal Threatened and Endangered Species | N/A: Letter query | USFWS Columbus Field Office | Project Area plus 5 mi buffer |
| Wind and Wildlife Protocol | http://www.dnr.state.oh.us/LinkClick.aspx?fileticket=S24B8hy2lu4%3D&tabid=21467 | ODNR- Div. Wildlife | Project Area plus 5 mi buffer |
| Bald Eagle Nest Locations | USFWS letter Personal comm. with A. Tibbels | ODNR- Div. Wildlife | Project Area plus 5 mi buffer |

BBS point-count surveys were conducted in May and June at 24 points randomly stratified across the Project Area relative to the proportion of individual habitat types throughout the Project Area. Three 10-minute point-count surveys were conducted at each point: 31 May, 2 June, 13 June, 14 June, 27 June, and 28 June 2011.

Certain bird species do not frequently sing until later in the breeding season; given this reduced detectability, an additional point-count survey was conducted in July for sites with suitable habitat for the Henslow's sparrow (*Ammodramus henslowii*; Ohio species of concern), dickcissel, and sedge wren (*Cistothorus platensis*; Ohio species of concern). This additional single-day, late-summer BBS point-count was conducted on sites near grassland (for all three species) or wet areas for the sedge wren only on 7 July 2011.

All surveys began at approximately dawn and did not extend past 10:00 A.M. Eastern Daylight Time. Surveys were conducted by an experienced observer who was able to distinguish Ohio breeding bird species by sight and sound. All birds detected during surveys were identified to species, estimated distance from the point, and direction (bearing) were recorded. Birds flying overhead that did not land or originate within 200-meters of the point were listed as "fly over." Observations were recorded using appropriate alpha species codes. Incidental observations of any listed species were noted regardless of whether detected within the given survey time or while at a point-count location.

3.0 RESULTS

3.1 LITERATURE REVIEW

3.1.1 USGS Breeding Bird Survey

Each summer, a large-scale roadside survey of North American birds is conducted for the USGS. The survey encompasses most of the continental United States and southern Canada, and includes parts of Alaska and northern Mexico. The BBS are conducted by experienced birders each May or June when breeding birds are at the peak of song production. Each route is 39.4 kilometers (km; 24.5 miles [mi]) long and includes 50 stops located at 0.8 km (0.5 mi) intervals. Data from the BBS provide researchers with valuable information regarding both long- and short-term population trends of many bird species and can help characterize breeding at a particular site.

The closest route to the Project Area is the Vickory Route (66113), which runs approximately 51,122 meters long and runs north-south through Sandusky, Seneca, and Huron counties, Ohio (Figure 3). The Vickory BBS route merges with the eastern-most property boundary for the Project Area. Four Ohio state-listed species have been detected during the Vickory BBS: the state threatened black-crowned night heron (*Nycticorax nycticorax*); the state species of concern bobolink (*Dolichonyx oryzivorus*); the state species of concern great egret (*Ardea alba*); and the state endangered northern harrier (*Circus cyaneus*). No federally listed species have been detected along this route.

Of the listed species observed on the Vickory Route, only the bobolink was detected during this BBS of the Project Area (Table 3). However, a pair of northern harriers and a great egret were incidentally observed on the Project Area (Table 4).

3.1.2 Breeding Bird Atlas

Breeding Bird Atlas (BBA) projects are grid-based surveys used to document the status and distribution of all bird species that breed within a given country, state, or county. Most atlas projects base their survey grid on 7.5-minute USGS topographic maps. As is typical of most, the Ohio BBA survey "blocks" were defined by dividing topographic maps into six areas of equal size (approximately 16 km² [10 mi²] each). Volunteers place each species observed into one of three breeding categories: possible, probable, or confirmed. Atlas projects typically require 5 to 6 years, but can vary in length.

Five BBA blocks are near the Project Area: the Watson 5 (38C1CE) Block, the Flat Rock 3 (38C3SW) Block, the Fireside 2 (38C2CW) Block, the Clyde 6 (38B2SE) Block, and the Tiffin North 5 (37C7CE) Block.

The Watson 5 (38C1CE) Block is divided by the southwest boundary of the Project Area. Six Ohio state-listed species were documented in the Watson 5 Block. The state-listed loggerhead shrike (*Lanius ludovicianus*) and the state endangered least flycatcher (*Empidonax minimus*) were both given a breeding bird status of "probable" during the 1982 - 1987 effort. The state species of concern, cerulean warbler (*Dendroica cerulea*) and the northern bobwhite (*Colinus virginianus*), were assigned a breeding bird status of "confirmed" and "possible," respectively. None of these four species were observed during the 2006 - 2011 effort. Although the state threatened bald eagle (*Haliaeetus leucocephalus*)

Table 3. Bird species and individuals observed during the Breeding Bird Survey of the Republic Wind, LLC Project Area, May, June, and July 2011.

| Species | Number Recorded | Percent of Total | Cornell Bird Habitat Use Type ¹ | Conservation Status ² |
|------------------------|-----------------|------------------|--|----------------------------------|
| Common Grackle | 147 | 10.8% | open woodland | LC |
| American Crow | 131 | 9.6% | open woodland | LC |
| European Starling | 125 | 9.2% | town | LC |
| Red-winged Blackbird | 123 | 9.1% | marsh | LC |
| House Sparrow | 94 | 6.9% | town | LC |
| Mourning Dove | 72 | 5.3% | open woodland | LC |
| American Robin | 71 | 5.2% | open woodland | LC |
| Horned Lark | 58 | 4.3% | grassland | LC |
| Song Sparrow | 55 | 4.0% | open woodland | LC |
| Canada Goose | 37 | 2.7% | lake/pond | LC |
| American Goldfinch | 36 | 2.6% | open woodland | LC |
| Savannah Sparrow | 29 | 2.1% | grassland | LC |
| Eastern Bluebird | 24 | 1.8% | grassland | LC |
| Indigo Bunting | 23 | 1.7% | open woodland | LC |
| Killdeer | 21 | 1.5% | grassland | LC |
| Chipping Sparrow | 21 | 1.5% | open woodland | LC |
| Field Sparrow | 18 | 1.3% | scrub | LC |
| Blue Jay | 17 | 1.3% | forest | LC |
| Northern Cardinal | 15 | 1.1% | open woodland | LC |
| Barn Swallow | 15 | 1.1% | town | LC |
| House Finch | 15 | 1.1% | town | LC |
| Brown-headed Cowbird | 14 | 1.0% | grassland | LC |
| Tufted Titmouse | 13 | 1.0% | forest | LC |
| Wood Thrush | 12 | 0.9% | forest | LC |
| Gray Catbird | 12 | 0.9% | open woodland | LC |
| Common Yellowthroat | 12 | 0.9% | scrub | LC |
| Red-eyed Vireo | 11 | 0.8% | forest | LC |
| House Wren | 10 | 0.7% | open woodland | LC |
| Red-bellied Woodpecker | 9 | 0.7% | forest | LC |
| Eastern Meadowlark | 9 | 0.7% | grassland | LC |
| Grasshopper Sparrow | 7 | 0.5% | forest | LC |
| Rose-breasted Grosbeak | 7 | 0.5% | forest | LC |
| Great Blue Heron | 7 | 0.5% | marsh | LC |
| Red-headed Woodpecker | 7 | 0.5% | open woodland | LC |
| Dickcissel | 6 | 0.4% | grassland | LC |
| Northern Flicker | 6 | 0.4% | open woodland | LC |
| Black-capped Chickadee | 5 | 0.4% | forest | LC |
| Mallard | 5 | 0.4% | lake/pond | LC |

Table 3. Bird species and individuals observed during the Breeding Bird Survey of the Republic Wind, LLC Project Area, May, June, and July 2011.

| Species | Number Recorded | Percent of Total | Cornell Bird Habitat Use Type ¹ | Conservation Status ² |
|--------------------------------|-----------------|------------------|--|----------------------------------|
| Baltimore Oriole | 5 | 0.4% | open woodland | LC |
| Vesper Sparrow | 4 | 0.3% | grassland | LC |
| Great Crested Flycatcher | 4 | 0.3% | open woodland | LC |
| Turkey Vulture | 4 | 0.3% | open woodland | LC |
| Eastern Towhee | 4 | 0.3% | scrub | LC |
| Eastern Wood Peewee | 3 | 0.2% | forest | LC |
| Scarlet Tanager | 3 | 0.2% | forest | LC |
| White-breasted Nuthatch | 3 | 0.2% | forest | LC |
| Bobolink ³ | 3 | 0.2% | grassland | LC |
| Red-tailed Hawk | 3 | 0.2% | grassland | LC |
| Greater Yellowlegs | 3 | 0.2% | marsh | LC |
| Chimney Swift | 3 | 0.2% | town | LC |
| Acadian Flycatcher | 2 | 0.1% | forest | LC |
| Cooper's Hawk | 2 | 0.1% | forest | LC |
| Willow Flycatcher | 2 | 0.1% | marsh | LC |
| Brown Thrasher | 2 | 0.1% | scrub | NT |
| Blue-headed Vireo | 1 | 0.1% | forest | LC |
| Downy Woodpecker | 1 | 0.1% | forest | LC |
| Eastern Kingbird | 1 | 0.1% | grassland | LC |
| Henslow's Sparrow ³ | 1 | 0.1% | grassland | LC |
| Wood Duck | 1 | 0.1% | lake/pond | LC |
| Least Sandpiper | 1 | 0.1% | marsh | LC |
| Carolina Wren | 1 | 0.1% | open woodland | LC |
| Warbling Vireo | 1 | 0.1% | open woodland | LC |
| Wild Turkey | 1 | 0.1% | open woodland | LC |
| Yellow-billed Cuckoo | 1 | 0.1% | open woodland | LC |
| TOTAL | 1,359 | | | |

1 - Habitats use type from Cornell Lab of Ornithology website.

2 - Conservation Status by International Union for Conservation of Nature:

LC = Least concern

NT = Near threatened

3 - Ohio Species of Concern

Table 4. Incidental observations of Ohio-listed bird species observed during summer breeding season at the Republic Wind, LLC Project Area, Seneca and Sandusky counties, Ohio, May, June, and July 2011.

| Species | Observations |
|------------------------------------|---|
| Bald Eagle ¹ | Observed feeding on carrion near Breeding Bird Survey (BBS) Point 11 on 15 May. |
| Northern Harrier ² | Pair was observed 5 June near Passerine Migration Point I. |
| Upland Sandpiper ¹ | One bird observed on 18 May near a flood pond along Township Road (TR) 178 just East of State Route 18. |
| Least Flycatcher ¹ | One observed and heard at Passerine Migration Point F on 12 May. |
| Red-Breasted Nuthatch ³ | Observed at Passerine Migration Survey Point E on 16 May and Point I on 2 May. |
| Blue Grosbeak ³ | One male bird was seen and heard on 12 May at the intersection of TR 80 and TR 148. |
| Western Meadowlark ³ | One bird was seen and heard on 12 May near BBS Point 6. |
| Great Egret ⁴ | Observed using farm and recreational ponds as late as 15 June. |

1 - Ohio Threatened Species

2 - Ohio Endangered Species

3 - Ohio Species of Special Interest

4 - Ohio Species of Concern

was not been found during the 1982 - 1987 effort, it was assigned a breeding bird status of "possible" during the 2006 - 2011 effort. The state species of concern bobolink was assigned a breeding bird status of "probable" during the 2006 - 2011 effort despite not being found during the 1982 - 1987 effort.

Of the listed species observed on the Watson 5 Block, only the bobolink was detected during the BBS of the Project Area. However, the least flycatcher and bald eagle were incidentally observed in or near the Project Area during the Republic BBS. Bald eagles are discussed in more detail in Section 3.3.3 below.

The Flat Rock 3 (38C3SW) Block is approximately 1 mi southeast of the Project Area. Three Ohio state-listed species were documented during the breeding season in the Flat Rock 3 Block. Both the state threatened least flycatcher and the state species of concern northern bobwhite were assigned a breeding bird status of "possible" during the 1982 - 1987 effort; neither species were found during the 2006 - 2011 effort. The state species of concern bobolink was assigned a breeding bird status of "confirmed" during the 1982 - 1987 effort and "probable" during the 2006 - 2011 effort.

