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June 19, 2018

Ms. Barcy F. McNeal, Secretary
Ohio Power Siting Board
Docketing Division
180 East Broad Street, 11th Floor
Columbus, OH 43215

**Re: Case No. 13-197-EL-BGN, 16-1687-EL-BGA, and 17-1099-EL-BGA
Trishe Wind Ohio, LLC
Compliance with Condition 13 of the Supplement - Bird and Bat Conservation
Strategy**

Dear Ms. McNeal:

Trishe Wind Ohio, LLC (“Applicant”) is certified to construct a wind-powered electric generation facility in Paulding County, Ohio, in accordance with the December 16, 2013 Opinion, Order, and Certificate (“Certificate”) issued by the Ohio Power Siting Board (“Board”). The Certificate is subject to the 40 conditions set forth in the December 16, 2013 Order, as well as the 26 conditions set forth in the October 1, 2013 supplement to the original application (“Supplement”).

Condition 13 of the Supplement requires the Applicant to submit to the Board’s staff for review and acceptance a post-construction bird and bat monitoring plan. On March 8, 2018, the Applicant filed a notification of compliance with Condition 13 and attached its Bird and Bat Conservation Strategy. At this time, the Applicant is updating its March 8, 2018 filing to notify the OPSB that its finalized Bird and Bat Conservation Strategy, which we attach to this letter, has been approved by the Ohio Department of Natural Resources (“ODNR”). ODNR intends to issue a formal approval letter subsequent to this filing.

We are available, at your convenience, to answer any questions you may have.

Respectfully submitted,

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COLUMBUS 73809-1 91962v1

Bird and Bat Conservation Strategy
Northwest Ohio Wind Project

Paulding County, Ohio

June 16, 2018



Prepared For:

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Bird and Bat Conservation Strategy

Northwest Ohio Wind Project

Paulding County, Ohio

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Date: 6/16/2018

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ACRONYMS AND ABBREVIATIONS

AEP	American Electric Power
amsl	above mean sea level
APLIC	Avian Power Line Interaction Committee
APM	Applicant Proposed Measures
BBCS	Bird and Bat Conservation Strategy
BBS	North American Breeding Bird Survey
BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
BMPs	Best Management Practices
CBC	Christmas Bird Count
CECPN	Certificate of Environmental Compatibility and Need
ECPG	Eagle Conservation Plan Guidance
ESA	Endangered Species Act
FAA	Federal Aviation Administration
ft	feet
GAP	Geographical Approach to Planning
GIS	Geographic Information Systems
GPS	Global Positioning System
kV	kilovolt
IBAs	Important Bird Areas
IPaC	Information for Planning and Consultation
m	meters
MBTA	Migratory Bird Treaty Act
MET	meteorological
mi ²	square mile(s)
MW	megawatt
NHI	Natural Heritage Inventory
NPDES	National Pollutant Discharge Elimination System
NWI	National Wetlands Inventory
O&M	Operations and Maintenance
ODNR	Ohio Department of Natural Resources
ODOW	Ohio Division of Wildlife
OPSB	Ohio Power Siting Board
POI	Point of Interconnection
ROW	right-of-way
RSA	rotor swept area
SWPPP	Storm Water Pollution Prevention Plan
TWO	Trishe Wind Ohio, LLC
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WEG	USFWS Final Land-based Wind Energy Guidelines

Westwood	Westwood Professional Services
WIRS	Wildlife Incident Reporting System
WMAs	Wildlife Management Areas
WPAs	Waterfowl Production Areas
WTG	wind turbine generator

1.0 INTRODUCTION

Trishe Wind Ohio, LLC (TWO), is dedicated to producing clean, reliable, renewable power while demonstrating respect and stewardship for the natural environment. As the sponsor of the 100-megawatt (MW) Northwest Ohio Wind Energy Project located in Paulding County, Ohio (hereafter referred to as “Project”), TWO submits the following Bird and Bat Conservation Strategy (BBCS) as evidence of its approach to responsible wind energy development. TWO believes that the Project will be a net-benefit to the health and prosperity of the nearby communities of Paulding County, Ohio.

1.1 Corporate Policy on Bird and Bat Conservation

TWO recognizes that wind power generation has the potential to impact birds and bats and is committed to minimizing these impacts for the sake of the ecosystems and the communities on which they depend. TWO also understands that renewable power generation, as an alternative to fossil fuel energy sources, benefits the environment and its inhabitants. By instituting a comprehensive BBCS, TWO believes that the benefits of the proposed Project will far outweigh its impacts and will provide significant positive contributions to both the human and natural environments.

In that spirit, TWO is committed to working cooperatively with the U.S. Fish and Wildlife Service (USFWS), Ohio Department of Natural Resources (ODNR) Division of Wildlife (ODOW), Ohio Power Siting Board (OPSB), and non-governmental organizations to promote the reasonable protection of bird and bat species during all phases of the Project’s development, construction, and operation. TWO is dedicated to incorporating the latest, state-of-the-art knowledge and best management practices (BMPs) in the field of bird and bat protection at wind farms and this is reflected in its pre-construction assessments, Project design, construction, post-construction monitoring, and long-term adaptive management strategies. Over the course of the Project’s operating life, TWO pledges to design and operate the proposed Project in a manner which provides decades of clean, renewable energy to the public while effectively reducing Project impacts to bird and bat species, thereby balancing the health of the environment with society’s growing need for electricity.

1.2 Purpose of the BBCS

In fulfillment of TWO’s commitment to environmental stewardship, TWO has developed this site-specific BBCS to reduce potential impacts to birds and bats as a result of construction and operation of the proposed Project. In formulating the BBCS, TWO incorporated recommendations and guidance from the following sources: the *USFWS Final Land-Based Wind Energy Guidelines* (WEG) (USFWS 2012); USFWS’s *Bird Protection Plan Guidelines* (APLIC and USFWS 2005); *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio*

(ODNR 2009); and the Edison Electric Institute's *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* (APLIC 2012). This BBCS also draws upon the results of pre-construction bird and bat studies conducted at and near the Project site; results from relevant post-construction surveys conducted to date at similar facilities; the latest science regarding options for effectively avoiding and minimizing potential impacts to birds and bats; and comments and recommendations that have been received to date from the USFWS and ODOW during the Project development process.

The BBCS is structured around an adaptive management framework and includes detailed provisions for avoiding, reducing, and, if warranted, mitigating for potential impacts to birds and bats. The BBCS will be a living document throughout the life of the Project, during which, TWO will work with USFWS and ODOW to evaluate the findings of post-construction studies, formulate recommendations and definitions, and incorporate them into the BBCS on an iterative basis. The monitoring, reporting, and adaptive management programs described in this BBCS will allow this plan to respond and adapt to both actual results and unforeseen or changing (biological or technological) circumstances over the life of the Project.

1.3 Goals and Objectives

This BBCS has been developed to be consistent with the *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (ODNR 2009) and the most recent WEG, dated March 23, 2012 (USFWS 2012). The goal of this BBCS is to minimize the Project's impacts to birds and bats in a scientifically sound, and commercially reasonable manner. TWO intends to achieve this goal by incorporating into the BBCS the following actions:

- Study baseline mortality and injury rates during the first year of Project operation, and work with USFWS and ODOW to establish management strategies and, if applicable, acceptable mortality thresholds;
- Implement a permanent (for the life of the Project) informal wildlife mortality monitoring and reporting program and an immediate alert procedure for biologically significant events;
- Implement a tiered consultation strategy to guide decision-making and allow for modifications to the BBCS, based on actual results and unexpected events over the life of the Project; and
- Evaluate the feasibility and effectiveness of avoidance and minimization measures and adaptive management on minimizing bird and bat mortality.

This document follows the suggested tiered approach as outlined in the WEG by documenting preliminary site evaluation (Tier 1) and characterization (Tier 2), pre-construction field studies and impact prediction (Tier 3), and post-construction monitoring studies and impact assessment (Tiers 4 and 5). Tier 1 and 2 analyses were

conducted for the Project Area to screen for potential broad-based environmental and site development issues and to guide site design. To that end, a sensitive habitat and sensitive species review was prepared and shared with the USFWS and ODOW as part of early agency coordination efforts. These documents have been incorporated into this BBCS and the Certificate of Environmental Compatibility and Public Need (CECPN) Application for the Project. Tier 3 field studies served to inform the Project proponents and regulatory agencies regarding avian and bat species present within the Project boundary and adjacent to the site. Furthermore, TWO is committed to an adaptive management strategy, such that as new guidance and information becomes available, the BBCS can be amended to incorporate more effective monitoring, avoidance, minimization and mitigation strategies, if needed.

1.4 Agency Coordination

Correspondence with state and federal agencies, including USFWS and ODOW was initiated in December 1, 2009 for information specific to the Project regarding sensitive resources and potential impacts. In January 2010, ODOW, in coordination with USFWS, provided survey recommendations for the proposed Project. The ODOW determined that the proposed facility required the “minimum” level of sampling effort based upon the location and land-use practices of the site, as over 93 percent of land within the Project Area is currently in active agriculture, and thus, is unsuitable as habitat for most species of birds and bats. Further coordination, conducted in late April 2010 with representatives from the wildlife agencies and project development team, minimized the avian survey recommendations further to exclude general avian point count surveys and include only northern harrier (*Circus cyaneus*) (state-listed endangered) monitoring. This reduction in avian survey requirements was due to the lack of suitable habitat for Ohio breeding birds, especially those with federal and/or state conservation status.

After a two year dormancy period, the Project was revitalized in late 2012. Contact was re-established with the wildlife agencies in March 2013 to assess the need for updated studies. The ODNR recommended updated northern harrier surveys, which is consistent with the *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (ODNR 2009). On October 28, 2014, a request for a Technical Assistance Letter (TAL) for Indiana bats was sent to the USFWS. In a TAL dated October 28, 2014, the USFWS concluded that the Project is unlikely to result in take of listed bat species only if the 6.9 m/s cut-in speed, at night, during spring and fall migration periods for bats is implemented. A summary of agency correspondence for the Project is provided in **Appendix A**.

1.5 Regulatory Framework

This BBCS was prepared to demonstrate efforts to comply with federal and state regulations including the federal Endangered Species Act (ESA), Bald and Golden Eagle Protection Act (BGEPA), Migratory Bird Treaty Act (MBTA), and State of Ohio regulations.

1.5.1 Endangered Species Act

The federal ESA of 1973 (16 U.S.C. §§1531 et seq.), as amended, provides for the listing, conservation, and recovery of listed threatened and endangered species and conservation of designated critical habitat that the USFWS has determined is required for the survival and recovery of these species. Section 9 of the federal ESA prohibits the “take” of species listed by USFWS as threatened or endangered.” Take is defined as “...to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in such conduct.” In recognition that take cannot always be avoided, Section 10(a) of the federal ESA includes provisions for take that is incidental to, but not the purpose of, otherwise lawful activities. Section 10(a)(1)(B) permits (incidental take permits) may be issued if take is incidental and does not jeopardize the survival and recovery of the species.

Section 7(a)(2) of the federal ESA requires all federal agencies, including the USFWS, to evaluate projects with respect to any species proposed for listing or already listed as endangered or threatened and any proposed or designated critical habitat for the species. Federal agencies must undertake programs for the conservation of endangered and threatened species, and are prohibited from authorizing, funding, or carrying out any action that will jeopardize a listed species or destroy or modify its critical habitat.

The siting, design, and operation components of the Project incorporate measures to ensure the potential for impacts to federally listed bird and bat species is reduced or eliminated. These measures are described in this BBCS.

1.5.2 Bald and Golden Eagle Protection Act

The federal BGEPA of 1940 (16 U.S.C. §§ 668–668c), as amended, is administered by the USFWS and was enacted to protect bald and golden eagles, their nests, eggs, and parts (e.g., feathers or talons). The BGEPA states that no person shall take, possess, sell, purchase, barter, offer for sale, transport, export, or import any bald or golden eagle alive or dead, or any part, nest or egg without a valid permit to do so. The BGEPA also prohibits the take of bald and golden eagles unless pursuant to regulations. Take is defined by the BGEPA as an action “to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.” Disturb is defined in

the BGEPA as “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior”. In addition to immediate impacts, this definition also covers impacts that result from human-caused alterations initiated around a previously used nest site during a time when eagles were not present. Although the bald eagle was removed from the Endangered Species List in June 2007, it is still federally protected under the BGEPA and Migratory Bird Treaty Act (MBTA 1918), as described in the following section. In addition, the *National Bald Eagle Management Guidelines* were published in conjunction with delisting by the USFWS in May 2007 to provide provisions to continue to protect bald eagles from harmful actions and impacts. In 2009, new permit rules were created for lawful take of eagles. In April 2013, USFWS issued *Final Eagle Conservation Plan Guidance, Module 1: Land-based Wind Energy* to address these new regulatory matters (USFWS 2013).

In 2017, a new incidental take permit rule for eagles became effective. Under 50 C.F.R. § 22.26, the USFWS can issue permits that authorize incidental take of bald and golden eagles when the take is associated with, but not the purpose of an otherwise lawful activity, and cannot practicably be avoided, and is compatible with the preservation of the bald and golden eagle. The 2017 rule requires that the permittee comply with all avoidance and minimization or other mitigation measures specified in the terms of the permit to mitigate for the detrimental effects on eagles, including direct and cumulative effects of the permitted take, which the USFWS must also take into account before it issues the permit. Additional considerations for issuing incidental take permits include determinations of whether: the take is associated with the permanent loss of an important eagle use area; the take is necessary to protect a legitimate interest in a particular locality; or the cumulative authorized take may exceed five percent of the local area population.

1.5.3 Migratory Bird Treaty Act

The MBTA of 1918 (16 U.S.C. §§ 703-712) makes it unlawful to pursue, capture, kill, or possess any migratory bird or part, nest, or egg of any such bird listed in wildlife protection treaties between the United States, Great Britain, Mexico, Japan, and Russia (and other countries of the former Soviet Union). Most birds (outside of introduced species and non-migratory game birds) within the United States are protected under the MBTA. In total, more than 1,000 bird species are protected by the MBTA, 58 of which can be legally hunted with a permit as game birds.

The MBTA addresses take of individual birds, not population level impacts. Failure to comply with the MBTA can result in criminal penalties. Although a new USFWS

Solicitor Memo interprets the MBTA to prohibit only purposeful take, and not incidental take, the USFWS recognizes that some level of mortality of migratory birds at wind projects can occur even if all reasonable measures to avoid mortality are implemented (USFWS 2010). The USFWS has and continues to provide wind power project developers guidance in making a good-faith effort to comply with the MBTA. The USFWS has indicated that the Department of Justice has exercised discretion in enforcing provisions of the MBTA regarding companies who have made good faith efforts to avoid the take of migratory birds. Due to the potential for resident and migratory birds to be affected by the Project, this BBCS has been developed, in part, as a good faith effort on behalf of TWO to comply with the MBTA.

1.5.4 State of Ohio Regulations

According to Ohio Revised Code 1531.25, (protection of species threatened with statewide extinction) the chief of the division of wildlife, with the approval of the wildlife council, may adopt and modify and repeal rules, in accordance with Chapter 119 of the Revised Code, restricting the taking or possession of native wildlife, or any eggs or offspring thereof, that he/she finds to be threatened with statewide extinction. The rules identify the common and scientific names of each endangered species and may be modified from time to time to include all species on the list of endangered fish and wildlife pursuant to Section 4 of the ESA, 87 Stat. 884, 16 U.S.C. 1531, as amended, and that are native to the State, or that migrate or are otherwise reasonably likely to occur within the State. In addition, Chapter 4906.20 of the Ohio Revised Code requires economically significant wind farms to be sited in a manner compatible with environmental protection including wildlife, sustainable development, and the efficient use of resources.

2.0 PROJECT DESCRIPTION

The Project will be constructed on approximately 21,046 acres (33 square miles [mi²]) of land in portions of Blue Creek and Latty Townships and the Village of Haviland in Paulding County, Ohio (**Exhibit 2-1**). This part of northwest Ohio is home to several operating, utility-scale wind farms including Timber Road Wind Farm (100 MW), located west of the Northwest Ohio Wind Energy Project, and Blue Creek Wind Farm (304 MW), which is located to the south.

Land lease and wind easements have been signed with approximately 274 landowners representing approximately 12,750 acres of land. TWO is proposing to install up to 42- GE 2.5-116 wind turbine generators (WTG), which would be placed in 42 of the currently permitted 60 locations along with associated infrastructure including a temporary staging and laydown area, underground electrical collection and communication lines, a voltage step-up facility, an operations and maintenance (O&M) building, permanent meteorological tower(s), and gravel access roads (**Exhibit 2-2**). Each WTG would have a hub height of approximately 90 meters (m) (295 feet [ft]) and a rotor diameter of 116 m (380 ft). The WTGs would be approximately 148 m (486 ft) tall at the maximum extension of the rotor blades (tip height) and mounted on a reinforced concrete foundation.

The Facility will interconnect to an existing 138 kilovolt (kV) American Electric Power (AEP) transmission line which runs through the southern part of the Project Area. The point of interconnection (POI) is at the existing AEP Haviland Substation, just south of Haviland, Ohio. Voltage from the 34.5 kV underground electrical collection system will be stepped up to 138 kV at a step-up transformer facility immediately adjacent to the Haviland Substation, obviating the need for an overhead interconnection transmission line.

3.0 PROJECT AREA

Topography within the Project Area is generally flat with numerous ditches and drain tile (**Exhibit 3-1**). Overall, the Project Area slopes downward from west to east from a high elevation of 746 feet above mean sea level (amsl) down to 710 feet amsl.

A total of five land cover types are recognized and mapped within the Project Area. Approximately 94 percent of the Project Area is comprised of cultivated cropland, consisting primarily of corn and soybeans and the remaining six percent is comprised of developed land, deciduous forest, herbaceous cover, and woody wetlands (**Exhibit 3-2**) (**Table 3-1**).

No significant waterbodies are mapped within the Project Area; however, intermittent and perennial watercourses cover approximately 35 linear miles within the Project Area. Portions of nine named waterways are located within the Project Area: Cunningham Creek, Blue Creek, Maddox Creek, Horse Run, West Branch Prairie Creek, Dry Creek, Hagerman Creek, Dog Run, and Prairie Creek (**Exhibit 3-3**).

Table 3-1: Land Cover Types within the Project Area

Land Cover Type	Total Area (Acres)	Percent of Project Area
Cultivated Crops	9,933	94.4
Developed Land	508.3	4.8
Deciduous Forest	63.6	0.6
Herbaceous	14.9	0.1
Woody Wetlands	4.6	< 0.1
TOTAL	10,524	100.0

4.0 PRE-CONSTRUCTION ASSESSMENT AND SITING

The USFWS has provided the wind industry with guidance on the siting, design and operation of wind farms through a series of guidance documents that have culminated with the USFWS voluntary WEG, issued on March 23, 2012 (USFWS 2012). USFWS guidance documents released prior to the issuance of the WEG included:

- Voluntary Interim Guidelines – July 2003
- Wind Turbine Guidelines Advisory Committee Recommended Guidelines – March 2010
- USFWS Draft Land-Based Wind Energy Guidelines – February 2011

Much of TWO's site selection, layout development, and biological survey work occurred while these guidance documents were evolving and before the final WEG were issued. However, because prior guidance contained many of the elements contained in the final WEG, TWO's site screening, characterization, and assessment processes were largely consistent with the tiered assessment approach called for in the WEG.

The following sections summarize the results of Tier 1 and Tier 2 studies completed within the Project Area by Westwood Professional Services (Westwood) on behalf of TWO. As recommended by the WEG, these studies involved considerable effort related to landscape-level and desktop environmental review to inform Project location, siting, and individual locations of turbines.

4.1 Tier 1 – Preliminary Site Screening

The Project Area is primarily comprised of row crop agricultural land and, as such, is ecologically suited for wind development. TWO completed desktop environmental review and siting analysis to determine where the Project Area should be located and to create a preliminary turbine layout that avoids sensitive resources in the Project Area. Turbine siting, spacing, and setbacks adhere to the wind energy conversion facility siting criteria outlined in Section 4906.20 of the Ohio Revised Code, and incorporates information from discussions with OPSB, ODOW, and USFWS. Although a 2014 amendment (HB 483) now requires a minimum setback of 1,125 feet in horizontal distance from the tip of the turbine's nearest blade at ninety degrees to the property line of the nearest adjacent property, the proposed Project was already permitted and therefore unaffected by the amendment. A map incorporating buildable and non-buildable land as determined by this data was developed to minimize impacts to the environment. Other constraints used in determining Project siting included avoidance of potential habitat for the Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*); avoidance of wetlands, grasslands, and forest stands; avoidance of habitat for state and federal protected species; and avoidance of sensitive and unique ecosystems identified by the ODOW.

4.2 Tier 2 – Site Characterization

In Tier 2 studies, available site-specific information is gathered to further characterize sites identified as potentially suitable in the Tier 1 evaluation. As such, a sensitive habitat review and sensitive species evaluation was prepared for the Project. Site-specific information was obtained from publicly available sources to identify the likelihood of occurrence of wildlife species of concern. Based on areas identified in the Tier 1 evaluation, the evaluation was further focused to identify areas that could present particular risk to particular species or species groups, such as known or suspected bat hibernacula, areas of known avian migratory corridors, raptor nesting sites, or records of special status bird or bat species. Sensitive resources near the Project Area were also identified through analysis of existing data sources. These sources included Ohio Natural Heritage Inventory (NHI) geographic information system (GIS) data; USFWS Information for Planning and Consultation (IPaC) system for federally listed species; ODNR Wildlife Management Areas (WMAs); USFWS Natural Wildlife Refuges and Waterfowl Production Areas (WPAs), Audubon Society Important Bird Areas (IBAs), North American Breeding Bird Survey (BBS) data, National Wetlands Inventory (NWI) maps, and other readily available databases, public records, GIS data, and websites. The results of these studies are summarized below.

The Project Area lies within an intensively farmed agricultural landscape that is already heavily fragmented. Cropland constitutes over 93 percent of the land cover in the Project Area. Woody habitat occurs in small widely scattered patches, including along riparian corridors. The Project Area contains almost no grassland.

Nesting habitat for raptors is poor in quality within the Project Area, particularly for bald eagles, and no IBA's are located within or near the Project Area. The ODOW has not documented any bald eagle nests in Paulding or Van Wert counties and TWO is not aware of any other types of important eagle use areas (i.e. foraging areas, winter night roosts) there. While it is possible for bald eagles to pass through the Project Area during migration periods, such movements are likely uncommon due to the minimal food resources available to eagles within the Project Area.

The 2006-2011 report on the nearest BBS survey route indicated that some 69 species of birds potentially breed in the Project Area. Most of these species are typical of intensively farmed agricultural areas with scattered farmsteads, small woodlots, and degraded watercourses. Due to the lack of suitable habitat, eagles and other rare/sensitive species are unlikely to utilize the Project Area for nesting purposes. Available data from pre-and post-construction monitoring of operating wind farms in the region indicate there is a low likelihood for federal and state-listed avian species of concern to occur within the Project Area and that the Project presents a low risk regarding impacts to birds.

Five of the seven bat species present in Ohio have the potential to utilize wooded stream corridors and wetland areas within and near the Project Area for foraging and roosting habitat; however, no mines, caves, karst, or pseudokarst formations are known to occur within or near the Project Area or surrounding region that would provide hibernaculum or night-roosting habitat for bats. The Project Area lies within the range of the federally listed Indiana bat and the northern long-eared bat. No designated critical habitat for the Indiana bat or northern long-eared bat exists within the Project Area. Based on three documented fatalities that occurred on adjacent wind farms during the 2012 and 2014 fall and spring migration periods, it is likely that both the Indiana bat and northern long-eared bat migrate through the Project Area.

4.3 Tier 1 & Tier 2 – USFWS WEG Questions and Responses

The Project Area offers very little quality habitat. Publicly available bird occurrence data sources and state and federal rare species and critical habitat databases suggest that state or federally listed bird species are unlikely to occur within the Project Area. Based on Project intentions to avoid sensitive habitat and resources, it is unlikely Project development will have significant adverse effects on avian and bat populations or habitat availability (**Table 4-1**).

Table 4-1: Northwest Ohio Wind Project Tier 1 and 2 Evaluation Summary

Tier Question	Tier Question Summary
Are there species of concern present on the potential site or is habitat present for these species?	The Project Area lies within the range of the federally endangered Indiana bat (<i>Myotis sodalis</i>), as well as the federally threatened northern long-eared bat (<i>Myotis septentrionalis</i>). No designated critical habitat for either species exists within the Project Area. Fifteen wildlife species listed by the ODNR as endangered, threatened, species of concern, or special interest have the potential to occur within the Project Area. These species are listed in Table 8-9 of the Amended CECPN application filed with the OPSB and include one fish species, three mussels, two reptiles, one amphibian, two birds and six bats. Eight of the fifteen species have low potential to occur within the Project Area due to intense agricultural activity and lack of habitat, including all of the listed species of fish, mussels, amphibians and reptiles. The northern harrier (<i>Circus cyaneus</i> ; state endangered) has been observed flying through the Project Area but has not been found to nest there due to a lack of grassland habitat.
Which bird and bat species are likely to use proposed site?	Some 69 species of birds potentially breed in the Project Area, of which surveys confirmed 26 species were observed within the Project Area. The most common birds found in agricultural areas include the red-winged blackbird (<i>Agelaius phoeniceus</i>), killdeer (<i>Charadrius vociferus</i>), and horned lark (<i>Eremophila alpestris</i>). Bat species most likely to utilize the Project Area include the little brown bat (<i>Myotis lucifugus</i>), big brown bat (<i>Eptesicus fuscus</i>),

Table 4-1: Northwest Ohio Wind Project Tier 1 and 2 Evaluation Summary

Tier Question	Tier Question Summary
	silver haired bat (<i>Lasionycteris noctivagans</i>), hoary bat (<i>Lasiurus cinereus</i>), and eastern red bat (<i>Lasiurus borealis</i>).
Is there potential for adverse effects to species of concern?	Unlikely, given the agricultural nature of the Project Area and overall general lack of suitable habitat identified within Tier 1 and Tier 2 studies. In a letter dated October 28, 2014, the USFWS concluded that the Project is unlikely to result in take of listed species only if the 6.9 m/s cut-in speed, at night, during spring and fall migration periods for bats is implemented .

4.4 Tier 3 – Field Studies to Document Site Wildlife Conditions and Predict Project Impacts

The purpose of the pre-construction field studies is to evaluate the Project’s potential to result in adverse impacts to biological resources, including passerine birds, raptors, bats, and natural communities. The specific investigations that have been conducted are outlined below and include multiple field surveys in accordance with the USFWS WEG (USFWS 2012) and *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (ODOW 2009).

With information from the sensitive habitat review and consultation with the ODOW and USFWS, the Project Area was evaluated against the four Tier 2 decision point outcomes contained in the USFWS WEG (USFWS 2012) and level of surveying effort contained in the *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (ODOW 2009) to provide a general framework for determining the duration and intensity of study needed for project siting, project permitting, and operations monitoring. For the purposes of this effort, the Project is considered a Category 2 project in terms of biological study requirements under the WEG tier decision point outcomes and the Project qualifies as “minimum” in terms of the level of surveying effort required as recommended in the *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (ODOW 2009).

According to the USFWS WEG (USFWS 2012), a Category 2 project consists of sites with little existing information and no indicators of high wildlife impacts. Projects in Category 2 have no obvious “red flags” that emerge from the preliminary site assessment (for example, “red flags” might be known occurrences of special-status species or elevated levels of fatalities at nearby wind facilities). According to the *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (ODOW 2009), a project that qualifies for a “minimum” level of survey effort contains...“ large tracts of agricultural lands that do not come

within 500 meters of a woodland greater than or equal to 10 hectares, wetlands greater than or equal to 3 hectares, or large water body (i.e., rivers, lakes, or reservoirs).” More than 1,300 staff-hours were dedicated to avian and bat field studies from 2010 to 2013, and the results of this effort are summarized below.

4.4.1 Pre-Construction Avian Surveys

While ODOW generally recommends breeding bird surveys for a site with a “minimum” level of risk, the 2009 guidance on breeding bird surveys states “Generally, active agriculture fields are not considered suitable nesting habitat for most species of birds; thus, surveys do not need to be conducted at any point that falls within these areas.” As such, turbines placed within agricultural land would be exempt from the recommendation for breeding bird surveys. Since all of the turbines would be placed in agricultural land, the ODOW concurred that the Project would be exempt from the requirement for breeding bird surveys.

Pre-construction avian surveys for the Project were initiated in 2010 and were completed in mid-2013. These studies consisted of reconnaissance-level avian surveys, northern harrier field surveys, and a ground-based raptor nest survey (**Table 4-2**). Data collected from these studies were used to identify species or species groups that may be at risk from Project development and may provide additional information for micro-siting wind facilities to minimize impacts to birds. A summary of the results of each survey is provided below.

Table 4-2: Avian Survey Efforts to Date for the Northwest Ohio Wind Project

Study	Taxa	Dates Conducted	Type of Survey
Reconnaissance-level avian surveys	All avian species	May 10-11, 2010; April 23-24, 2013	Roadside surveys
Northern harrier field surveys	Northern harriers	May 12-13, 2010; May 26-27, 2010; June 7-8, 2010; May 6-7, 2013	Roadside surveys
Ground-based raptor nest surveys	General raptors	April 22-24, 2013	Roadside surveys

4.4.1.1 Reconnaissance-Level Avian Surveys

Avian surveys were conducted on-site in spring of 2010 and again in 2013 and consisted of incidental wildlife observations during more intensive surveys for wetlands, habitat types, and other focused bird survey efforts. Prior to on-site surveys, several resources were consulted to provide background information as to avian and bat species that may be present in the Project Area. Existing data sources

consulted included the North American BBS (Sauer *et al.* 2012), the National Audubon Christmas Bird Count (CBC) (National Audubon Society 2002), the U.S. Geological Survey (USGS) Geographical Approach to Planning (GAP) Breeding Bird Richness in Ohio (USGS 2013), and state and federal conservation lists (threatened and endangered species). A request was also made to the ODNR for a review of the Ohio NHI database. Information from these sources has been synthesized and is presented below for avian species with potential to occur in the Project Area.

Available information regarding avian use of the Project Area and surrounding region was based on review of existing data compiled by BBS and CBC which together present a master list of potential avian species throughout the year. The BBS provides data on bird abundance and diversity during summer, while the CBC provides a source of winter data.

There are no BBS routes in Paulding County. The nearest BBS route is the Berne route, which is located approximately 9 miles southwest of the Project Area in adjacent Allen and Adams Counties, Indiana. There are several other BBS routes within 20 miles of the Project Area; however, these routes include land cover types that aren't representative of the Project Area, such as predominant hay and riparian areas. The closest CBC location; the Black Swamp CBC is located in northern Paulding County.

Data from 2006 to 2011 for the Berne BBS survey route indicated that 69 avian species potentially breed in the Project Area. Results from the field reconnaissance-level survey conducted in 2010 indicated that 19 of the 69 avian species were observed or confirmed to be breeding in the Project Area. Seven additional species were observed in the Project Area during a site visit conducted in 2013. The species confirmed to use the area are typical of intensively farmed agricultural areas with scattered farmsteads, small woodlots and degraded watercourses. Bird species observed during the 2010 and 2013 survey effort are presented in Table 4-3.

Table 4-3: Avian Species Observed within the Project Area during the 2010 and 2013 Site Visits

Common Name	Scientific Name
Canada goose	<i>(Branta canadensis)</i>
Wood duck	<i>(Aix sponsa)</i>
Great blue heron	<i>(Ardea herodias)</i>
Cooper's hawk	<i>(Accipiter cooperii)</i>
Mourning dove	<i>(Zenaida macroura)</i>
Great-horned owl	<i>(Bubo virginianus)</i>
Red-bellied woodpecker	<i>(Melanerpes carolinus)</i>
Eastern phoebe	<i>(Sayornis phoebe)</i>

Horned lark	<i>(Eremophila alpestris)</i>
Tree swallow	<i>(Tachycineta bicolor)</i>
Eastern bluebird	<i>(Sialia sialis)</i>
American robin	<i>(Turdus migratorius)</i>
Gray catbird	<i>(Dumetella carolinensis)</i>
European starling	<i>(Sturnus vulgaris)</i>
Yellow warbler	<i>(Dendroica petechia)</i>
Chipping sparrow	<i>(Spizella passerina)</i>
Eastern towhee	<i>(Pipilo erythrophthalmus)</i>
Song sparrow	<i>(Melospiza melodia)</i>
House finch	<i>(Carpodacus mexicanus)</i>
Turkey vulture	<i>(Cathartes aura)</i>
Rock dove	<i>(Columba livea)</i>
Common grackle	<i>(Quiscalus quiscula)</i>
Mallard	<i>(Anas platyrhynchos)</i>
Brown-headed cowbird	<i>(Molothrus ater)</i>
Eastern meadowlark	<i>(Sturnella magna)</i>
Red-winged blackbird	<i>(Agelaius phoeniceus)</i>

Birds observed on this route are generally common and abundant species, which include, but are not necessarily limited to, the following: turkey vulture (*Cathartes aura*), American robin (*Turdus migratorius*), European starling (*Sturnus vulgaris*), common grackle (*Quiscalus quiscula*), brown-headed cowbird (*Molothrus ater*), eastern meadowlark (*Sturnella magna*), red-winged blackbird, mallard (*Anas platyrhynchos*), and Canada goose (*Branta canadensis*). The state endangered northern harrier has been observed during both the breeding and non-breeding seasons. No other state-listed threatened or endangered birds have been observed on the Berne BBS route. Additional state-listed birds documented during the CBC winter counts include the endangered sandhill crane (*Antigone canadensis*) and threatened bald eagle (*Haliaeetus leucocephalus*).

4.4.1.2 Northern Harrier Field Surveys

Coordination with representatives from the wildlife agencies and Project development team in 2010, modified avian survey recommendations further to limit monitoring to the northern harrier (state-listed endangered) due to lack of suitable habitat for Ohio breeding birds, especially those with federal and/or state conservation status. Accordingly, breeding season northern harrier surveys were conducted by Westwood in spring of 2010 (Westwood 2010).