Of the listed species observed on the Flat Rock 3 Block, only the bobolink was detected during the BBS of the Project Area (Table 3). However, the least flycatcher and bald eagle were incidentally observed in or near the Project Area during the Republic BBS (Table 4).

The Fireside 2 (38C2CW) Block is completely located within the southern portion of the Project Area. One state-listed species has been documented during the breeding season in the Fireside 2 Block. It is the state species of concern Henslow's sparrow was assigned a breeding bird status of "probable" during the 2006 - 2011 effort. The Henslow's sparrow was also documented during the Republic BBS (Table 3). The Fireside 2 Block has no data entered for the 1982 - 1987 breeding bird survey.

The Clyde 6 (38B2SE) Block is located in the northeast corner of the Project Area. Two state-listed species have been documented during the breeding season in the Clyde 6 Block. The state species of interest northern pintail (*Anas acuta*) was assigned a breeding bird status of "possible" during the 2006 - 2011 effort. The state species of interest ruddy duck (*Oxyura jamaicensis*) was assigned a status of "probable" during the 2006 - 2011 effort. The Clyde 6 Block has no data entered for the 1982 - 1987 breeding bird survey. No listed species observed during the BBA surveys of Fireside 2 were observed during the BBS of the Project Area (Table 3).

The Tiffin North 5 (37C7CE) Block is located approximately 3.9 mi west of the western-most point of the Project Area. One state-listed species has been documented during the breeding season in the Tiffin North 5 Block. The state threatened bald eagle was assigned a breeding bird status of "confirmed" during the 2006 - 2010 effort. The Tiffin North 5 Block has no data entered for the 1982 - 1987 breeding bird survey.

The bald eagle was an incidental observation during the BBS of the Project Area (Table 3). Bald eagles are discussed in more detail in Section 3.3.3 below.

3.1.3 Important Bird Areas, Federal and State Wildlife Refuges, and Private Protected Areas

The portion of the Project Area where turbines are proposed for development is approximately 3 mi east of the Sandusky River Important Bird Area (IBA), which is located on

the Sandusky River. The proposed transmission line extends 1 mi into this IBA and ends at the Sandusky River (Figure 3).

A review of on-line ODNR maps showed, the nearest conservation area (National Wildlife Refuge, State Park, Wildlife Management Area or Nature Preserve) is Erie Sand Barrens Nature Preserve over 12 mi northeast of the Project Area. Other conservation areas are nearly 20 mi north of the Project Area on or near Lake Erie.

3.2 BREEDING BIRD SURVEY RESULTS

3.2.1 Avian Species Composition

Observations in the Project Area yielded a total of 1,359 individual birds of 64 species (Table 3; Appendix C). Most of the species were birds of open country, as 51.6% of the documented species are classified as open woodland (31.3%) and grassland birds (20.3%) using the Cornell Lab of Ornithology (2011) classification. Many of the open woodland bird species are ubiquitous and highly adaptable species such as the American robin, American crow, common grackle, northern cardinal, and mourning dove. Others are birds of woodland edges and open thickets, i.e., song sparrow, American goldfinch, chipping sparrow, indigo bunting, gray catbird, and house wren. Four out of five of the most numerous grassland species observed were also common birds adaptable to open settings, including intensively managed agricultural lands, i.e., horned lark, savannah sparrow, brown-headed cowbird, and killdeer.

Species associated with "town" or urban setting, and birds classified as marsh birds each comprised 7.8% of the observed species. The birds were primarily comprised of introduced exotics (European starling, house sparrow) or birds that will build nests on or in man-made structures (barn swallow, house finch, chimney swift). Ninety percent of the individual marsh birds observed in the Project Area was the common red-winged blackbird. The remaining ten percent was wading birds and the willow flycatcher. A great blue heron breeding colony was identified during a separate survey of the Project Area for raptor nests (Figure 4). The twelve to fifteen nests observed in the colony are located in the northwestern portion of the Project Area; however, only 7 individual great blue herons were observed during the Republic BBS.

Forest birds comprised 21.9% of observed bird species and were characterized by common species adapted to more open habitats such as edges and urban settings, i.e., blue jay, tufted titmouse, red-bellied woodpecker, black-capped chickadee, white-breasted nuthatch, and downy woodpecker.

Common birds associated with scrub vegetation or associated with lake/ponds made up the balance of the observations (Table 3). Eighty-six percent of the individual birds classified as birds of lake/pond habitats were observed in a single flock of 37 Canada geese.

3.2.2 Avian Individual Abundance

Six of the 64 documented species (9.3 %), comprised just over 50% of all individuals observed (Table 3). Species with the greatest number of observed individuals were, in order of abundance, the common grackle, American crow, European starling, red-winged blackbird, house sparrow, and mourning dove (Table 3).

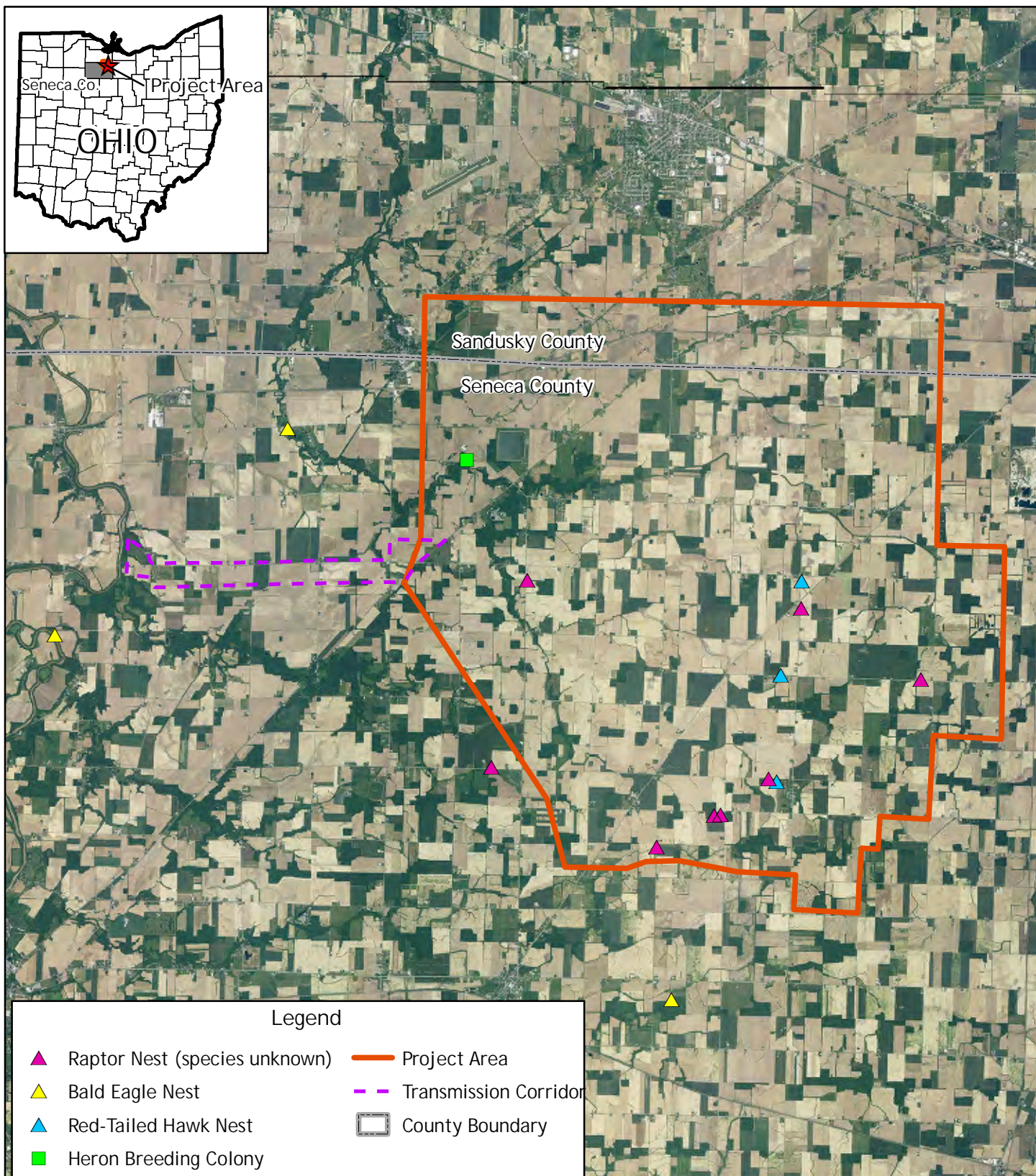


Figure 4. Raptor Nest Locations and Heron Breeding Colony Found in 2011 Within the Republic Wind, LLC, Project Area, Seneca and Sandusky Counties, Ohio.

| | | | |
|--|---|---|--|
| | <p>Miles</p> <p>1 0 1 2</p> <p>Project No. 1953.001.005</p> | <p>August 2011</p> <p>Basemap: NAIP Imagery - Seneca and Sandusky Counties, OH (2010)</p> | |
|--|---|---|--|

3.2.3 Listed Bird Species

Of the 64 species observed during this BBS (Table 3), two are listed by the state of Ohio as species of concern: Henslow's sparrow and bobolink. Both of these birds are associated with grasslands and both were observed in association with grasslands in the southeastern portion of the Project Area at summer BBS point 11 and late-summer BBS point 6. Another seven state-listed birds were incidentally observed in or near the Project Area, but not during a point-count. No federally listed birds were documented.

The Project Area lies within the range of the federally endangered Kirtland's warbler (*Dendroica kirtlandii*). Kirtland's warbler migrates through Ohio in the spring (late April through May) and fall (late August through early October), traveling between its breeding grounds in Michigan, Wisconsin, and Ontario and its wintering grounds in the Bahamas (USFWS 2011). There are no records of Kirtland's warbler within the Project Area, nor were any detected during the BBS of the Project Area.

Incidental observations made outside of the sampling points are provided in Table 4. Observed birds listed in Ohio were the bald eagle, northern harrier, upland sandpiper, least flycatcher, red-breasted nuthatch, blue grosbeak, and western meadowlark.

3.2.4 Bald Eagles

While not part of the BBS for the Project Area, bald eagle nests were monitored by BHE near the Project Area as requested by ODNR and USFWS. Preliminary data from this monitoring is presented here to provide a complete picture of breeding birds in or near the Project Area. Separate reporting on bald eagle usage of the Project Area will be provided at a later date, when all data collection is completed.

A single bald eagle was incidentally observed within the Project Area during the BBS of the Project Area. It was detected feeding on carrion on 15 May 2011 near BBS point 11. The three bald eagle nests located within 2.25 mi of the Project Area (Figure 4) were monitored, although only one nest was successful in producing eaglets in 2011. The closest nest to the Project Area is the Fort Seneca (FS) nest and is approximately 1 mi south of the end of the proposed transmission line on the Sandusky River, but is more than 5 mi from the nearest area where a turbine may be placed. It was the only successful nest of the three nests nearest to the Project Area. In addition, USFWS records indicate 20 bald eagle nests have been documented within 10 mi of the Project boundary. Other than the three monitoring bald eagle nests, the 2011 success rate of the other 17 nests is not known.

BHE also conducted bald eagle nest monitoring 23 March through 19 July 2011 at the three nests nearest the Project Area. This nest monitoring occurred two days a week for 4 hours each day from 16 March through 15 May 2011. Monitoring temporarily ceased and then resumed 13 June through 19 July 2011.

Two nests ("Old Fort" and "Republic" nests), located northwest and south of the Project Area, respectively, were not used or were abandoned. The Republic nest was initially used but it was damaged in a wind storm and subsequently abandoned.

The FS nest was monitored twice a week from 4 April through 16 May 2011. Monitoring resumed on a twice weekly basis beginning 13 June 2011 as per ODNR Protocol and continued through 19 July 2011. This nest produced two eaglets that fledged. Observations showed the birds flew towards the Sandusky River and its environs almost exclusively and were not

observed using the Project Area. Few observations documented the birds flying to or from the east where the Project Area lies. More eagle use surveys are planned for the autumn of 2011, winter 2011/2012, and early spring of 2012.

4.0 DISCUSSION

Utility-scale wind turbines can directly and indirectly affect birds that breed within the boundaries of a wind energy generation facility. Nocturnally migrating passerines are the most abundant species at most wind energy facilities and are the most commonly reported fatalities (National Academy of Science [NAS] 2007). Bird mortality at wind farms is generally only a few birds per turbine distributed among many species and is influenced by factors that are largely lacking at the Project Area. In 2007, the NAS reported an average of 2.22 bird fatalities per turbine per year from wind energy facilities in the upper Midwest, the region most comparable to the Project Area. As previously noted, most of these mortalities would not have been breeding birds.

The Project Area is currently under intensive agricultural management (84.7% cropland) and presents limited habitat diversity. In total, only 2% of the Project Area supports forest, wetlands, and grasslands. A few small streams and drainageways and associated thin borders of woodland vegetation along with scattered woodlots provide habitat on-site and provide some avian habitat diversity. With so much of the Project Area in cropland (84.7%), the proposed wind farm is likely to result in negligible bird habitat fragmentation, because suitable habitat is limited and woodlands, grasslands, and wetlands are planned to be buffered and avoided, wherever feasible.

Studies detailing conclusive displacement of passerines due to the presence of wind turbines are lacking. Leddy et al. (1999) found increased densities of breeding grassland passerines at increased distances from wind turbines in Minnesota, and higher densities in a control plot than in areas close to turbines. Johnson et al. (2000) reported displacement of breeding birds at the 354 turbine Buffalo Ridge, Minnesota wind facility displaced some groups and species of birds. However, the displacement area was largely limited to areas less than 100 meters from turbines.

Construction may temporarily disrupt or displace avian nesting near a wind energy facility during the 6 to 12 months that construction occurs depending upon the location and configuration of the facility relative to the quality, location, and proximity of the habitat. This effect would be expected to be minor given the dearth of habitats within the Project Area, the relatively small footprint of wind turbines and associated infrastructure, and the ability to site turbines to avoid or minimize effects.

The topography associated with a wind turbine facility location may influence the risk of avian collisions. Studies suggest that siting turbines on the edge of steep slopes or within depressions increases collision risk, especially for raptor species (Orloff and Flannery 1992, 1996; Smallwood and Thelander 2004; Thelander and Rugge 2001). The nearest one of these features, the Sandusky River, lies about 5 miles west of the Project Area. Green Creek, a small headwater stream, runs through a portion of the Project Area.

Land-based wind farm studies results show low rates of waterbird and waterfowl mortality (Everaert 2003). Wetland habitat suitable for waterbirds in the proposed Project Area is restricted to Westerhouse Ditch, Emerson Creek, Beaver Creek Upground Reservoir, agricultural drainage ditches, farm ponds, and recreational ponds associated with homes.

The low percentage of water acreage (0.4% open water and wetlands in total Project Area) should limit waterfowl or wetland-associated bird species usage of the Project Area.

Increased perching sites can increase risk to migrating and resident breeding birds. Perching sites will be minimized through use of tubular towers on which to mount the turbines, thereby eliminating perch availability and lowering the risk of birds colliding with rotating blades.

No federally listed bird species were observed breeding in or near the proposed Project Area and none have been documented in the records of the USFWS and ODNR. Ohio listed birds observed during BBS counts were the Henslow's sparrow and bobolink. Incidentally observed listed birds were the bald eagle, northern harrier, upland sandpiper, least flycatcher, red-breasted nuthatch, blue grosbeak, and western meadowlark. Avoidance of grasslands may reduce potential interactions with five of these species (Henslow's sparrow, bobolink, northern harrier, upland sandpiper, and western meadowlark). Avoidance of woodland or scrub areas may reduce interactions with the remaining four species (bald eagle, least flycatcher, red-breasted nuthatch, and blue grosbeak).

5.0 CONCLUSIONS

Elevated topography, river corridors, forest cover, scrublands, water, wetlands, and large grasslands are the types of features associated with diverse breeding bird populations. These characteristics are generally lacking in the Project Area. The BBS data show few sensitive bird species breed in the Project Area. The results of the BBS in the Project Area are consistent with habitats that lack diversity or attractive resources for breeding birds. This BBS suggests that the potential for breeding bird displacement or collision caused by the proposed Project turbines should be similar to other Midwestern wind farms where the landscape is dominated by row crop agriculture.

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APPENDIX A

Agency Coordination



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June 8, 2011

To all interested parties,

Based upon the revised project boundary map received on 31 May 2011 and site visit conducted on 7 April 2011, the Ohio Department of Natural Resources Division of Wildlife (DOW) has prepared these revised survey recommendations for Nordex's proposed project located in Seneca and Sandusky counties.

Currently the project falls within regions that DOW has identified as needing moderate monitoring efforts. The updated boundary has increased the forested area to 3095 acres. If the developer decides to amend the boundaries, the DOW will revise our survey recommendations.

The table below was created based upon a review of the project maps provided and a site visit. The table summarizes the types and level of effort recommended by the DOW. Results from these studies will help the Department of Natural Resources assess the potential impact these turbines may pose, and influence our recommendations to the Ohio Power Siting Board. Monitoring should follow those criteria listed within the "On-shore Bird and Bat Pre-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio."

For additional ODNR comments, including information on the potential presence of threatened and endangered species within or adjacent to your project area, please contact Brian Mitch at (614) 265-6378 or brian.mitch@dnr.state.oh.us

| Project | |
|------------------------|---|
| Survey type | |
| Breeding bird | Breeding bird surveys should be conducted at all sites. The number of survey points may be based on the amount of available habitat, or twice the maximum number of turbines proposed for the site. If turbines are placed in agricultural land it, this requirement may be waived by DOW after a review of the proposed turbine locations is provided. |
| Raptor nest searches | Nest searches should occur on, and within a 1-mile buffer of the proposed facility. |
| Raptor nest monitoring | There is 3 eagle nest located on or within the 2 miles of the proposed project. The pairs within the 2 mile radius should be monitored to assess their daily movement patterns. Should any additional nests of a protected species of raptor be located during nest searches, monitoring should commence as outlined within the on-shore protocols. |



Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR

DAVID MUSTINE, DIRECTOR

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| Bat acoustic monitoring | To be conducted at all meteorological towers. |
| Passerine migration (# of survey points) | 13 |
| Diurnal bird/raptor migration (# of survey point) | 1 |
| Sandhill crane migration (same points as raptor migration) | NS |
| Owl playback survey points | NS |
| Barn owl surveys | NS |
| Bat mist-netting (# of survey points) | 25 |
| Nocturnal marsh bird survey points | NS |
| Waterfowl survey points | NS |
| Shorebird migration points | NS |
| Radar monitoring locations | 1 (waived) |

NS = Not required based on the lack of suitable habitat.

If you have any questions, please feel free to contact me.

Jennifer Norris, Wind Energy Wildlife Biologist
Olentangy Wildlife Research Station
Ohio Division of Wildlife
8589 Horseshoe Road
Ashley, OH 43003
Office phone: 740-747-2525 x 26
Cell: 419-602-3141
Fax: 740-747-2278

cc: Mr. Stuart Siegfried, Ohio Power Siting Board
Ms. Megan Seymour, United States Fish and Wildlife Service
Mr. Brian Mitch, Ohio Department of Natural Resources

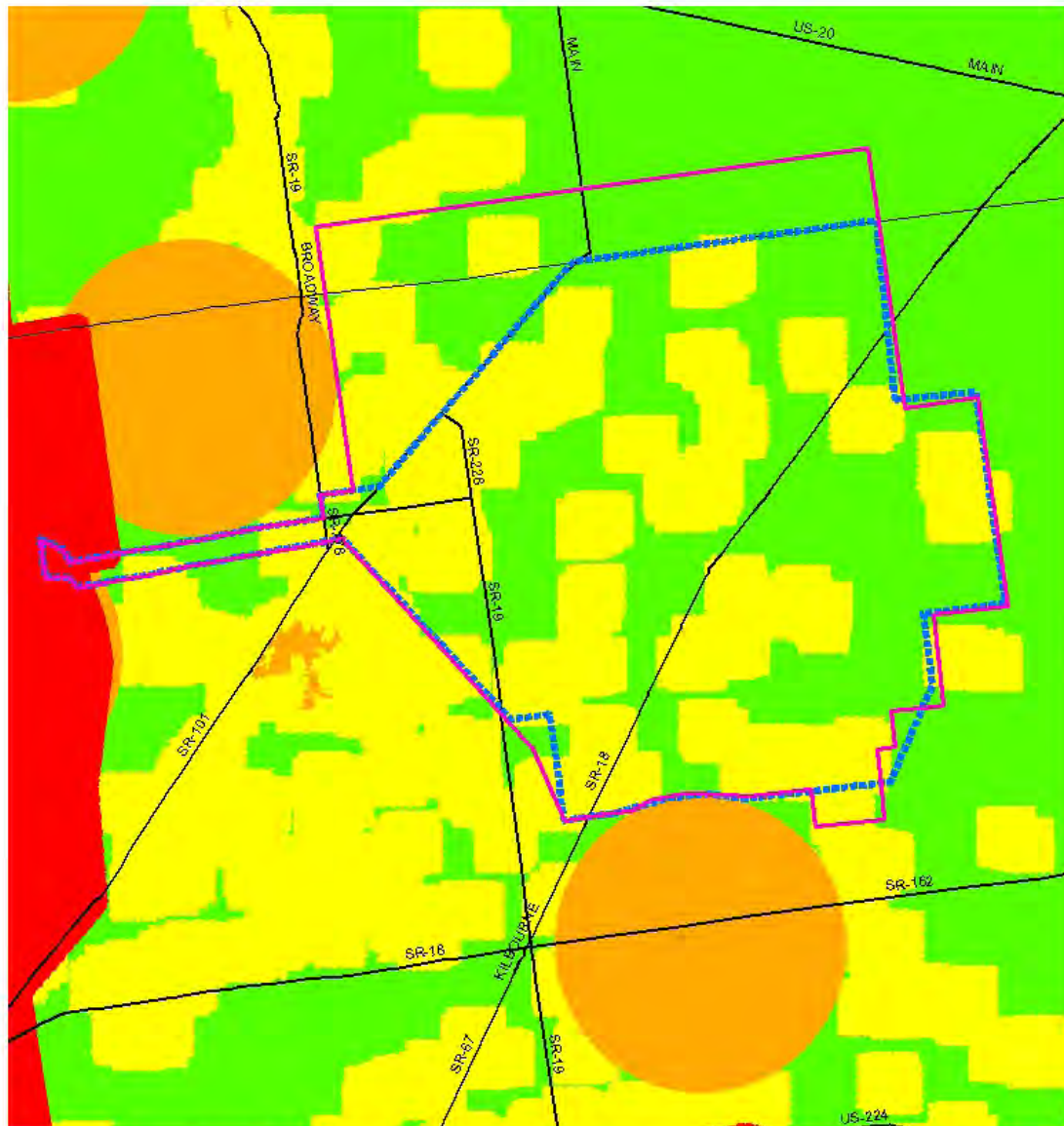








Ohio Department of Natural Resources

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DAVID MUSTINE, DIRECTOR

Figure 1. Survey effort map with revised boundary for Nordex's proposed Republic project.