After a two-year dormancy period, the Project was revitalized in late 2012. Westwood re-established contact with the wildlife agencies in March 2013 to assess the need for updated studies. The ODOW recommended updated northern harrier

surveys, which is consistent with the *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (ODNR 2009). Northern harrier surveys were conducted again in May 2013 by Westwood to assess whether this species utilizes the Project Area for nesting.

To locate potential northern harrier nests, public roads in the Project Area were surveyed twelve times during the breeding season, stopping every mile to scan with binoculars and a spotting scope for northern harriers. Surveys totaled 60-hours in 2010 and an additional 60 hours in 2013 (Westwood 2010, 2013a). Specific attention focused on stream and creek corridors that northern harriers typically prefer for hunting and nesting. If a harrier was observed, that bird was followed as long as possible and flight movements were mapped with notes on behavior, sex, and habitat. The compilation of mapped flight movements and behavioral cues highlighted potential nesting areas.

2010 Survey Results

Female northern harriers were detected on three survey days; however, none of these observations indicate use of the Project Area for breeding (Westwood 2010). A female was observed flying in the late afternoon of May 13, 2010. A female was again detected June 7 and 8 in the same location both days, but in a different location than the May 13 sighting. It could not be determined if the birds were the same individual between May and June survey days (no harriers were detected during May 26 and 27 surveys). The earlier observations were of a female hunting just above the ground repeatedly flying in a north-south direction approximately 0.25 mile west of County Road 137 and County Road 60. The bird was also observed preening between flights (Westwood 2010). Hunting behavior was observed for approximately 45 minutes during the mid-morning of both days before she made uncharacteristic high, straight-line flights to the west and out of sight (nearly two miles before she was out of sight through high powered optics). She was relocated on several occasions; once north of the Project Area hunting along Blue Creek, which is open in some places and fairly wooded in others; once soaring high and being harassed by blackbirds; and once again flying high in the vicinity of County Road 137 and County Road 60. These non-hunting flights are not typical of breeding season northern harrier behavior, especially for a female (Westwood 2010).

2013 Survey Results

Female northern harriers were observed May 6 and 7 in similar locations (Westwood 2013a). While it is likely that the same female was observed multiple times, this cannot be confirmed. A female was first observed hunting near County Road 48 and County Road 131 on the morning of May 6 and followed for about a half hour. The female hunted the Hagerman Creek stream corridor and adjacent

fields, generally making her way northeast before getting on a thermal and soaring high and further north out of sight. Later that afternoon, a female was spotted hunting in Section 10 of Township 1 North, Range 3 East, after which she took off on a thermal to the east and flew out of sight. Early on the early morning of May 7, a female was again observed and then took off to the south for a half a mile, before getting on a thermal and moving east. All three of these observations were indicative of a late-season migrating harrier, not breeding activities (Westwood 2013a).

Summary

No male northern harriers were observed in the Project Area in any of the surveys. Based on the observations of the female harriers and lack of male observations, it is unlikely that northern harriers are breeding in the Project Area and surrounding region. The observed females were likely without a mate, as their behavior and flight patterns were not consistent with breeding season activities.

4.4.1.3 Ground-Based Raptor Nest Surveys

A ground-based raptor nest survey was conducted by Westwood during April 22-24, 2013 (Westwood 2013b). Raptor nests were identified from roadsides within the Project boundary and a one-mile buffer. The survey timing corresponded to the early nesting season for most raptors and when their stick nests are most visible before deciduous leaf emergence. Potential nests were monitored for nesting activity and species occupancy. Nesting activities included incubation, feeding, and territory defense. The locations of nests were approximated based on aerial photography and landmarks. The extremely flat terrain, extensive road network, and limited woodlots made nest identification and location straightforward (Westwood 2013b).

As a result of the survey effort, a total of 12 raptor nests were identified within the Project Area and associated 1-mile buffer (Westwood 2013b). This included 10 red-tailed hawk (*Buteo jamaicensis*) nests, one Cooper's hawk (*Accipiter cooperii*) nest, and one great horned owl (*Bubo virginianus*) nest. With the exception of the great horned owl nest, all other nests were occupied and either in the incubation or early brood rearing stage.

4.4.2 Bat Surveys

4.4.2.1 Mist-Netting Surveys

In accordance with ODNR survey recommendations, TWO retained Tragus, Inc. to conduct mist-netting surveys for bats within the proposed Project Area. Mist-

netting surveys were conducted from July 1 to July 4, 2010 to more fully understand the use of the Project Area by bats, especially the federally endangered Indiana bat.

Methods

Mist-Netting Techniques. The study included two sites (16 net nights) over Blue Creek and Prairie Creek (and associated tributaries) (**Exhibit 4-1**). Sites were selected during a separate field reconnaissance conducted by representatives of TWO and Tragus. At each site, four net sets were constructed. Each net set consisted of a tier of low-visibility nylon mist nets erected across likely flyways and other areas where bat activity was anticipated or otherwise noted. When possible, nets were erected to sufficient height and width to entirely block off the flight corridor. At least one net set for each site consisted of a series of three nets stacked vertically. Nets were secured to a rope-and-pulley system suspended from telescoping poles (Kunz, 1988). Nets were erected during the twilight hours and monitored every 5-10 minutes for a five-hour period. All mist nets were constructed of 50-denier/2-ply (1.5-inch mesh) nylon (Tragus 2010).

Data Collection. Basic biological data were collected from all bats netted, including species identification, ear, tragus, forearm length, gender, age (juvenile or adult), weight in grams, and reproductive condition (if discernible). All bats were marked with a small dab of white-out to account for recaptures and released at the site of capture. Additional information recorded included the climatological conditions, date, time of capture, lunar phase, and percent cloud cover. Species identification was based on the keys described by Belwood (1998).

Site Selection. Potential flight corridors within the study included bridges over entrenched drainage ditches (Prairie Creek and Blue Creek), narrow forested riparian areas, and one old forested oxbow with enclosed tree canopy. A hand-held ultrasound detector (Peterson Model D-100) and an ANABAT unit were used to monitor bat activity at the site and to identify additional areas for the placement of mist nets, as appropriate (Tragus 2010).

Results

Site A (July 1, July 3) (total net nights = 8). Site A was monitored on July 1 and 3. Both nights were clear with no cloud cover, no precipitation and no wind. The moon was approximately ¼ full each night but was low on the horizon, late rising and did little to deter bats from flying (Tragus 2010). Temperatures on both nights ranged from a high of 80 degrees when nets were first raised for the evening (9:15 PM) to a low of 52 degrees when nets were finally lowered for the evening (2:30 AM). The location of net sets for Site A is shown in **Exhibit 4-2**. The following is a description of the net sets for Site A.

- Net A1 consisted of two tiers of 6-meter mist nets stacked vertically under a bridge over Hagerman Creek (a tributary to Prairie Creek). At this location, it was possible to block off most of the potential flight corridor.
- Net A2 consisted of two tiers of 12-meter wide mist set over a deeply entrenched portion of Hagerman Creek. A third 6-meter net was added at the bottom of the set to close off the lowest portion of the ditched stream. The right bank of the stream supported a narrow band of trees and the depth of the ditch added to allow partial blockage of the flight corridor.
- Net A3 consisted of two tiers of 9-meter mist nets stacked vertically under a bridge over Prairie Creek. At this location, it was possible to entirely block off the flight corridor.
- Net A4 consisted of a single 6-meter mist net set over an old access bridge over Prairie Creek in an area with sparse riparian vegetation. At this location, it was possible to entirely block off the potential flight corridor.

Site B (July 2, July 4) (total net nights = 8). Site B was monitored on July 2 and 4. July 2 was clear with no cloud cover, no precipitation and no wind. The moon was approximately $\frac{1}{4}$ full each night but was low on the horizon, late rising and did little to deter bats from flying. Temperatures on both nights ranged from a high of 82 degrees when nets were first raised for the evening (9:15 PM) to a low of 54 degrees when nets were finally lowered for the evening (2:30 AM) (Tragus 2010). The location of net sets for Site B is shown in **Exhibit 4-3**. The following is a description of the net sets for Site B.

- Nets B1 and B2 were each placed over Cunningham Creek (a tributary to Blue Creek). Net B1 consisted of two tiers of 6-meter mist nets stacked vertically to the underside of the tree canopy and net B2 consisted of three tiers of 6-meter mist nets stacked vertically and raised to the underside of the tree canopy over the riparian area. This section of creek has been severely channelized and represented an excellent flight corridor.
- Net B3 consisted of a single 6-meter mist net set over Blue Creek at a location where an overarching willow tree allowed for partial blockage of the flight corridor.
- Net B4 consisted of three tiers of 6-meter mist nets stacked vertically and raised to the underside of the tree canopy over a marshy area. The marshy area appeared to be an old oxbow of the original stream corridor prior to

ditching and draining of the region for agriculture. At this location, it was possible to entirely block off the potential flight corridor.

Results of the mist-netting survey effort for both sites indicated that only two bat species were captured: eastern red bat (*Lasiurus borealis*) and big brown bat (*Eptesicus fuscus*) (**Table 4-4**) (Tragus 2010). The red bat and big brown bat are considered common species and well adapted to life in disturbed environments reflective of intense agricultural use.

Overall activity during the survey period was very low. Only a few bats were visually observed at dusk in any location. Several of the big brown bats were lactating females and indicative of a roost site somewhere within the Project Area but low catch numbers did not justify radio-telemetry for any individuals of this species. Bat calls were also collected at all sites and analyzed. Results indicated that very few bat calls were detected, and most were those of either big brown or red bats. No state or federally listed bat species were noted during the course of this investigation (Tragus 2010).

Table 4-4: Summary Data for Bats Captured During Mist Netting Conducted from July 1-4, 2010 (Tragus 2010)

Date	Time	Species	Net	Gender	Age	Breeding Status
7/2/2010	9:30 PM	Red bat	B4	F	A	Lactating
7/2/2010	9:30 PM	Big brown bat	B4	F	A	Lactating
7/2/2010	9:30 PM	Big brown bat	B4	M	A	N/A
7/2/2010	9:30 PM	Red bat	B4	M	A	N/A
7/2/2010	9:30 PM	Big brown bat	B2	F	A	Lactating
7/2/2010	9:30 PM	Big brown bat	B2	M	A	N/A
7/2/2010	9:30 PM	Red bat	B2	M	A	N/A
7/4/2010	9:30 PM	Big brown bat	B2	M	A	N/A

4.4.2.2 Acoustic Bat Surveys

Methods

Acoustic bat surveys were conducted by Tragus, Inc. using two SD1 ANABAT detectors (Titley electronics) from March 15 through November 15, 2010 for one full season of data collection. Surveys were conducted in accordance with ODNR guidelines (ODNR 2009) for bat wind farm screening to determine general bat presence, activity levels, and species composition in the proposed Project Area. Two

single channel detectors were deployed at one of the meteorological (MET) towers in the Project Area (**Exhibit 4-1**). As recommended by agency guidelines, one microphone was placed approximately 5 meters above ground level and a second microphone was placed at a height of approximately 40 meters at the met tower (Tragus 2011).

Equipment used during the survey effort included two separate recording systems housed in two weatherproof locked boxes affixed to the MET tower. Each box housed a 12-volt battery, Anabat SD1 unit and solar charging harness attached to a south facing 10 watt solar panel. The bat hat systems (including pre-amp shroud, 45-degree angled reflector plate, and a Titley electronics standard microphone) and microphone cables were secured to the 40 and 5 meter pulley systems and raised up the MET tower. Installation at the MET tower site began on February 12, 2010; the same day that two pulley systems were installed at 40 meters and 5 meters onto the MET tower. Data recording commenced on March 15, 2010 (Tragus 2011).

Bat echolocation calls were recorded from the evening of March 15 through November 15 each day beginning at a minimum of 30 minutes before sunset and ending at a minimum of 30 minutes after sunrise. The data were stored on compact flash cards which were collected bi-weekly by a local field assistant. Flash cards were then mailed to Tragus for analysis.

In accordance to the ODNR protocol, a bat echolocation call “passes” were identified as > 2 echolocation pulses and when possible were identified to species or species groups, such as big brown/silver-haired [EPFULANO] (Betts, 1998). All call files were provided to ODNR and USFWS along with a report of the survey results. Call files that were indeterminate and could therefore not be identified to species or species group have been counted and grouped by characteristic frequency, such as Q25. For example, a Q25 grouping indicates that the call is an indeterminate species and also is an indeterminate species group; and therefore, the only classification to give the call is characteristic frequency of 25 kilohertz (kHz) (Tragus 2011).

Results

A combined total of 129,276 sound files were recorded during the period from March 15 to November 15, 2010. Filtering and visual examination of files to eliminate extraneous noise (e.g., wind, insects, etc.) resulted in a total of 2,954 recorded bat call passes. A total of five bat species were identified during the survey effort. These included the big brown bat, silver haired bat, eastern red bat, hoary bat, and tri-colored bat. The big brown bat composed the greatest proportion of bat passes (33 percent). This was followed by the Q25 group (28 percent) (which was composed of potential calls by the silver-haired, big brown, and hoary bat), the

big brown/silvered haired group [EPFULANO] (18 percent), followed by the eastern red bat (15 percent). The hoary and silver haired bat comprised the remaining 4 percent and 2 percent, respectively (Tragus 2011).

The average number of nightly bat passes was 26 in July, 38 in August, and 18 in September. The highest activity was July through mid-September from 9:00-10:00 pm and again at 5:00 am. Although the roosting habitat and drinking sources in a 10-15-mile circumference around the MET tower are of moderate to low quality to bats, the agricultural fields provide a near constant foraging source for summer residents and was utilized primarily from late June through mid-September (Tragus 2011).

5.0 RISK ASSESSMENT

This section provides a qualitative risk assessment for direct impacts to birds and bats related to the construction and operation of the Project. The intention is not to predict the number of fatalities due to turbine collision and other sources of direct mortality, because recent studies have shown that there is little correlation between pre-construction risk assessments and actual documented mortality of bird and bat species at wind farms (de Lucas *et al.* 2008; Ferrer *et al.* 2011; Sharp *et al.* 2010). As such, it is difficult to predict expected mortality rates at a proposed facility from pre-construction survey data alone. Post construction data from nearby and regional operational wind projects is likely a more reliable and accurate predictor of risk. In response to these findings, this BBCS is designed to allow TWO to work continuously with the ODOW and USFWS to adapt to actual results and unknown circumstances, so that unexpected events and changes over time may be addressed.

5.1 Birds

5.1.1 Non-Raptor Avian Species

The avian community likely to occur within the Project Area during the spring, summer, fall, and winter seasons is characteristic of species associated with typical agricultural habitat. The majority of the Project Area and surrounding region has been developed for agricultural use, specifically crops such as soybeans and corn.

Area wind farms near the proposed Project that are currently operational include the 99 MW and 50 MW Timber Road I and II Wind Farms in Paulding County and the 304 MW Blue Creek Wind Project in Van Wert and Paulding counties. All three projects have highly similar land cover types to those of the proposed Project, with between 94 and 95 percent of the project areas comprised of cultivated cropland, and the remaining areas comprised of developed land, woodland, grassland, and isolated wetland areas.

While the Timber Road I and II, and Blue Creek wind projects have strong similarities to the Northwest Ohio Project regarding land use and similar overall avian species composition, there currently is no publicly available pre- or post-construction fatality data for these projects to make direct inferences to avian fatality rates for the Northwest Ohio Project. However, bird mortality documented during post-construction studies at 11 other wind energy facilities in the Midwest and Northeast is comparatively low, with a mean mortality rate of 3.82 fatalities/MW/year, with a range from 0.32 fatalities/MW/year to 14 fatalities/MW/year (**Exhibit 5-1**).

Bird risk within the Project Area is likely highest during the spring and fall migration seasons, as has been observed at most wind energy facilities (NWCC 2010). Passerines, both resident and migrant, are likely at highest risk in the Project Area,

as this avian group represents the majority (75 percent) of mortalities at wind turbines nationwide (Johnson *et al.* 2007; Strickland and Morrison 2008). It is estimated that less than 0.01 percent of migrant songbirds that pass over wind farms are killed, based on radar data and mortality monitoring (Erickson 2007) and no studies to date indicate or suggest a level of fatality that rises to a level of concern, relative to population-level impacts. Night-migrating passerines may be at a higher risk, as this group has accounted for over 50 percent of avian fatalities at certain sites, but no particular species or group of species has been identified as incurring greater numbers of fatalities (Erickson *et al.* 2002).

Locally breeding songbirds and other passerines may experience lower mortality rates than migrants because many of these species tend to fly below the RSA during the breeding season. However, some breeding songbird species have behaviors that increase their risk of collisions with turbines. Birds taking off at dusk or landing at dawn, or birds traveling in low cloud or fog conditions, for example, are likely at the greatest risk of collision (Kerlinger 1995).

Collision risk is likely to be much lower for other non-raptor bird groups in the Study Area. While waterfowl were the second highest species group observed during pre-construction avian surveys, waterfowl are considered to have low risk for turbine-related fatalities either due to demonstrated avoidance behavior and/or few documented fatalities at other wind energy facilities. Research has demonstrated that waterfowl rarely collide with wind turbines (Kingsley and Whittam 2007; Gehring 2011). The only sites experiencing regular waterfowl fatalities have been those located on the shores of large, open expanses of water (Erickson *et al.* 2002).

5.1.2 Raptors

Despite the observation that most avian fatalities at wind farms are passerines, raptor fatality (including eagles) historically has received the most attention. Raptor fatality at newer wind projects has been low relative to older-generation wind farms, although there is substantial regional variation in raptor fatality rates (Erickson *et al.* 2002; Johnson *et al.* 2002; Kerns and Kerlinger 2004; Jain *et al.* 2007). Raptors constitute approximately 6 percent of reported bird fatalities, but generally have a smaller percentage of birds observed using wind farms during pre-construction surveys (Strickland *et al.* 2011).

High raptor use (greater than 2.0 birds/20 min) has been associated with high raptor mortality at wind farms (Strickland *et al.* 2011). Conversely, raptor mortality appears to be low when raptor use is low (less than 1.0 birds/20 min; Strickland *et al.* 2011).

What little data is available for wind farms in the Midwest and Northeast, suggests that fatality rates of raptors at these wind energy facilities are low. The lowest

reported raptor fatality rate was 0.01 fatalities/MW/year for the Buffalo Mountain Wind Farm in Tennessee and rates for three other studies: Maple Ridge, New York; Noble Bliss, New York; Noble Clinton, New York; and Noble Ellenburg, New York reported 0.04, 0.19, 0.29, and 0.31 fatalities/MW/year, respectively.

Three species of raptors; the red-tailed hawk, Cooper's hawk, and great horned owl, were documented nesting in the Project Area. The northern harrier was also observed in the Project Area on several occasions during field surveys, but this species was not confirmed to nest in the Project Area. All four species are commonly associated with agricultural and grassland habitats which provide opportunities for foraging, an activity associated with susceptibility to turbine-collisions (Thelander *et al.* 2003). Red-tailed hawks, Cooper's hawks, great horned owls, and northern harriers have all been recorded fatalities at other wind projects (Kingsley and Whittman 2005), although northern harriers have few documented mortalities, even in areas with high northern harrier use (Erickson *et al.* 2002). This could possibly be because the species generally flies below the RSA, which is consistent with the observation of northern harriers within the Project Area during surveys conducted in 2010 and 2013.

Risks to non-eagle raptors are expected to be low for the Project because topographic features that encourage risky behaviors like slope-soaring and kiting are limited within the Project Area. In addition, any project-related fatalities are unlikely to have population-level impacts because red-tailed hawks, Cooper's hawks, and great-horned owls are common nationwide (Sauer *et al.* 2012).

Data on the collision risks of red-tailed hawk and other raptors at wind energy facilities are well documented; however, currently few data concerning the collision risk of bald eagles nesting near wind energy developments are available. In general, bald eagles have been rarely documented as casualties at wind energy facilities and a recent study shows that bald eagles exhibit a high rate of avoidance of operational wind turbines (Sharp *et al.* 2011). As of 2012, six substantiated bald eagle fatalities or injuries were documented at wind turbines in the United States and two were reported in Ontario, Canada (Allison 2012; Pagel *et al.* 2013). At least one additional bald eagle fatality was recently reported in publicly available reports in fall 2015 at the Oliver III Wind Farm in Mercer County, North Dakota, although the exact cause of the eagle's death is undetermined (Thompson 2015).

While it is possible that bald eagles do occasionally occur within the Project Area, their occurrence is likely to be sporadic and in low numbers and indicative of transient bald eagles that may occasionally use the Project Area during migratory periods. Habitat for nesting bald eagles is nearly non-existent within the Project Area in comparison to available habitat elsewhere in the state that currently support nesting bald eagles. The Project Area contains few large trees suitable for nesting

(i.e. large diameter, > 15-20 m in height, adequate crown structure). Where trees are present in the Project Area, most are associated with forested shelterbelts and are located near a residence, less than 25 m tall, are closed canopied and are located far from perennial water sources. Further, there are no known bald eagle nests in Paulding or Van Wert counties.

5.1.3 Special-Status Avian Species

No federally listed avian species were observed during field surveys or as incidental observations within the Project Area. However, one of the species identified to occur within the Project Area; the northern harrier is listed as endangered in the State of Ohio.

The northern harriers detected during 2010 and 2013 northern harrier field surveys are considered to have a low risk for turbine collision at the Project due to a combination of relatively low use rates within the Project Area, infrequent flight within the height of the RSA, and/or few to no records of fatalities at other wind facilities with publicly available results of mortality studies.

5.1.4 Conclusion

The Project has been sited and designed to be a low-risk site for birds. The Project Area does not contain distinct topography, unique habitats or resources, or other features that could concentrate birds. No indicators of high avian risk in the Project Area (e.g., presence of federally-listed species, impacts to high quality avian habitat, high volume use as migration stopover habitat, etc.) were evident during field surveys, which were conducted in accordance with Tier 3 of the WEG. Based on available data from operational wind projects in the Midwest and Northeast, bird collisions at the Project are expected to occur at a low frequency and be comparable with that of other Midwest and Northeast wind energy facilities. Impacts are not expected to occur to a degree which would adversely affect populations.

5.2 Bats

5.2.1 General Impacts

In the mist-netting and acoustic studies for the proposed Project, the primary species detected were the big brown and silver-haired bat. Documented bat fatalities of these and other common bat species at previously developed wind farms have been associated almost exclusively with operating turbines. Studies conducted in Ohio and other wind farms in the United States reported that all dead bats were recovered from turbine locations; none were located at meteorological towers or transmission lines (Johnson *et al.* 2000; Young *et al.* 2003). The prominent

proximate causes of bat deaths at wind turbines are direct collision (i.e., blunt-force trauma) (NREL 2013) and barotrauma (Grodsky *et al.* 2011).

Bat fatality at previously developed wind farms has been associated primarily with dispersing and migrating bats. Three species of long-distance migratory bats (hoary bat, eastern red bat, and silver-haired bat) compose the majority of fatalities, and hoary bats alone compose about half of all documented fatalities in North America (Kunz *et al.* 2007). Although the majority of documented bat fatalities at existing wind projects is related to long-distance migratory species, some mortality among resident bat species is also associated with the spring and fall migration periods, and during the summer pup rearing period. At wind farms in the Midwest, where grassland and crop fields accounted for a substantial proportion of the vegetative cover, over 90 percent of the documented bat fatalities occurred between mid-July and mid-September (Erickson *et al.* 2002). Based on Ohio's monitoring data for years when a full year of monitoring was completed, monthly breakdown of mortality is as follows: April - 3 percent, May - 10 percent, June - 8 percent, July - 19 percent, August - 30 percent, September - 23 percent, October - 5 percent, and November < 1 percent (USFWS 2018). This includes projects utilizing cut-in speeds in spring and fall to minimize bat mortality.

Bat fatalities at wind farms are also known to be affected by other factors, such as weather variables. It has been shown that most bat fatalities tend to occur during low wind speeds over relatively short periods of time (Arnett *et al.* 2008; Hein *et al.* 2013).

As mentioned previously, the Project Area is located on a landscape dominated by agricultural use. The loss of disturbed, agricultural habitat that may occur within the Project Area is likely to be of minor consequence for the local bat community due to the demonstrated preference for forested and open water habitat by most bat species. As with any North American wind energy facility within the range of bat species, the operating WTGs will present a risk of bat mortality due to collisions or barotrauma. Although the Project Area is located in a primarily agricultural landscape, the presence of the WTGs, even in open, non-forested areas, poses a risk of bat mortality. Bat mortality has been documented at Midwestern wind energy facilities in agricultural areas during the fall migration season, demonstrating that some migrating bats will fly over open land (Johnson *et al.* 2003; Kerlinger *et al.* 2007; Good *et al.* 2011).

Based on data evaluated for the spring, summer, and fall survey periods, bat assemblage and use are expected to be comparable to that of other operational wind projects in the Midwest and Northeast. Bat mortality documented for 18 post-construction studies at wind energy facilities in the Midwest and Northeast is variable, with a mean mortality rate of 18.7 bat fatalities/MW/year. Bat fatalities

ranged from a low of only 3.6 fatalities/MW/year at the Crescent Ridge Project in Illinois, to a high of 53.3 fatalities/MW/year at the Buffalo Mountain, (Phase 3) Project in Tennessee (**Exhibit 5-2**).

In the previous acoustic studies for the Northwest Ohio Wind Project, the primary species detected were the big brown bat, silver haired bat, and hoary bat. Each of these species have been reported among fatalities at operating wind energy developments across the United States (Arnett and Baerwald 2013; Arnett *et al.* 2008). Furthermore, the majority of fatalities have been reported during the late summer and early fall, which corresponds to the period of time during which the greatest activity was acoustically recorded in the present study. Activity and subsequent fatalities during the late summer/early fall period is primarily due to the migratory nature of two of these species (i.e., the hoary and silver-haired bat).

5.2.2 Special Status Bat Species

5.2.2.1 Indiana Bat

Results from the mist net surveys and acoustic bat monitoring conducted in 2010 yielded negative results for the Indiana bat. The Project Area encompasses no potential winter hibernacula and very limited habitat potentially suitable for Indiana bat summer maternity roosts. Hibernacula for the Indiana bat has been documented in seven southern Ohio counties, the nearest being the Lewisburg Limestone Mine about 85 miles due south of the Project Area in Preble County, Ohio.

The Indiana bat ranges throughout 21 states in the eastern U.S. While there has long been concern that Indiana bats may be vulnerable to wind turbines, the first known fatality of an Indiana bat occurred in northern Indiana in September 2009, and a second fatality was documented at the same site in September 2010. Since that time, there have been 8 additional known fatalities of Indiana bats at wind facilities (**Table 5-1**) throughout the range of the species. Because, not all facilities conduct fatality monitoring, it is likely that additional Indiana bat mortality has occurred at other wind facilities throughout the range of the species.

One of the documented Indiana bat fatalities occurred at the Blue Creek Wind Farm on the night of October 2-3, 2012 during fall migration. The Blue Creek Wind Farm is contiguous to the southern boundary of the proposed Project. This fatality occurred about 1.5 miles from the southwest corner of the Project Area boundary. Two additional Indiana bat fatalities occurred October 10, 2013 and April 14, 2014 at the Timber Road II Wind Farm which lies west of the Project site. These fatalities occurred approximately 4.5 and 6.4 miles west of the nearest portion of the Project Area boundary.

Investigations of interactions between wind turbines suggest that bats are particularly susceptible to fatality at turbines during the period associated with fall migration (which includes late summer). The Indiana bat fatalities to date suggest that this is also the most vulnerable time for this species. Five of the seven known fatalities to date appear to be associated with fall migration, while one occurred in July, and one occurred in April, likely during spring migration (**Table 5-1**).

Table 5-1: Documented Indiana Bat Fatalities at Wind Energy Facilities

Location	Estimated Date of Death	Sex	Age	Habitat Description
Indiana	September 8-9, 2009	Female	Adult	93% agricultural land use; less than 1% forest
Indiana	September 17, 2010	Female	Adult	93% agricultural land use; less than 1% forest
Pennsylvania	September 25, 2011	Female	Young of Year	Primarily forested area
West Virginia	July 7, 2012	Male	Adult	Forested Ridgeline with a few wetland resources (small streams and wetlands along the ridgeline)
Ohio	October 2-3, 2012	Female	Adult	Crop land and developed land are 98% of project area
Ohio	October 7-9, 2013	Unknown	Adult	Crop land and developed land are 98% of project area
Ohio	April 13-14, 2014	Female	Adult	Crop land and developed land are 98% of project area

It is unknown whether the Blue Creek and Timber Road II Indiana bat fatalities were related to any specific topographic or habitat feature within the respective project areas. There is some evidence that Indiana bats in the more mountainous eastern part of their range follow landscape features (e.g. mountain ridges, forested riparian corridors), when migrating. However, it is not known if such a relationship has been documented in flatter, more open country in the Midwest. Research conducted from radio telemetry data and band returns for Indiana bats conducted for the Buckeye Wind HCP suggests that among 218 individual Indiana bats, migration distances between summer habitat and winter hibernacula ranged from 17 to 357 miles. Migration paths were much shorter and multi-directional for bats in mountainous regions than for bats in the Midwest. Based on band recovery data, Indiana bats in the Midwest Recovery Unit, where the proposed Project is located, appear to primarily migrate from summer habitat to the north (e.g. southern Michigan) to hibernacula in Kentucky or southern Indiana. Band recovery data for Indiana bats captured in Ohio are consistent with this migration pattern. This being

the case, migration movements by Indiana bats summering farther north may fly through the Project Area while in route to hibernacula well to the south.

5.2.2.2 Northern Long-Eared Bat

No northern long-eared bats were detected within the Project Area during mist netting and acoustic bat surveys conducted during 2010. However, like Indiana bats, northern long-eared bats may migrate through the Project Area during spring and/or fall.

Operating wind turbines have been documented to kill northern long-eared bats, particularly during the fall migratory period (USFWS 2014). Northern long-eared bats have been reported in percentages ranging from 0.7 to 1.3 percent (2-6 individuals) among fatalities at two wind energy facilities in the eastern United States (Arnett *et al.* 2008). More recent data reveals a total of 43 fatalities have been reported throughout North America with the majority found during the fall (August - October) (Gruver and Bishop-Boros 2015).

Other wind projects in the Midwest have documented mortality of northern long-eared bats, therefore it is assumed that there is some potential for mortality of northern long-eared bats at the Northwest Ohio facility as well. Northern long-eared bats are in the same genus as Indiana bats, have similar migration periods, habitat needs, and morphological features. Therefore, TWO believes that the proposed avoidance measures outlined for Indiana bats will also result in avoidance of mortality for northern long-eared bats as well.

5.2.3 Use of Pre-Construction Acoustic Monitoring to Predict Post-Construction Bat Fatalities

To date, it remains unclear whether data acquired from pre-construction acoustic monitoring can predict post-construction fatalities. However, some studies have attempted to correlate post-construction acoustic bat pass rates with fatalities at operating wind energy projects (Baerwald and Barclay 2009; Gruver *et al.* 2009; Johnson *et al.* 2004) with varying degrees of success. One recent and comprehensive study (Hein *et al.* 2013) aimed to address this issue by characterizing bat activity based on acoustic monitoring and post-construction fatality studies across geographic regions. Hein *et al.* (2013) synthesized data from 94 pre-construction bat acoustic surveys and 75 post-construction bat fatality studies at proposed and operating wind energy facilities across four regions in the United States and Canada. From 12 of these facilities, both pre-construction acoustic and post-construction fatality data were available to examine whether bat acoustic data collected prior to construction can be used to predict fatality. Among the larger synthesis study, both pre-construction acoustic and post-construction fatality data varied considerably

both within and among regions. The examination of the 12 facilities with paired pre- and post-construction data suggested a positive relationship but was found to be not significant and pre-construction activity only explained a small portion of the variation in fatalities (Hein *et al.* 2013). However, the authors cited that more data with consistent methodologies could help to tease out a relationship between pre-construction bat acoustic surveys and post-construction fatality studies.

Considering the Hein *et al.* (2013) study, there is a lack of publicly available data on pre-construction acoustic bat pass rates and post-construction fatality rates in Ohio to make a scientifically plausible prediction of fatalities for any wind energy development in the region. Hence, the acoustic data obtained in the present study may not necessarily indicate bat mortalities at the proposed Northwest Ohio Wind Project. However, data obtained from this study can be useful in identifying potential mitigation measures that may be effective in reducing fatalities (Arnett *et al.* 2011; Baerwald *et al.* 2009). For example, the activity recorded during the late summer through early fall period indicates a period of about 8 weeks from late July to late September when bat activity is the highest, and most of this activity was within four hours during the first part of the night, 2100–0100 hrs (9:00 pm–1:00 am). If fatalities are detected during post-construction, then this information could be of value when determining a mitigation strategy, such as feathering turbine blades to not allow them to “free-wheel” when not operating between 9:00 pm–1:00 am during the 8-week period of July to September. Furthermore, greater efficiency in a mitigation strategy could be gained by modeling environmental variables to predict bat activity throughout the late summer to early fall period (Weller and Baldwin 2011).

5.2.4 Conclusion

An early iteration of the proposed Project included up to 60 wind turbines. Since that time, the plan has been revised to increase the number of turbines with higher rated power output. The results of these changes reduced the number of turbines required to construct the Project to 42 wind turbines. TWO operational measures have also been adjusted at the request of USFWS to provide seasonal feathering of turbine blades when operating below equipment cut-in speeds as explained in Section 6.3. Considering these and other elements, the Project has been sited and designed to be a relatively low-risk site for bats. The Project Area does not contain distinct topography, unique habitats or resources, or other features that could concentrate bats or bat activity. No indicators of high bat risk in the Project Area (e.g., impacts to roost trees or hibernaculum, high volume use as a migration corridor, etc.) were discovered during the Tier 2 of the WEG or the annual passive acoustic bat monitoring, which was conducted in accordance with Tier 3 of the WEG. Based on available data from operational wind projects in surrounding states and elsewhere in the Midwest and Northeast, bat fatalities at the Project are expected

to occur at a low frequency and be comparable with that of other Midwest and Northeast wind energy facilities. Impacts are not expected to occur to a degree which would adversely affect populations.

6.0 AVOIDANCE AND MINIMIZATION MEASURES

TWO will implement measures to avoid and minimize impacts to birds and bats in the siting and design, construction, operation, and decommissioning phases of the Project as presented in the following sections.