-  Nordex's Republic revised (June 2011) boundary
-  Nordex's Republic revised (February 2011) boundary
-  Minimum
-  Moderate
-  Moderate (where applicable)
-  Extensive



0 0.5 1 2 Miles




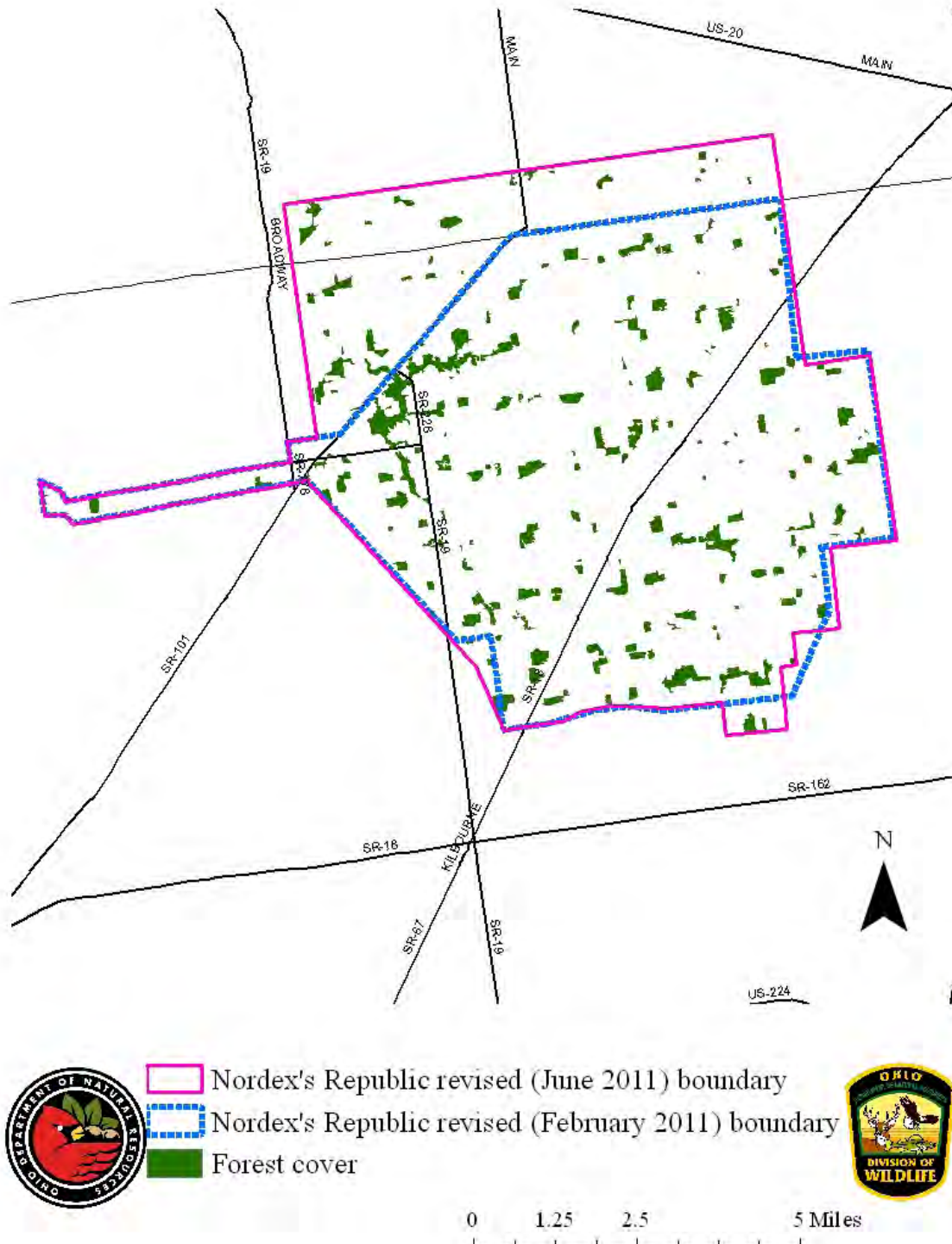


Ohio Department of Natural Resources

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DAVID MUSTINE, DIRECTOR

Figure 2. Forest cover map with revised boundary for Nordex's proposed Republic project.





United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

March 18, 2011

Laura Caspari
300 S. Wacker Drive
Suite 1500
Chicago, IL 60606

TAILS : 31420-2011-TA-0502

Re: Nordex Republic Wind Project, Seneca County

Dear Ms. Caspari:

This letter is in response to a meeting with the U.S. Fish and Wildlife Service (Service) on January 31, 2011 regarding the proposed wind power project in Seneca County, Ohio. The proposed project area appears to be a mix of agricultural land with scattered forested areas throughout. The proposed project is approximately 3 miles east of the Sandusky River Important Bird Area (IBA), which is located on the Sandusky River. However, it does appear that the proposed transmission line does extend approximately 1 mile into this IBA and ends right next to the Sandusky River. The proposed project also has a very large number of karst features throughout the project area, particularly on the east and northeast side of proposed project boundary. These areas could provide potential wintering habitat for bats. We understand the proposed project is approximately 200 MW including approximately 83 turbines. In addition, you have provided the Service and ODNR with a revised project boundary that included a proposed location of an approximate 4 mile transmission line that extends directly west of the central portion of the project. According to a revised letter from the Ohio Division of Natural Resources (ODNR) dated February 16 2011, the Division of Wildlife (DOW) has determined that the proposed facility would be classified as "extensive" site under the current monitoring protocols based upon the location of the transmission line. We understand that field surveys are planned for 2011.

The following comments are being provided pursuant to the Endangered Species Act (ESA), Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and Fish and Wildlife Act of 1956. This information is being provided to assist you in making an informed decision regarding wildlife issues, site selection, project design, and compliance with applicable laws. The Service has been working closely with ODNR Division of Wildlife to develop recommended survey protocols and site evaluations that will satisfy both state and federal wildlife statutes, and this letter describes these measures, in part. The protocols, "On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio" are available on ODNR's website at:

http://www.dnr.state.oh.us/Home/wild_resource/subhomepage/ResearchandSurveys/WildlifeWind/tabid/21467/Default.aspx

We encourage and appreciate your early coordination with both ourselves and ODNR, and recommend continued collaboration on this project to ensure wildlife issues are fully and appropriately addressed.

The Service supports the development of wind power as an alternative energy source, however, wind farms can have negative impacts on wildlife and their habitats if not sited and designed with potential wildlife and habitat impacts in mind. Selection of the best sites for turbine placement is enhanced by ruling out sites with known, high concentrations of birds and/or bats passing within the rotor-swept area of the turbines or where the effects of habitat fragmentation will be detrimental. In support of wind power generation as a wildlife-friendly, renewable source of power, development sites with comparatively low bird, bat and other wildlife values, would be preferable and would have relatively lower impacts on wildlife.

WATER RESOURCE COMMENTS:

The Service recommends that impacts to streams and wetlands be avoided, and buffers surrounding these systems be preserved. Streams and wetlands provide valuable habitat for fish and wildlife resources, and the filtering capacity of wetlands helps to improve water quality. Naturally vegetated buffers surrounding these systems are also important in preserving their wildlife-habitat and water quality-enhancement properties. Furthermore, forested riparian systems (wooded areas adjacent to streams) provide important stopover habitat for birds migrating through the region. The proposed activities do not constitute a water-dependent activity, as described in the Section 404(b)(1) guidelines, 40 CFR 230.10. Therefore, practicable alternatives that do not impact aquatic sites are presumed to be available, unless clearly demonstrated otherwise. Therefore, before applying for a Section 404 permit, the client should closely evaluate all project alternatives that do not affect streams or wetlands, and if possible, select an alternative that avoids impacts to the aquatic resource. If water resources will be impacted, the Buffalo Corps of Engineers should be contacted for possible need of a Section 404 permit.

ENDANGERED SPECIES COMMENTS:

Because of the potential for wind power projects to impact endangered bird, bat, or other listed species, they are subject to the Endangered Species Act (16 U.S.C. 1531-1544) section 9 provisions governing "take", similar to any other development project. Take incidental to a lawful activity may be authorized through the initiation of formal consultation if a Federal agency is involved; or if a Federal agency, Federal funding, or a Federal permit are not involved in the project, an incidental take permit pursuant to section 10(a)(1)(B) of the ESA may be obtained upon completion of a satisfactory habitat conservation plan for the listed species. However, there is no mechanism for authorizing incidental take "after-the-fact."

The proposed project lies within the range of the **Indiana bat** (*Myotis sodalis*), a federally listed endangered species. Since first listed as endangered in 1967, their population has declined by nearly 60%. Several factors have contributed to the decline of the Indiana bat, including the loss and degradation of suitable hibernacula, human disturbance during hibernation, pesticides, and the loss and degradation of forested habitat, particularly stands of large, mature trees. Fragmentation of forest habitat may also contribute to declines. During the winter Indiana bats hibernate in caves and abandoned mines. Summer habitat requirements for the species are not well defined but the following are considered important:

1. Dead or live trees and snags with peeling or exfoliating bark, split tree trunk and/or branches, or cavities, which may be used as maternity roost areas.
2. Live trees (such as shagbark hickory and oaks) which have exfoliating bark.
3. Stream corridors, riparian areas, and upland woodlots which provide forage sites.

Indiana Bat Maternity Habitat

There are no positive records for Indiana bat captures within Seneca County and in addition, there are no records within 10 miles of the proposed project boundaries. According to the interim Indiana bat and wind guidance, if both of the following conditions are true for the proposed project, Indiana bat presence is very unlikely within and near the project area during the summer period, and it is unlikely that Indiana bats will be exposed to wind facility operations during the summer.

1. No suitable foraging or roosting habitat is in the project area or within 1,000 feet of the project area boundary
2. Commuting habitat (in the project area or within 1,000 feet of the project area boundary) is isolated from (i.e., more than 1000 feet), or if connected more than 2.5 miles from, suitable roosting or foraging habitat.

If both of these conditions are not met, further analysis is required to determine whether Indiana bats exposure is likely. The project areas appear to be a mix of agricultural land with scattered forested areas throughout, with a number of forested areas exceeding 100 acres. It appears that suitable summer foraging and roosting habitat for the Indiana bat likely exists within the project area.

Mist Net Surveys: Based on ODNR's On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio, a total of 22 mist net surveys have been requested for the proposed project boundary. The Service agrees that is an appropriate level of effort for the proposed project boundary. The surveys must be conducted by a permitted surveyor (see attached list) and be designed and conducted in coordination with the Endangered Species Coordinator for this office. Survey effort should follow ODNR's protocols, which exceed the Service's standard protocol. The highest quality Indiana bat habitat areas within the project area should be selected for mist netting. Mature woodlots greater than 100 acres in size with permanent water sources should be the primary focus of mist net surveys. Service biologists would be happy to aid in identification and selection of suitable mist net sites, if necessary. We recommend that any Indiana bats captured, especially reproductively active females, be monitored through radio-tracking to determine roost locations and foraging patterns. If an Indiana bat is captured, this office shall be notified within 24 hours, or by the next business day.

Radio Transmitters: Up to four Indiana bats should be fitted with radio transmitters and tracked to roost site(s) and foraging areas until daily activity patterns are fairly well established, or as long as the transmitter remains attached and activated. Preference shall be given to tracking female bats, though one male Indiana bat may be tracked if captured prior to capturing four female Indiana bats. Please see the ODNR's protocols for additional information on radio tracking non-Indiana bats.

Acoustic Surveys: Bat acoustic monitoring is to be conducted at all meteorological towers within the project area. We recommend regular inspection of the AnaBat detectors throughout the survey period to ensure proper functioning.

The results of all bat surveys should be coordinated with this office prior to initiation of any work. Based on the results of the mist net survey, we will evaluate potential impacts to the Indiana bat from the proposed project. If sufficient information is not provided to document that take is unlikely, authorization of incidental take either through Section 7 or Section 10 of the Endangered Species Act of 1973, as amended, will be necessary.

Hibernacula Habitat

The project area lies within an area primarily underlain with Silurian and Devonian carbonate bedrock, indicating that the presence of caves is possible, and several identified karst areas are found within the project area. Please see the Ohio Department of Natural Resources, Division of Geological Survey Ohio

Karst Areas Map (www.dnr.state.oh.us/portals/10/pdf/karstmap.pdf), for additional information. If caves or sinkholes are present within the project area, we recommend further coordination with this office to determine if surveys of these areas are recommended.

Indiana Bat Migratory Habitat

Wind energy facilities in various habitat types across the U.S. and Canada have been documented to cause “widespread and often extensive fatalities of bats” (Arnett *et al.* 2008), primarily during the fall *migratory* season. Further, Indiana bat mortalities have been detected at a wind power facility in Indiana, confirming suspicions that migrating Indiana bats are also susceptible to mortality from wind turbines. At this time, research into the mechanisms that cause mortality of bats at wind power sites is still ongoing, and few operational tools exist to avoid and minimize take — feathering of turbines during times when bats are most at risk has been shown to reduce mortality in some situations. Based on this, we are advising all operating wind farms and wind farms in planning stages within the range of the listed bats that lethal take is a possibility without curtailment of operations at night during the migratory period regardless of whether summer habitat is present or if Indiana bats are detected during summer mist netting. Due to the potential of take during spring and fall migration, we recommend developers evaluate their exposure to the prohibitions of ESA. This is a risk management decision the developer must make. The Service advises you to consider the following two options to ensure violations of the Endangered Species Act (ESA) Section 9 take prohibition do not occur:

- 1) Feather turbines during low wind speed conditions at night during the fall and spring migratory seasons as a way to proactively and definitively avoid take of Indiana bats (and other species of bats as well). Based on the Indiana bat Draft Recovery Plan First Revision (Service, 2007), fall migration generally occurs between August 1 and October 15, and spring migration generally occurs between April 1 and May 15.
- 2) Wind facility developers can work with the Service to apply for an Incidental Take Permit by submitting a Habitat Conservation Plan (HCP), as required under Section 10 of the Endangered Species Act. A HCP can be used to address Indiana bat presence during both summer foraging and migration periods. A HCP does typically require some time and survey effort to complete. Alternatively, you may consider joining in the regional effort to develop a wind power HCP to address Indiana bats and other listed species.

If you plan to implement either of these two options, please contact us for further information.

The proposed project lies within the range of the **rayed bean** (*Villosa fabalis*), a freshwater mussel that is currently proposed for listing as federally endangered. The rayed bean is generally known from smaller, headwater creeks, but records exist in larger rivers. They are usually found in or near shoal or riffle areas, and in the shallow, wave-washed areas of lakes. Substrates typically include gravel and sand, and they are often associated with, and buried under the roots of, vegetation, including water willow (*Justicia americana*) and water milfoil (*Myriophyllum* sp.). Should the proposed project directly or indirectly impact any of the habitat types described above, we recommend that a survey be conducted to determine the presence or probable absence of rayed bean mussels in the vicinity of the proposed site. Any survey should be designed and conducted in coordination with the Endangered Species Coordinator for this office.

The project lies within the range of the **eastern massasauga** (*Sistrurus catenatus catenatus*), a docile rattlesnake that is declining throughout its national range and is currently a Federal Candidate species. The snake is currently listed as endangered by the State of Ohio. Your proactive efforts to conserve this species now may help avoid the need to list the species under the Endangered Species Act in the future. Due to their reclusive nature, we encourage early project coordination to avoid potential impacts to

massasaugas and their habitat. At a minimum, project evaluations should contain delineations of whether or not massasauga habitat occurs within project boundaries.

The massasauga is often found in or near wet areas, including wetlands, wet prairie, or nearby woodland or shrub edge habitat. This often includes dry goldenrod meadows with a mosaic of early successional woody species such as dogwood or multiflora rose. Wet habitat and nearby dry edges are utilized by the snakes, especially during the spring and fall. Dry upland areas up to 1.5 miles away are utilized during the summer, if available. For additional information on the eastern massasauga, including project management ideas, please visit the following website:
<http://www.fws.gov/midwest/Endangered/lists/candidat.html> or contact this office directly.

The proposed project lies within the range of the **Kirtland's warbler** (*Dendroica kirtlandii*), a federally listed endangered species. The Kirtland's warbler is a small blue-gray songbird with a bright yellow breast. This species migrates through Ohio in the spring and fall, traveling between its breeding grounds in Michigan, Wisconsin, and Ontario and its wintering grounds in the Bahamas. During migration, individual birds usually forage in low vegetation and stay in one area for a few days. This species may occur in Ohio in the spring from late April through May and in the fall from late August to early October. The ODNR has recommended 11 passerine migration surveys for the proposed project boundary. We strongly recommend that surveyors note any possible Kirtland's warbler detections during the passerine migration survey, and photo-document the detections if possible. Any sightings should be reported to the Service within 24 hours, or the next business day.

MIGRATORY BIRD COMMENTS:

The Migratory Bird Treaty Act (16 U.S.C. 703-712; MBTA) implements four treaties that provide for international protection of migratory birds. The MBTA prohibits taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. While the MBTA has no provision for allowing unauthorized take, the FWS recognizes that some birds may be taken during activities such as wind turbine operation even if all reasonable measures to avoid take are implemented. The U.S. Fish and Wildlife Service's (FWS) Office of Law Enforcement carries out its mission to protect migratory birds not only through investigation and enforcement, but also through fostering relationships with individuals and industries that proactively seeks to eliminate their impacts on migratory birds. Although it is not possible under the MBTA to absolve individuals, companies, or agencies from liability (even if they implement avian mortality avoidance or similar conservation measures), the Office of Law Enforcement focuses on those individuals, companies, or agencies that take migratory birds with disregard for their actions and the law, especially when conservation measures have been developed but are not properly implemented.

At this time, we continue to encourage existing and proposed wind developments to follow current Service recommendations on wind power siting and construction (*Interim Guidelines to Avoid and Minimize Impacts from Wind Turbines – 2003*). The Service also encourages developers to coordinate with Service biologists regarding their projects. Proper coordination will help developers make informed decisions in siting, constructing, and operating their facilities. Additionally, the Service hopes to work cooperatively with wind developers to advance the state of the art of wind power siting, construction, and operation. Advancements in these areas will represent great strides towards the environmentally safe development of this otherwise renewable and clean source of energy.

The Service and ODNR DOW have worked together to develop a recommended bird survey protocol for wind turbine projects. The details of the protocol are provided in ODNR's On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio. ODNR has

documented that the project area qualifies for “extensive” survey effort due to the proximity to possible migratory bird high use areas. We recommend implementation of the ODNR bird survey protocol or alternatively, modification of the project boundary to avoid potential migratory bird high use areas and implementation of the “extensive” survey protocol. Bird survey results will be interpreted to determine if potential risk to birds is relatively high or low in various portions of the project area. Based on survey results we may make recommendations as to turbine placement and operation, or pre- or post-construction monitoring.

Research into the actual causes of bat and bird collisions with wind turbines is limited. To assist Service field staffs in review of wind farm proposals, as well as aid wind energy companies in developing best practices for siting and monitoring of wind farms, the Service published *Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines* (2003). On February 8, 2011, the U.S. Fish and Wildlife Service released the Draft Voluntary, Land-Based Wind Energy Guidelines that have now been published in the Federal Register and are now open for public comment until May 19, 2011. The Guidelines can be found at: <http://www.fws.gov/windenergy>. Until those guidelines are final, the Service recommends following the 2003 Interim Guidelines. We encourage any company/licensee proposing a new wind farm to consider the following excerpted suggestions from the guidelines in an effort to minimize impacts to migratory birds and bats.

- 1) Pre-development evaluations of potential wind farm sites to be conducted by a team of Federal and/or State agency wildlife professions with no vested interest in potential sites;
- 2) Rank potential sites by risk to wildlife;
- 3) Avoid placing turbines in documented locations of federally-listed species;
- 4) Avoid locating turbines in known bird flyways or migration pathways, or near areas of high bird concentrations. (i.e., rookeries, leks, State or Federal refuges, staging areas, wetlands, riparian corridors, etc.) Avoid known daily movement flyways and areas with a high incidence of fog, mist or low visibility;
- 5) Avoid placing turbines near known bat hibernation, breeding, or maternity colonies, in migration corridors, or in flight paths between colonies and feeding areas;
- 6) Configure turbine arrays to avoid potential avian mortality where feasible. (i.e., group turbines and orient rows of turbines parallel to known bird movements) Implement storm water management practices that do not create attractions for birds, and maintain contiguous habitat for area-sensitive species;
- 7) Avoid fragmenting large, contiguous tracts of wildlife habitat. Wherever practical, place turbines on lands already disturbed and away from intact healthy native habitats. If not practical, select fragmented or degraded habitats over relatively intact areas;
- 8) Minimize roads, fences, and other infrastructure. Wherever possible, align collection lines and access roads to minimize disturbance;
- 9) Develop a habitat restoration plan for the proposed site that avoids or minimizes negative impacts on vulnerable wildlife while maintaining or enhancing habitat values for other species. (i.e., avoid attracting prey animals used by raptors;
- 10) Use tubular supports with pointed tops rather than lattice supports to minimize bird perching and nesting opportunities. Avoid placing external ladders and platforms on tubular towers to minimize

perching/nesting. Avoid use of guy wires for turbine or meteorological tower supports. All existing guy wires should be marked with bird deterrents. (Avian Power Line Interaction Committee 1996);

- 11) If taller turbines (top of rotor-swept area is greater than 199 feet above ground level) require lights for aviation safety, the minimum amount of lighting specified by the Federal Aviation Administration (FAA) should be used. Unless otherwise requested by the FAA, only white strobe lights should be used at night, and should be of the minimum intensity and frequency of flashes allowable;
- 12) Adjust tower height to reduce risk of strikes in areas of high risk for wildlife;
- 13) Wherever feasible, place electric power lines underground or on the surface as insulated, shielded wire to avoid electrocution of birds. Use recommendations of the Avian Power Line Interaction Committee (1996) for any required above-ground lines, transformers, or conductors.

The full text of the guidelines is available at <http://www.fws.gov/habitatconservation/wind.pdf>. The Service believes that implementing these guidelines may help reduce mortality caused by wind turbines. We encourage you to consider these guidelines in the planning and design of the project. We particularly encourage placement of turbines away from any large wetland, stream corridor, or wooded areas, including the areas mentioned previously, and avoid placing turbines between nearby habitat blocks.

BALD AND GOLDEN EAGLE COMMENTS:

Bald and golden eagles are included under the Migratory Bird Treaty Act, but are afforded additional legal protection under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d). The Service recently issued a final rule that authorizes issuance of eagle take permits, where the take to be authorized is associated with otherwise lawful activities. If take of bald eagles is likely, based on the best information available, a bald eagle take permit for this project will be necessary. We understand the original project boundary was adjusted to avoid a known bald eagle nest and the Service greatly appreciates this effort to conserve trust resources. However, there are still 3 bald eagle nests within 2 miles of the proposed project boundary, including the proposed transmission line. The closest nest is approximately 1 mile southwest of the end of the transmission line on the Sandusky River. In addition, there are also 20 bald eagle nests within 10 miles of the project boundary. Raptor nest searches and nest monitoring should be conducted in accordance with ODNr's extensive survey protocol to identify any raptors, including bald eagles that may nest in or near the project area. The results of this survey should be coordinated with this office.

On February 8, 2011, the U.S. Fish and Wildlife Service released the Draft Eagle Conservation Plan Guidance that have now been published in the Federal Register and are available for public comment until May 19, 2011. The Guidelines can be found at: <http://www.fws.gov/windenergy>. The Draft Eagle Conservation Plan Guidance was developed to provide interpretive guidance to wind developers, Service biologists who evaluate potential impacts on eagles from proposed wind energy projects, and others in applying the regulatory permit standards as specified by the Bald and Golden Eagle Protection Act and other federal laws. While this guidance is still draft, we believe that it deserves careful attention, as it lays out a proposed process for evaluating risk to eagles from wind power projects and developing an eagle conservation plan, in support of applying for a permit to authorize take. Appendix C of the Draft Eagle Conservation Plan Guidance suggests a monitoring protocol for wind projects. Monitoring data should be interpreted to document potential risk to eagles. If take of eagles is likely, a bald eagle take permit will be necessary.

COORDINATION OF SURVEY RESULTS:

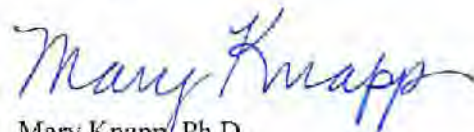
Please submit survey results to this office for review. Survey results will be interpreted to determine areas with relatively low bat and bird activity/diversity as opposed to areas with relatively high bat and bird activity/diversity. Based on the survey results, we may make recommendations as to turbine placement and operation, additional consultation under Section 7 or 10 of the Endangered Species Act of 1973, as amended, additional permits under the Bald and Golden Eagle Protection Act, or pre- or post-construction monitoring.

POST CONSTRUCTION MONITORING:

The Service recommends the project be monitored post-construction to determine impacts to migratory birds and bats. A specific post-construction monitoring plan should be prepared and reviewed by the Service and should include a scientifically robust, peer reviewed methodology of mortality surveys. We recommend that the post-construction monitoring protocol be developed based on the results of pre-construction monitoring, and look forward to working with the project proponent to develop this document.

Thank you for the opportunity to provide comments on this proposed project. If you have questions, or if we may be of further assistance in this matter, please contact Melanie Cota at extension 15 in this office or by email at Melanie_Cota@fws.gov or visit our website at <http://www.fws.gov/midwest/Ohio>.