6.1 Project Siting and Design

TWO is committed to a project design intended to avoid sensitive habitats to the degree possible. The siting process was initiated with the completion of a desktop environmental review and was further informed by subsequent field studies. Previous studies on wind farms have identified a variety of design measures and BMPs to minimize adverse effects on habitat and wildlife (USFWS 2012). Prudent avoidance and minimization measures have been incorporated into this BBCS and actual Project siting and design to minimize risk to bird and bat species. The following have been, or will be, taken into consideration throughout the construction and operational phases of the Project.

6.1.1 Avoidance of Migratory Pathways and Other Important Use Areas

The Project Area is broadly located within the Mississippi Flyway although no critical areas of wildlife congregation, staging areas, nesting sites, migration stopovers or corridors, special management areas, or other areas of seasonal importance occur within the Project Area or surrounding region. The nearest migratory passageway occurs approximately 12 miles north of the Project Area along the Maumee River. By locating the Project outside of major migratory corridors and other important use areas for wildlife, the siting guidelines recommended by the USFWS regarding the avoidance of migration flyways and other important use areas for birds were followed. There are no known corridors for bats near the Project Area. Furthermore, no winter roosts for any bat species are known to occur within the Project Area, nor are any mines, caves, karst, or pseudokarst formations known to occur within or near the Project Area or surrounding region.

6.1.2 Facilities and Turbine Layout and Design

In order to minimize impacts to wildlife, TWO has incorporated the following avoidance and minimization measures into siting decisions for the proposed turbines and associated infrastructure currently known and planned for construction.

- 1) Creation of new roads will be minimized to the maximum extent practicable;
 - a. Existing roads or farm lanes will be utilized to the extent practical.

- b. No more than 12 miles of new access roads will be created to connect wind turbines to existing access roads.
 - c. The permanent footprint of new access roads will be kept to a minimum width (20 ft) to minimize disturbance to surrounding grasslands or other vegetation.
- 2) Tower design will minimize opportunities for bird perching;
 - a. Tubular tower supports rather than lattice supports are incorporated into the Project design to minimize bird perching and nesting opportunities.
 - b. Internal ladders and platforms on tubular towers are part of the Project design to minimize perching and nesting of birds.
- 3) Underground electrical collection and transmission lines have been incorporated into the Project design to the extent practical, minimizing potential for avian and bat collisions and electrocutions;
 - a. All of the 34.5 kilovolt (kV) electrical collection lines (approximately 32 miles) will be buried underground.
 - b. Transmission lines, if not underground, will be equipped with insulated and shielded wire to avoid electrocution of birds and bats.
 - c. Placement of transmission lines will avoid impacts to wetlands.
 - d. Avian Power Line Interaction Committee guidelines (APLIC 2006) will be followed for the siting of above ground transmission lines.
 - e. New distribution poles will be fitted with bird perch deterrents, where possible and as dictated by APLIC construction guidelines.
- 4) Operational lighting will be minimized to the maximum extent practicable;
 - a. Unnecessary lighting on the operations and maintenance building and substation at night will be eliminated to reduce attraction of birds and bats.
 - b. No steady burning lights will be left on at the facility buildings or turbines unless necessary for safety or security; in such cases, the lights will be shielded downward and utilize motion detectors, infrared light sensors or “auto-off” switches that will automatically be extinguished after 2 hours to avoid continuous lighting.
- 5) Federal Aviation Administration (FAA) lighting will be minimized to the maximum extent practicable;
 - a. Attached to the top of some of the nacelles, per specifications of the FAA, will be a single, medium intensity aviation warning light.
 - b. The minimum amount of pilot warning and obstruction avoidance lighting specified by the FAA will be used (FAA 2017).

- c. FAA lights are anticipated to be flashing red strobes (L-864) that operate only at night. TWO will use the lowest intensity lighting as allowed by FAA.
 - d. To the extent possible, USFWS recommended lighting schemes will be used on the nacelles, including reduced intensity lighting and lights with short flash durations that emit no light during the “off phase”.
 - e. MET towers will also utilize the minimum lighting as required by the FAA.
- 6) MET tower design will minimize opportunities for avian collision;
- a. Effort will be made to avoid MET tower designs that include guy wires to the greatest extent practicable.
 - b. If guy lines are used on MET towers, they will be equipped with bird deterrent devices in accordance with the APLIC (2006) guidelines and/or according to the manufacturer’s recommendation.

6.2 Construction and Maintenance

The following construction phase measures have been incorporated into the BBCS to avoid construction activities near sensitive habitats during critical periods in bird and bat life cycles, and to minimize impacts to wildlife habitat. These measures were derived from industry based BMPs, the USFWS WEG (USFWS 2012), USFWS recommended measures contained in the TAL (USFWS 2014, Appendix A) for potential impacts to the Indiana bat, and Applicant Proposed Measures (APM), which are voluntary measures proposed by TWO.

- 1) Tree clearing will only occur between the period of October 1 and March 31 to prevent direct injury or mortality to roosting Indiana bats.
- 2) Clearing and construction practices will reduce soil disturbance and allow for the reestablishment of natural vegetation;
 - a. Where possible, vegetation will be cleared without grubbing or removal of stumps or roots.
 - b. All construction equipment will be restricted to designated travel areas to minimize ground disturbance.
 - c. Vegetation removal will be limited to the minimum area needed to construct the proposed Project and will be restricted in environmentally sensitive areas. During construction, travel and equipment staging will be restricted to designated access roads and work areas to minimize disturbance to nearby vegetation. The extent of these areas will be shown on the construction plans and clearly demarcated in the field with stakes, flagging, or fencing.

- d. Construction clearing for storage yards, staging areas, or temporary roads not needed for long-term operation of the Project will be allowed to revegetate after commissioning of the Project.
 - e. If turbines require substantial maintenance involving large cranes or other heavy equipment, the same measures used during construction to limit clearing of vegetation and disturbance of soil will be used.
 - f. Areas where mowing will be conducted to support post-construction monitoring will be cleared and mowed prior to the breeding season for most birds. Regular mowing will occur to prevent establishment of habitat suitable for nesting activities throughout the active breeding season.
- 3) BMPs will be used to avoid the introduction and spread of invasive species;
- a. Construction vehicles and equipment that arrive from other areas will be regularly cleaned.
 - b. Following construction, depending on seed availability and landowner preferences, non-agricultural areas will be re-seeded and stabilized using native seed, to restore natural habitat. Re-seeding will be consistent with state requirements to avoid the introduction of invasive plant species.
- 4) BMPs for construction activities will minimize degradation of water quality from storm water runoff and sediment from construction;
- a. A plan note will be incorporated into the construction contract requiring that contractors adhere to all provisions of National Pollutant Discharge Elimination System (NPDES) permits and the Storm Water Pollution Prevention Plan (SWPPP).
 - b. Federal and state measures will be followed for handling toxic substances to minimize danger to water and wildlife resources from spills.
 - c. The Project was designed to avoid or minimize stream crossings and wetlands where reasonable and practicable. Due to the nature of this type of project, there is some flexibility in selecting turbine locations and, more so, access road and electric collection line locations. As such, great care was taken to design Project facilities to avoid or minimize impacts to wetlands, drainages, and other water features to the maximum extent practicable.
- 5) Maintenance activities will help to avoid the creation of foraging opportunities for raptors and/or scavengers, or availability of materials that could be harmful to birds;
- a. Rock and brush piles that could create habitat for raptor prey will be removed from turbine areas.

- b. Any observed road-kill or other dead animals that may attract scavenging raptors such as vultures or eagles will be cleared from within turbine areas, and access roads;
 - To avoid disruption of study results, clearing/removal of dead animals will be suspended as appropriate during post-construction monitoring period in areas within the monitoring transects that overlap turbine areas and access roads.
 - c. Food waste littering by construction/maintenance staff will be prohibited.
 - d. To avoid attracting wildlife to the construction site, contractors will provide appropriate trash collection receptacles throughout the Project Area to collect construction related waste materials, including garbage and refuse.
- 6) Maintenance of overhead utilities will minimize impacts to birds;
- a. Bird flight diverters will be installed on all new overhead transmission lines to be built near sensitive habitat areas (i.e. streams, wetlands, or other water bodies) to minimize risks to waterfowl and other birds. The fiber optic and shield wire will be marked in these areas with bird diverters at intervals of 20 feet. Where two shield wires are required, the bird diverters will be placed at alternating intervals of 40 feet such that the over-all interval between bird diverters on both wires is 20 feet. The conductor wires will be attached to the poles via davit arms, brace post, or post mount insulators and arms, as needed, to meet local utility practice and rural utility specifications.
 - b. All conductor wire spacing and other features will follow the guidelines developed by the APLIC working group guidelines as they are written at the time of installation.
- 7) Fire potential will be minimized;
- a. Spark arrestors will be used on all electrical equipment.
 - b. Smoking will be restricted to designated areas on site.

6.3 Operation

The following operation phase measures have been incorporated into the BBCS to avoid operation activities near sensitive habitats during critical periods in bird and bat life cycles, and to minimize impacts to wildlife habitat.

- 1) Turbine blades will be fully feathered below a wind speed of 6.9 meters per second between one half hour before sunset to one half hour after sunrise during the Indiana bat's fall migratory period, August 1 - October 30 and during the Indiana bat's spring migratory period from March 15 to May 15.

- 2) All operations personnel will be trained to identify potential wildlife conflicts and the proper response. This training will include sensitivity to birds and other terrestrial wildlife. For operations, TWO will develop an incidental reporting process by which operations personnel document bird or bat casualties during routine maintenance work and at other times that they are within the Project Area (see Section 7.2.1).
- 3) All carrion discovered on-site during regular maintenance and monitoring activities will be removed, pursuant to the terms of all applicable permits, to avoid attracting bald eagles and other raptors.
- 4) Project personnel will be advised regarding speed limits on Project-owned roads (25 mph) to minimize wildlife mortality due to vehicle collisions.
- 5) Fires will be handled in accordance with the TWO Fire Protection and Prevention Plan. The plan includes pre-fire planning with the local fire department, fire prevention through good housekeeping and equipment maintenance, reporting fires to the local fire authorities and TWO management, and limited fire suppression using fire extinguishers by trained TWO personnel.
 - a. At all times during operation, satisfactory spark arresters will be maintained on internal combustion engines.
- 6) Mechanical measures will be used to the greatest extent practicable to control noxious weeds in all surface-disturbed areas.
 - a. The use of herbicides and pesticides will be minimized and spot treatments implemented where possible to avoid and/or minimize potential impacts to nearby water resources.
- 7) All applicable hazardous material laws and regulations existing or hereafter enacted or promulgated regarding hazardous or solid wastes will be complied with and a Spill Prevention, Control and Countermeasure Plan (SPCCP) will be implemented as appropriate by federal and/or state regulations. The only hazardous chemicals anticipated to be on-site are the chemicals contained in diesel fuel, gasoline, coolant (ethylene glycol), and lubricants in machinery.
 - a. Hazardous chemicals contained in diesel fuel, gasoline, coolant (ethylene glycol), and lubricants will not be stored in or near any wetland or other waterway, nor will any vehicle refueling, or routine maintenance occur in or near waterways without appropriate secondary containment.

6.4 Decommissioning

Once the Project has reached the end of its operational life and transitions to decommissioning stage, that process will target restoration of the baseline ecosystem to the extent practicable and will be completed in coordination with appropriate regulatory agencies. TWO will comply with the decommissioning recommendations and conditions from the OPSB CECPN, as required.

- 1) Decommissioning activities will avoid additional site disturbances and removal of native vegetation to the extent practicable.
- 2) Foundations will be removed to a depth of 4 feet below the surrounding grade and covered with soil to allow for reestablishment of native plants or crops or as otherwise prescribed by conditions specified in the OPSB CECPN.
- 3) If topsoil is removed during decommissioning, it will be stockpiled and used as topsoil for replanting. Once decommissioning activities are complete, topsoil will be restored, reseeded, and stabilized.
- 4) Overhead pole lines that are no longer needed will be removed.
- 5) Erosion and sediment control measures will be implemented in all disturbance areas where potential for erosion exists, consistent with storm water management objectives and requirements.
- 6) Any fencing erected for the Project will be removed unless in use by the landowner and allowed under OPSB CECPN conditions.

7.0 POST-CONSTRUCTION MONITORING AND ADAPTIVE MANAGEMENT

7.1 Tier 4 – Post Construction Monitoring

The USFWS WEG and ODOW *Onshore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* recommends at least one year of post-construction fatality monitoring for sites at which studies predict a low probability of significant adverse impacts and suggests that two or more years of fatality monitoring may be necessary at sites for which pre-construction field studies indicate moderate or high probability of significant adverse impacts. Results of the Tier 1 and 2 analyses for the Project, Tier 3 analyses of data from the avian surveys on the Project to date, and analysis of pre-construction and fatality monitoring data from other operating wind projects in the Midwest and Northeast suggest that the potential risk to avian and bat species from the Project is low. Factors influencing the low risk determination for the Project include the overall lack of distinct topography, unique habitats or resources, or other features that could concentrate birds or bats; absence of federally-listed species; and lack of evidence from other operating wind projects in the Midwest and Northeast of significant numbers of bird and bat fatalities.

To facilitate TWO's evaluation of mortality rates of birds and bats at the Project, a comprehensive post-construction avian and bat mortality monitoring is proposed. The overall objectives of the post-construction monitoring effort will be to determine the overall bird and bat fatality rates from the Project; to evaluate the circumstances under which fatalities occur; and to determine whether the estimated mortality is lower, similar, or higher than the average mortality rates observed at other local, regional, and national wind projects. The baseline monitoring will also address ODOW and USFWS objectives which are to validate the risk assessment and to adaptively manage impacts in cooperation with the agencies to meet no net loss standards of the BGEPA and minimize impacts to general avian and bat populations. Post-construction monitoring will be completed for bats and birds concurrently, and detailed methods for these surveys are presented in **Appendix B – Post Construction Avian and Bat Fatality Monitoring Plan**. Since post-construction monitoring methods are constantly improving as researchers develop new and more accurate methods of survey, TWO will consider recommendations to adopt new survey techniques and protocols as they become available.

Pursuant to the Amended CEPCN, 60 days prior to the first turbine becoming commercially operational, TWO is to submit a post-construction avian and bat monitoring plan for ODOW and OPSB staff review and approval. The following sections describe the criteria that will be used in developing this plan. TWO intends to follow such plan as approved by ODNR and OPSB staff. As noted in the OPSB staff report, the monitoring is to be completed for two years, although the ODNR and OPSB staff may waive the second year of monitoring.

7.2 Tier 5 – Other Post-Construction Studies

7.2.1 Continued Monitoring and Coordination Process

In addition to the one-year post-construction fatality monitoring study, TWO will implement a Wildlife Incident Reporting System (WIRS) at the start of operations and it will remain active for the life of the Project. The WIRS will be designed to provide a means of recording avian and bat fatalities found at the Project site to increase the understanding of wind turbine and wildlife interactions. The WIRS will provide a set of standardized instructions for the Projects' personnel to follow in the event of a wildlife incident within the Project Area. Each incident will be documented on a data sheet and reported to the ODOW and USFWS on an annual basis or as otherwise minimally required by each agency. The data will be logged into and maintained within a tracking spreadsheet by the Site Manager or a designee. All site personnel will be required to receive training on WIRS procedures as well as how to complete and submit the WIRS report.

This long-term operational effort will consist of managerial, operations, and maintenance staff documenting and reporting any fatality discovered during the Project's operation. The WIRS will provide a set of standardized instructions for Project personnel to follow in response to wildlife incidents within the Project. These instructions will include the following:

- Each fatality/injury will have a WIRS form completed, and a photo documentation,
- A qualified individual will be contacted to remove carcass or injured wildlife,
- Species identification will be completed and confirmed by a qualified individual,
- Carcass will be removed and/or disposed of per any site permits,
- If injured, a rehabilitation center will be contacted to remove and care for injured wildlife, and
- If the subject species is federally-listed, state-listed, or an eagle, an incident will be reported to ODOW and USFWS as soon as possible, within not more than one business day.

7.3 Adaptive Management for Unexpected Avian, Bat, and/or Habitat Impacts

TWO is committed to an adaptive management approach when monitoring and evaluating the effects of the Project on birds and bats. The basis of this approach allows for flexible decision-making that can be adjusted as events and circumstances become better understood. The underlying goal is to understand observed versus predicted

impacts, and to identify design features that minimize unexpected effects through an iterative learning process and regarding other studies and current research.

Based on the results of the Tier 4 monitoring program described in Section 7.1.1, adaptive management measures could be considered to further avoid, minimize, or compensate for unanticipated and significant project impacts to wildlife. Factors considered when determining potential need for an adaptive response will include:

- Mortality of an eagle or mortality of a species listed as endangered or threatened under the federal ESA or Ohio's Endangered Species Statute. Note that the final 4(d) Rule concerning the northern long-eared bat currently concludes that incidental take of this species resulting from wind energy development and operation is not prohibited. Any documented northern long-eared bat mortality will be reported to the USFWS and ODOW, however adaptive management measures are presently not contemplated under the current 4(d) rule. If the status of the northern long-eared bat is downgraded to endangered, or the 4(d) rule is changed, TWO will update this BBCS and adaptive management measures as appropriate.
- Significant levels of mortality of unlisted bird and bat species. Significance will be determined by qualified biologists and will be based on the latest information available, including the most recent data on species' population sizes and trends. For example, even relatively high levels of mortality of the most common species may not be significant. Conversely, lower levels of mortalities of less common species may be of more concern, particularly if these species appear to be at risk (e.g., USFWS's BCC).

As stated previously, bat mortality at the Project is expected to be within the range reported for other Ohio wind projects. In particular, TWO's commitment to operation measures, including overnight feathering of turbine blades up to the manufacturer set cut-in speed from April 1 to October 31 (as described in Section 6.3), is expected to minimize impacts to bats.

Because the Project is not expected to result in higher bat mortality than has been observed in Ohio to date, as well as the fact that there is a general shortage of available data on unlisted bat populations from which to determine a specific threshold that would indicate potential for significant impacts, specific adaptive management thresholds regarding general bat fatality rates are not proposed.

However, during the post-construction monitoring period, TWO will notify the ODOW and OPSB of bat fatality rates at the time of annual monitoring report submittal. The annual report will include the estimated bat fatalities per MW, as well as a facility-wide bat fatality estimate on an annual and operational lifespan scale for the Project.

Additionally, if five or more dead or injured bats are found in one five-day period, the OPSB will be notified within 24 hours.

TWO will coordinate with the ODOW and OPSB regarding annual bat fatality rates, as well as, if five or more dead or injured bats are found in one five-day period. TWO will investigate, based on the available data, the circumstances under which the fatalities occurred, the species affected, and whether population-level¹ impacts may be occurring. TWO will coordinate with the ODOW and OPSB regarding the conclusions of the investigation and discuss whether the implementation of potential minimization measures (e.g., operational changes) and/or mitigation measures (e.g., reduce non-TWO sources of mortality for the affected species) may be appropriate.

Following the implementation of remedial actions, TWO will calculate estimates of non-listed bat fatality rates from the monitoring data collected at the Project for at least one subsequent year to evaluate the effectiveness of the adaptive management measures.

After the intensive post-construction monitoring period, incidental monitoring will be used to continue to monitor impacts to bats over the life of the Project. Bat carcasses will be reported regularly to TWO's environmental staff. Quarterly reports will be submitted to the ODOW and OPSB for the life of the Project, identifying any dead or injured bat species found, as well as the location and date of the species. If at any point over the life of the Project, five or more dead or injured bats are detected within a five-day period, TWO will notify the ODOW within 24 hours, and if any federally listed species are affected, the USFWS will also be notified. As described above, TWO will then investigate, based on the available data, the circumstances under which the event occurred, the species affected, and whether population-level impacts may be occurring. TWO will coordinate with the ODOW and OPSB regarding the conclusions of the investigation and discuss the implementation of potential minimization measures (e.g., operational changes) and/or mitigation measures (e.g., reduce non-TWO sources of mortality for the affected species).

7.4 Additional Adaptive Management Considerations

If the impacts observed in the first year of monitoring represent a significant impact to wildlife, the second year of post-construction fatality monitoring could be modified to provide further information to be used in implementing adaptive management measures. This second year would likely focus on the significant impacts identified for species of concern. For example, if it is found that the bat fatalities at the Project are significant based on analysis of the post-construction fatality data, a second year of

¹ Population will be evaluated at the smallest level for which reliable population size and/or trend data are available. Local, regional, or range-wide populations may be evaluated depending on the data available for the particular species.

fatality monitoring could be done that focuses on the time period when subject bat fatalities were discovered in year one (e.g., July-October). The same protocol, as stated above would be used for searches but, in this example, with a focus on a concentrated search period and reduced plot sizes to narrow the search to the area where bat carcasses are most likely to be found (e.g., closer to the turbines).

Some of the adaptive management options that could be considered, depending on the results of the post-construction mortality monitoring and taking into account economic feasibility², might include the following:

- 1) Lighting may be modified if it contributes to bird mortality events and provided it is not contrary to FAA requirements.
- 2) Installation of or modifications to anti-perching and anti-nesting devices.
- 3) Operational minimization (e.g., feathering, modified operations from sundown to sunrise, alteration of cut-in speeds, measures with turbines demonstrating higher levels of impact).
- 4) The above and other state-of-the-art technology proven to decrease bird/bat mortality without affecting the financial viability of the Project may be considered and/or applied.

7.5 Action Plan Should New Risks Arise

In addition to adaptive management triggered based on the results of the post-construction mortality studies, additional adaptive measures will be considered as a result of other studies or incidental wildlife observations during Project operations. Operations staff will also be trained to implement an incidental wildlife reporting protocol (Section 7.2.1). TWO will communicate the results of this monitoring activity to the ODOW and USFWS. Any further decisions regarding the scope of additional survey efforts (if needed) or adaptive management will be coordinated with the ODOW and USFWS.

There may be other scenarios where newly identified risks, such as finding a new raptor nest near turbines, that may require additional measures; including a need for individual turbines to be monitored more closely for use and fatalities. The intent of monitoring is to document changes in use (e.g., higher use) in a timely manner such that management changes (e.g., removal of prey sources) or operational changes can be implemented and, in this example, potential impact to raptors will continue to be minimized.

Lastly, TWO will consider implementing adaptive management measures if the status of any species potentially impacted by the Project changes, such as if any species

² Once a project is operational there is a fixed amount of capital expenditure and the only available source of funding is from operational budgets, which must be within the economic parameters of the Project.

become listed under federal or state protected species regulations, or the status of a species is changed.

8.0 BBCS IMPLEMENTATION

Project construction is anticipated to be completed by mid-2018. Monitoring and reporting measures detailed in the BBCS were developed based on industry standards and the perceived risks from the Project. This document will be modified with the incorporation of new data obtained from post-construction fatality monitoring as the Project proceeds. Any modification to this document will be made in coordination with the ODOW, OPSB, and USFWS.

8.1 Key Contacts

TWO has identified the individuals listed in the **Table 8-1** below with the goal of connecting avian experts with company decision makers. These individuals are currently considered to be primary contacts for questions regarding this BBCS. Additional contacts to be identified for the Project include a Site Manager.

Table 8-1: Key Contacts for the Northwest Ohio Wind Project BBCS

Title	Contact	Phone	Email
Asset Manager	Joe Nobile	(919) 747-5057	jnobile@camstex.com
Site Manager	Brad Norden	(419) 270-2692	Norde14195@gmail.com
Project Consultant	Steve Battaglia	(952) 906-7405	steve.battaglia@westwoodps.com
Westwood Senior Biologist	Brad Norling	(952) 697-5767	bradley.norling@westwoodps.com
USFWS Contact	Megan Seymour	(614) 416-8993	megan_semour@fws.gov
ODNR ODOW Contact	Erin Hazelton	(614) 265-6349	erin.hazelton@dnr.state.oh.us

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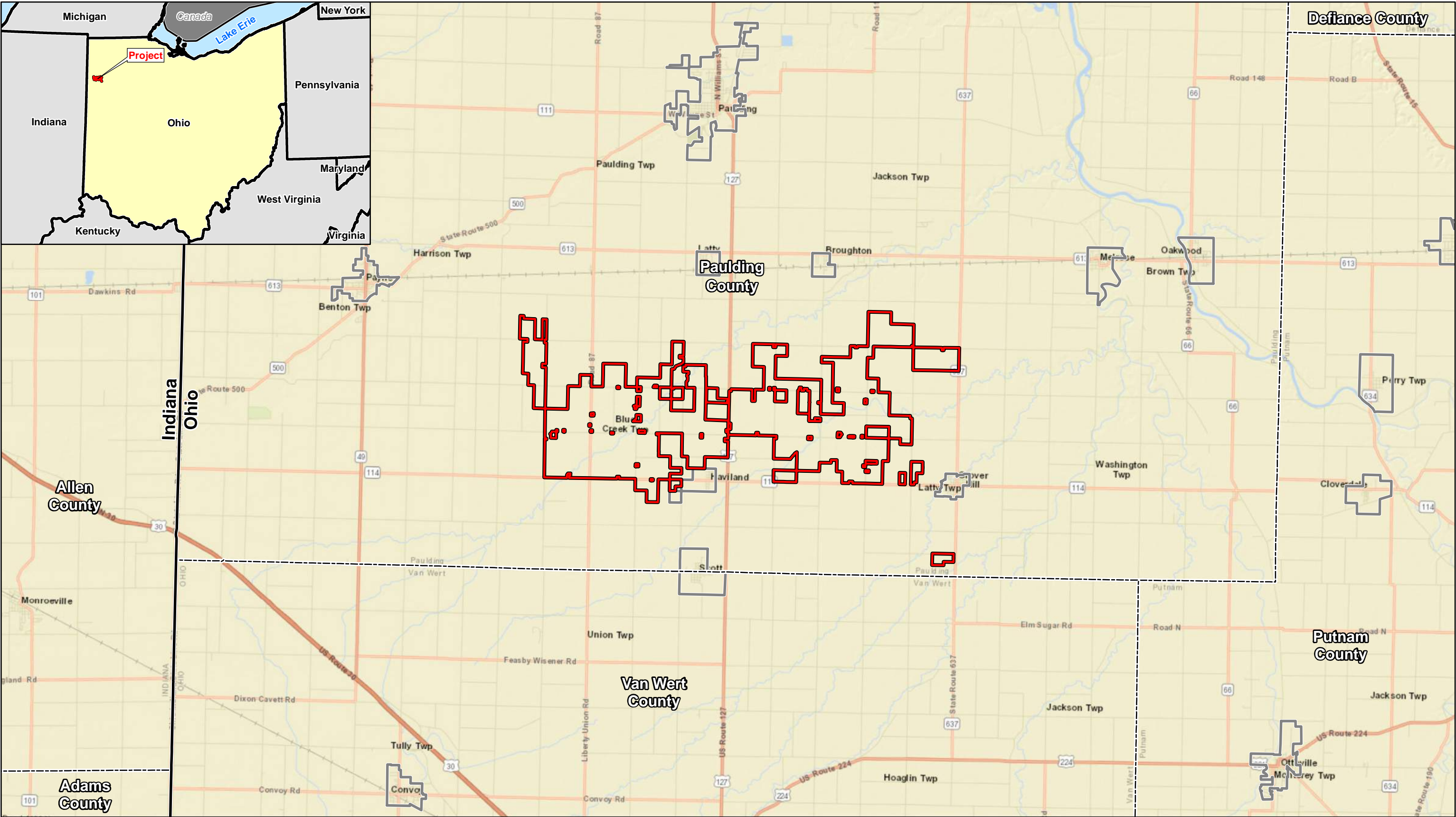
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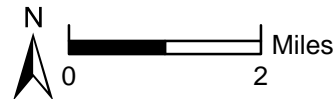
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Data Source(s): Westwood (2018); ESRI WMS World Streets Basemap (Accessed 2018).

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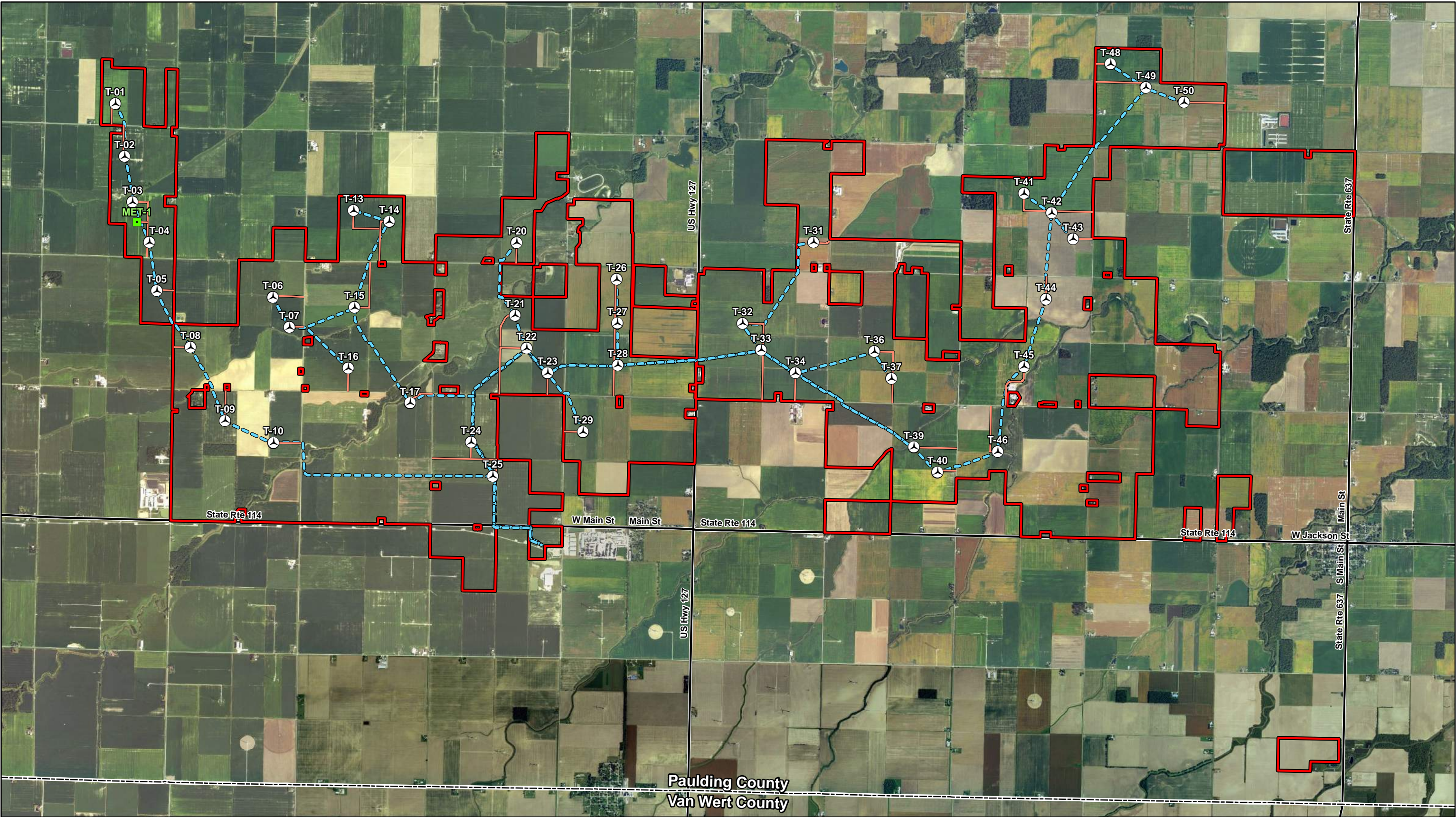
-  Project Boundary
-  State Boundary
-  City Boundary
-  County Boundary



Northwest Ohio Wind Project

Paulding County, Ohio








Project Location Map



Data Source(s): Westwood (2018); Ohio NAIP Imagery (Accessed 2018); Census Bureau (2017).

Westwood
Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.

Legend

- | | | |
|--|---|---|
|  Project Boundary |  Turbine |  Access Road |
|  Major Road |  Met Tower |  Collection Line |
|  County Boundary | | |



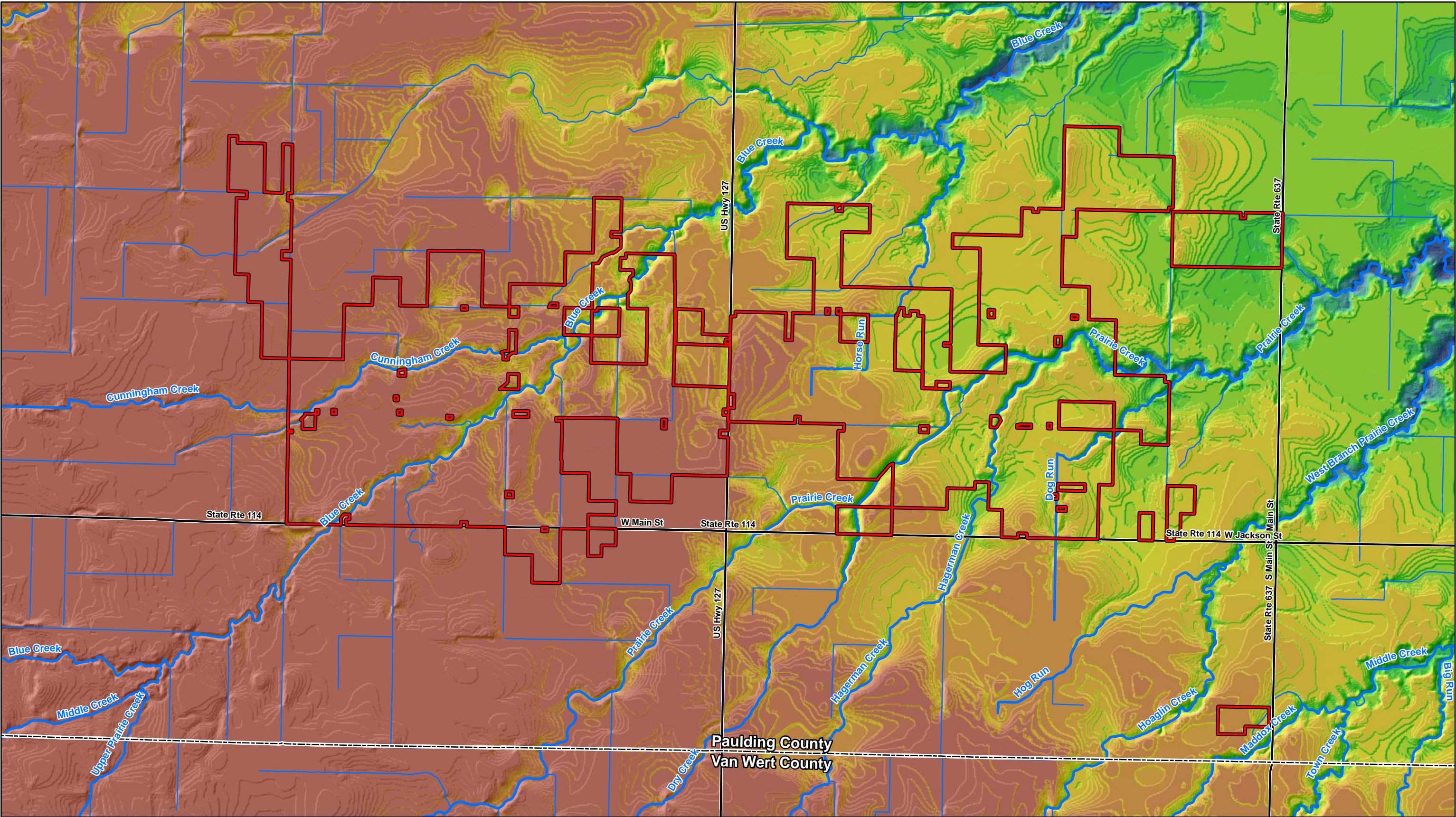
Northwest Ohio Wind Project

Paulding County, Ohio

Project Site Map

EXHIBIT 2-2

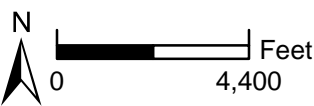
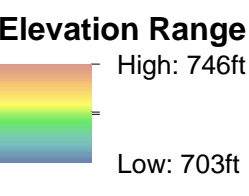
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Data Source(s): Westwood (2018); Ohio NAIP Imagery (Accessed 2018); Census Bureau (2017); USGS NHD Dataset (2013); USGS (2018).

Legend

- Project Boundary
- Major Drainage Feature
- Minor Drainage Feature
- Major Road
- County Boundary

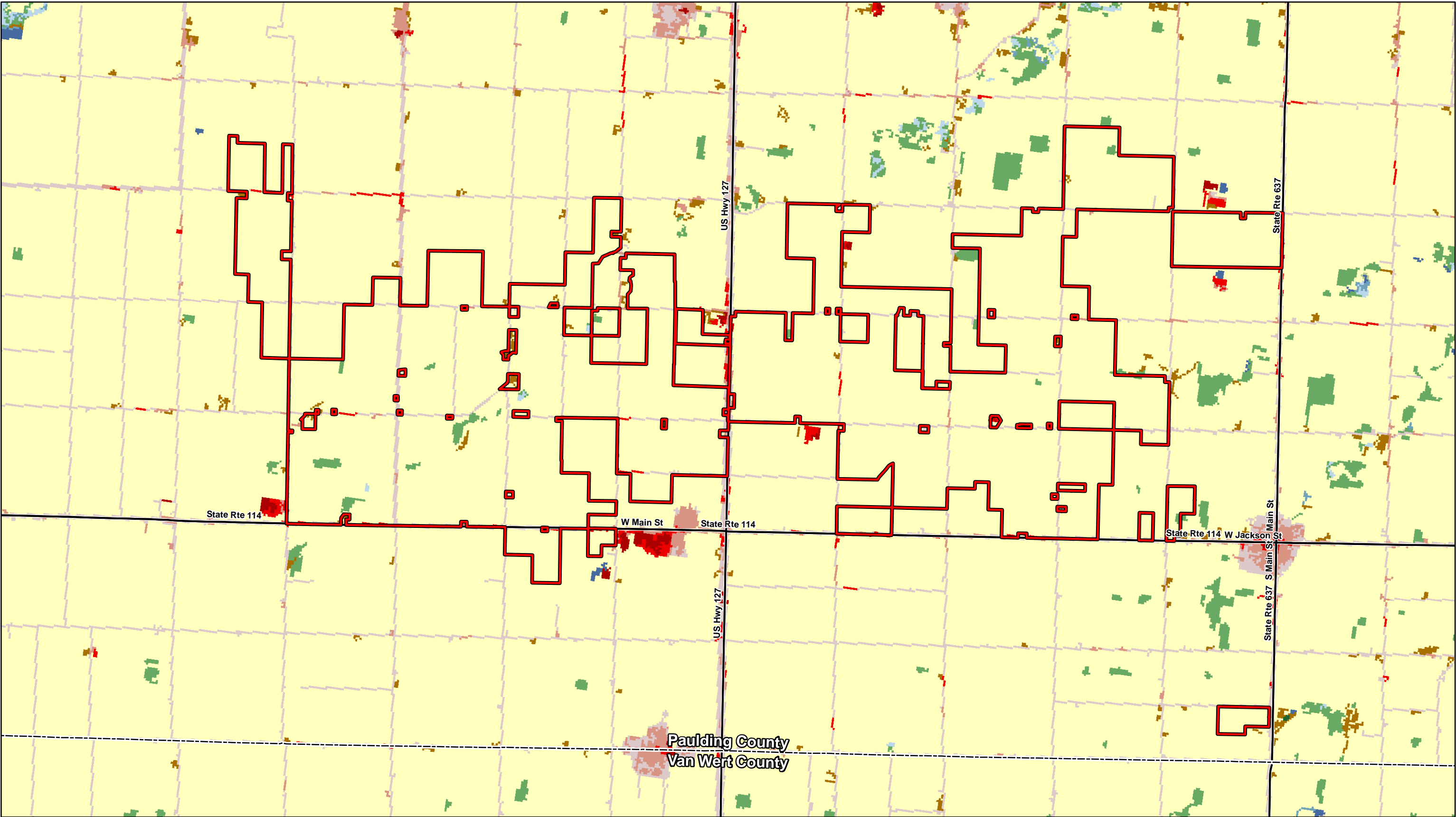


Northwest Ohio Wind Project

Paulding County, Ohio

Topography & Major Drainage Features

EXHIBIT 3-1



Data Source(s): Westwood (2018); Ohio NAIP Imagery (Accessed 2018); Census Bureau (2017); U.S. Geological Survey (2011).

Legend

- | | | | |
|-----------------------------|--------------------------|------------------------------|----------------|
| Project Boundary | Cultivated Crop | Developed, High Intensity | Herbaceous |
| Major Road | Deciduous Forest | Developed, Open Space | Open Water |
| County Boundary | Developed, Low Intensity | Emergent Herbaceous Wetlands | Woody Wetlands |
| Developed, Medium Intensity | Evergreen Forest | | |

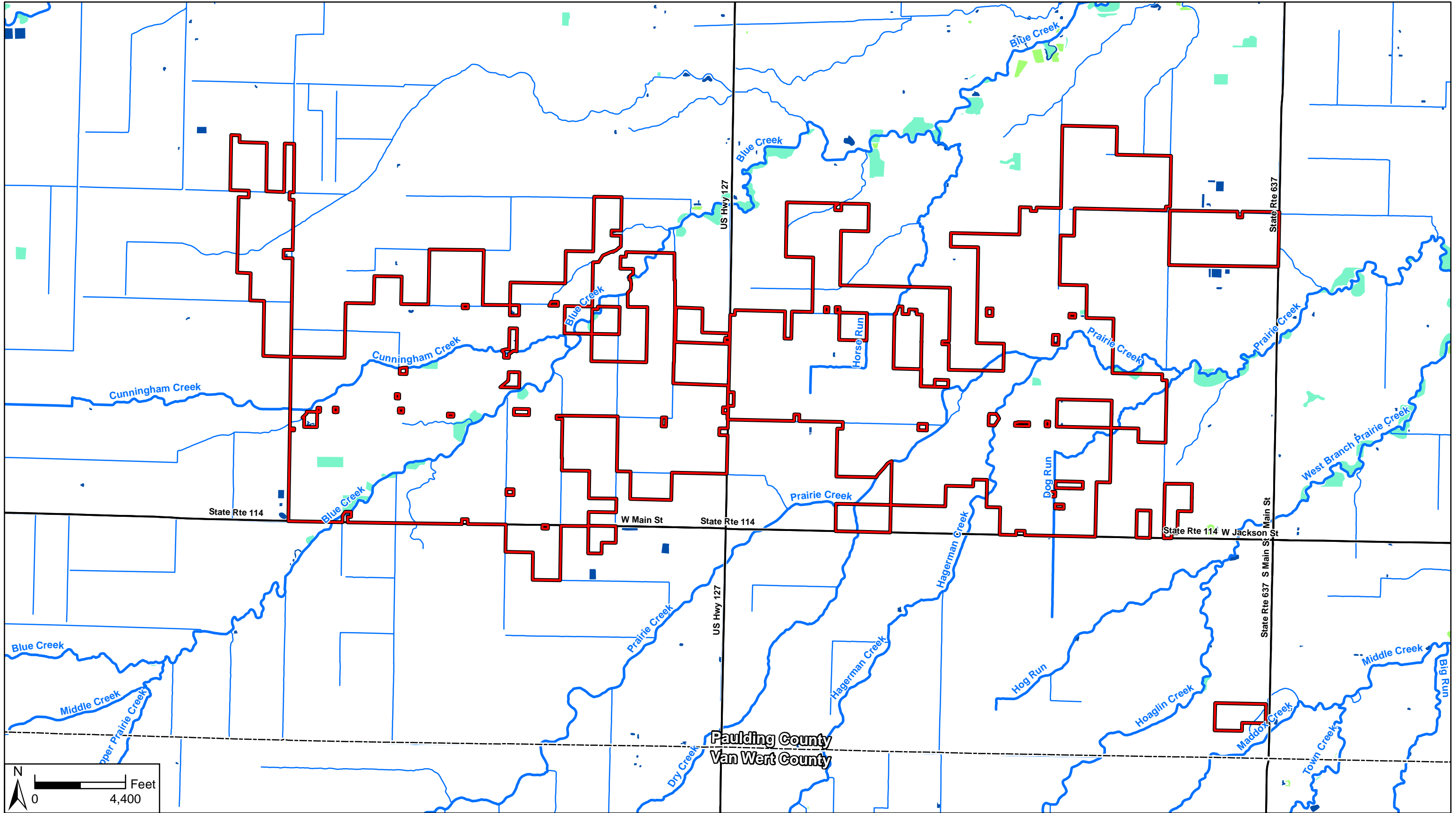


Northwest Ohio Wind Project

Paulding County, Ohio

Land Cover Types

EXHIBIT 3-2



Data Source(s): Westwood (2018); Ohio NAIP Imagery (Accessed 2018); Census Bureau (2017); USGS NHD Dataset (2013); U.S. Fish and Wildlife Service (2017); Ducks Unlimited (2017).

Legend

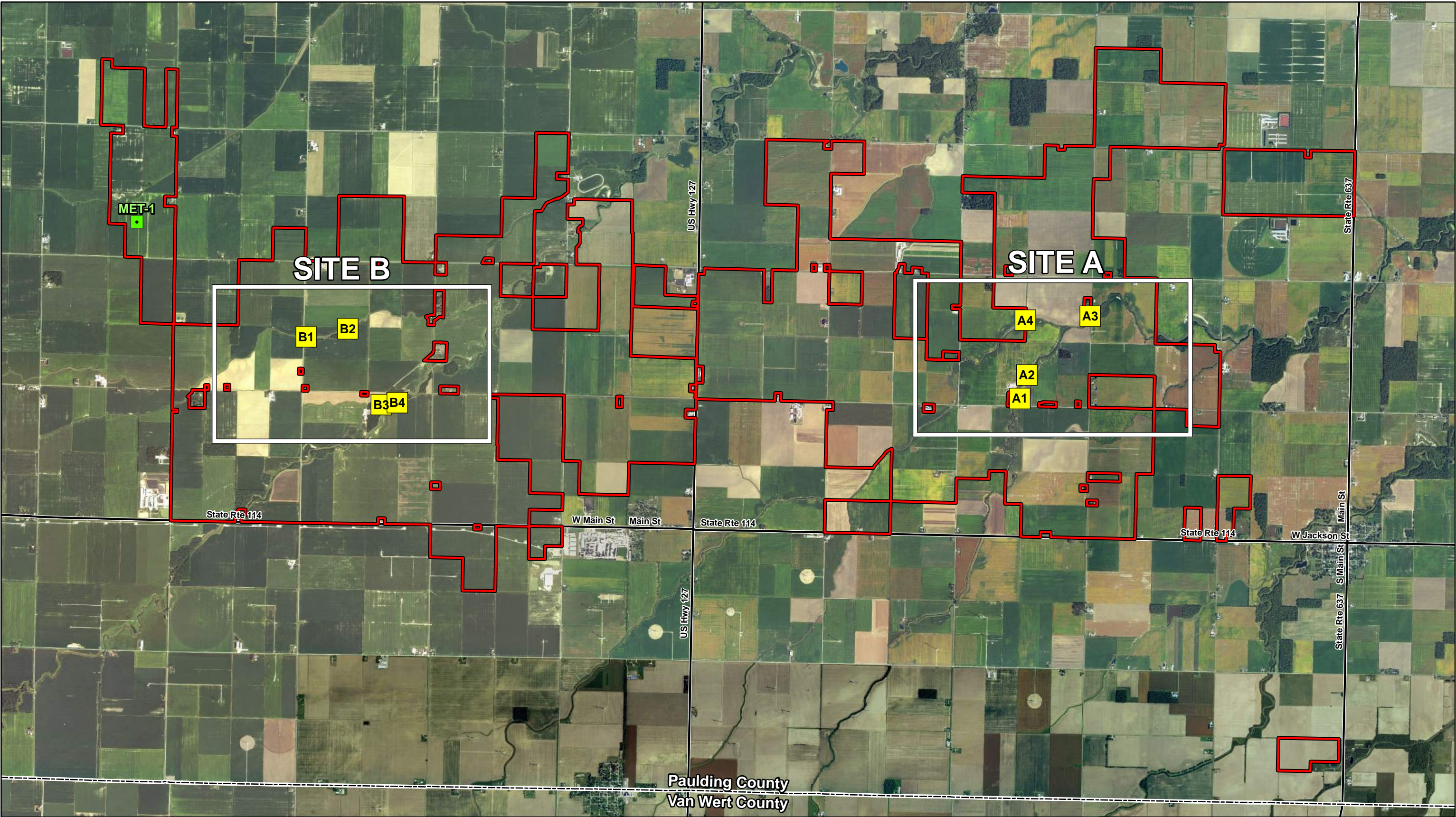
- | | | | |
|------------------|------------------------|-----------------------------------|-----------------|
| Project Boundary | Major Drainage Feature | Freshwater Emergent Wetland | Freshwater Pond |
| Major Road | Minor Drainage Feature | Freshwater Forested/Shrub Wetland | Riverine |
| County Boundary | | | |

Northwest Ohio Wind Project

Paulding County, Ohio

Surface Water and Wetlands

Westwood
Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.



Data Source(s): Westwood (2018); Ohio NAIP Imagery (Accessed 2018); Census Bureau (2017).

Legend

- | | |
|------------------|--------------------------|
| Project Boundary | Net Location |
| Major Road | Met Tower |
| County Boundary | Net Location Site Extent |



Northwest Ohio Wind Project

Paulding County, Ohio

Mist Netting and Acoustic Bat Survey Areas

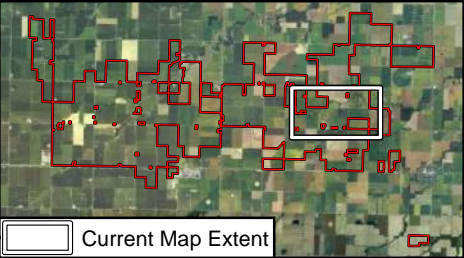
Map Document: P:\0004572.01\GIS\BACS Exhibit\NWCO_BBOS_Ext-2_SiteA\MistNetting_locations_180208.mxd 2/8/2018 11:45:28 AM rdevilo





Data Source(s): Westwood (2018); Ohio NAIP Imagery (Accessed 2018); Census Bureau (2017).

Westwood

Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.



Legend

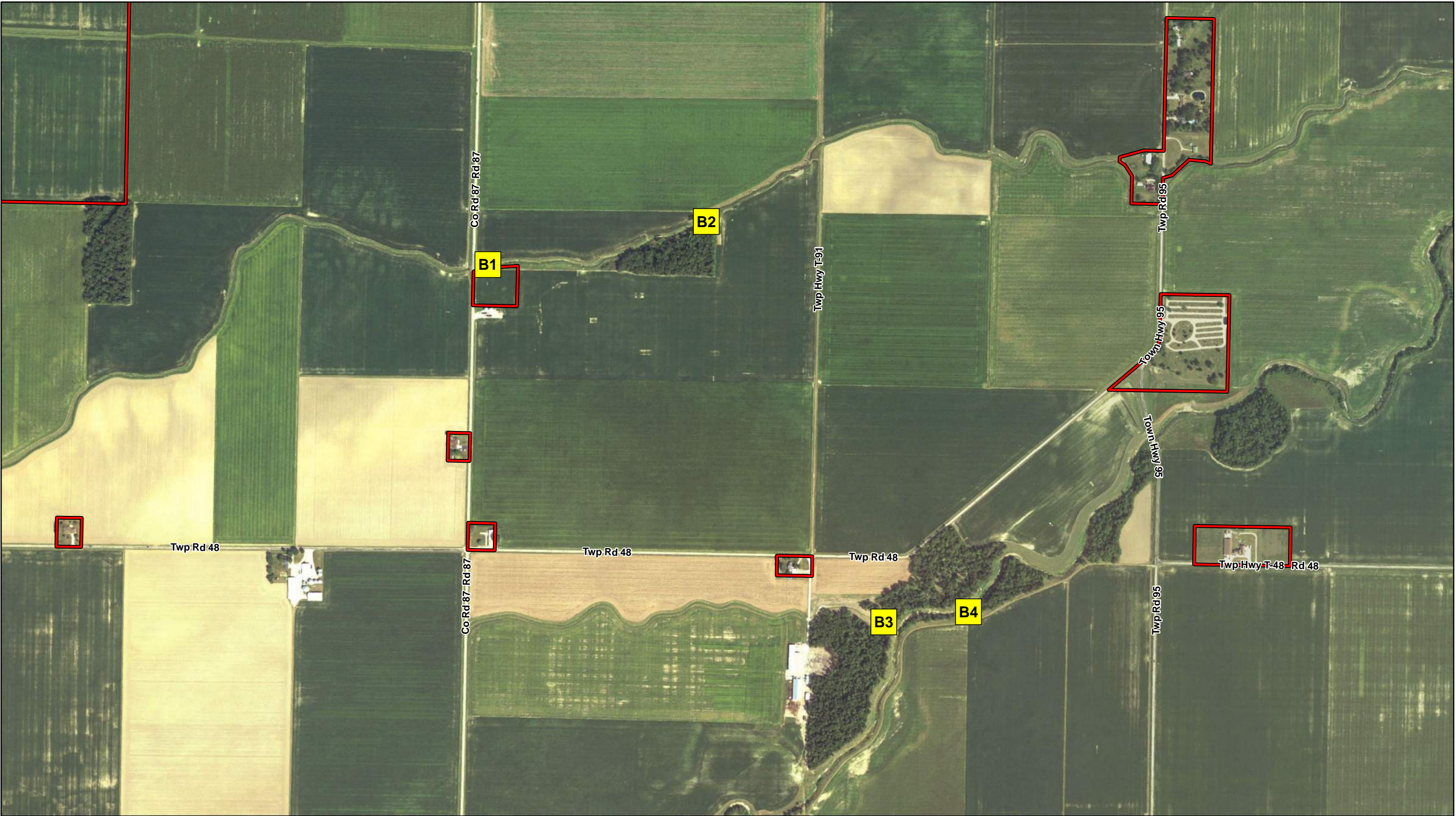
-  Net Location
-  Project Boundary



Northwest Ohio Wind Project

Paulding County, Ohio

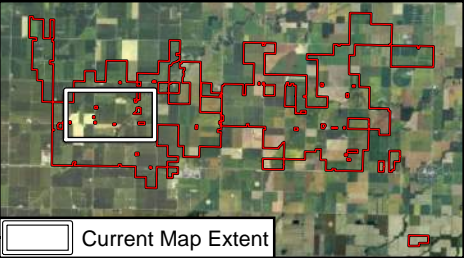
Site A Mist Netting Locations





Data Source(s): Westwood (2018); Ohio NAIP Imagery (Accessed 2018); Census Bureau (2017).

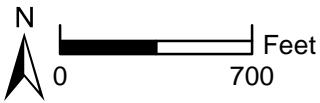
Westwood

Toll Free (888) 937-5150 westwoodps.com
Westwood Professional Services, Inc.



Legend

-  Net Location
-  Project Boundary



Northwest Ohio Wind Project

Paulding County, Ohio

Site B Mist Netting Locations

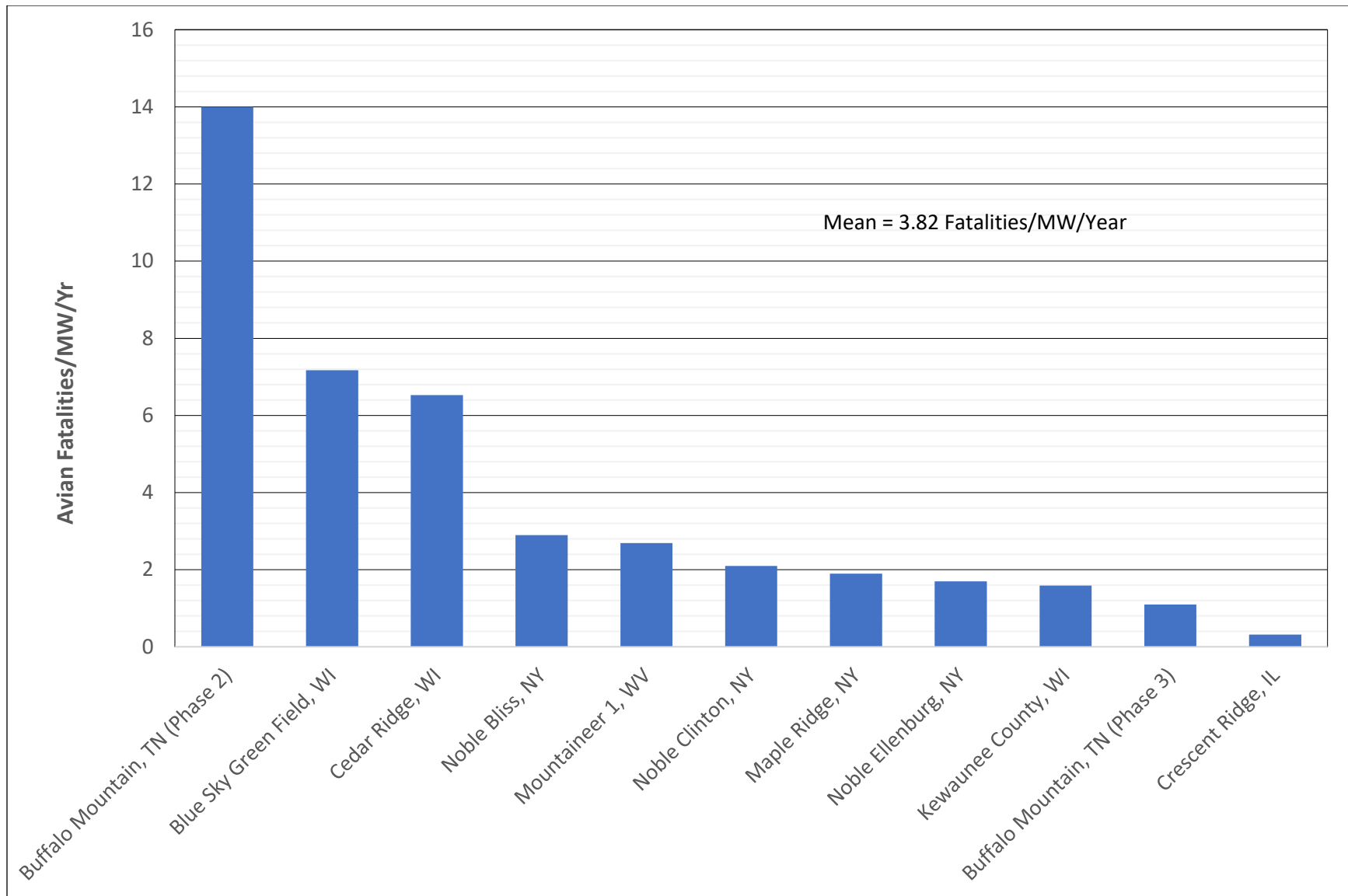


Exhibit 5-1: Results of Publicly Available Post-Construction Avian Mortality Monitoring Studies at Wind Energy Facilities in the East.

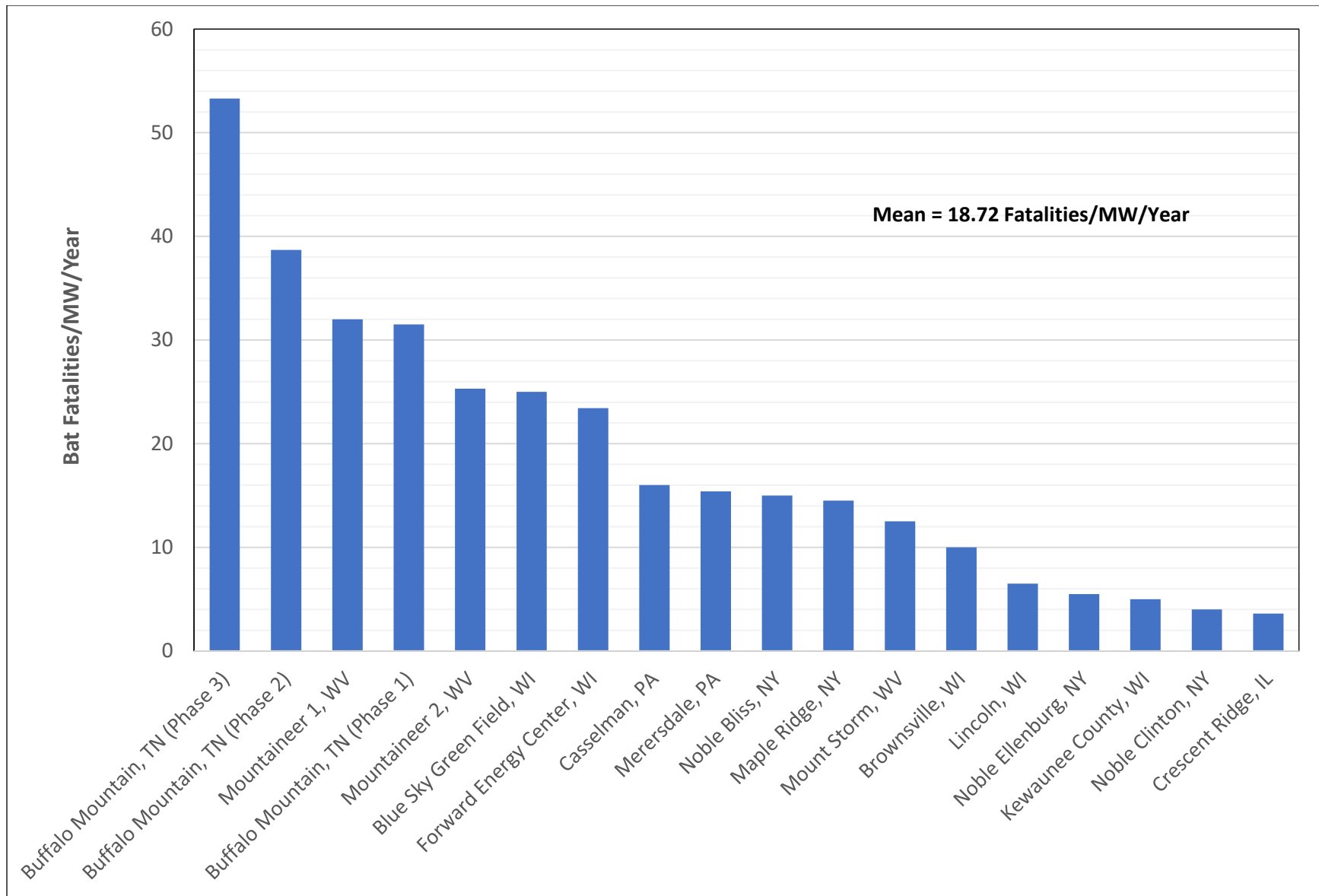


Exhibit 5-2: Results of Publicly Available Post-Construction Bat Mortality Monitoring Studies at Wind Energy Facilities in the Midwest and Northeast.

APPENDICES

APPENDIX A

Agency Correspondence

Summary of Wildlife Agency Correspondence Prior to May 24, 2013 Filing of CECPN Application – Northwest Ohio Wind Energy Project.

Date	Sender	Recipient	Type of Corresp.	Comments
01-28-2010	ODNR Division of Wildlife (DOW)	“Interested Parties”	Letter	Wildlife survey recommendations per <i>On-shore Bird and Bat Pre-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio</i> : (1) breeding bird surveys at 2 sample points per turbine, except turbines on agricultural land; (2) raptor nest searches on and within 1 mile of proposed facility; (3) nest monitoring if nests of protected raptor species found; (4) bat acoustic monitoring at existing met tower locations within project area boundaries.
02-02-2010	ODNR Div. of Natural Areas and Preserves (DNAP)	NWOWE	Letter	ODNR Natural Heritage Program letter indicating: (1) no records of threatened/endangered species in project area plus a one mile buffer; (2) no dedicated nature preserves or scenic rivers; (3) no state forests or wildlife areas; and (4) no unique ecological sites, geologic features or animal assemblages.
02-26-2010	USFWS	NWOWE	Letter	Comment letter indicating: (1) the project area is “predominantly rural and agricultural”, “wildlife habitat is limited to a few isolated woodlots scattered throughout the project area”, no woodlots greater than 10 hectares were identified, and “several small streams pass through the project area” but “do not appear to support much, if any, riparian habitat; (2) the USFWS concurs with “minimum” level of wildlife survey effort; (3) “a very limited amount of suitable roosting and foraging habitat” for federally endangered Indiana bats is present; (3) one 1976 record of an Indiana bat maternity colony abuts the eastern project boundary; and (4) mist net surveys at 2 locations within project area were recommended.
04-22-2010	ODNR DOW	NWOWE	Email	Meeting follow-up and ODNR recommended revisions to project boundary to avoid more sensitive “moderate” and “high” wildlife survey effort areas around Grover Hill.
04-22-2010	NWOWE	ODNR DOW	Email	Request for confirmation that adoption of ODNR recommended boundaries would not change previously recommended wildlife survey effort.

04-22-2010	ODNR DOW	NWOWE	Email	Confirming that both original site boundaries and ODNR recommended boundaries fall under the “minimum” level of survey effort.
05-05-2010	NWOWE	ODNR DOW & USFWS	Email	Transmitting revised site boundary based on ODNR site visit on 04-29-2010 and requesting concurrence on boundary and requesting any updated survey recommendations.
05-06-2010	USFWS	NWOWE	Letter	Update to 02-26-2010 comment letter relating to new site boundary (as revised per ODNR recommendations) indicating: (1) the revised project area is “predominantly rural and agricultural” and that “wildlife habitat is limited to a few isolated woodlots scattered throughout the project area”; (2) “a very limited amount of suitable roosting and foraging habitat” for federally endangered Indiana bats is present; (3) one 1976 record of an Indiana bat maternity colony abuts the eastern project boundary; and (4) mist net surveys at 2 specified locations within project area were recommended.
12-16-2010	USFWS	NWOWE	Letter	Response to bat mist net survey results: (1) indicating it to be “unlikely that Indiana bats are using the project site on a regular basis during the summer maternity season”; (2) discussing the potential for turbine collisions during migration periods; (3) describing potential measures for avoiding or minimizing collision risk; and (4) presenting options for developing Habitat Conservation Plan (HCP) and obtaining Incidental Take Permit (ITP) under federal Endangered Species Act.
01-30-2013	USFWS	NWOWE	Letter	Letter regarding: (1) a fall migration Indiana bat collision that occurred at adjacent Blue Creek Wind Farm; (2) reiterating potential measures for avoiding or minimizing collision risk; and (4) again presenting options for developing Habitat Conservation Plan (HCP) and obtaining Incidental Take Permit (ITP) under federal Endangered Species Act.
03-19-2013	NWOWE	ODNR DOW	Emails	Emails to coordinate ODNR receipt of revised project boundary shape files to facilitate updated ODNR review.
03-20-2013	ODNR	Westwood	Emails	Emails to/from ODNR confirming successful receipt of revised

		Professional Services		project boundary shape files.
03-26-2013	NWOWE	ODNR DOW (cc'd to OPSB)	Emailed Letter	Letter following up on March 19, 2013 meeting at OPSB: (1) discussing guidance in <i>On-shore Bird and Bat Pre-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio</i> and 2009 ODNR survey recommendation letter; (2) describing minor change in project boundary and similarity of land use percentages to previous project area; and (3) requesting updated survey recommendation letter, including breeding bird survey recommendations consistent with 2009 ODNR survey recommendation letter.
03-29-2013	NWOWE	ODNR DOW	Email	Follow-up email confirming that all turbines had been sited on actively cultivated agricultural land.
05-15-2013	NWOWE	ODNR DOW & USFWS	Email & Certified Letter	Letter: (1) indicating that no updated wildlife survey recommendations had been received from either agency; (2) stating that NWOWE was continuing to operate under the ODNR DOW wildlife survey recommendations issued on December 12, 2009; (3) summarizing the results of wildlife surveys completed to date; and (4) indicating what the last remaining wildlife survey (i.e. harrier nest survey) was continuing.
06-12-2013	USFWS	NWOWE	Emails	Emails: (1) confirming receipt of wildlife survey reports and 05-15-2013 survey summary letter; (2) confirming that materials sufficient for USFWS review; and (3) providing contact information for USFWS staff working on regional multi-species HCP.