Sincerely,



Mary Knapp, Ph.D.
Supervisor

Cc: Ms. Jennifer Norris, ODNR, Olentangy Wildlife Research Station, Ashley, OH
Mr. Brian Mitch, ODNR, REALM, Columbus, OH

Attachment: USFWS Permitted Indiana bat Surveyors in Ohio



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994
December 13, 2010

USFWS permittees for Indiana bat surveys in Ohio*

| | |
|---|---|
| <p>ABR, Inc. – Environmental Research and Services Leslie Rodman P.O. Box 249 Forest Grove, OR 97116 (503) 359-7525 ext. 113 / FAX (503) 359-8875 lrodman@abrinc.com</p> | <p>Alliance Consulting Inc. T. Sydney Burke 124 Philpott Lane Beaver, WV 25813 (304) 255-0491 ext. 343 / FAX (304) 255-4232 sburke@aci-wv.com</p> |
| <p>Apogee Environmental Consultants, Inc. Joel Beverly P.O. Box 338 Ermine, KY 41815 (606) 633-7677 / FAX (606) 632-2626 apogee_env@bellsouth.net</p> | <p>Appalachian Technical Services P.O. Box 3537 6741 Indian Creek Road Wise, VA 24293 (276) 328-4200 / FAX (276) 328-4900 wise@atsone.com</p> |
| <p>BHE Environmental 11733 Chesterdale Road Cincinnati, OH 45246 (513) 326-1500 / FAX (513) 326-1550 ktvrell@bheenvironmental.com</p> | <p>Eric Britzke 112 Cherokee Trail Clinton, MS 39056 (870) 261-3666 Eric.R.Britzke@usace.army.mil</p> |
| <p>Timothy Carter Ball State University Department of Biology, CL 121 Muncie, IN 47306-0440 (765) 285-8842 / FAX (765) 285-8804 tcarter@bsu.edu</p> | <p>Civil & Environmental Consultants Katie Dunlap 8740 Orion Place, Suite 100 Columbus, OH 43240 (614) 710-0175 / (888) 598-6808 FAX (614) 540-6638 kdunlap@cecinc.com</p> |
| <p>Copperhead Environmental Consulting, Inc. P.O. Box 73 11641 Richmond Road Paint Lick, KY 40461 (859) 925-9012 mwgumbert@copperheadconsulting.com</p> | <p>3600 Park 42 Drive, Suite 130B Cincinnati, OH 45241-2072 (513) 985-0226 / (800) 759-5614 333 Baldwin Road Pittsburgh, PA 15205-9702 (412) 429-2324 / (800) 365-2324 FAX (412) 429-2114</p> |

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|--|---|
| Davey Resource Group Jessica Hickey 1500 N. Mantua St., P.O. Box 5193 Kent, OH 44240-5193 (800) 828-8312 / FAX (330) 673-0860 jessica.hickey@davey.com | Ecological Specialties LLC William D. Hendricks 1785 Symsonia Road Symsonia, KY 42082 (270) 851-4362 / FAX (270) 851-4363 myotis@hughes.net |
| Ecology and Environment, Inc. Josh Flinn 55 Corporate Woods 9300 West 110 th St., Suite 645 Overland Park, KS 66210 (913) 339-9519 / FAX (913) 458-0972 jflinn@ene.com | Eco-Tech, Inc. Peter Lee Droppelman 1003 E. Main St. Frankfort, KY 40601 (502) 695-8060 / FAX (510) 695-8061 ldroppelman@ecotechinc.com |
| Environmental Solutions & Innovations Virgil Brack, Jr. 781 Neeb Road Cincinnati, OH 45233 (513) 451-1777 / FAX (513) 451-3321 vbrack@environmentalsi.com | Jackson Environmental Consulting Jeremy Jackson 203 North Mayo Trail Pikeville, KY 41501 (606) 432-9345 / FAX (606) 437-6563 jjj@jacksonenvironmental.com |
| J.F. New & Associates, Inc. Jeremy Sheets 708 Roosevelt Road Walkerton, IN 46574 (574) 586-3400 / FAX (574) 586-3446 jsheets@jfnew.com | Daniel Judy LPG Environmental and Permitting Services 1174 Camp Avenue Mount Dora, FL 32757 (352) 383-1444 djudy@lpgenvironmental.com |
| Robert Kiser 38 Kiser Lane Whitesburg, KY 41858 | Andrew Kniowski 2021 Coffey Road 210 Kottman Hall Columbus, OH 43210 (540) 420-5213 kniowski.1@osu.edu |
| Allen Kurta Eastern Michigan University Department of Biology 316 Mark Jefferson Ypsilanti, MI 48197 (734) 487-4242 / FAX (734) 487-9235 akurta@emich.edu | Michelle Malcosky 266 Atterbury Blvd. Hudson, OH 44236 (330) 968-8272 mmalcosky@gmail.com |

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| Rodney McClanahan 265 Moss Lane Anna, IL 62906 (618) 658-1317 turkeyctr@earthlink.net | Mountain State Biosurveys, LLC Thomas Risch 6703 Ohio River Road Lesage, WV 25537 (304) 762-2453 www.mtnstatebio.com |
| Pittsburgh Wildlife & Environmental, Inc. Neil Bossart 853 Beagle Club Road McDonald, PA 15057 (724) 796-5137 nbossart@windstream.net | Redwing Ecological Services, Inc. Benjamin Deetsch 129 South Sixth Street Louisville, KY 40202 (502) 625-3009 FAX (502) 625-3077 kfuchs@rewing.win.net |
| Lynn Robbins Southwest Missouri State University Department of Biology 901 South National Avenue Springfield, MO 65804-0095 (417) 836-5366 FAX (417) 836-4204 lwr704f@smsu.edu | Stantec Consulting Services, Inc. Jeff Brown 11687 Lebanon Road Cincinnati, OH 45241 (513) 842-8205 / FAX (513) 842-8250 jeff.brown@stantec.com Bob Madej 1500 Lakeshore Drive, Suite 100 Columbus, OH 43204 (614) 486-4383 / FAX (614) 486-4387 robert.madej@stantec.com James Kiser 1901 Nelson Miller Parkway Louisville, KY 40223 (502) 212-5000 / FAX (502) 212-5055 james.kiser@stantec.com |
| Merrill Tawse 791 Woodland Road Mansfield, OH 44906 (419) 756-1203 / cell (419) 989-2335 mtawsebats@yahoo.com | |
| Third Rock Consultants, LLC Rain Storm 2514 Regency Rd., Suite 104 Lexington, KY 40503 (859) 977-2000 / FAX (859) 977-2001 mforee@thirdrockconsultants.com | John Timpone 427 Terrington Drive Ballwin, MO 63021 (417) 894-5554 wanderingwolverine13@yahoo.com |
| Tragus Environmental Consulting Mike Johnson Endangered Species Consultants 37 North Highland Avenue Akron, OH 44303 (330) 472-7013 mike@tragusinc.com | Brianne Lorraine Walters Dept. of Ecology and Organismal Biology Indiana State University Terre Haute, IN 47809 (812) 237-8294 / FAX (812) 237-2526 bwalters2@isugw.indstate.edu |

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|--|---|
| Western Ecosystems Technology, Inc. Stephen Brandebura 2003 Central Avenue Cheyenne, WY 82001 (307) 634-1756 / FAX (307) 637-6981 sbrandebura@west-inc.com | John O. Whitaker, Jr. Department of Life Sciences Indiana State University Terre Haute, IN 47809 (812) 237-2383 / FAX (812) 237-2526 jwhitaker3@isugw.indstate.edu |
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*This list reflects permit data available as of December 13, 2010, and is subject to periodic revision to reflect permit changes



Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR

DAVID MUSTINE, DIRECTOR

Ohio Division of Wildlife

Vicki J. Mountz, Acting Chief
2045 Morse Rd., Bldg. G
Columbus, OH 43229-6693
Phone: (614) 265-6300

February 16, 2011

To all interested parties,

Based upon the updated project boundary map received on 8 February 2011, the Ohio Department of Natural Resources Division of Wildlife (DOW) has prepared these revised survey recommendations for Nordex's proposed project located in Seneca County.

Currently the project falls within regions that DOW has identified as needing extensive monitoring efforts. If the developer decides to amend the boundaries or based upon DOW site visit, the DOW will revise our survey recommendations.

The table below was created based upon a review of the project maps provided and summarizes the types and level of effort recommended by the DOW. Results from these studies will help the Department of Natural Resources assess the potential impact these turbines may pose, and influence our recommendations to the Ohio Power Siting Board. Monitoring should follow those criteria listed within the "On-shore Bird and Bat Pre-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio."

For additional ODNR comments, including information on the potential presence of threatened and endangered species within or adjacent to your project area, please contact Brian Mitch at (614) 265-6378 or brian.mitch@dnr.state.oh.us

| Project | |
|------------------------|--|
| Survey type | |
| Breeding bird | Breeding bird surveys should be conducted at all sites. The number of survey points may be based on the amount of available habitat, or twice the maximum number of turbines proposed for the site. Because agricultural land is not considered to be suitable nesting habitat for most species of bird, turbines placed within these types of habitat are exempt of this recommendation. |
| Raptor nest searches | Nest searches should occur on, and within a 1-mile buffer of the proposed facility. |
| Raptor nest monitoring | There is 1 eagle nest located on or within the 2 miles of the proposed project; as well 2 additional nests are just past the 2 mile buffer. The pair within the 2 mile radius should be monitored to assess their daily movement patterns. Should any additional nests of a protected species of raptor be located during nest searches, monitoring should commence as outlined within the on-shore protocols. |



Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR

DAVID MUSTINE, DIRECTOR

| | |
|--|---|
| Bat acoustic monitoring | To be conducted at all meteorological towers. |
| Passerine migration (# of survey points) | 11 |
| Diurnal bird/raptor migration (# of survey point) | 1 |
| Sandhill crane migration (same points as raptor migration) | NS |
| Owl playback survey points | NS |
| Barn owl surveys | NS |
| Bat mist-netting (# of survey points) | 22 |
| Nocturnal marsh bird survey points | NS |
| Waterfowl survey points | NS |
| Shorebird migration points | NS |
| Radar monitoring locations | 1 |

NS = Not required based on the lack of suitable habitat.

If you have any questions, please feel free to contact me.

Jennifer Norris, Wind Energy Wildlife Biologist
Olentangy Wildlife Research Station
Ohio Division of Wildlife
8589 Horseshoe Road
Ashley, OH 43003
Office phone: 740-747-2525 x 26
Cell: 419-602-3141
Fax: 740-747-2278

cc: Mr. Stuart Siegfried, Ohio Power Siting Board
Ms. Megan Seymour, United States Fish and Wildlife Service
Mr. Brian Mitch, Ohio Department of Natural Resources

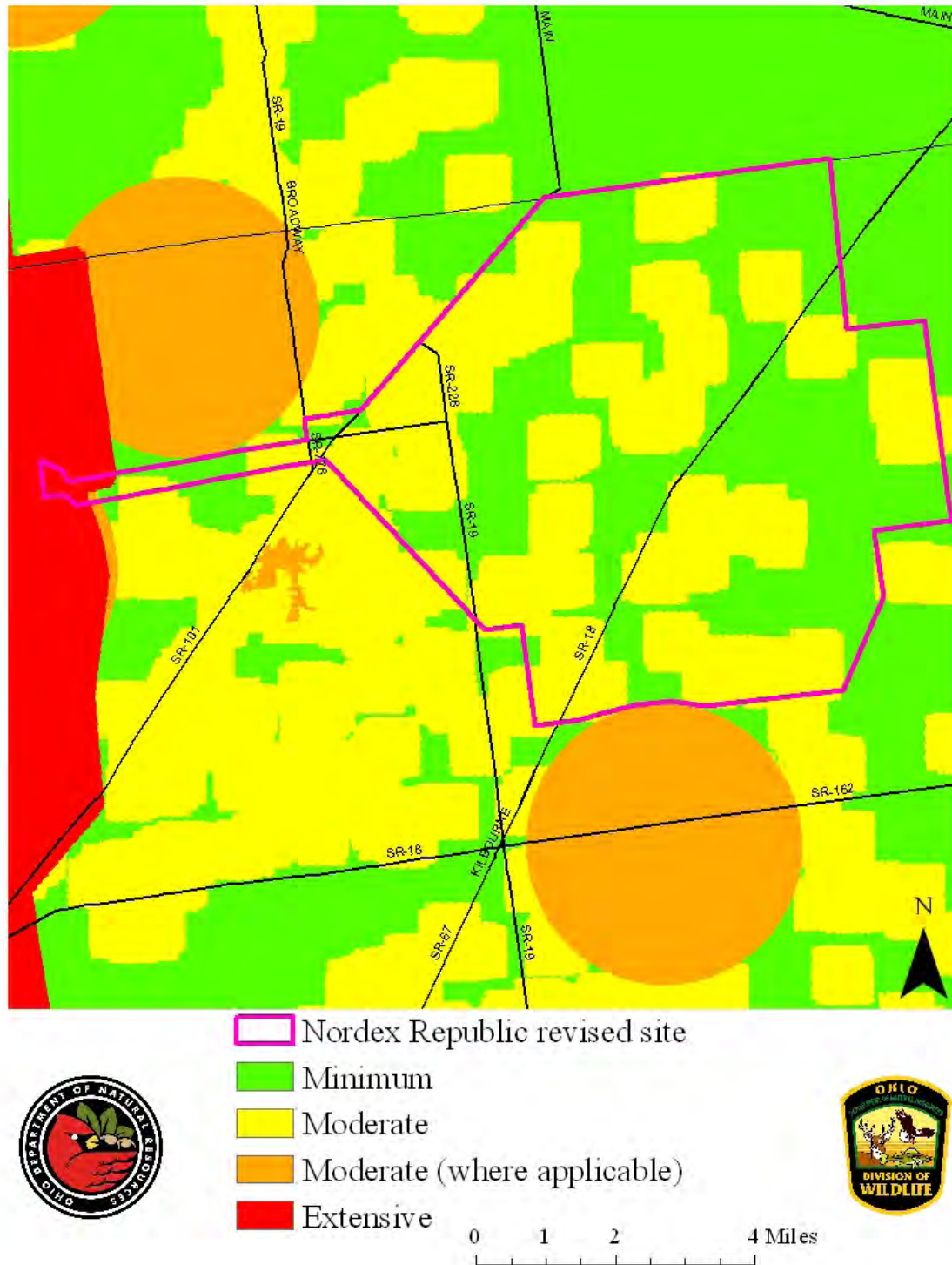


Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR

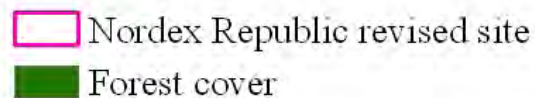
DAVID MUSTINE, DIRECTOR

Figure 1. Survey effort map with revised boundary for Nordex's proposed Republic project.





DAVID MUSTINE, DIRECTOR





Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR

DAVID J. MUSTINE, DIRECTOR

Ohio Division of Wildlife

Vicki J. Mountz, Acting Chief
2045 Morse Rd., Bldg. G
Columbus, OH 43229-6693
Phone: (614) 265-6300

January 25, 2011

To all interested parties,

Based upon the project boundary map received on 24 January 2011, the Ohio Department of Natural Resources Division of Wildlife (DOW) has prepared these survey recommendations for Nordex's proposed project located in Seneca County.

Currently the project falls within regions that DOW has identified as needing moderate (where applicable) monitoring efforts. If the developer decides to amend the boundaries, the DOW will revise our survey recommendations.

The table below was created based upon a review of the project maps provided and summarizes the types and level of effort recommended by the DOW. Results from these studies will help the Department of Natural Resources assess the potential impact these turbines may pose, and influence our recommendations to the Ohio Power Siting Board. Monitoring should follow those criteria listed within the "On-shore Bird and Bat Pre-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio."

For additional ODNR comments, including information on the potential presence of threatened and endangered species within or adjacent to your project area, please contact Brian Mitch at (614) 265-6378 or brian.mitch@dnr.state.oh.us

Project

| Survey type | |
|------------------------|---|
| Breeding bird | Breeding bird surveys should be conducted at all sites. The number of survey points may be based on the amount of available habitat, or twice the maximum number of turbines proposed for the site. Because agricultural land is not considered to be suitable nesting habitat for most species of bird, turbines placed within these types of habitat are exempt of this recommendation. |
| Raptor nest searches | Nest searches should occur on, and within a 1-mile buffer of the proposed facility. |
| Raptor nest monitoring | There is 1 eagle nest located on or within the 2 miles of the proposed project. This pair should be monitored to assess their daily movement patterns. Should any additional nests of a protected species of raptor be located during nest searches, monitoring should commence as outlined within the on-shore protocols. |



Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR

DAVID MUSTINI, DIRECTOR

| | |
|--|---|
| Bat acoustic monitoring | To be conducted at all meteorological towers. |
| Passerine migration (# of survey points) | 11 |
| Diurnal bird/raptor migration (# of survey point) | 1 |
| Sandhill crane migration (same points as raptor migration) | NS |
| Owl playback survey points | NS |
| Barn owl surveys | NS |
| Bat mist-netting (# of survey points) | 15 |
| Nocturnal marsh bird survey points | NS |
| Waterfowl survey points | NS |
| Shorebird migration points | NS |
| Radar monitoring locations | NS |

NS = Not required based on the lack of suitable habitat.

If you have any questions, please feel free to contact me.

Jennifer Norris, Wind Energy Wildlife Biologist
Olentangy Wildlife Research Station
Ohio Division of Wildlife
8589 Horseshoe Road
Ashley, OH 43003
Office phone: 740-747-2525 x 26
Cell: 419-602-3141
Fax: 740-747-2278

cc: Mr. Stuart Siegfried, Ohio Power Siting Board
Ms. Megan Seymour, United States Fish and Wildlife Service
Mr. Brian Mitch, Ohio Department of Natural Resources

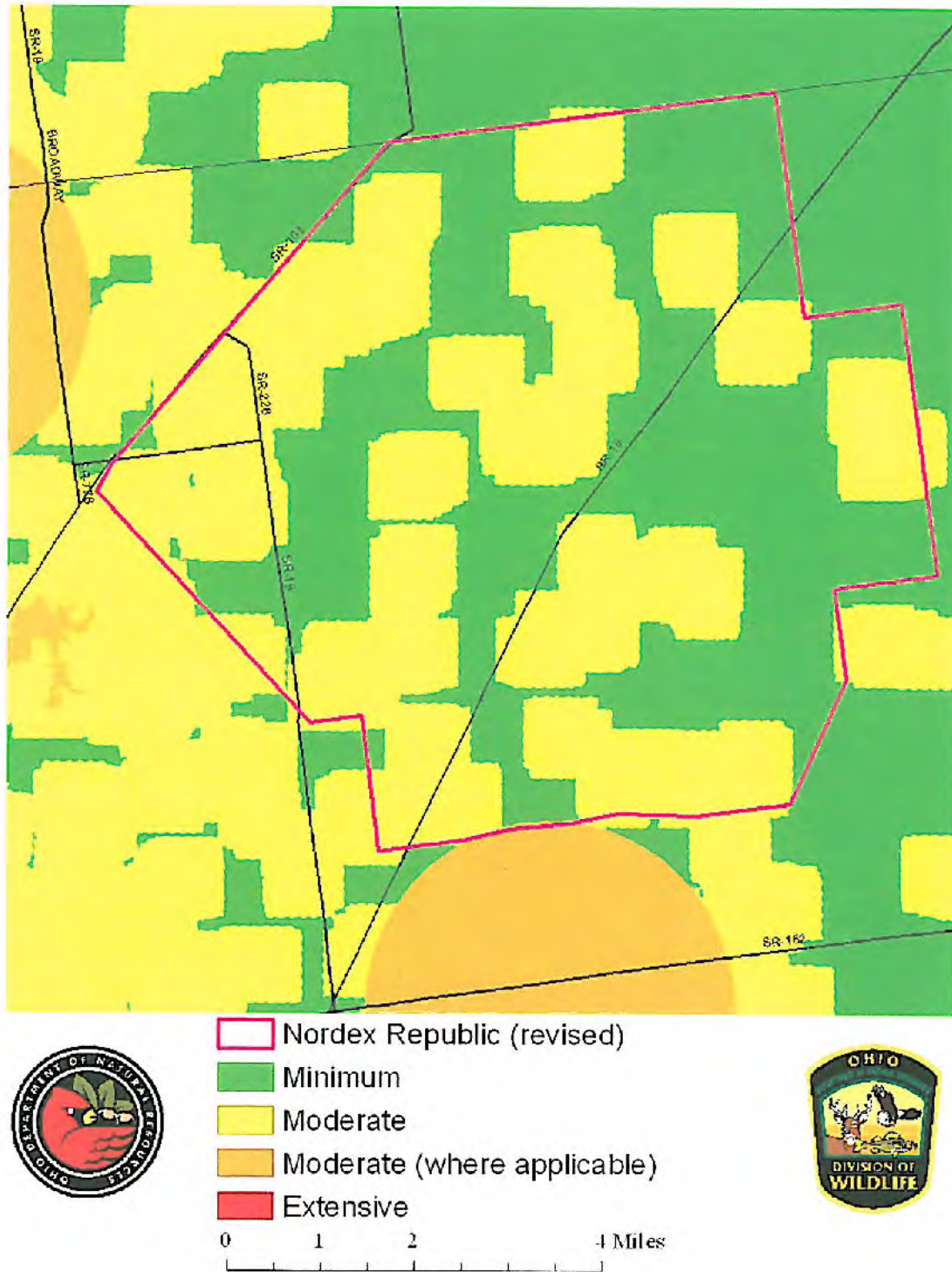


Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR

DAVID MUSTINE, DIRECTOR

Figure 1. Survey effort map with revised boundary for Nordex's proposed Republic project.



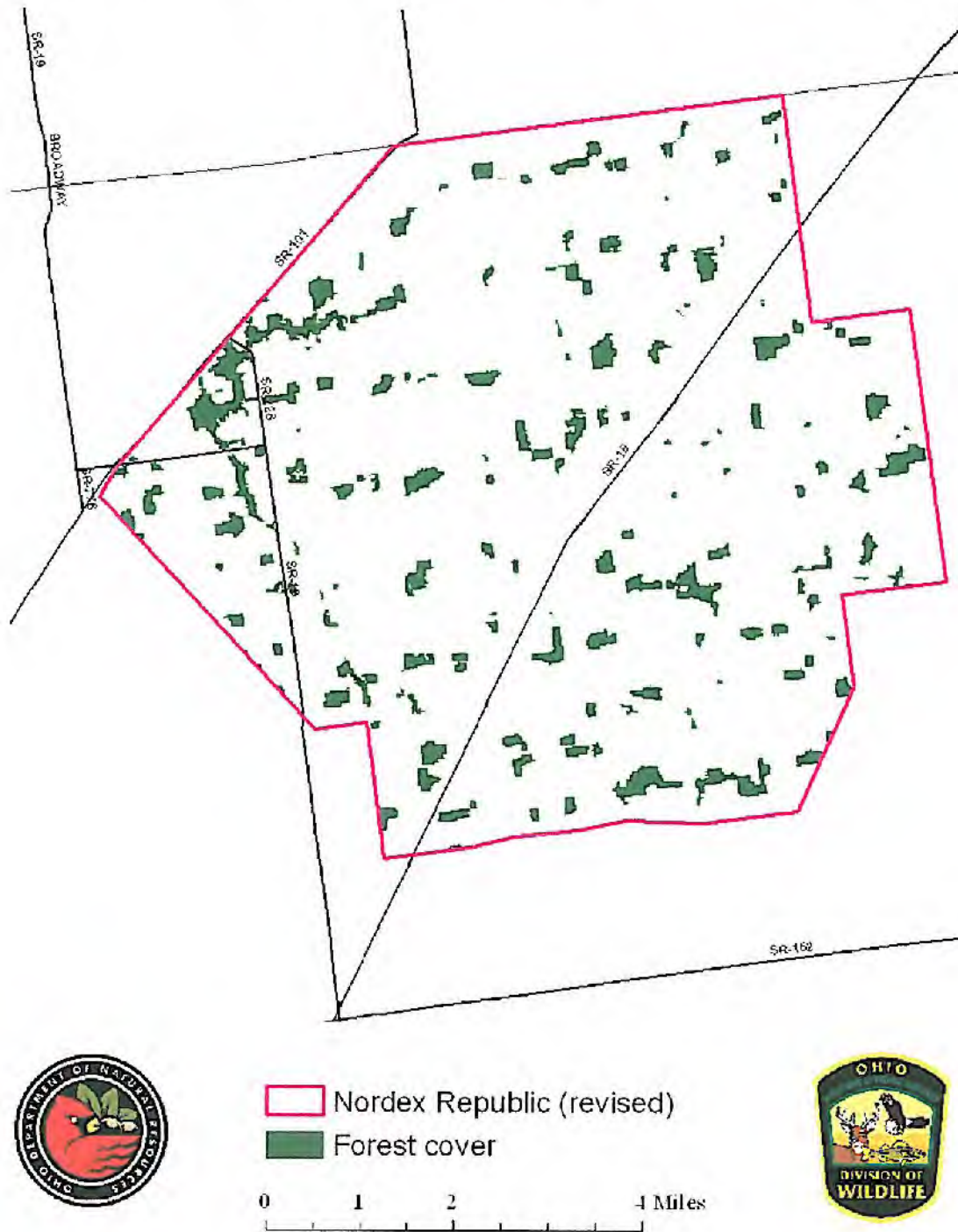


Ohio Department of Natural Resources

JOHN R. KASICH, GOVERNOR

DAVID MUSTINE, DIRECTOR

Figure 2. Forest cover map with revised boundary for Nordex's proposed Republic project.