Ohio Department of Natural Resources

TED STRICKLAND, GOVERNOR

SEAN D. LOGAN, DIRECTOR

Division of Wildlife
David M. Graham, Chief
2045 Morse Rd., Bldg. G
Columbus, OH 43229-6693
Phone: (614) 265-6300

January 28, 2010

To all interested parties,

Based upon a review of the project boundary map received on 27 January 2010, the Ohio Department of Natural Resources Division of Wildlife (DOW) in coordination with the U.S. Fish & Wildlife Service has prepared these surveying recommendations for National Wind's proposed project located in Paulding County. The DOW has determined that this proposed facility would require the "minimum" level of sampling effort under the current monitoring protocols based upon the location and land-use practices of the site (Fig. 1). Over 95% of this project's land is currently in active agriculture, and thus, not suitable habitat for most species of birds or bat. The DOW has no records of protected species of raptor (hawks, falcons, and eagles) nesting or bat observations within 5-miles of the project site. The table below was created based upon the project map 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	National Wind Paulding / Van Wert Counties
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	The DOW has no records of nest for protected species of raptor on or within 2 miles of the proposed facility. Any discovered during the nest searches should be monitored in coordination with the DOW.

Bat acoustic monitoring	Acoustic monitoring should be conducted at all meteorological towers located within the phase 1 boundaries.
Passerine migration (# of survey points)	NS
Diurnal bird/raptor migration (# of survey point)	NS
Sandhill crane migration (same points as raptor migration)	NS
Owl playback survey points	NS
Barn owl surveys	NS
Bat mist-netting (# of survey points)	NS
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.

Keith Lott, Wind Energy Wildlife Biologist

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

17354



Ohio Department of Natural Resources

TED STRICKLAND, GOVERNOR

SEAN D. LOGAN, DIRECTOR

Division of Natural Areas and Preserves*Anthony J. Celebreeze, III, Acting Chief*

2045 Morse Rd., Bldg. F-1

Columbus, OH 43229-8693

Phone: (614) 265-6453; Fax: (614) 267-3096

February 2, 2010

Scott Hafner
Northwest Ohio Wind Energy, LLC
3033 Excelsior Blvd., Suite 525
Minneapolis, MN 55416

Mr. Hafner:

After reviewing our Natural Heritage maps and files, I find the Division of Natural Areas and Preserves has no records of rare or endangered species in the Northwest Ohio Wind Energy Phase I project area, including a one mile radius, in portions of Blue Creek and Latty Townships, Paulding County, Ohio, and on portions of the Payne, Latty, Oakwood, Convoy, Scott and Wetsel Quads (419-587-3620).

There are no dedicated state nature preserves or scenic rivers at the project site. We are also unaware of any unique ecological sites, geologic features, animal assemblages, state parks, state forests or state wildlife areas within a one mile radius of the project area.

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Although we inventory all types of plant communities, we only maintain records on the highest quality areas.

Please contact me at 614-265-6818 if I can be of further assistance.

Sincerely,

A handwritten signature in black ink, appearing to read "Debbie Woischke".

Debbie Woischke, Ecological Analyst
Natural Heritage Program





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

February 26, 2010

Ms. Megan Sorensen
National Wind, LLC
3033 Excelsior Blvd., Suite 525
Minneapolis, MN 55416

TAILS# 31420-2010-TA-0411

Dear Ms. Sorensen:

This is in response to your January 28, 2010 email regarding the proposed National Wind Paulding Phase I Wind Project, in Blue Creek and Latty Townships, Paulding County, Ohio. The proposed project involves the installation of 100-120 MW of wind power, and associated collection lines, access roads, substations, and other infrastructure. The project area is predominantly rural and agricultural. Within the project area wildlife habitat is limited to a few isolated woodlots scattered throughout the project area. No woodlots greater than 10 hectares were identified within the project boundaries. Several small streams pass through the project area, however these do not appear to support much, if any, riparian habitat.

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 U.S. Fish and Wildlife Service (Service) has been working closely with the Ohio Department of Natural Resources (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. We 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. As you are aware, ODNR has developed an On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio (ODNR's protocols). Based on the habitat within the project area, this project qualifies as a "minimum" survey effort under ODNR's protocols, and per ODNR's January 28, 2010 letter. The Service agrees that this level of effort is sufficient to document wildlife use of the project area.

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 rotoswept 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 District of the 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.

The Service currently has one record for the Indiana bat in Paulding County, however the project area is greater than 5 miles from this record. There is no suitable Indiana bat habitat within the project area, therefore no mist net surveys are warranted at this time, and the Service believes that take of Indiana bats during the summer maternity season is unlikely to occur. However, an Indiana bat mortality was recently detected at a wind power facility in Indiana. The mortality occurred during the fall migration period, and the project area where the mortality occurred was composed of agricultural fields and did not support suitable Indiana bat summer habitat (forests). This indicates that take of Indiana bats from wind turbines

during the fall and possibly during the spring migration seasons could occur at any wind power facility within the range of the Indiana bat. At this time the Service is developing Indiana bat range-wide recommendations to address potential take of Indiana bats for wind power facilities without suitable summer habitat, but for which take may occur during the migration periods. The Service will provide all wind power developers in Ohio these recommendations when they become available. In the meantime, developers may want 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) Alternatively, work with the Service to develop a valid research program for your facility during the migration seasons. Then apply for an ESA Section 10(a)(1)(A) Enhancement of Survival permit that would allow for legal possession of Indiana bat fatalities during the research program. The details of such a research program may vary according to sites, but in general would include operating the turbines under various regimes and conducting fatality searches for each participating turbine to gain better knowledge of when Indiana bats are most susceptible to fatalities during the migration periods. Data from this research will be used by the Service to determine the level of take that occurs during migration periods, potentially to suggest more appropriate avoidance and minimization measures, and timing of such measures relative to migration periods. Either of these two options would allow wind facilities to operate without risk of violating the Endangered Species Act.

A third alternative is for a wind facility to 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. An HCP can be used to address Indiana bat presence during both summer foraging and migration periods. An HCP does typically require some time and survey effort to complete.

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. 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. Based on the aerial photos of the project area, it does not appear that the project area supports suitable habitat for this species, therefore no additional actions relative to the eastern massasauga are warranted at this time.

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.

The Service and ODNr Division of Wildlife have worked together to develop a recommended bird survey protocol for wind turbine projects. As noted above, ODNr's protocols indicate that this site is a "minimum" effort site. Upon completion of the minimum effort surveys, 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.

The project lies within the range of the **bald eagle** (*Haliaeetus leucocephalus*), a species included under the Migratory Bird Treaty Act, but also afforded additional legal protection under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d). No bald eagle nests currently occur within the project area or within 5 miles of the project area. ODNr's "minimum" survey protocol calls for raptor nest searches which would identify any new eagle nests that may be established within the project area. If any bald eagle activity is noted during the wildlife surveys, further coordination with this office is recommended.

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). 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 all 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.

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 ODNr's On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio, 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. Please contact biologist Megan Seymour at extension 16 in this office if we can be of further assistance.

Sincerely,

A handwritten signature in cursive script that reads "Mary Knapp".

Mary Knapp, Ph.D.
Supervisor

Cc: Mr. Keith Lott, ODNR, Old Woman Creek, 2514 Cleveland Road East, Huron, OH 44839
Mr. Brian Mitch, ODNR, REALM, Columbus, OH



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

May 6, 2010

Ms. Megan Sorensen
National Wind, LLC
3033 Excelsior Blvd., Suite 525
Minneapolis, MN 55416

TAILS# 31420-2010-TA-0411

Dear Ms. Sorensen:

This is in response to your May 5, 2010 email and our April 29, 2010 meeting and site visit for the proposed National Wind Paulding Phase I Wind Project, in Blue Creek and Latty Townships, Paulding County, Ohio. The proposed project involves the installation of 100-120 MW of wind power, and associated collection lines, access roads, substations, and other infrastructure. The project area is predominantly rural and agricultural. Within the project area wildlife habitat is limited to a few isolated woodlots scattered throughout the project area. The U.S. Fish and Wildlife Service (Service) previously commented on this project in a letter dated February 26, 2010. Since that time, revised project boundaries have been provided that expanded the footprint of the project area and the Service has been asked to review our previous recommendations. This letter is an addendum to our previous letter.

ENDANGERED SPECIES COMMENTS:

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.

The Service currently has one record for a maternity colony of Indiana bats in Paulding County, and the revised project boundary abuts the 5-mile boundary from this capture record. This record is from 1976, and no surveys to determine the status of this colony have occurred since 1976. There is a very limited amount of suitable roosting and foraging habitat within the project area due to the extensive agricultural

use of the site. Two stream corridors occur in the revised project area that provide a limited amount of potential Indiana bat habitat. These are Blue Creek in the western portion of the project area and Prairie Creek at the eastern edge of the project area. Because of these small pockets of suitable habitat, and because the project area is immediately adjacent to an Indiana bat record, we believe that Indiana bat surveys are warranted to document the presence or likely absence of the Indiana bat within the project area.


Mist Net Surveys: We recommend 2 mist net sites for the project area, one along Blue Creek and one along Prairie Creek in the eastern portion of the project area. We recommend that the highest quality Indiana bat habitat areas adjacent to the stream corridors be selected for mist netting. Please note that Indiana bat surveys may only be conducted by individuals with a Federal permit (please see attached list). Survey effort should follow ODNR's protocol, which exceeds the Service's standard protocol. 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.

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 a "not likely to adversely affect" determination, formal consultation under Section 7 or 10 of the Endangered Species Act of 1973, as amended, will be necessary.

Thank you for the opportunity to provide comments on this proposed project. Please contact biologist Megan Seymour at extension 16 in this office if we can be of further assistance.

Sincerely,


for Mary Knapp, Ph.D.
Supervisor

Cc: Mr. Keith Lott, ODNR, Old Woman Creek, 2514 Cleveland Road East, Huron, OH 44839



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 16, 2010

Ms. Megan Sorensen
National Wind, LLC
3033 Excelsior Blvd., Suite 525
Minneapolis, MN 55416

TAILS #: 31420-2011-TA-0199

RE: National Wind Paulding Phase I Wind Project Mist Net Survey, Paulding County, Ohio

Dear Ms. Sorensen:

This is in response to the Tragus July 2010 mist net survey report for the Indiana bat (*Myotis sodalis*) at the proposed National Wind Paulding Phase I Wind Project, in Blue Creek and Latty Townships, Paulding County, Ohio. The Service previously commented on this project in a letter dated February 26, 2010 and May 6, 2010. The proposed project involves the installation of 100-120 MW of wind power, and associated collection lines, access roads, substations, and other infrastructure. The project area is predominantly rural and agricultural. The Service currently has one record for a maternity colony of Indiana bats in Paulding County, and the revised project boundary abuts the 5-mile boundary from this capture record. We recommended 2 mist net survey sites for the project area, one along Blue Creek and one along Prairie Creek in the eastern portion of the project area. The mist net survey was conducted by Tragus during July 1-4, 2010. The mist net survey met the Service's standard recommended protocol for Indiana bat surveys, and the weather during the survey was conducive to capturing Indiana bats.

The mist net survey resulted in the capture of eight bats of two species. Species captured included 3 eastern red bats (*Lasiurus borealis*) and 5 big brown bats (*Eptesicus fuscus*). Lactating females of both eastern red and big brown bats were captured. Big brown are one of Ohio's most common species of bats, and are adapted to using human-made structures for roosting. The eastern red bat, a wide-ranging, solitary, foliage-roosting bat is not necessarily common, but is not considered rare in Ohio or rangewide, though it is unusual to capture so many eastern red bats over the course of a two-night mist net survey. No state or federally listed bat species were captured during the survey. The mist net survey results indicate that it is unlikely that Indiana bats are using the project site on a regular basis during the summer maternity season.

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 mortality has been recently 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. Due to the potential of take during spring and fall migration, we recommend developers evaluate their exposure to the prohibitions of the 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 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.

Thank you for the opportunity to provide comments on this proposed project. Please contact biologist Megan Seymour at extension 16 or Melanie Cota at extension 15 in this office if we can be of further assistance.

Sincerely,



Mary Knapp, Ph.D.
Supervisor

cc: Mr. Keith Lott, ODNR, Old Woman Creek, 2514 Cleveland Road East, Huron, OH 44839
Mr. Brian Mitch, ODNR, REALM, Columbus, OH



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

January 30, 2013

Ms. Megan Sorensen
National Wind, LLC
3033 Excelsior Blvd., Suite 525
Minneapolis, MN 55416

TAILS# 31420-2010-TA-0411

Dear Ms. Sorensen:

This letter is to notify you that on the night of October 2-3, 2012 an Indiana bat (*Myotis sodalis*) fatality occurred at a wind power facility in Paulding County, Ohio. The carcass was delivered to the U.S. Fish and Wildlife Service's (Service) Columbus Ohio Field Office on October 4, 2012, and was confirmed as an Indiana bat by Service biologists.

The Indiana bat is listed as endangered under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*, ESA). The ESA prohibits take of listed species without a permit authorizing such take. The ESA defines take as, "to harass, harm, pursue, hunt, shoot wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

Based on the project maps provided to our office by National Wind, LLC in November 2010, your proposed Northwest Ohio Wind project is within approximately 1.5 miles of the location where the Indiana bat mortality was found. We understand that you have recently filed with the Ohio Power Siting Board for a Certificate of Environmental Compatibility and Public Need for the proposed project.

The Service would like to re-emphasize to you that take of Indiana bats at your facility may be likely to occur. As noted in the Service's February 26, 2010 letter to your company regarding the proposed project, take of Indiana bats at wind power projects is a possibility without curtailment of operations at night during the migratory period regardless of whether summer habitat is present. Current information on Indiana bat migration risk is provided below:

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, West Virginia, Pennsylvania, and Ohio 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 Indiana bat 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 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.

The Service strongly advises you to consider implementing one of these options to ensure compliance with the ESA. We welcome a meeting to discuss this issue further. Please contact biologist Megan Seymour at extension 16 in this office for more information.

Sincerely,



Mary Knapp, Ph.D.
Supervisor

Cc: Ms. Jennifer Norris, ODNR, Bld. G, Columbus, OH
Mr. Stuart Siegfried, PUCO, 180 E. Broad St., Columbus, OH 43215
Special Agent Victoria Owens, USFWS, 359 Main Rd., Delaware, OH 43015



March 26, 2013

Ms. Jennifer L. Norris
Ohio Department of Natural Resources
Wildlife Central Office
2045 Morse Road, Building G
Columbus, OH 43229-6693

Subject: Breeding Bird Survey Requirements
Northwest Ohio Wind Energy Project
Paulding County, Ohio

Dear Jennifer,

I wanted to follow up on a portion of the conversation we had during our March 19, 2013 meeting on the Northwest Ohio Wind Energy (NWOWE) project at the Ohio Power Siting Board (OPSB) offices. Specifically, I am concerned about our discussion as to whether breeding bird surveys are necessary at turbine locations on active cropland. I've gone back and re-visited the ODNR On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Facilities in Ohio dated May 4, 2009. I am also aware that that a revision to those guidelines was issued in June 2012 but that it only dealt with post-construction fatality monitoring. The 2009 guidance on breeding bird surveys states:

"Generally, active agricultural fields are not considered suitable nesting habitat for most species of birds; thus, surveys do not need to be conducted at any point that falls within these areas."

On December 12, 2009, the Ohio DNR issued survey recommendations based on the ODNR's application of the 2009 guidelines using the boundaries of the NWOWE project as they existed then. The ODNR characterized the site as "minimum" with regard to the recommended surveying and monitoring protocols. The letter recommended breeding bird surveys but expressly stated:

"[b]ecause 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."

The boundary of the NWOWE project has changed somewhat since 2009 and the updated boundaries have been supplied to you. Land use within the revised project boundary is virtually identical to that within the 2009 boundary -- approximately 92.9 percent active agricultural land in both cases. Moreover, the land within the revised site boundary neither encompasses nor lies within 500 meters (1,640 feet) of any contiguous woodlands ≥ 20 hectares, wetlands ≥ 3 hectares or large water bodies (i.e. rivers, lakes or reservoirs).

Ms. Jennifer Norris

March 26, 2013

Page 2

If we were required to apply the ODNR's breeding bird survey protocols to turbine locations on active cropland (which we believe will likely be 100 percent of the turbine locations), my conservative estimate is that this would entail a biologist spending 37 half-days on-site during May and June of 2013 (not including travel time to and from the site). We do not believe this level of data collection effort and expense is justified in areas that the ODNR has expressly stated are not suitable nesting habitat for the very species being surveyed for.

Since the ODNR guidelines for pre-construction surveys and project area land use remain unchanged, the survey recommendations for breeding bird surveys provided in 2009 should remain valid. Accordingly, we respectfully request that the forthcoming updated ODNR survey recommendation letter contain the same language for breeding bird surveys as the 2009 letter. If the Ohio DNR elects to recommend breeding bird surveys at turbine locations on active cropland, we would further request that you supplement your recommendation with a detailed explanation of the specific land use and/or biological changes that have occurred since 2009 that form the basis for the revised recommendation.

Thanks in advance for considering the information provided with this letter. We look forward to receiving the updated survey recommendation letter.

National Wind, LLC



Ronald P. Peterson

Director – Project Permitting

cc. Chris Cunningham – Ohio Power Siting Board
Marcus da Cunha – National Wind
Sally Bloomfield – Bricker Eckler



May 15, 2013

Ms. Jennifer L. Norris
Ohio Department of Natural Resources
Wildlife Central Office
2045 Morse Road, Building G
Columbus, OH 43229-6693

Ms. Megan Seymour
U.S. Fish and Wildlife Service
Ohio Ecological Services Field Office
4625 Morse Road, Suite 104
Columbus, OH 43230

Subject: Wildlife Surveys
Northwest Ohio Wind Energy Project
Paulding County, Ohio

Dear Jennifer and Megan,

I am following up on past conversations and correspondence regarding wildlife survey recommendations for the Northwest Ohio Wind Energy project in Paulding County. Westwood supplied you both with copies of our 2010 avian and bat survey results on March 15, 2013 and a shapefile of the project boundary was successfully received by the Ohio Department of Natural resources ODNR DOW on March 20, 2013. I followed up with a letter to ODNR DOW dated March 26, 2013 requesting confirmation that, consistent with the *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio*), we would not need to conduct breeding bird surveys at turbine locations sited in active cropland. I followed up again on March 29, 2013 to confirm that all turbine locations were sited on active cropland.

To date, we have not received any new recommendations for updated surveys from either ODNR or USFWS. Accordingly, we have continued to proceed under the previous ODNR Division of Wildlife recommendations, dated December 12, 2009. Westwood's avian ecologist carried out updated raptor nest surveys on April 22-24, 2013. To date she has located twelve raptor nests in the project area plus a one-mile buffer. These nests are occupied by one great horned owl, one Coopers hawk and ten red-tailed hawks. No nests of protected species listed in Table 1 of the 2009 ODNR DOW guidelines have been found to date. An updated northern harrier survey is currently underway, with sixty hours of total observation time scheduled. If any harrier nests are found, Westwood will immediately initiate coordination with ODNR DOW to discuss nest monitoring protocols.

During 2010 mist netting and acoustic surveys performed by Tragus, Inc., no Indiana bats were caught or detected. It is my understanding that copies of Tragus' reports on these two surveys were transmitted to your agencies by Westwood on March 15, 2013. Tragus performed the mist-netting survey at locations recommended by ODNR DOW using the methods set forth in Appendix 5 of the Draft Indiana Bat Recovery Plan (dated April 2007). These surveys were supplemented by continuous acoustic monitoring from May 15 to November 15, 2010, using the survey protocol specified at that time by the ODNR DOW. To date, we have been operating under the USFWS guidance on Indiana bats dated October 26, 2011. Since Tragus performed both mist net and acoustic surveys and habitat conditions haven't changed, the 2011 guidance would suggest that the negative results for Indiana bats should remain valid for 5 years. However, we are aware that the USFWS just updated its Indiana bat survey guidelines on May 5, 2013. The updated guidelines state that "[u]nless otherwise agreed to by the USFWS, negative presence/probable absence survey results obtained using this guidance are valid for a minimum of two years." The Frequently Asked Questions document accompanying the new guidelines goes on to state that:

"[s]urveys completed for some project types (i.e. coal mining) or at some project sites may be considered valid for a longer period of time (i.e., 5 years) due to existing biological opinions or when considering other available information about bat populations (e.g., in states with severely reduced bat populations)."

We believe that the habitat conditions within the project area combined with the information generated during the 2010 bat surveys support a five year period of validity rather than two years. No noticeable landscape changes have occurred in the project area, which has very little potentially suitable summer habitat for Indiana bats. Most of the watercourses within the project area are nearly devoid of trees and, where trees do exist, they are in early successional trees in scattered small clumps of less than 20 acres in size. The methods used in the mist net survey performed in 2010 were consistent with the methods set forth in the new USFWS survey guidelines and yielded negative results for Indiana bats. The acoustic survey yielded only 5 calls from the genus *Myotis* (out of 2,954 recorded bat calls) and none were detected at the 40 meter height. We do acknowledge, however, that the 2010 acoustic survey was performed using a software package that the USFWS has not included in its current list of candidate automated acoustic bat ID software packages.

Please let me know immediately if you have any questions about or issues with the wildlife surveys we have commissioned for the Northwest Ohio Wind Energy project.

Ms. Jennifer Norris
Ms. Megan Seymour
May 15, 2013
Page 3

Best regards,

National Wind, LLC

A handwritten signature in black ink, appearing to read "Ronald P. Peterson", is written over a light gray rectangular background.

Ronald P. Peterson
Director – Project Permitting

cc. Chris Cunningham – Ohio Power Siting Board
Marcus da Cunha – National Wind
Sally Bloomfield – Bricker Eckler
Eric Hansen – Westwood Professional Services



October 28, 2014

Ms. Megan Seymour
U. S. Fish and Wildlife Service
Ecological Services
4625 Morse Road, Suite 104
Columbus, OH 43230

Re: Request for IBAT & NLEB Technical Assistance Letter
Trishe Wind Ohio, LLC Project (formerly Northwest Ohio Wind Energy)
Paulding County, Ohio

Dear Megan,

This letter is to follow up on our recent telephone and email communications regarding my request for a Technical Assistance Letter (TAL) for Indiana bats (IBATs) potentially traversing the Trishe Wind Ohio, LLC (formerly Northwest Ohio Wind Energy, LLC or NWOWE) project area. You indicated in an email dated October 24, 2013 that in order to supply a TAL, TWO needed to supply a summary document describing the status of IBATs in the project area and any avoidance and minimization measures we plan to use to avoid any take if IBATs. This letter is intended to supply that summary. Given the potential listing of the northern long-eared bat (NLEB), we have discussed it in this summary and request that this species be included in the TAL as well. The mitigation measures proposed in this request are based in part on several subsequent email and telephone conversations we have had, particularly with regard to mitigation measures made necessary by recent spring and fall migration Indiana bat fatalities that have occurred on adjacent wind farms. This letter also includes a discussion of how the U.S. Fish and Wildlife Service (USFWS) Wind Energy Guidelines (WEG) have been applied in the siting and design of the project.

Change of Project Ownership

As you are aware, National Wind, LLC entered Chapter 7 bankruptcy in April of 2014. Through the bankruptcy process, Trishe Resources, Inc. acquired the assets of National Wind, including the NWOWE project. Trishe Resources, Inc. is now moving forward with the project under the new name of Trishe Wind Ohio, LLC (hereafter referred to as TWO). With this letter, TWO is requesting a TAL under which it would operate the TWO project until such time is a Habitat Conservation Plan (HCP) might be prepared and an Incidental Take Permit (ITP) potentially obtained. The name TWO is used throughout the narrative that follows, even though most of the decisions made and actions taken were done under the name NWOWE.

Land-Based Wind Energy Guidelines

The USFWS has provided the wind industry with guidance on the siting, design and operation of wind farms through a series of guidance documents that have culminated with the USFWS' voluntary Land-Based Wind Energy Guidelines (WEG), issued on March 23, 2012 (USFWS 2012). USFWS guidance documents released prior to the issuance of the WEG included:

- Voluntary Interim Guidelines – July 2003
- Wind Turbine Guidelines Advisory Committee Recommended Guidelines – March 2010
- USFWS Draft Land-Based Wind Energy Guidelines – February 2011

Much of TWO's site selection, layout development and biological survey work occurred while these guidance documents were evolving and before the final WEG were issued. However, because prior guidance contained many of the elements contained in the final WEG, TWO's site screening, characterization and assessment processes were largely consistent with the tiered assessment approach called for in the WEG. To assist the USFWS in evaluating the TWO project within the context of the WEG, TWO has prepared a summary of the information called for WEG Tiers 1-4. This information is supplied in attached **Appendix A**.

Status of IBATs in Project Area

The boundaries of the project area were specifically established to maintain at least a five-mile spatial buffer from any recorded locations of IBAT maternity colonies. TWO coordinated with the USFWS and ODNR during the summer of 2010 with regard project boundary revisions to maintain this buffer. The USFWS provided comment letters on the TWO project on February 26 and May 6, 2010 which included information on IBATs and their habitat, as well as survey recommendations based on the revised project boundaries. All project infrastructure in the current project layout lies within the project boundary used by USFWS in making its May 6, 2010 comments and wildlife survey recommendations. With the December 16, 2013 approval of TWO's Certificate of Environmental Compatibility and Public Need (CECPN), the Ohio Power Siting Board (OPSB) made that project layout final¹.

The TWO project area encompasses no potential winter hibernacula and very limited habitat potentially suitable for IBAT summer maternity roosts. Hibernacula have been documented in seven southern Ohio counties, the nearest being the Lewisburg Limestone Mine about 85 miles due south of TWO in Preble County, Ohio. In its May 6, 2010 comment letter, the USFWS characterized summer habitat for IBATs as:

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.

¹ The final layout contained in the approved CECPN includes 60 turbine locations. With the selection of the one of the three turbines under consideration for the TWO project, between 50 and 59 of these locations will be used for turbines.

2. Live trees (such as shagbark hickories and oaks) which have exfoliating bark.
3. Stream corridors, riparian areas, and upland woodlots which provide forage sites.

In its May 6, 2010 comment letter, the USFWS characterized IBAT habitat in the TWO project area as follows:

“The Service currently has one record for a maternity colony of Indiana bat in Paulding County, and the revised project boundary abuts the 5-mile boundary of this capture record. This record is from 1976, and no surveys to determine the status of this colony have occurred since 1976. There is a very limited amount of suitable roosting and foraging habitat within the project area due to the extensive agricultural use of the site. Two stream corridors occur within the revised project area that provide a limited amount of potential Indiana bat habitat. These are Blue Creek in the western portion of the project area and Prairie Creek at the eastern edge of the project area. Because of these small pockets of suitable habitat, and because the project area is immediately adjacent to an Indiana bat record, we believe that Indiana bat surveys are warranted to document the presence or likely absence of the Indiana bat within the project area.”

In accordance with the January 28, 2010 ODNR survey recommendations, TWO retained Tragus, Inc. to conduct acoustic and mist net surveys for bats. Mist net surveys were performed on July 1, 2, 3 and 4, 2010 in locations along Blue and Prairie Creeks as recommended by the USFWS. Only red bats and big brown bats were documented, with no IBATs or NLEBs being caught. Tragus’s mist net survey report was dated July 2010 and was filed with OPSB in Appendix K-1 of TWO’s amended CECPN application. Tragus also performed acoustic bat monitoring from March 15 to November 15, 2010, using two SD1 Anabat units mounted at 5 and 40 meters on TWO’s meteorological mast in the western portion of the project area. Again, no IBATs or NLEBs were detected. Five bat species were documented: big brown, silver haired, eastern red, hoary, and tri-colored bats. Tragus’s acoustic bat survey report was dated March 2011 and was filed with OPSB as Appendices K-1 through K-4 of TWO’s amended CECPN application. To our knowledge, no material changes in potential IBAT or NLEB habitat have occurred on the project site since the acoustic and mist net surveys were performed in 2010.

Based on a January 30, 2013 letter from USFWS and subsequent email and telephone coordination, it is our understanding that one IBAT was killed at the Blue Creek Wind Farm during fall migration on the night of October 2-3, 2012. The Blue Creek Wind Farm is contiguous to the southern boundary of TWO’s project site. We understand that this fatality occurred about 1.5 miles from the southwest corner of the TWO project area boundary. Based on subsequent telephone conversations with you, it is our further understanding that IBAT fatalities occurred on or about October 10, 2013 and April 14, 2014 at the Timber Road II Wind Farm which lies west of the TWO project site. It is our understanding that these fatalities occurred approximately 4.5 and 6.4 miles west of the nearest part of the TWO project area boundary. We do not have access to fatality monitoring reports from either Blue Creek or Timber Road II, so we do not know if any NLEB fatalities have been documented at either facility.

It is unknown whether the Blue Creek and Timber Road II IBAT fatalities were related to any specific topographic or habitat feature within the respective project areas. There is some evidence that IBATs in the more mountainous eastern part of their range follow landscape features (e.g. mountain ridges, forested riparian corridors), when migrating. However, we are not aware that such a relationship has been documented in flatter, more open country in the Midwest. The Buckeye Wind HCP (Stantec 2013) provides an excellent summary IBAT migration research. Based on radio telemetry data and band returns, migration distances between summer habitat and winter hibernacula among 218 individual IBATs ranged from 17 and 357 miles. Migration paths were much shorter and multi-directional for bats in mountainous regions than for bats in the Midwest. Based on band recovery data, IBATs in the Midwest Recovery Unit (RU), where the TWO project is located, appear to primarily migrate from summer habitat to the north (e.g. southern Michigan) to hibernacula in Kentucky or southern Indiana. Band recovery data for IBATs captured in Ohio are consistent with this migration pattern. This being the case, migration movements by IBATs summering farther north may fly through the TWO project area en route to hibernacula well to the south. Figure 4-6 of Buckeye HCP illustrates this movement pattern.

It seems likely that TWO will cause periodic fatalities among IBATs (and potentially NLEBs) passing through the area during migration movements. However, given the distance to the nearest hibernacula, flat topography and limited, widely scattered tree cover in the TWO project area, there is currently no way to predict the potential locations or frequency of future IBAT fatalities. Similarly, periodic NLEB fatalities are possible but we currently have no data that would assist in predicting where or how often such fatalities might occur.

Proposed Pre-ITP Mitigation Measures

If the TWO project becomes operational before an ITP is in place, TWO proposes to undertake operational mitigation measures designed to avoid the take of IBATs. These proposed measures are based on input from the USFWS. TWO proposes to adopt a 6.9 meters/second turbine cut-in speed from ½ hour before sunset to ½ hour after sunrise during the fall and spring migration periods, which have been defined by the USFWS as August 1 through October 31 and March 15 through May 15. Turbine blades will be feathered when wind speeds are below 6.9 meters/second to minimize “free-wheeling” during curtailment periods. The rationale for each component of the proposed interim operational mitigation measures is described below:

- **Cut-in Speed:** A spring and fall migration cut-in speed of 6.9 m/s was recommended by the USFWS in an email dated October 28, 2014.
- **Feathering:** Feathering of turbine blades when wind speeds are below cut-in speed was recommended by the USFWS in an email dated October 24, 2013.
- **Seasonal Time Frame:** Operational mitigation is proposed for the periods from March 15 and May 15 and from August 1 to October 31, which are the fall and spring migration periods identified by the USFWS in an October 28, 2014 email to TWO.

- Time of Day: As recommended by USFWS in an email dated October 28, 2014, operational mitigation measures would be applied from ½ hour before sunset to ½ hour after sunrise. Sunrise and sunset times will be adjusted each week, with the mean sunrise and sunset times for the applicable week being used in making these weekly adjustments.

Pre-ITP operational mitigation measures for IBATs should also adequately protect NLEBs. On January 6, 2014, the USFWS issued *Northern Long-eared Bat LEB Interim Conference and Planning Guidance – USFWS Regions 2, 3, 4, 5 & 6* (USFWS 2014), which provides a general comparison of the NLEB with the IBAT. Pages A16-A17 of this guidance indicate that NLEBs and IBATs have similar fall and spring migration periods and foraging activity patterns. Given the similarities in these parameters, the operational mitigation measures described above should prevent the take of both IBATs and NLEBs.

Post-Construction Fatality Monitoring

TWO will initiate post-construction fatality monitoring as turbines become operational. Per TWO's approved CECPN, monitoring will be conducted in accordance with ODNR protocols for the first two years of operation. After two years, TWO will coordinate with the USFWS and ODNR to determine if additional monitoring is recommended.

SCADA System of Selected Turbine

All three turbine technologies under consideration by TWO have on-site Supervisory Control and Data Acquisition (SCADA) systems, any of which can be programmed to implement the above-described mitigation measures based on real time weather data collected at a meteorological mast on site. TWO has contacted each of the three manufacturers of turbines under consideration and obtained confirmation that their SCADA systems are capable of implementing the proposed operational mitigation measures. The time frames for turbine blades to reach the "rest" mode after wind speeds fall below 6.9 m/s would range between 20 and 45 seconds, depending on which turbine is selected. TWO has confirmed that implementation of the foregoing mitigation measures would not conflict with the turbine manufacturer's warranty for any of the three turbines being considered.

Other Mitigation Measures

Project Siting

As described above, the TWO project area was sited specifically to exclude potential habitat for IBATs, as well as natural features generally (e.g. wetlands, grasslands and forest stands). The project area is intensely farmed with almost 95 percent of the land in active crop production.

Avoidance of Wetlands and Forest Stands

The design of the TWO project avoids all natural wetlands (including forested wetlands). The project will involve some temporary crossings of natural streams to facilitate the movement of erection cranes. However, the project will entail no permanent impacts to natural streams. Temporary stream crossing locations have been selected to avoid and minimize the clearing of woody vegetation. All of the permanent impacts to water resources associated with the TWO project involve man-made ditches along roads or within active cropland. No forest stands will be affected by construction of the project.

Seasonal Tree Clearing Windows

If any tree removal proves necessary during construction and would involve trees potentially suitable as IBAT habitat, such clearing would be limited to the period between October 1 and March 31 to avoid bat disturbance or mortality. The OPSB has included this seasonal clearing window as a condition of the approved CECPN.

Please let me know if you have any questions regarding the foregoing analysis and proposed interim operational mitigation measures. We look to continued coordination with you as we work toward obtaining a TAL for the TWO project.

Best regards,

Trishe Resources, Inc.



Ronald P. Peterson
Permitting Manager

Enclosures

LITERATURE CITED

Stantec Consulting Services, Inc. 2013. Final Buckeye Wind Power Project Habitat Conservation Plan. 409 pp.

USFWS. 2012. U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines. Issued April 2013.

USFWS. 2014. Northern long-eared bat interim conference and planning guidance – USFWS Regions 2, 3, 4, 5 & 6. Issued January 6, 2014.

APPENDIX A
USFWS WIND ENERGY GUIDELINES (WEG)
QUESTIONS AND RESPONSES
TRISHE WIND OHIO (TWO) PROJECT
(Formerly Northwest Ohio Wind Energy (NWOWE))

SUMMARY OF WEG TIERS

WEG Tier 1 – Preliminary Site Evaluation

WEG Tier 1 analysis is used to: (1) identify regions where wind energy development poses significant risks to species of concern or their habitats, including the fragmentation of large-scale habitats and threats to regional populations of federal- or state-listed species; (2) “screen” a landscape or set of multiple potential sites to avoid those with the highest habitat values and/or (3) begin to determine if a single identified potential site poses serious risk to species of concern or their habitats.

WEG Tier 2 – Site Characterization

WEG Tier 2 identifies additional data necessary to systematically and comprehensively characterize a potential wind power development site in terms of the risk wind energy development would pose to species of concern and their habitats.

WEG Tier 3 – Field Studies to Document Site Wildlife and Habitat and Predict Project Impacts

WEG Tier 3 entails field studies to provide pre-construction information necessary to: (1) further evaluate a site for determining whether the wind energy project should be developed or abandoned; (2) design and operate a site to avoid and minimize significant adverse impacts if a decision is made to develop; (3) design compensatory mitigation measures if significant adverse habitat impacts cannot be acceptably avoided or minimized; and (4) determine the duration and level of effort to be involved in post-construction monitoring.

WEG Tier 4 – Post-construction Studies to Estimate Impacts

WEG Tier 4 is based on the results of Tiers 1, 2 and 3 and determines the duration and level of effort involved in post-construction monitoring. Post-construction studies are designed to assess whether predictions of fatality risk and direct and indirect impacts to habitat of species of concern were correct.

WEG Tier 5 – Other Post-construction Studies and Research

Tier 5 studies are not necessary on most wind power projects and are unlikely to be necessary on the TWO project. Tier 5 studies are site-specific and intended to: (1) analyze factors associated with impacts in cases where Tier 4 analyses indicate they are potentially significant; (2) identify why mitigation measures implemented for the project were not adequate; and (3) assess demographic effects on local populations of species of concern, when demographic information is important, including species of habitat fragmentation concern.

In each tier of the USFWS WEG sets forth a series of questions to be answered by the project developer. USFWS questions and TWO's responses for **preconstruction Tiers 1, 2 and 3** are provided below.

WEG TIER 1 – PRELIMINARY SITE EVALUATION – USFWS Questions and TWO Responses

WEG Tier 1 Question 1: Are there species of concern present on the potential site(s), or is habitat (including designated critical habitat) present for these species?

TWO Tier 1 Response 1: The USFWS WEG defines “species of concern” very broadly, including species:

- Listed as threatened, endangered or candidate species under the federal Endangered Species Act (ESA);
- Subject to the Migratory Bird Treaty Act (MBTA);
- Subject to the Bald and Golden Eagle Protection Act (BGEPA);
- Designated by law, regulation or other formal process for protection or management by the relevant agency or other authority; or
- That have been shown to be significantly adversely affected by wind energy development; and
- Determined to be possibly affected by the project.

Federal ESA:

The project area lies within the range of the federally endangered Indiana bat (*Myotis sodalis*), as well as the northern long-eared bat (*Myotis septentrionalis*) which has been proposed for listing as an endangered species. No designated critical habitat for Indiana bats exists within the project area. Neither species has been caught during mist net surveys or detected during acoustic bat surveys. However, based on two individual fatalities that occurred on adjacent wind farms during the 2012 and 2014 fall and spring migration periods, Indiana bats migrate through the TWO project area as well. The Ohio Department of Natural Resources (ODNR) has also indicated that the TWO project area falls within the range of the federal and state endangered rayed bean mussel species (*Villosa fabalis*)¹. Mussel surveys will be conducted in the spring of 2014 to determine the presence or absence of this species in stream reaches to be traversed by project infrastructure. The TWO project area falls within the range of the eastern massasauga (*Sistrurus*

¹ The USFWS does not list the rayed bean as occurring within Paulding County. See <http://www.fws.gov/midwest/endangered/lists/ohio-spp.html>. Also, the USFWS did not mention the rayed bean in its June 21, 2013 comment letter on the TWO CECPN application.

catenatus catenatus; a federal candidate species) but the USFWS has indicated that the project area does not appear to support suitable habitat for this species.

Ohio ESA:

Fifteen wildlife species listed by the ODNR as endangered, threatened, concern or special interest have the potential to occur within the TWO project area. These species are listed in Table 8-9 of the Amended CECPN application filed with the OPSB and include one fish species, three mussels, two reptiles, one amphibian, two birds and six bats. Eight of the fifteen species have low potential to occur within the project area due to intense agricultural activity and lack of habitat, including all of the listed species of fish, mussels, amphibians and reptiles. The northern harrier (*Circus cyaneus*; state endangered) has been observed flying through the project area but has not been found to nest there due to a lack of grassland habitat. As stated above, Indiana bats (state endangered) likely fly through the TWO project area during migration periods but do not appear to breed there due to a lack of roosting habitat. The northern long-eared bat was also recently listed as a state species of concern but has not been documented in the TWO project area. Five bat species designated by the ODNR as species of concern or special interest were documented during 2010 mist netting and acoustic bat surveys. The big brown bat (*Eptesicus fuscus*), red bat (*Lasiurus borealis*), silver-haired bat (*Lasionycteris noctivagans*) and hoary bat (*Lasiurus cinereus*) are listed as species of concern and the evening bat (*Nycticeius humeralis*) is listed as special interest. Species of concern or special interest are not necessarily in danger of becoming threatened or endangered.²

MBTA

Based on the Ohio Breeding Bird Survey (BBS) and the USFWS list of migratory birds³, about 90 percent of the bird species breeding within the TWO project area are covered by the MBTA. Only one block of the Ohio Breeding Bird Survey (BBS) overlaps a part of the TWO project area that will host turbines (Block 34D3CE of Region 24/25/34, also known as Latty 5)⁴. BBS results for this block from 2006-2011 listed 69 species of birds potentially breeding in the area, of which 19

² "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." (See: <http://wildlife.ohiodnr.gov/species-and-habitats/state-listed-species>)

³ <https://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/mbtandx.html>

⁴ <http://bird.atlasing.org/Atlas/OH/Main?cmd=blockSummary&locID=L314925>

species were observed or confirmed to be breeding. Of the 69 species, 64 (92.8 percent) are migratory and protected by the MBTA. Seven additional bird species were observed during 2010 avian survey work, of which six are migratory and covered by the MBTA. It is inevitable that the TWO project will generate some turbine collisions involving migratory bird species. However, all turbines have been sited on active cropland and away from grasslands, forested areas and wetlands, which should help minimize avian collisions. TWO is not aware of documentation indicating that any of the migratory bird species likely to be found within the project footprint have been shown to date to have been significantly adversely affected by wind energy development.

BGEPA

The ODNR has not documented any bald eagle nests in Paulding or Van Wert counties⁵ and TWO is not aware of any other types of important eagle use areas (i.e. foraging areas, winter night roosts) there. While it is possible for bald eagles to pass through the TWO project area during migration periods, such movements are likely uncommon due to the minimal food resources available to eagles within the project area. Golden eagles are rare in the eastern United States. Small numbers have been observed during the winter utilizing reclaimed mine lands in eastern and southeastern Ohio. However, northwestern Ohio lacks habitat suitable for wintering golden eagles. The potential for golden eagles to use of pass through the TWO project area is negligible.

Species Designated by Law, Regulation or other Formal Process for Protection or Management by the Relevant Agency or other Authority

TWO is not aware of any other species designated by law, regulation or other formal process for protection or management by an agency or other authority.

Species that have been Shown to be Significantly Adversely Affected by Wind Energy Development

TWO is not aware of documentation indicating that any of the bird or bat species of concern mentioned above have been significantly adversely affected by wind energy development to date. However, any take of IBATs or NLEBs is considered significant and both species have incurred wind turbine collision fatalities at other wind farm facilities.

WEG Tier 1 Question 2: Does the landscape contain areas where development is precluded by law or areas designated as sensitive according to scientifically credible information? Examples of designated areas include, but are not limited to: federally-designated critical habitat; high-priority conservation areas for non-government organizations (NGOs); or other local, state, regional, federal, tribal, or international categorizations.

⁵ <http://www.dnr.state.oh.us/portals/9/resources/2012eaglenestdist.pdf>

TWO Tier 1 Response 2: The TWO project area does not encompass any areas precluded from development by law or designated as sensitive by a local, state, regional, federal, tribal government or non-governmental entity. No federally-designated critical habitat; high-priority conservation areas for non-government organizations (NGOs); or other local, state, regional, federal, tribal, or international categorizations have been identified within the TWO project area.

WEG Tier 1 Question 3: Are there known critical areas of wildlife congregation, including, but not limited to: maternity roosts, hibernacula, staging areas, winter ranges, nesting sites, migration stopovers or corridors, leks or other areas of seasonal importance?

TWO Tier 1 Response 3:

The TWO project area does not contain any known critical areas of wildlife congregation such as maternity roosts, hibernacula, staging areas, winter ranges, nesting sites, migration stopovers or corridors, leks or other areas of seasonal importance.

WEG Tier 1 Question 4: Are there large areas of intact habitat with the potential for fragmentation, with respect to species of habitat fragmentation concern needing large contiguous blocks of habitat?

TWO Tier 1 Response 4: No. The TWO project area lies within an intensively farmed agricultural landscape that is already heavily fragmented. Cropland constitutes nearly 95 percent of the land cover in the TWO project area. Woody habitat occurs in small widely scattered patches, including along riparian corridors. The project area contains almost no grassland.

WEG TIER 2 –SITE CHARACTERIZATION - USFWS Questions and TWO Responses

WEG Tier 2 Question 1: Are known species of concern present on the proposed site, or is habitat (including designated critical habitat) present for these species?

TWO Tier 2 Response 1: See response to Tier I question 1 above.

WEG Tier 2 Question 2: Does the landscape contain areas where development is precluded by law or designated as sensitive according to scientifically credible information? Examples of designated areas include, but are not limited to: federally-designated critical habitat; high-priority conservation areas for NGOs; or other local, state, regional, federal, tribal, or international categorizations.

TWO Tier 2 Response 2: No. The TWO project area encompasses no:

- Federally-designated critical habitat;
- Federal Waterfowl Production Areas;
- State Wildlife Management Areas;
- State Natural Areas or Preserves;

- Audubon Important Bird Areas (IBAs);
- High-priority conservation areas for other non-governmental organizations (NGOs); or
- Land covered under any other local, state, regional, federal, tribal or international conservation categorization.

WEG Tier 2 Question 3: Are there plant communities of concern present or likely to be present at the site(s)?

TWO Tier 2 Response 3: No. The TWO project area contains virtually no grassland that could include native prairie remnants. Negligible grassland will be affected by construction. The project area also encompasses no undisturbed woody habitat and negligible woody habitat will be affected by construction.

WEG Tier 2 Question 4: Are there known critical areas of congregation of species of concern, including, but not limited to: maternity roosts, hibernacula, staging areas, winter ranges, nesting sites, migration stopovers or corridors, leks, or other areas of seasonal importance?

TWO Tier 2 Response 4: No. See response to Tier I question 3 above.

WEG Tier 2 Question 5: Using best available scientific information has the developer or relevant federal, state, tribal, and/or local agency identified the potential presence of a population of a species of habitat fragmentation concern?

TWO Tier 2 Response 5: No. The TWO project area is already heavily fragmented by agriculture and no species of habitat fragmentation concern are known to be present.

WEG Tier 2 Question 6: Which species of birds and bats, especially those known to be at risk by wind energy facilities, are likely to use the proposed site based on an assessment of site attributes?

TWO Tier 2 Response 6:

As stated in Tier 1 Response 1, the 2006-2011 report on the nearest BBS survey route indicated that 69 species of birds potentially breed in the TWO project area, of which the survey confirmed 19 were observed or confirmed to be breeding. Seven additional species were observed in 2010 during avian reviews for the TWO project. The species confirmed to use the area are typical of intensively farmed agricultural areas with scattered farmsteads, small woodlots and degraded watercourses. Bird species confirmed present between 2006 and 2011 include:

- | | |
|---|---|
| 1. Canada goose (<i>Branta canadensis</i>) | 7. Red-bellied woodpecker (<i>Melanerpes carolinus</i>) |
| 2. Wood duck (<i>Aix sponsa</i>) | 8. Eastern phoebe (<i>Sayornis phoebe</i>) |
| 3. Great blue heron (<i>Ardea herodias</i>) | 9. Horned lark (<i>Eremophila alpestris</i>) |
| 4. Cooper's hawk (<i>Accipiter cooperii</i>) | 10. Tree swallow (<i>Tachycineta bicolor</i>) |
| 5. Mourning dove (<i>Zenaidura macroura</i>) | 11. Eastern bluebird (<i>Sialia sialis</i>) |
| 6. Great-horned owl (<i>Bubo virginianus</i>) | |

- | | |
|---|---|
| 12. American robin (<i>Turdus migratorius</i>) | 21. Rock dove (<i>Columba livea</i>) |
| 13. Gray catbird (<i>Dumetella carolinensis</i>) | 22. Common grackle (<i>Quiscalus quiscula</i>) |
| 14. European starling (<i>Sturnus vulgaris</i>) | 23. Mallard (<i>Anas platyrhynchos</i>) |
| 15. Yellow warbler (<i>Dendroica petechia</i>) | 24. Brown-headed cowbird (<i>Molothrus ater</i>) |
| 16. Chipping sparrow (<i>Spizella passerina</i>) | 25. Eastern meadowlark (<i>Sturnella magna</i>) |
| 17. Eastern towhee (<i>Pipilo erythrophthalmus</i>) | 26. Red-winged blackbird (<i>Agelaius phoeniceus</i>) |
| 18. Song sparrow (<i>Melospiza melodia</i>) | |
| 19. House finch (<i>Carpodacus mexicanus</i>) | |
| 20. Turkey vulture (<i>Cathartes aura</i>) | |

None of these species are rare and none are unusually at risk from energy facilities. However, any of the listed bird species could potentially incur some level of collision risk.

Five bat species were documented during mist net and acoustic surveys in the TWO project area: big brown bat (*Eptesicus fuscus*), red bat (*Lasiurus borealis*), silver-haired bat (*Lasionycteris noctivagans*), hoary bat (*Lasiurus cinereus*) and evening bat (*Nycticeius humeralis*). IBATs bats are not known to breed in the project area but very likely pass through during fall and spring migration movements. NLEBs have not been documented in the TWO project area but also may breed there or pass through during migration periods.

Fatality monitoring results from adjacent wind farms in similar habitat would provide a good indication as to the frequency and species distribution of bird and bat fatalities that might be anticipated at TWO. However, this data is not publicly available.

WEG Tier 2 Question 7: Is there a potential for significant adverse impacts to species of concern based on the answers to the questions above, and considering the design of the proposed project?

TWO Tier 2 Response 7: Based on the answers to the questions above, the TWO project area has been sited and designed to avoid impacts to habitats that would potentially be used by species of concern. There is some potential for avian and bat collisions to occur on the TWO project but this potential has been minimized by siting turbines away from wildlife habitat, as well as through planned operational mitigation measures. Given the federal endangered status of the IBAT (and potentially the NLEB), even small numbers of turbine-related fatalities involving these species are of substantial concern. Until such time as TWO might pursue a Habitat Conservation Plan (HCP) and Incidental Take Permit (ITP), TWO has requested a Technical Assistance Letter (TAL) from USFWS and has proposed operational mitigation designed to prevent the taking of these species.

WEG TIER 3 – FIELD STUDIES TO DOCUMENT SITE WILDLIFE AND HABITAT AND PREDICT PROJECT IMPACTS – USFWS Questions and TWO Responses

WEG Tier 3 Question 1: Do field studies indicate that species of concern are present on or likely to use the proposed site?

TWO Tier 3 Response 1: Field studies have confirmed that the following species of concern utilize or periodically move through the Site Permit Area:

Northern Harrier:

Northern harriers have been observed flying through the TWO project area. However, the project area has negligible grassland, which this species requires for nesting and hunting.

State and Federally Listed Bat Species:

As previously stated, five bat species designated by the ODNR as species of concern or special interest were documented during 2010 mist netting and acoustic bat surveys: big brown bat, red bat, silver-haired bat, hoary bat and evening bat. No IBATs or NLEBs have been identified during field surveys but these species very likely pass through the TWO project area during migration periods.

State and Federally Listed Mussel Species:

Mussel surveys have not yet been performed so it is possible that state or federally listed species may be present in some project area streams. Mussel surveys will be carried out in the spring of 2015 in advance of any impacts to such streams. Any mussels found will be relocated to ensure impact avoidance.

WEG Tier 3 Question 2: Do field studies indicate the potential for significant adverse impacts on affected population of species of habitat fragmentation concern?

TWO Tier 3 Response 2: No. The TWO project area is already severely fragmented and the TWO facility will not increase the level of habitat fragmentation. All of the above-ground infrastructure to be constructed for the facility will be placed on cultivated cropland.

WEG Tier 3 Question 3: What is the distribution, relative abundance, behavior, and site use of species of concern identified in Tiers 1 or 2, and to what extent do these factors expose these species to risk from the proposed wind energy project?

TWO Tier 3 Response 3:

Northern Harrier:

Distribution: Northern harriers are found throughout Ohio.

Relative abundance: Harriers are relatively common nationwide but their populations are declining, presumably due to the ongoing loss of grassland and wetland habitat. Because this species feeds on a variety of animals in agricultural areas (e.g. small mammals, birds, snakes, frogs, insects (especially grasshoppers), and carrion), it is also susceptible to pesticide contamination. Northern harriers are designated as state-endangered in Ohio. However, this species is abundant enough within its range to be rated "Least Concern" by the International Union for Conservation of Nature (IUCN).

Behavior: Northern Harriers nest on the ground in grasslands and densely vegetated wetland areas. They primarily hunt small animals by sight and sound while flying low over grasslands and wetlands. Harriers have a disk-shaped face that looks and functions much like an owl's, with stiff facial feathers helping to direct sound to the ears.

Site Use: Northern harriers were observed flying through the TWO project area during avian survey work but have not been observed to nest there. Hunting opportunities for harriers are extremely limited due to the negligible amount of grassland and wetland within the project area.

Risk Exposure: Northern harrier risk exposure is considered low. Northern harriers are not known to nest in the project area and would seldom hunt there due to the general lack of grasslands and wetlands. Also, this species is also likely to be low risk behaviorally because it would seldom be within the rotor swept zone of turbines due its low-flying hunting behavior.

Indiana Bat

Distribution: IBATs are distributed widely in the central and eastern United States. Their range encompasses all or part of 23 states. Within Ohio, IBATs bats are known to summer and winter in 19 and 6 counties, respectively. Paulding County is on the only county in northwestern Ohio where this species is found in the summer. All of Ohio's winter hibernacula are in southern counties.

Relative abundance: The nationwide population of IBATs was estimated to be 387,000 as of 2009, which is less than half of the population that existed when the species was listed in 1967. Since the discovery of white-nosed syndrome in 2007, millions of cave hibernating bats, including Indiana bats, have been lost. A recent U.S. Geological Survey (USGS) study

predicts that, if the current rate of WNS spread continues and the species does not develop immunity, only 13.7% of the existing population of IBATs will remain by 2022.⁶

Behavior: During summer, female IBATs form maternity colonies almost always under the loose bark of trees or within tree cavities on either uplands or within forested wetlands. Trees greater than 8 inches in diameter are favored for such colonies. Feeding occurs primarily within closed canopy forest along riparian corridors. Mating occurs in late summer and early fall while swarming in caves prior to hibernation. Indiana bats hibernate in winter, usually in caves. Most IBATs that summer in Ohio migrate to and from hibernacula in large caves south of the state, mostly in Kentucky. IBATs hibernate in dense clusters on cave walls and ceilings, sometimes reaching densities of 300 bats per square foot. Up to 50 percent of the total IBAT population hibernates in just seven caves, making this species very vulnerable to disease (including WNS) and disturbance-related impacts during winter.

Site Use: IBATS are not known to breed, summer or winter within the TWO project area and are likely to pass through the project area only during the fall and spring migration periods, when they travel between summer habitat to the north and hibernacula to the south

Risk Exposure: The risk exposure for Indiana bats involves a number of factors and is likely in flux. Based on the individual fatalities that occurred during fall and spring migration at the adjacent Blue Creek and Timber Road II Wind Farms, it is very likely that there will be some IBAT fatalities over time at TWO. However, given the distance to the nearest hibernaculum, the lack of breeding habitat and the absence of landscape features that might funnel migration movements, the number of Indiana bat fatalities at TWO in any given year will likely be low. This appears to be the case at the adjacent wind farms, both of which encompass habitat that is virtually identical to the TWO project area. The number of annual fatalities may diminish if the IBAT population continues to fall due to white-nosed syndrome. However, the significance of each individual fatality will increase if the overall population continues to decline.

Mussels

Distribution: The rayed bean appears to be declining rangewide (Strayer and Jirka 1997, West et al. 2000). The rayed bean has been eliminated from 78% of the total number of streams and other water bodies from which it was historically known. This species has also been eliminated from long reaches of former habitat in hundreds of miles of the Maumee, Ohio, Wabash, and Tennessee Rivers and from numerous stream reaches in their tributaries. In addition, the species is no longer known from the States of Illinois, Kentucky, Tennessee, Virginia, and West Virginia, representing half of the states from which it was formerly known. The rayed bean historically occurred in 115 streams, rivers and canals in 10 states. As reported by the USFWS in 2012, the species is found in 31 streams and 1 lake, a 73 percent

⁶ Thogmartin, W. E., C. Sanders-Reed, J. A. Szymanski, R. A. King, L. Pruitt, P. C. McKann, M. C. Runge, and R. E. Russell. 2013. White-nose syndrome is likely to extirpate the endangered Indiana bat over large parts of its range. *Biological Conservation* 160:162–172.

reduction⁷. In Ohio, the rayed bean is known to occur in 12 streams/rivers, with populations stable in one, declining in three and unknown in the remaining eight.

Relative abundance: The USFWS reports that the rayed bean has experienced a significant reduction in range and most of its populations are disjunct, isolated, and, with few exceptions, apparently declining. The species has been extirpated from over 80 streams/water bodies within its historical range, indicating that substantial population losses have occurred. Relatively few streams are thought to harbor sizable viable populations. Population reductions are largely associated with habitat degradation from pollution (including agricultural runoff) and the smothering of gravel substrates by sediment.

Behavior: The rayed bean generally lives in smaller, headwater creeks, but it is sometimes found in large rivers and wave-washed areas of glacial lakes. It prefers gravel or sand substrates, and is often found in and around roots of aquatic vegetation. Adults spend their entire lives partially or completely buried in substrate, filtering water through their gills to remove algae, bacteria, detritus, microscopic animals, and dissolved organic material for food. Male rayed bean mussels release sperm into the water column that is then siphoned by females to fertilize their eggs. Fertilized eggs develop into microscopic larvae, called glochidia, within special gill chambers. Females expel mature glochidia, which then must attach to the gills or fins of specific host fish species to complete development into juvenile mussels. After attaching to host fish, glochidia mature within a few weeks. Juvenile mussels then drop off and continue to grow, if they fall onto appropriate substrate. Using fish as a host species allows the rayed bean to move upstream and populate habitats it could not otherwise reach.

Site Use: Site use by mussels is currently unknown, as mussel surveys have not yet been conducted. However, if mussels utilize streams within the project area, the only potential for impacts would be at six temporary crane crossing locations. Whether mussels are using these locations will be determined in May 2014 when mussel surveys are performed.

Risk Exposure: Risk exposure for all species of mussels is considered very low because mussel surveys will be conducted and any mussels found will be relocated before temporary crane crossings are constructed. Crossing locations will be restored to preconstruction condition immediately after cranes have crossed.

WEG Tier 3 Question 4: What are the potential risks of adverse impacts of the proposed wind energy project to individuals and local populations of species of concern and their habitats? (In the case of rare or endangered species, what are the possible impacts to such species and their habitats?)

⁷ <http://www.fws.gov/policy/library/2012/2012-2940.html>

TWO Tier 3 Response 4:

With the exception of bats, the potential for turbine collisions involving species of concern is generally low. The only avian species of concern known to pass through the project area is the northern harrier. As stated above, this species is not likely to incur turbine collisions due to the lack of suitable nesting and foraging habitat, as well as the species' low flying mode of hunting. With regard to bats, the risk of periodic individual IBAT fatalities is high. However, based on fatalities to date at adjacent wind farms, the number of annual IBAT fatalities at TWO is likely to be low. Given the IBAT's increasingly endangered status due to white-nosed syndrome, each individual fatality at TWO will contribute more significantly to overall population-level mortality than for more common bat species. Given that no NLEBs were documented during bat surveys in the TWO project area, the risk to this species is unknown but may be similar to or lower than for IBATs.

During mist net and acoustic surveys, five other bat species were documented in the TWO project area: big brown bat (*Eptesicus fuscus*), red bat (*Lasiurus borealis*), silver-haired bat (*Lasionycteris noctivagans*), hoary bat (*Lasiurus cinereus*) and evening bat (*Nycticeius humeralis*). Of these more common species, only big brown bats have been found to have died from WNS. However, big brown bats are typically found in lower numbers than other species at affected sites, and few have been found with the signs of WNS⁸. The WNS pathogen has been detected on red bats and silver-haired bats but the diagnostic symptoms of WNS were not observed on these species.⁹ Given that the more common species of bats are present for a greater portion of the year and in greater numbers than IBATs and NLEBs, they are likely to collide with turbines in greater numbers. However, these species have incurred less mortality from WNS, making it unclear whether turbine collisions at TWO will meaningfully contribute to cumulative mortality in these bat species.

Turbines, access roads and the project interconnection substation have all been sited on active cropland so that they will not affect habitat potentially used by species of concern. Underground collector cables have also been routed to be under active cropland. Where underground collector cables will pass beneath streams that might provide mussel habitat, the cables will be installed by directional drilling to preclude any potential for impacts. Up to six temporary crane crossings will involve streams that could potentially harbor mussels. These streams will be surveyed prior to construction and any mussels found will be relocated to preclude direct impacts to individual mussels and mussel populations. Temporary crane crossings will be removed shortly after the crossings occur and the affected stream segments will be restored to pre-construction condition.

⁸ <http://www.fws.gov/northeast/pdf/white-nosefaqs.pdf>

⁹ <https://www.whitenosesyndrome.org/about/bats-affected-wns>

WEG Tier 3 Question 5: How can developers mitigate identified significant adverse impacts?

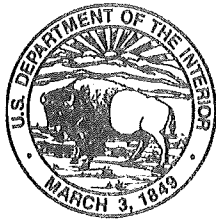
TWO Tier 3 Response 5: TWO has already done a great deal to mitigate potential adverse impacts through the siting and design of the TWO Project. Project infrastructure has been sited almost exclusively on active cropland so as to minimize the potential for adverse impacts to species of concern. No un-fragmented natural habitat will be affected by the project.

With regard to mussels, TWO will commission mussel surveys in locations where crane crossings would temporarily affect streams that could potentially harbor mussel species of concern. Any mussels found in will be relocated to locations that will not be affected by construction. Follow up surveys will be performed to monitor the success of any relocation efforts. After crane crossings have occurred, temporary culverts and fill material will be removed and the crossing locations restored to their preconstruction condition.

Turbine collision fatalities among species of concern are expected to be limited to small numbers of individual birds and bats. Anticipated population-level impacts to potentially affected species are generally not expected to be significant. However, again, any loss of Indiana bats or northern long-eared bats would contribute to population-level mortality associated with the ongoing impact of white-nosed syndrome. Until such time as TWO might obtain an incidental take permit (ITP) for Indiana bats and northern long-eared bats, TWO has proposed operational mitigation measures designed to avoid collisions involving these species. TWO's proposed operational measures consist of a 6.9 meters/second turbine cut-in speed during the fall and spring migration periods (August 1 through October 15 and April 1 through May 15) from sunset to sunrise when temperatures are above 50 degrees Fahrenheit. Turbine blades would be feathered when wind speeds are below 6.9 meters/second to minimize "free-wheeling" during curtailment periods. It is anticipated that these measures would be further tailored in the future if a Habitat Conservation Plan (HCP) is prepared and an ITP obtained.

WEG Tier 3 Question 6: Are there studies that should be initiated at this stage that would be continued in post-construction?

TWO Tier 3 Response 6: No. Post-construction fatality monitoring and reporting of incidental fatality finds are expected to be sufficient to quantify wildlife impacts once the TWO project becomes operational. However, if post-construction fatality monitoring results indicate that additional post-construction studies are warranted, they will be initiated at that time to support ongoing adaptive management.



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



October 28, 2014

Mr. Ronald Peterson
Permitting Manager
Trishe Resources, Inc.
5575 Wayzata Blvd., Suite 700
St. Louis Park, MN 55416

Re: Trishe Wind Ohio, LLC Project (formerly Northwest Ohio Wind Energy)
Paulding Co., OH

Dear Mr. Peterson:

The purpose of this letter is to acknowledge and respond to Trishe Wind Ohio's (the Company's) request for technical assistance dated October 28, 2014 concerning the effects of the above-referenced project on Endangered Species Act (ESA)-listed species under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS).

Section 9(a)(1)(B) of the ESA, 16 U.S.C. § 1538 (a)(1)(B), makes it unlawful for any person to "take" an endangered species. Take of threatened species is prohibited pursuant to 50 C.F.R. § 17.31, which was issued by the USFWS under the authority of Sections 4(d) and 9(a)(1)(G) of the ESA, 16 U.S.C. §§ 1533(d) and 1538(a)(1)(G), respectively. "Take" is defined by the ESA as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct" 16 U.S.C. § 1532(19).

Take of Indiana bats (*Myotis sodalis*) at two existing wind projects in northwest Ohio has been documented in both fall and spring. The proposed Trishe Wind Ohio project is located adjacent to these projects (see Attachment), and thus the USFWS believes that, without implementation of avoidance measures, take of Indiana bats at the Trishe Wind Ohio project is likely to occur during both the spring and fall migration periods.

The USFWS has reviewed the information you have provided regarding the presence of Indiana bats and other ESA-listed species and their habitat in the vicinity of the Trishe Wind Ohio site, and the measures set forth in the technical assistance letter request, that Trishe Wind Ohio will implement to avoid any potential take of such species and their habitat, including implementing tree clearing only between October 1 and March 31, and fully feathering the wind turbine generators below a wind speed of 6.9 meters per second between one half hour before sunset to

one half hour after sunrise during the Indiana bat's fall migratory period, August 1 – October 30 and during the Indiana bat's spring migratory period, March 15-May 15. Based on USFWS' review of these avoidance measures, no incidental take permit is recommended. The USFWS reached this conclusion through coordination and ongoing discussions with the Company including the Company's commitment, in writing to the USFWS, that proven avoidance measures will be implemented throughout the life of the project or until incidental take coverage is obtained. However, if an unexpected take does occur, an incidental take permit may be required in the future.

Additionally, the USFWS is proposing to list the Northern long-eared bat (*Myotis septentrionalis*) as endangered under the ESA. The final listing decision for the northern long-eared bat will occur no later than April 2, 2015. No Northern long-eared bats were detected at the Trishe Wind Ohio facility during pre-construction surveys, but like Indiana bats, Northern long-eared bats may migrate through the wind facility during spring and/or fall. Other wind projects in the Midwest have documented mortality of Northern long-eared bats, therefore we assume that there is some potential for mortality of Northern long-eared bats at the Trishe Wind Ohio facility as well. Northern long-eared bats are in the same genus as Indiana bats, have similar migration periods, habitat needs, and morphological features. Therefore the USFWS believes that the avoidance measures outlined above for Indiana bats will also result in avoidance of mortality for Northern long-eared bats.

As required by the Ohio Power Siting Board Certificate of Environmental Compatibility and Public Need, and as agreed to by Trishe Wind Ohio, post-construction mortality monitoring will be required to document bird and bat mortalities. This monitoring must be consistent with Ohio Department of Natural Resources (ODNR) protocol and be reported annually. ODNR's monitoring protocol is also of sufficient effort to document to the USFWS that the measures above are precluding take of Indiana bats and Northern long-eared bats. We request that you provide our office with the monitoring results concurrent with ODNR notification.

This office is not authorized to provide guidance in regards to the USFWS Office of Law Enforcement (OLE) investigative priorities involving federally listed species. However, we understand that OLE carries out its mission to protect ESA-listed species through investigation and enforcement, as well as by fostering relationships with individuals, companies, and industries that have taken effective steps to avoid take of listed species, and by encouraging others to implement measures to avoid take of listed species. It is not possible to absolve individuals or companies from liability for unpermitted takes of listed species, even if such takes occur despite the implementation of appropriate take avoidance measures. However, the Office of Law Enforcement focuses its enforcement resources on individuals and companies that take listed species without identifying and implementing all reasonable, prudent and effective measures to avoid such takes. As of this date, the Columbus Field Office concludes that the proposed project will not or is unlikely to result in take of ESA listed species.

We recommend you coordinate this project with the ODNR Division of Wildlife, as both the Indiana bat and Northern long-eared bat are state-listed species. Please contact Jennifer Norris at (614) 265-6349, or Jennifer.Norris@dnr.state.oh.us.

We appreciate Trishe Wind Ohio's efforts to coordinate with our office in determining what measures could be implemented to avoid take of any ESA-listed species or their habitat at the project site. Should any new information become available, we request that Trishe Wind Ohio promptly notify the USFWS. If new information becomes available to the USFWS that other measures could be implemented to avoid take that would not require additional commitment by Trishe Wind Ohio, such as wind speeds shown to preclude foraging by Indiana bats, USFWS will notify Trishe Wind Ohio as soon as possible.