Ohio Department of Natural Resources

TED STRICKLAND, GOVERNOR

SEAN D. LOGAN, DIRECTOR

Division of Wildlife
David M. Graham, Chief
2045 Morse Rd., Bldg. G
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Phone: (614) 265-6300

April 2, 2010

To all interested parties,

Based upon the revised project boundary map received on 2 April 2010, the Ohio Department of Natural Resources Division of Wildlife (DOW) has prepared these survey recommendations for the proposed Nordex wind energy project located in Seneca County. After reviewing the project area map provided and site visits conducted within that region, the DOW has determined that this proposed facility would be classified as a "moderate" site under the current monitoring protocols (Fig. 1).

The table below was created based upon the project maps provided and summarizes the types and level of effort recommended by the DOW. Results from these studies will help the Department of Natural Resources assess the potential impact these turbines may pose, and influence our recommendations to the Ohio Power Siting Board. Monitoring should follow those criteria listed within the "On-shore Bird and Bat Pre-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio."

| Project | |
|----------------------|---|
| Survey type | |
| Breeding bird | Breeding bird surveys should be conducted at all sites. The number of survey points may be based on the amount of available habitat, or twice the maximum number of turbines proposed for the site. Because agricultural land is not considered to be suitable nesting habitat for most species of bird, turbines placed within these types of habitat are exempt of this recommendation. |
| Raptor nest searches | Nest searches should occur on, and within a 1-mile buffer of the proposed facility. |

| | |
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| Raptor nest monitoring | There are 2 eagle nests located on or within 2 miles of the proposed project. These pairs should be monitored to assess their daily movement patterns. Should additional nests of a protected species of raptor be located during nest searches, monitoring should commence as outlined within the on-shore protocols. |
| Bat acoustic monitoring | Acoustic monitoring should be conducted at all meteorological towers. |
| Passerine migration (# of survey points) | 16 |
| Diurnal bird/raptor migration (# of survey point) | 1 |
| Sandhill crane migration (same points as raptor migration) | NS |
| Owl playback survey points | 1 |
| Barn owl surveys | NS |
| Bat mist-netting (# of survey points) | 32 |
| Nocturnal marsh bird survey points | NS |
| Waterfowl survey points | NS |
| Shorebird migration points | NS |

| | |
|----------------------------|----|
| Radar monitoring locations | NS |
|----------------------------|----|

NS = Not required based on the lack of suitable habitat.

The DNR looks forward to working with you on this or any other proposed project in the future. If you have any questions, please feel free to contact me.

Keith

Old Woman Creek Nat'l Estuarine Research Reserve and State Nature Preserve
Ohio Division of Wildlife
2514 Cleveland Road East
Huron, OH 44839
Office phone: 419-433-4601
Cell: 419-602-3141
Fax: 419-433-2851

cc: Mr. Stuart Siegfried, Ohio Power Siting Board
Ms. Megan Seymour, United States Fish and Wildlife Service

Figure 1.

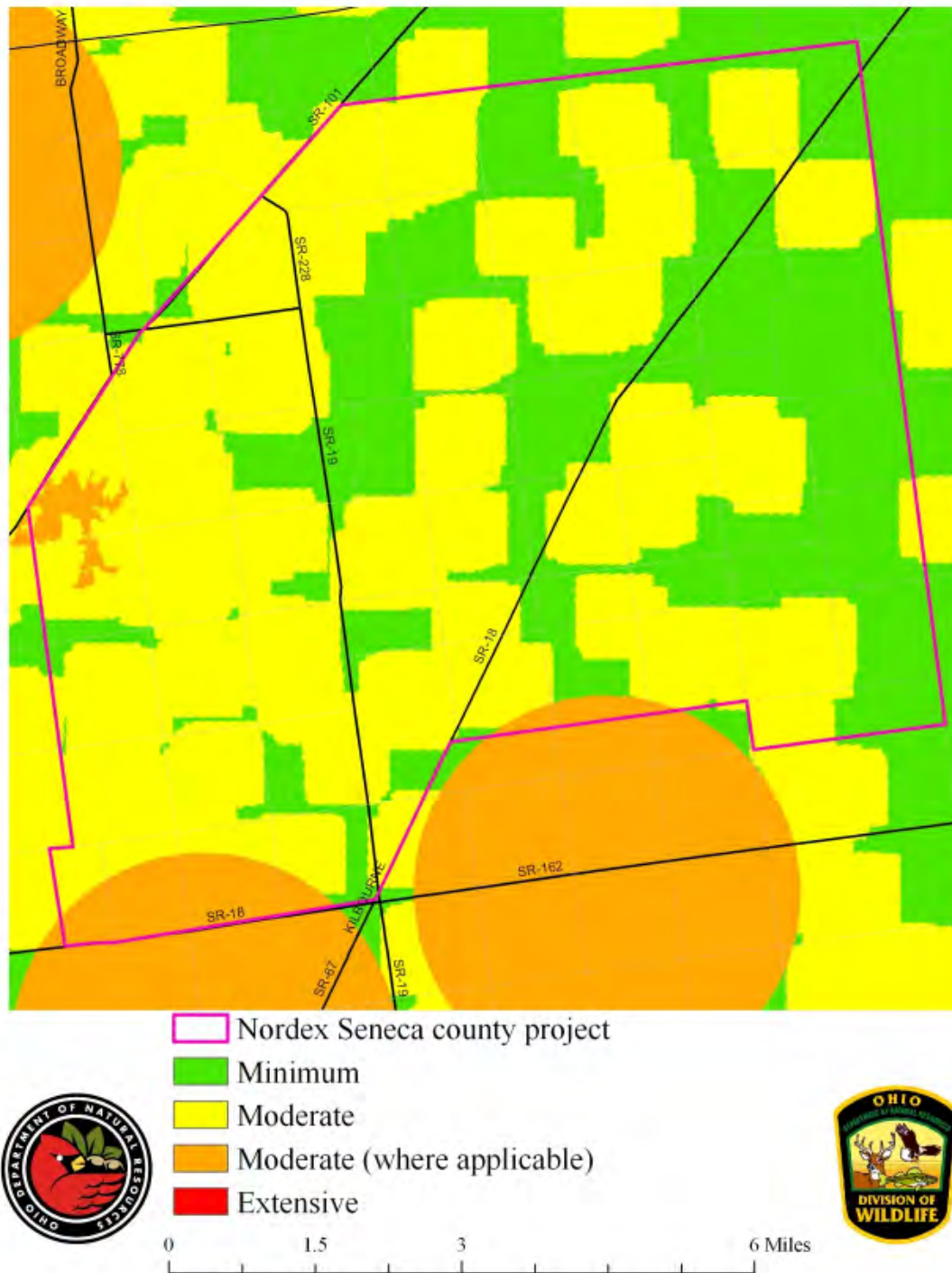
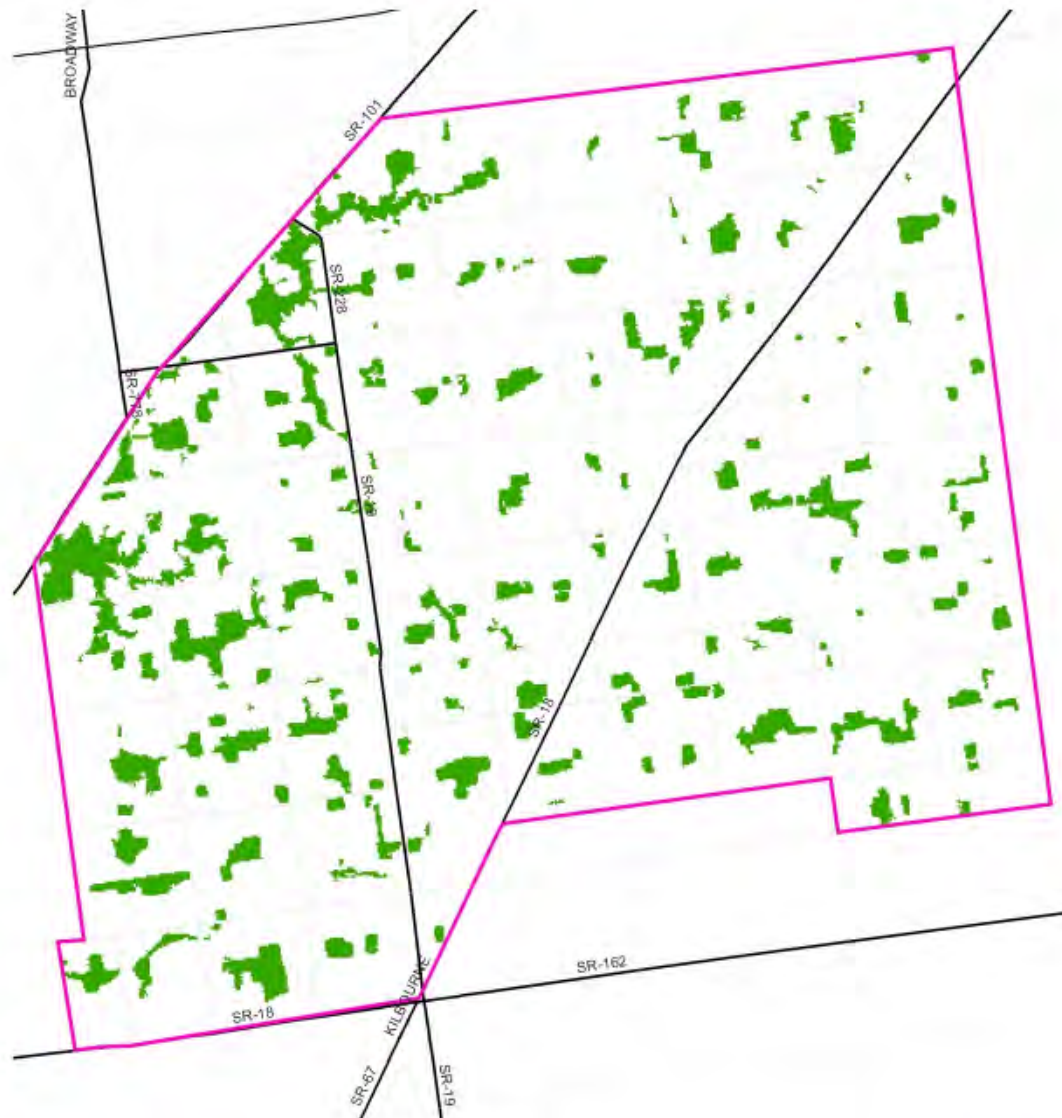




Figure 2.



 Nordex Seneca county project
 Forest cover

0 1.5 3 6 Miles



APPENDIX B
Site Photographs

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

12/26/2018 12:57:15 PM

in

Case No(s). 17-2295-EL-BGN

Summary: Application Exhibit J Part 6 of 33 electronically filed by Teresa Orahod on behalf of Dylan F. Borchers