Sincerely,

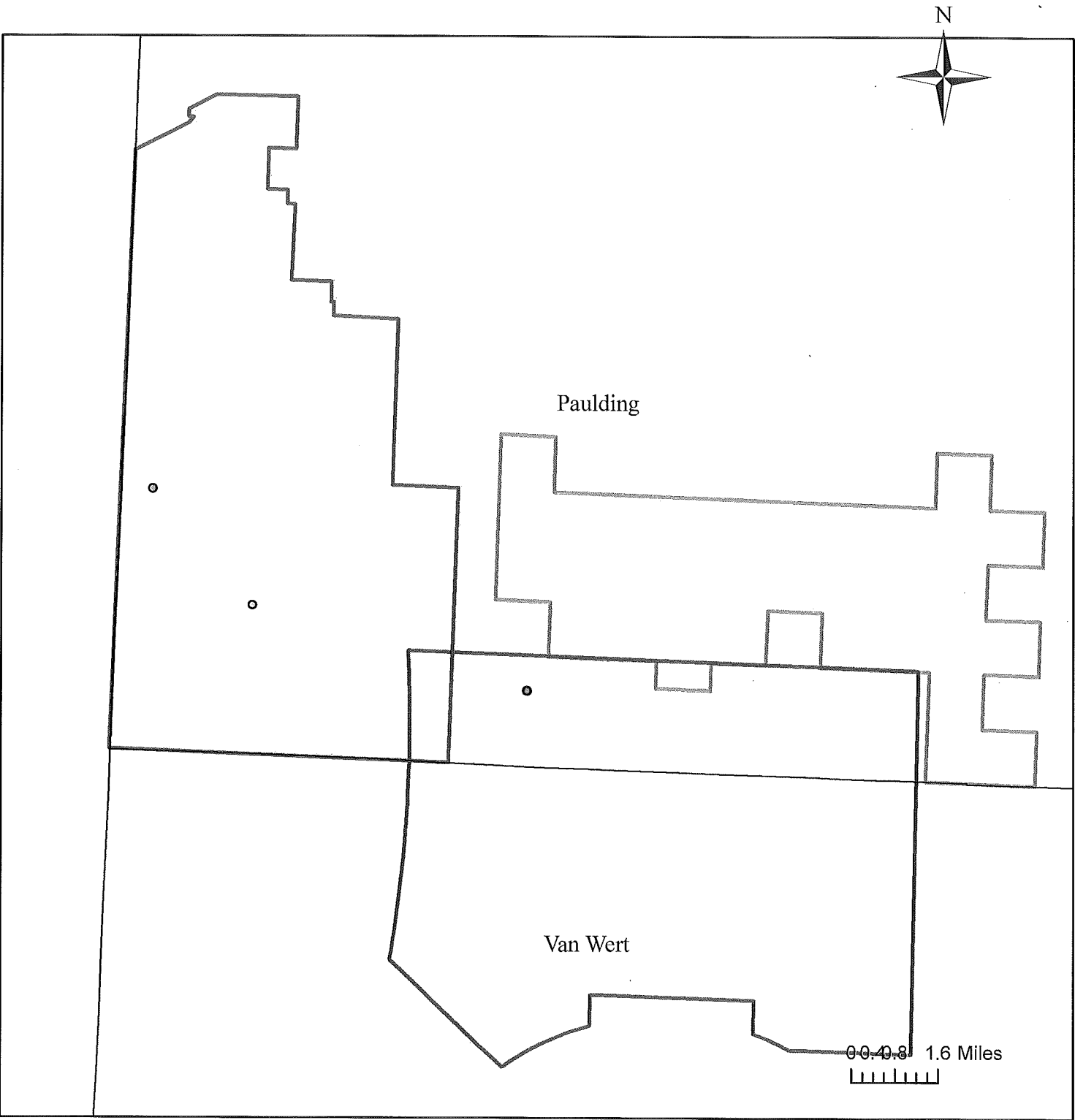
A handwritten signature in black ink, appearing to read "Jeromy Applegate". The signature is fluid and cursive, with a large, stylized initial "J" and "A".

Jeromy Applegate
Acting Field Supervisor

cc: Jennifer Norris, ODNR, via e-mail

Attachment: Proposed Trishe Wind Project proximity to other wind projects in Northwest Ohio

Proposed Trishe Wind Project proximity to other wind projects in Northwest Ohio



Legend

- Counties
- TimberRoadII Boundary 04-06-2010
- Iberdrola BlueCreek 02-15-2011
- Trishe/Northwest Wind 03-2013
- Indiana bat mortality

APPENDIX B

Post-Construction Avian and Bat Fatality Monitoring Work Plan

Work Plan for 2018-2020
Post-Construction Avian and Bat Fatality Monitoring
Northwest Ohio Wind Project

Paulding County, Ohio
June 15, 2018



Prepared For:

Trishe Wind Ohio, LLC.
591 West Putnam Avenue
Greenwich, CT 06830

Work Plan for 2018-2020 Post-Construction Avian and
Bat Fatality Monitoring

Northwest Ohio Wind Project

Paulding County, Ohio

Prepared for:

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Project Number: R0004572.01.00
Date: 6/15/2018

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Appendix A: 2018 Post-Construction Avian and Bat Fatality Monitoring Schedule

Appendix B: ODOW Post-Construction Fatality Forms

1.0 INTRODUCTION

Trishe Wind Ohio, LLC (TWO) proposes to construct and operate the 100-megawatt (MW) Northwest Ohio Wind Energy Project located in Paulding County, Ohio (hereafter referred to as “Project”). The Project will be constructed on approximately 21,046 acres (33 square miles [mi²]) of land in portions of Blue Creek and Latty Townships and the Village of Haviland in Paulding County, Ohio (**Exhibit 1**). This part of northwest Ohio is home to several operating, utility-scale wind farms including Timber Road Wind Farm (100 MW), located west of the Northwest Ohio Wind Energy Project, and Blue Creek Wind Farm (304 MW), which is located to the south.

The Ohio Division of Wildlife (ODOW) *Onshore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (ODNR 2009) recommends at least one year of post-construction fatality monitoring for sites at which studies predict a low probability of significant adverse impacts and suggests that two or more years of fatality monitoring may be necessary at sites for which pre-construction field studies indicate moderate or high probability of significant adverse impacts. Results of the Tier 1 and 2 analyses for the Project, Tier 3 analyses of data from the avian surveys on the Project to date, and analysis of pre-construction and fatality monitoring data from other operating wind projects in the Midwest and Northeast suggest that the potential risk to avian and bat species from the Project is low. Factors influencing the low risk determination for the Project include the overall lack of distinct topography, unique habitats or resources, or other features that could concentrate birds or bats; absence of federally-listed species; and lack of evidence from other operating wind projects in the Midwest and Northeast of significant numbers of bird and bat fatalities.

To facilitate TWO’s evaluation of mortality rates of birds and bats at the Project, post-construction avian and bat mortality monitoring is proposed. The overall objectives of the post-construction monitoring effort will be to determine the overall bird and bat fatality rates from the Project; to evaluate the circumstances under which fatalities occur; and to determine whether the estimated mortality is lower, similar, or higher than the average mortality rates observed at other local, regional, and national wind projects. The baseline monitoring will also address ODOW and USFWS objectives which are to validate the risk assessment and to adaptively manage impacts in cooperation with the agencies to meet no net loss standards of the Bald and Golden Eagle Protection Act (BGEPA) and minimize impacts to general avian and bat populations.

The proposed post-construction avian and bat fatality study would be consistent with the ODOW approved, standardized protocol, as outlined in ODNR’s *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (ODNR 2009) and serves as the Tier 4 stage in the *U.S Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines* (USFWS 2012) for assessing potential impacts to wildlife and their habitats from wind energy development. The fatality monitoring study provides a decision framework for collecting information on the level of avian and bat fatalities

associated with the Project, an evaluation of the overall level of risk, and the ability to make more informed operational decisions regarding future mitigation strategies, as appropriate.

The Work Plan is intended to be a working document that:

- 1) Identifies post-construction surveys that are proposed to be conducted under an existing contract with TWO,
- 2) Identifies the scope of field surveys and methods that will be used to gather relevant data, and
- 3) Provides a preliminary schedule of tasks that will meet the expectations of TWO, Ohio Power Siting Board (OPSB), ODNR, and USFWS.

This Work Plan reflects the current understanding of the proposed Project. The scope, methods, and schedule are subject to change as the proposed Project proceeds or new information becomes available. The methods presented in this Work Plan will be discussed with the USFWS and ODOW biologists to ensure that all survey methodologies are approved and acceptable to the regulatory agencies prior to the start of fatality monitoring.

2.0 PROJECT BACKGROUND

Land lease and wind easements have been signed with approximately 274 landowners representing approximately 12,750 acres of land. TWO is proposing to install up to 42- GE 2.5-116 wind turbine generators (WTG), which would be placed in 42 of the currently permitted 60 locations along with associated infrastructure including a temporary staging and laydown area, underground electrical collection and communication lines, a voltage step-up facility, an operations and maintenance (O&M) building, permanent meteorological tower(s), and gravel access roads (**Exhibit 2**). Each WTG would have a hub height of approximately 90 meters (m) (295 feet [ft]) and a rotor diameter of 116 m (380 ft). The WTGs would be approximately 148 m (486 ft) tall at the maximum extension of the rotor blades (tip height) and mounted on a reinforced concrete foundation.

The Facility will interconnect to an existing 138 kilovolt (kV) American Electric Power (AEP) transmission line which runs through the southern part of the Project Area. The point of interconnection (POI) is at the existing AEP Haviland Substation, just south of Haviland, Ohio. Voltage from the 34.5 kV underground electrical collection system will be stepped up to 138 kV at a step-up transformer facility immediately adjacent to the Haviland Substation, obviating the need for an overhead interconnection transmission line.

Topography within the Project Area is generally flat with numerous ditches and drain tile (**Exhibit 3**). Overall, the Project Area slopes downward from west to east from a high elevation of 746 feet above mean sea level (amsl) down to 710 feet amsl.

A total of five land cover types are recognized and mapped within the Project Area. Approximately 94 percent of the Project Area is comprised of cultivated cropland, consisting primarily of corn and soybeans and the remaining six percent is comprised of developed land, deciduous forest, herbaceous cover, and woody wetlands (**Exhibit 4**) (**Table 1**).

Table 1: Land Cover Types within the Project Area

Land Cover Type	Total Area (Acres)	Percent of Project Area
Cultivated Crops	9,933	94.4
Developed Land	508.3	4.8
Deciduous Forest	63.6	0.6
Herbaceous	14.9	0.1
Woody Wetlands	4.6	< 0.1
TOTAL	10,524	100.0

3.0 POST-CONSTRUCTION AVIAN AND BAT FATALITY MONITORING

The fatality monitoring study provides a decision framework for collecting information on the level of avian and bat fatalities associated with the Project, an evaluation of the overall level of risk, and the ability to make more informed operational decisions regarding future mitigation strategies, as appropriate. The proposed methodologies are outlined below and include 2 years (6 seasons) of fatality monitoring in accordance with the Ohio Department of Natural Resources (ODNR) approved, standardized protocol, as outlined in ODNR's *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (ODNR 2009).

3.1 STUDY DESIGN

Wind farm-related fatality estimation is based on the number of carcasses found during carcass searches conducted under operating turbines. Both the probability that a carcass persists on site long enough to be detected by searchers (carcass persistence) and the ability of searchers to detect carcasses (searcher efficiency) can lead to imperfect detection of carcasses during standardized searches. Therefore, the post-construction monitoring will include: (1) standardized carcass searches to monitor potential injuries or fatalities associated with wind farm operation, (2) carcass removal trials to assess seasonal, site-specific carcass persistence time, and (3) searcher efficiency trials to assess observer efficiency in finding carcasses. Annual fatality rates will then be calculated by correcting for the bias (i.e., underestimation) due to searcher efficiency and scavenging rates by using an equation that accounts for the number of turbines searched, the carcass persistence, and searcher efficiency (e.g., Huso estimator, Huso 2010).

Post-construction monitoring will consist of mortality search protocol "Option B" contained in ODNR's *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio*. This method will be the most cost-effective method for the Project. Table 2 below summarizes key elements of the "Option B" search protocol as they apply to the proposed Project.

Table 2: Key Elements of ODOW's "Option B" Mortality Search Protocol

Protocol	Search Time Interval	Search Distance from Turbine	Sample Size (# turbines searched)
Daily plots uncleared	Daily (7 days/week)	Twice blade length (58 m x 2 = 116 m radius)	10 percent of total turbines or minimum of 5. (5 turbines searched)
3-day plots cleared	Every 3 days	1.2 times the blade length or minimum of 60 m (58 m x 1.2 = 70 m radius)	>40 turbines: 1/4 searched, minimum of 20. 20 minus the number of turbines surveyed daily above. (15 turbines searched)

Roads and pads	Weekly	Within (100 m) of a turbine (100 m radius)	Remaining Project turbines that are not searched with another method. (22 turbines searched)
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In addition to one full year of mortality monitoring, ODOW has requested a second year of monitoring be conducted. The initial fatality monitoring study is proposed to be initiated within one week of commercial operation (**Appendix A – Schedule**) and will be consistent with ODOW and USFWS recommendations but may be adapted in certain ways to improve overall efficiency and data quality (i.e., electronic data forms). Since construction is anticipated to be completed and the facility operational by mid- July 2018, surveys will be conducted for roughly two seasons over the 2018 monitoring season. Surveys will be conducted again during 2019 over three seasons, with seasons roughly defined as spring (April 1–June 15), summer (June 16–August 31), and fall (September 1–November 15). During 2020, approximately surveys will be conducted during the spring survey season from April 1-June 15.

3.1.1 Turbine Selection and Transect Establishment

Based on the information in Table 2 above, daily searches would be conducted of 5 of the 42 turbines. Since these plots are proposed to be cleared, ODOW has agreed to reduce the search distance from each turbine to 1.2 times the blade length rather than twice the blade length as recommended for uncleared plots. Thus, a minimum search radius of 70 meters (230 feet) will be searched out from each turbine with a circular area equal to approximately 3.8 acres (**Exhibit 5**). Fifteen of the remaining 37 turbines would be sampled every 3 days. The search plot size of these 15 turbine locations will also be a minimum search radius of 70 meters (230 feet). Daily and 3-day plot turbines were randomly selected. Lastly, the roads and pads of the 22 remaining turbines that are not surveyed daily or every 3-days, would be surveyed weekly for the full monitoring period. Road and pad surveys would be conducted out to a maximum of 100 m from each turbine (**Exhibit 6**).

Per ODOW protocols, vegetation height on cleared plots will be 4" or less. The Westwood field team will coordinate with TWO to arrange for fatality monitoring site access and clearing of daily and 3-day search plots by individual landowners. Turbines selected for the "Option B" Mortality Search Protocol are shown in **Exhibit 8** and outlined below.

Daily plots turbines (cleared): T-2, T-20, T-22, T-34, and T-42.

3-day plots cleared turbines: T-3, T-4, T-7, T-8, T-13, T-15, T-17, T-24, T-28, T-32, T-37, T-40, T-44, T-45, and T-46.

Road and pad turbines: T-1, T-5, T-6, T-9, T-10, T-14, T-16, T-21, T-21, T-23, T-25, T-26, T-27, T-29, T-31, T-33, T-36, T-39, T-41, T-43, T-49, and T-50.

3.1.2 Carcass Search Protocol

A grid of parallel linear transects will be established at each of the search plots, with transects spaced at 5-m (16 foot) intervals. Transects will be pre-loaded onto a tablet PC equipped with a Bluetooth Global Positioning System (GPS) unit (i.e., Apple iPad and Bad Elf GPS Pro) and the corners of search plots would be marked in the field around searched turbines using wooden stakes, fluorescent flagging tape, and/or fluorescent marking paint. Plot stakes will be removed and collected at the end of the monitoring season. Based on feedback from landowners during the monitoring, the staking program may be modified to meet landowner preferences.

Beginning each day at approximately first light, searchers will walk along each transect searching both sides out to approximately 2.5 m (8.2 feet) for fatalities. Surveyors will attempt to complete searches of the allotted turbines by 1:00 p.m. each day. When a bird or bat is encountered, the distance when the observer first detected it will be recorded. The searcher will then assess whether the individual is alive or dead. If the individual is alive, efforts will be made to release or take the animal to a licensed rehabilitator. If successful rehabilitation is not likely, then the individual will be humanely euthanized.

For each individual (regardless of whether found dead or alive), the site will be flagged, and returned to after the turbine search has been completed. Once relocated, a photograph will be taken of the carcass before it is moved. Each carcass will be collected in individual re-sealable plastic bags, and the carcass identification number written in pencil on a piece of write-in-the-rain paper enclosed with the carcass. Carcass mortality data will be recorded on the Fatality Reporting Form contained in ODNR's *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (ODNR 2009) (**Appendix B**). Mortalities encountered outside the bounds of an official will be collected, and the above information recorded, but "Incidental" will be written into the notes area. These will not be used in the calculation of site mortality rates but may (depending on species) be used in searcher efficiency or carcass removal trials. Bats within the *Myotis* family are difficult to differentiate and will not be used for scavenging rate or searcher efficiency trials. These carcasses will be frozen and given to the ODOW at a prearranged date. If a state or federal threatened or endangered species is located, the ODOW and USFWS will be contacted within 24 hours. At that time arrangements will be made for turning over the carcass to the appropriate agency. If a larger than expected mortality event occurs, ODOW and the USFWS will be notified within 24 hours. For our purposes of this document, a significant mortality event will be defined as > 5 birds/bats at an individual turbine, and/or > 20 birds and/or bats across the entire facility.

As per the recommendations contained in ODNR's *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio*, vegetation mapping will be conducted for each of the searched turbines 3 times per year (spring, summer, and fall), given that vegetation can influence carcass detectability. Mapping will consist of

recording the GPS location, vegetation height and percent cover every 10 meters (33 feet) along each transect.

Appropriate wildlife salvage/collection permits will be obtained from the ODOW and USFWS to facilitate legal transport of injured animals and/or carcasses. Deposition of carcasses is discussed in Deposition of Data section below.

3.1.3 Searcher Efficiency Trials

Searcher efficiency, or the probability that an observer detects a carcass that is available to be found during a search, is used to account for imperfect detection in carcass searches. Searcher efficiency trials will be conducted in which a known number of study carcasses are placed in random locations within the survey areas. These trials will incorporate the assessment of each member of the field staff and will be conducted so that searchers being assessed have no prior knowledge of the trial. Bird carcasses of 2 size-classes (large bird and small bird) and bats will be used in the trials.

Trial turbines will be randomly selected, and trials will be conducted concurrently during fatality monitoring for all three seasons (i.e., spring, summer, and fall) each year. For each season, approximately 60-70 carcasses will be utilized (at least 200 carcasses each year) with no more than 3 carcasses placed at any given turbine. Carcasses may be used for multiple trials throughout the season. Each carcass will be placed at a turbine, with distance (within the searched area) and direction selected at random. Each carcass will be discreetly marked to identify it as a trial individual. Carcasses will be similar to those expected to be encountered during the search and should vary in both species composition and stage of decomposition. Each study carcass will have their location marked by GPS and be discreetly marked so that they can be identified as a study carcass if they are detected. The location of each carcass will be recorded along with a unique identifier. When observers locate each study carcass, all data will be collected as if the object was a fatality. Searcher efficiency data including the date, time, and location that each study carcass was planted will be recorded on the Searcher Efficiency Form contained in ODNR's *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (ODNR 2009) (**Appendix B**).

Study carcasses that are found by the surveyor being tested are considered successful trials and collected by that surveyor. Trial carcasses that are not found by the surveyor being tested are considered unsuccessful trials and will be recovered by the trial coordinator, such that a surveyor has only one opportunity to find each individual study carcass.

3.1.4 Carcass Removal Trials

Carcass removal time, or the number of days a carcass persists in the study area before it is removed, is used to account for removal bias. Carcasses may be removed from the search plot due to scavenging or other means (e.g., decomposition). It is assumed that carcass removal occurs at a constant rate and does not depend on the time since death of the organism.

Because carcass persistence is expected to vary with season and carcass size, a carcass removal trial will be conducted in the spring, summer, and fall survey periods using carcasses of varying size classes (large bird, small bird, and bats). Bats killed at the facility (excepting any *Myotis* and unknown bat species) will be used in trials. Mice will be used as surrogates for bats in the event that bats are unavailable.

Estimates of carcass removal will be used to adjust the total number of carcasses found for those removed from the study area, correcting for removal bias. Removal trials will be conducted within the search plots and on roads and pads within 100 meters (328 feet) of turbines if roads and pads are being searched for a portion of the survey period.

Carcass removal trials will begin when carcass search studies begin. A minimum of 50 carcasses per year will be placed at random distances and directions. Several carcasses will be placed each month, since rates are likely to change throughout the year. These carcasses will be checked daily for the first week, then every 2 days until the carcass is removed or completely decomposed. Changes in carcass condition will be tracked and documented with photos.

Preferably, carcasses used for scavenging rate estimation will be those collected from the site, and not surrogate species such as pigeons, starlings, or house sparrows since these have been found to be scavenged less frequently. Information that will be recorded for each placed carcass include: the GPS location, vegetation height, percent cover, distance/direction from turbine, and species.

3.1.5 Deposition of Data

During the fatality study, raw data forms will be housed with the biologists conducting the study and individual carcasses collected during the study will be housed in a marked freezer at the site field office. All collected carcass will be kept in individual re-sealable plastic bags, and the carcass identification number written in pencil on a piece of write-in-the-rain paper enclosed with the carcass. Bats within the *Myotis* family will be frozen and given to the ODOW at a prearranged date. Individual carcasses not used in trials in 2018, 2019, and 2020 survey seasons will be delivered to ODOW at the end of the year and used again in trials during the subsequent field season. Decomposed carcasses will be discarded.

3.1.6 Reporting and Data Analysis

An interim mortality monitoring report along with all data forms would be provided to ODOW, USFWS, and OPSB following the completion of each post-construction monitoring season (i.e., Summer and Fall 2018; Spring, Summer, and Fall 2019; and Spring 2020). The report will include fatality estimates and data summaries. Fatalities will be expressed both in terms of fatalities/turbine/season and in terms of fatalities/MW/season, as recommended to facilitate comparison with other studies (USFWS 2012). The report will include all data analyses, including overall fatality estimates and a discussion of monitoring results and their implications. In addition to the mortality monitoring report, the discovery of any federally-

listed species or eagles would be reported to USFWS and the discovery of state-listed species to the ODOJ within 24 hours of their discovery.

Annual fatality estimates will be calculated for all birds, all bats, small birds, large birds, raptors, nocturnal avian migrants, raptor species of special concern, target grassland birds, and state sensitive avian species. Fatality estimates will be based upon the number of carcasses found during standardized searches as adjusted for searcher efficiency bias (proportion of trial carcasses not found by searchers), carcass removal bias (probability that a carcass remained in the study plot and was available for detection by the searchers over the 40-day trial period), and the density-weighted proportion of area searched (in the case of road and pad surveys). The following define the statistical methods utilized to develop adjusted annual fatality estimates. Several fatality estimation models exist (e.g. Shoenfeld 2004, Huso 2010, etc.); the Huso estimator will be used to estimate fatalities for this study, unless a more appropriate estimator is available at the time of analysis. Estimates of facility-related fatalities will be based on the following:

- 1) Observed number of carcasses found during standardized searches during the monitoring year for which the cause of death is either unknown or is probably facility related,
- 2) Non-removal rates expressed as the estimated average probability a carcass is expected to remain in the study area and be available for detection by the searchers during removal trials,
- 3) Searcher efficiency expressed as the proportion of planted carcasses found by searchers during searcher efficiency trials, and
- 4) Percent of area searched at each turbine (i.e., takes into consideration road and pad sampling) and percentage of carcasses found at varying distances from turbine.

Definition of Variables

The following variables are used in the equations below for the Huso estimator (Huso 2010; Huso *et al.* 2012):

c_i	total number of carcasses in category i (e.g., combinations of size, visibility, season, search interval, etc.)
n	number of turbines sampled at the Project
k	number of carcass categories
\hat{a}_i	density-weighted area correction for category i
l_i	time interval between the previous search and discovery for category i
\hat{l}_i	effective search interval for carcasses in category i
r^i	average probability of persistence for carcass in category i
p_i	probability of detection for carcass in category i

$\hat{\pi}$	the estimated probability that a carcass is both available to be found during a search and is found, as determined by the removal trials and the searcher efficiency trials.
\hat{f}_i	per turbine mortality for category i
\hat{m}	total per turbine mortality

Estimation of Carcass Persistence Rates

Estimates of carcass persistence rates are used to adjust carcass counts for removal bias. Carcass persistence will be modeled as a function of carcass size, and possibly other variables including plot type, season, ground visibility, and the interactions between these variables. The average probability of persistence of a carcass r_i , will be estimated from an interval censored survival regression model. Exponential, log-logistic, lognormal, and Weibull distributions are fit, and the best model will be selected using an information theoretic approach known as AICc, or corrected Akaike Information Criteria (Burnham and Anderson 2002).

Estimation of Searcher Efficiency Rates

Searcher efficiency rates, p_i , will be estimated for each size class using a logistic regression model. Additional covariates for this logistic regression model may include plot type, season, ground visibility, and the interactions between these variables. The logistic regression models the natural logarithm of the odds of finding an available carcass as a function of the above covariates. The model assumes that searchers have a single opportunity to discover a carcass. The best model will be selected using AICc.

Density-weighted Area Correction

The size of each search plot is selected to encompass the area underneath each turbine where fatalities are most likely to fall; however, it is not always possible to search an entire plot due to ground cover (e.g., tall crops) and terrain. The carcass density-weighted proportion (DWP) of area searched will be modeled to account for unsearched area; separate estimates will be calculated for birds and bats. Searched area is weighted as a function of distance from the turbine, because the areas near the turbine tend to have a higher density of carcasses than areas farther from the turbine (Huso *et al.* 2014). The result is an estimate of the proportion of fatalities expected to land within searched areas around a turbine. If there are enough carcasses of a given type, a maximum likelihood estimation (MLE) modeling approach will be used. If carcass counts are too low to fit an MLE approach, a physics-based model which predicts the maximum fall distance for a given turbine height and rotor diameter will be used (Hull and Muir 2013). Area corrections based on the Hull and Muir model assume a linear decrease in density of carcasses from the turbine base out to the maximum predicted fall distance.

Carcasses Excluded from Fatality Estimation

One of the underlying assumptions of the Huso model is that searchers have a single opportunity to discover a carcass (Huso *et. al.* 2016). In practice, particularly when carcass persistence times are long, carcasses may be discovered that have been available for more than one search. In order to meet the assumptions of the Huso model, the estimated time since death is determined for each carcass, in the field. A carcass is excluded from fatality estimation if the estimated time since death is longer than the search interval associated with that carcass; in other words, a carcass with estimated time since death longer than the search interval is assumed to have been available for more than one search. Carcasses excluded from fatality estimation are also excluded from the calculation of a density-weighted area correction. However, all carcasses found during the study will be reported.

Adjusted Facility-Related Fatality Rates

The estimated probability that a carcass in category i was available and detected is:

$$\hat{\pi} = \hat{a}_i \cdot p_i \cdot r_i \cdot v_i$$

where $v_i = \min(1, \hat{I}_i / I_i)$. The model assumes that searchers have a single opportunity to find each carcass, even though some carcasses may persist through multiple searches before being detected. Therefore, a carcass is included in adjusted fatality estimates if it has been available since the last search, and no longer. The probable time since death, recorded in the field, will be used to evaluate each carcass for inclusion in the final fatality estimates.

The total number of fatalities (\hat{f}_i) in category i , based on the number of carcasses found in category i is given by:

$$\hat{f}_i = \frac{c_i}{\hat{\pi}_i}$$

The total per turbine fatality rate (m) will be estimated by:

$$\hat{m} = \frac{\sum_{i=1}^k \hat{m}_i}{n}$$

The standard errors and 90 percent confidence intervals will be calculated using bootstrapping (Manly 1997). Bootstrapping is a computer simulation technique that is useful for calculating point estimates, variances, and confidence intervals for complicated test statistics. A total of 1,000 bootstrap samples will be used. The standard deviation of the bootstrap estimates will be the estimated standard error. The lower 5th and upper 95th percentiles of the 1,000 bootstrap estimates will be estimates of the lower limit and upper limit of 90 percent confidence intervals.

4.0 AVOIDANCE AND MINIMIZATION MEASURES

The following operation phase measures have been incorporated into the BBCS to avoid operation activities near sensitive habitats during critical periods in bird and bat life cycles, and to minimize impacts to wildlife habitat.

- 1) Turbine blades will be fully feathered below a wind speed of 6.9 meters per second between one half hour before sunset to one half hour after sunrise during the Indiana bat's fall migratory period, August 1 - October 30 and during the Indiana bat's spring migratory period from March 15 to May 15.
- 2) All operations personnel will be trained to identify potential wildlife conflicts and the proper response. This training will include sensitivity to birds and other terrestrial wildlife. For operations, TWO will develop an incidental reporting process by which operations personnel document bird or bat casualties during routine maintenance work and at other times that they are within the Project Area.

4.1 Continued Monitoring and Coordination Process

In addition to the two-year post-construction fatality monitoring study, TWO will implement a Wildlife Incident Reporting System (WIRS) at the start of operations and it will remain active for the life of the Project. The WIRS will be designed to provide a means of recording avian and bat fatalities found at the Project site to increase the understanding of wind turbine and wildlife interactions. The WIRS will provide a set of standardized instructions for the Projects' personnel to follow in the event of a wildlife incident within the Project Area. Each incident will be documented on a data sheet and reported to the ODOW and USFWS on an annual basis or as otherwise minimally required by each agency. The data will be logged into and maintained within a tracking spreadsheet by the Site Manager or a designee. All site personnel will be required to receive training on WIRS procedures as well as how to complete and submit the WIRS report.

This long-term operational effort will consist of managerial, operations, and maintenance staff documenting and reporting any fatality discovered during the Project's operation. The WIRS will provide a set of standardized instructions for Project personnel to follow in response to wildlife incidents within the Project. These instructions will include the following:

- Each fatality/injury will have a WIRS form completed, and a photo documentation,
- A qualified individual will be contacted to remove carcass or injured wildlife,
- Species identification will be completed and confirmed by a qualified individual,
- Carcass will be removed and/or disposed of per any site permits,
- If injured, a rehabilitation center will be contacted to remove and care for injured wildlife, and

- If the subject species is federally-listed, state-listed, or an eagle, an incident will be reported to ODOW and USFWS as soon as possible, within not more than one business day.

As recommended in ODNR's *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (ODNR 2009), TWO will conduct two seasons of passive acoustic bat surveys within the Project Area. TWO proposes to conduct passive acoustic bat surveys using broadband full-spectrum Song Meter SM3BAT+ detectors (Wildlife Acoustics, Inc.) from mid-July through November 15, 2018 and again the following year from April 1 through November 15, 2019. Surveys will be conducted in accordance with current agency guidelines for bat wind farm screening. The acoustic surveys will determine general bat presence, activity levels, and species composition in the proposed Project Area. Westwood will deploy an array of two SM3BAT+ detectors at two of the temporary met towers within the Project Area (**Exhibit 8**).

For each of the met towers, one microphone will be placed approximately 5 meters above ground level and a second microphone will be placed as high as possible without interfering with any associated weather-monitoring equipment. Each of the detectors will sample from approximately ½ hour before sunset until ½ hour after sunrise on a nightly basis throughout the survey period(s). Detectors will be visited every week to download data and check the condition of the detectors. Each detector will be powered by a 12-volt battery attached to a solar panel and encased in a waterproof housing. Westwood will install and maintain the detectors. Once installed, monitoring stations will remain fixed during the study.

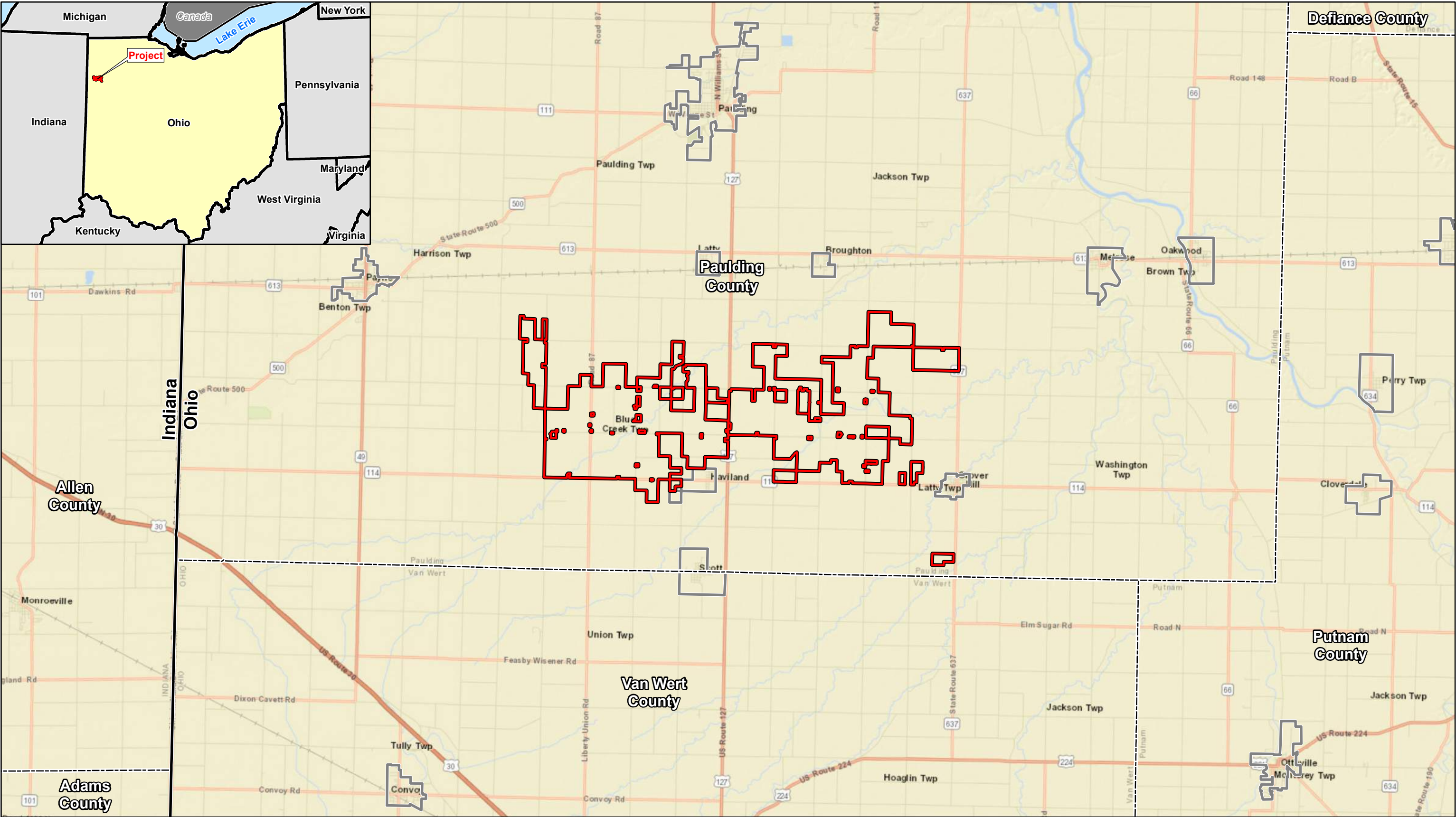
Analysis of bat call files will be performed by first processing and filtering audio files for bat calls using automated call analysis software (i.e. Kaleidoscope or similar). The resulting call files will be filtered and visually screened using Sonobat and AnalookW software to remove any remaining files containing non-bat sounds (i.e., wind noise, insects). Files with suitable bat calls will be examined visually and classified to species and species groups based on comparison to libraries of known bat reference calls. Classification to species will be possible only when clear calls are recorded and only for certain species. In the event that a call is not classifiable to species, the call will be classified to species group categories or not classified.

The results of the acoustic bat surveys for the 2018 and 2019 sampling period(s) will be documented in a *Draft Acoustic Bat Survey Summary Report*. The report will include analysis, a results summary, and discussion of 2018 and 2019 survey results. The report will summarize the number of call sequences by detector, detection rate overall and by detector, timing of activity, and species composition. Each of the *Draft Acoustic Bat Survey Summary Reports* will include all text, figures, tables, graphics, and appendices and will be submitted to ODOW and USFWS for comment and review upon the completion of the surveys. Acoustic files will be made available to the ODOW and USFWS upon request.

5.0 LITERATURE CITED





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- Shoenfeld, P. 2004. Suggestions Regarding Avian Mortality Extrapolation. Technical memo provided to FPL Energy. West Virginia Highlands Conservancy, HC70, Box 553, Davis, West Virginia, 26260. Available online at: <https://www.nationalwind.org/wp-content/uploads/2013/05/Shoenfeld-2004-Suggestions-Regarding-Avian-Mortality-Extrapolation.pdf>.

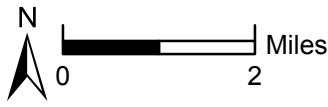
Exhibits



Data Source(s): Westwood (2018); ESRI WMS World Streets Basemap (Accessed 2018).

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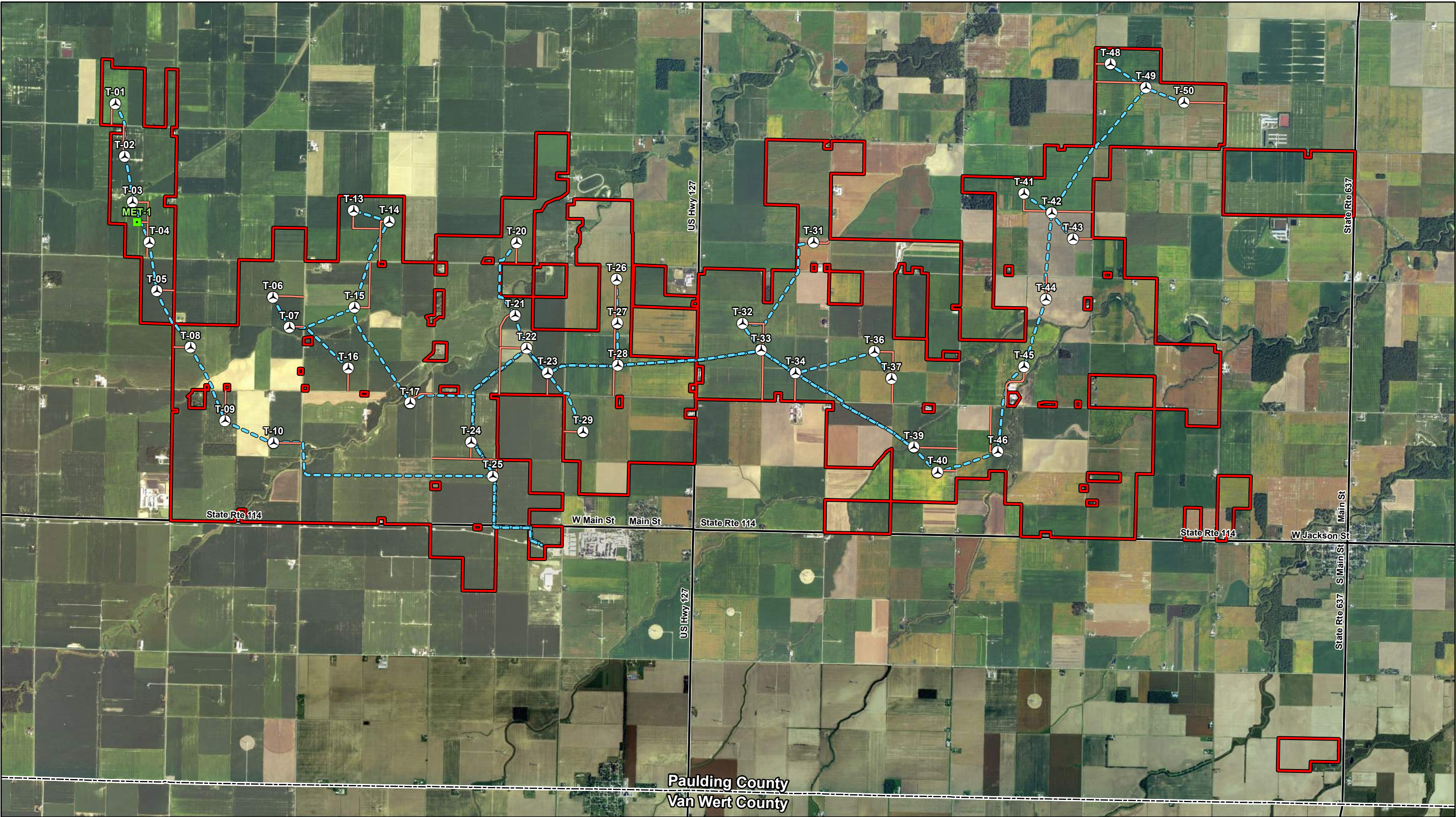
- | | |
|--|---|
|  Project Boundary |  City Boundary |
|  State Boundary |  County Boundary |



Northwest Ohio Wind Project

Paulding County, Ohio

Project Location Map

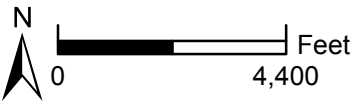


Data Source(s): Westwood (2018); Ohio NAIP Imagery (Accessed 2018); Census Bureau (2017).

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Legend

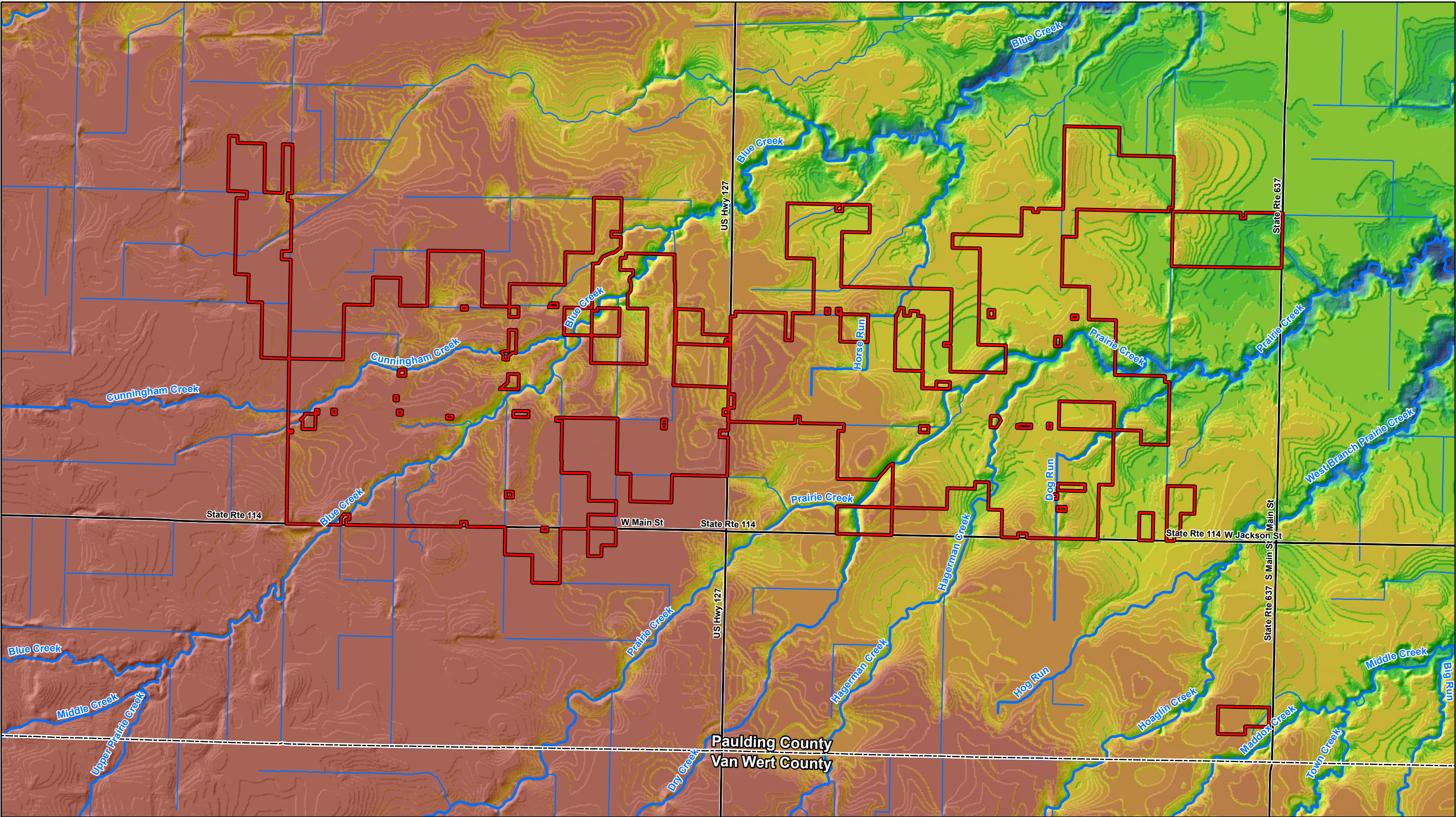
- | | | |
|------------------|-----------|-----------------|
| Project Boundary | Turbine | Access Road |
| Major Road | Met Tower | Collection Line |
| County Boundary | | |



Northwest Ohio Wind Project

Paulding County, Ohio

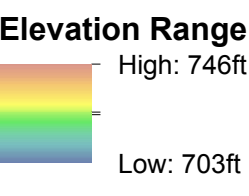
Project Site Map



Data Source(s): Westwood (2018); Ohio NAIP Imagery (Accessed 2018); Census Bureau (2017); USGS NHD Dataset (2013); USGS (2018).

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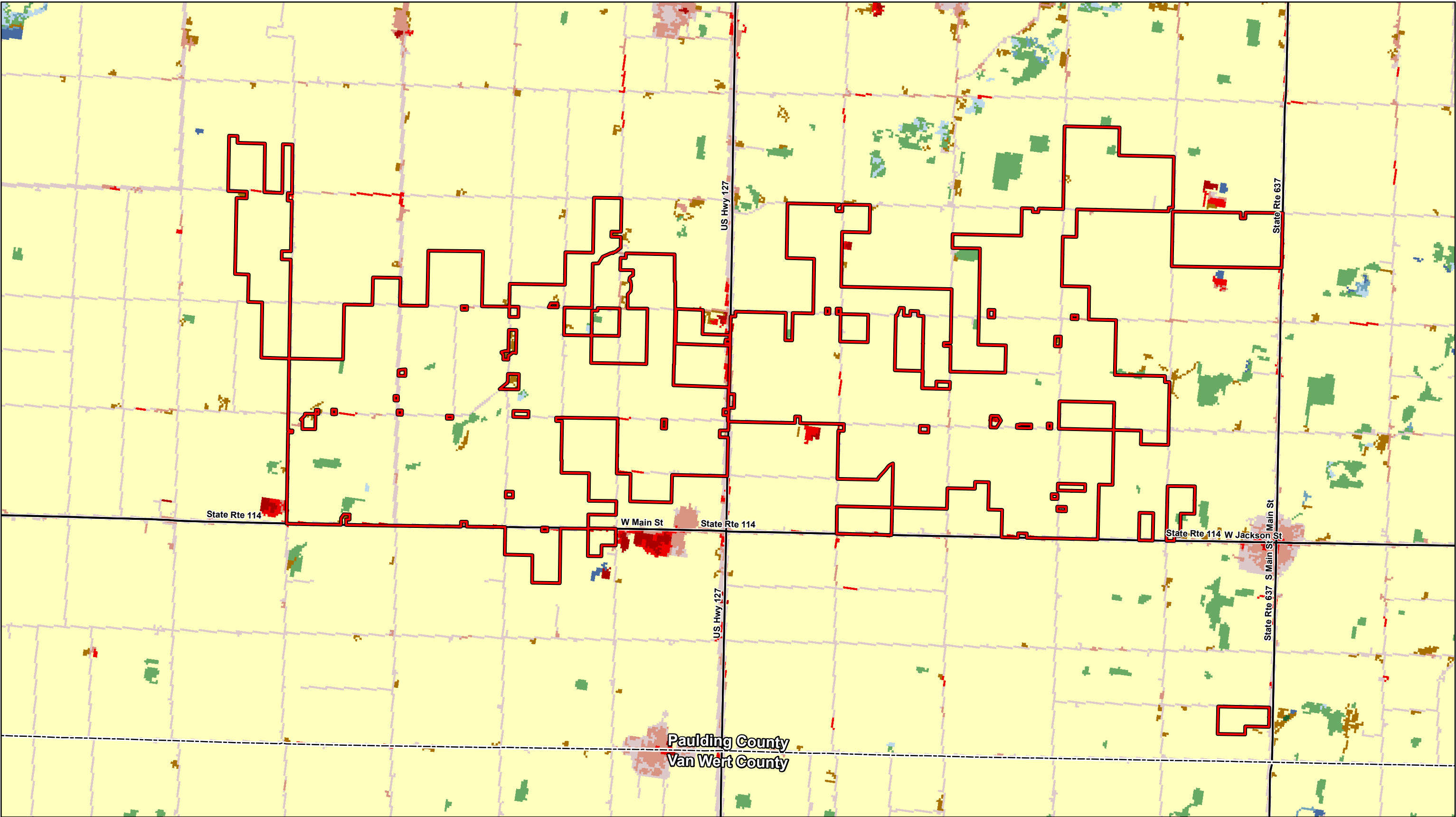
- Project Boundary
- Major Drainage Feature
- Minor Drainage Feature
- Major Road
- County Boundary



Northwest Ohio Wind Project

Paulding County, Ohio

Topography & Major Drainage Features



Data Source(s): Westwood (2018); Ohio NAIP Imagery (Accessed 2018); Census Bureau (2017); U.S. Geological Survey (2011).

Legend

- | | | | |
|-----------------------------|--------------------------|------------------------------|----------------|
| Project Boundary | Cultivated Crop | Developed, High Intensity | Herbaceous |
| Major Road | Deciduous Forest | Developed, Open Space | Open Water |
| County Boundary | Developed, Low Intensity | Emergent Herbaceous Wetlands | Woody Wetlands |
| Developed, Medium Intensity | Evergreen Forest | | |



Northwest Ohio Wind Project

Paulding County, Ohio

Land Cover Types



Exhibit 5: Search Plot Example of the Daily Plots and 3-Day Cleared Protocols

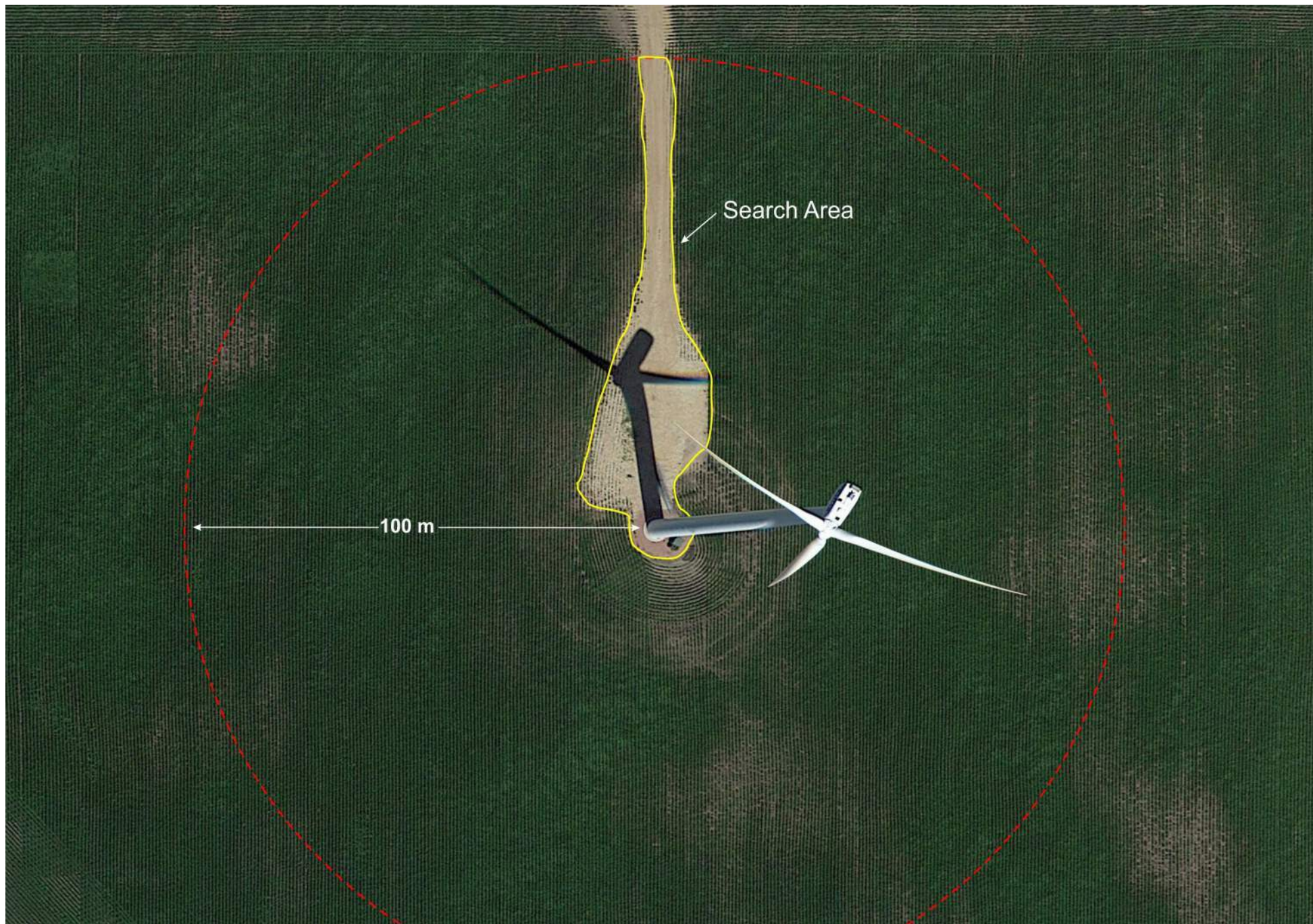
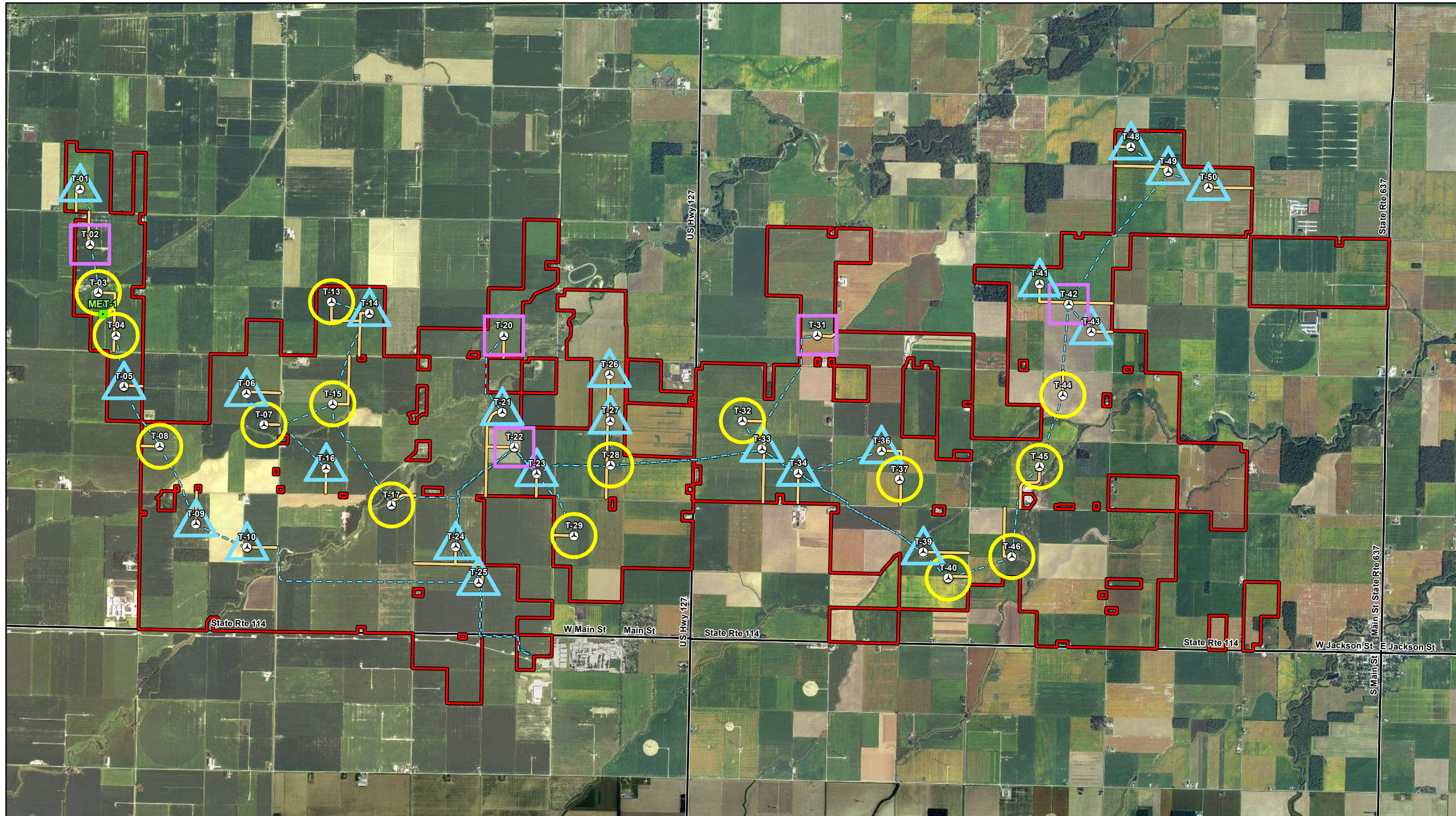


Exhibit 6: Search Plot Example of the Roads and Pads Protocol



Data Source(s): Westwood (2018); Ohio NAIP Imagery (Accessed 2018); ESRI WMS National Geographic Basemap (Accessed 2018); Census Bureau (2017).

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Legend

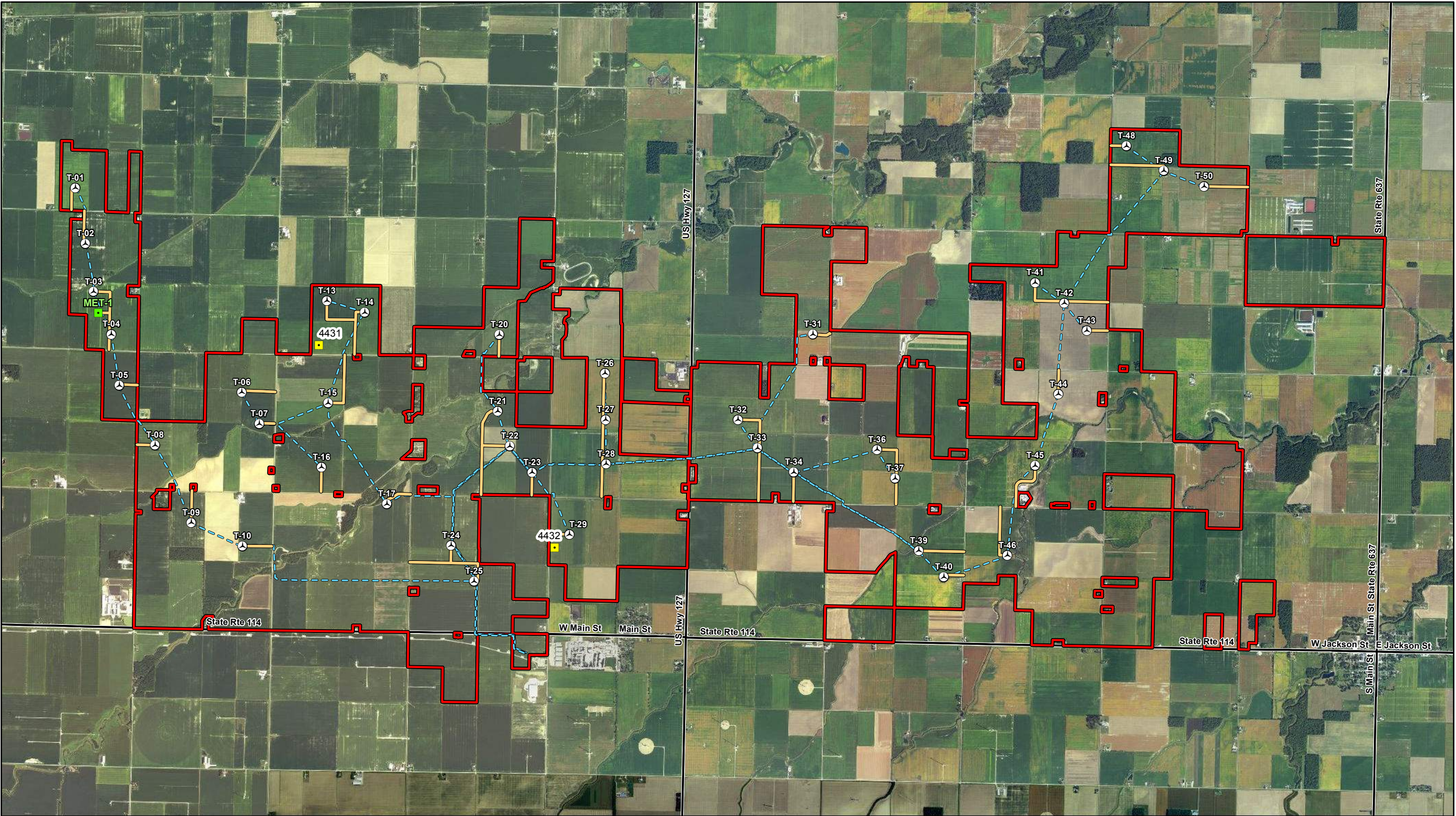
- | | | |
|------------------|-----------------|--------------------|
| Turbine | Met Tower | 3-Day Plot Cleared |
| Project Boundary | Access Road | Daily Plot Cleared |
| Major Road | Collection Line | Roads & Pads |



Northwest Ohio Wind Project

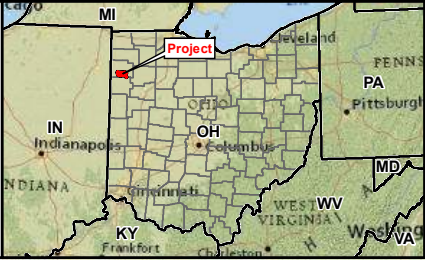
Paulding County, Ohio

Search Areas and Protocols Map










Data Source(s): Westwood (2018); Ohio NAIP Imagery (Accessed 2018); ESRI WMS National Geographic Basemap (Accessed 2018); Census Bureau (2017).

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Legend

- | | | |
|--|---|---|
|  Turbine |  Met Tower |  Temporary Met Tower |
|  Project Boundary |  Access Road | |
|  Major Road |  Collection Line | |



Northwest Ohio Wind Project

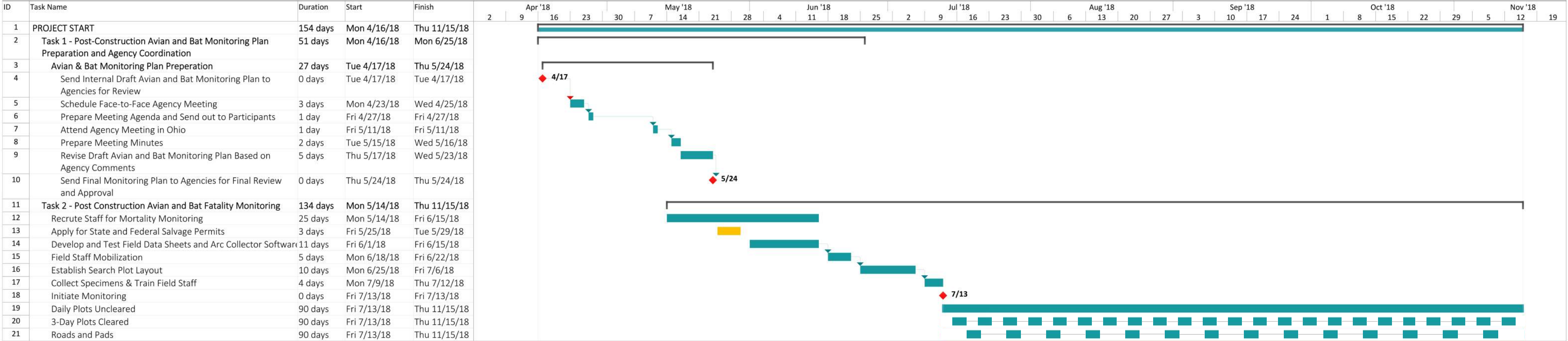
Paulding County, Ohio

Met Tower Locations

Appendix A

2018 Post-Construction Avian and Bat Fatality Monitoring Schedule

Northwest Ohio 2018 Avian & Bat Fatality Monitoring Schedule



Project: NW Ohio Mortality Moni Date: Mon 4/2/18	Task		Summary		External Milestone		Inactive Summary		Manual Summary Rollup		Finish-only		Manual Progress	
	Split		Project Summary		Inactive Task		Manual Task		Manual Summary		Deadline			
	Milestone		External Tasks		Inactive Milestone		Duration-only		Start-only		Progress			

Appendix B

ODOW Post-Construction Fatality Forms

FATALITY REPORTING FORM

Date:_____

Turbine #:_____

Searcher:_____

Total number of fatalities found during search:_____

Start time:_____

End time:_____

Carcass ID ¹ :			Transect Information			From Turbine	
Time	Turbine #	Carcass #	Transect #	Perp. Dist ² (m)	Obs. Dist ³ (m)	Distance (m)	Bearing
Species	Age ⁴	Sex ⁵	Condition	Alive / Dead	Estimated time on ground ⁶		
			Euthanized	Yes / No			
GPS file:			Scavenged	Yes / No	Veg. Height		% Cover
Photo ID			Notes				

Carcass ID:			Transect Information			From Turbine	
Time	Turbine #	Carcass #	Transect #	Perp. Dist. (m)	Obs. Dist. (m)	Distance (m)	Bearing
Species	Age	Sex	Condition	Alive / Dead	Estimated time on ground		
			Euthanized	Yes / No			
GPS file:			Scavenged	Yes / No	Veg. Height		% Cover
Photo ID			Notes				

¹ Carcass ID = MMDDYYYY - Turbine # - Fatality number for that search

² Perpendicular distance from transect

³ Distance from which the searcher detected the carcass

⁴ Adult / Juvenile / Unknown

⁵ Male / Female/ Unknown

⁶ Last night / 2 – 3 days / 4 – 7 days / 7 – 14 days / > 2 weeks / Unknown

Carcass ID:			Transect Information			From Turbine	
Time	Turbine #	Carcass #	Transect #	Perp. Dist. (m)	Obs. Dist. (m)	Distance (m)	Bearing
Species	Age	Sex	Condition	Alive / Dead	Estimated time on ground		
			Euthanized	Yes / No			
GPS file:			Scavenged	Yes / No	Veg. Height		% Cover
Photo ID			Notes				

Carcass ID:			Transect Information			From Turbine	
Time	Turbine #	Carcass #	Transect #	Perp. Dist. (m)	Obs. Dist. (m)	Distance (m)	Bearing
Species	Age	Sex	Condition	Alive / Dead	Estimated time on ground		
			Euthanized	Yes / No			
GPS file:			Scavenged	Yes / No	Veg. Height		% Cover
Photo ID			Notes				

Carcass ID:			Transect Information			From Turbine	
Time	Turbine #	Carcass #	Transect #	Perp. Dist. (m)	Obs. Dist. (m)	Distance (m)	Bearing
Species	Age	Sex	Condition	Alive / Dead	Estimated time on ground		
			Euthanized	Yes / No			
GPS file:			Scavenged	Yes / No	Veg. Height		% Cover
Photo ID			Notes				

SEARCHER EFFICIENCY FORM

Carcass ID	Date	Species	Easting ¹	Northing	Veg. height	Percent cover	Detected (yes/no)
Turbine #:		Distance (m)		Direction		Photo ID	

Carcass ID	Date	Species	Easting	Northing	Veg. height	Percent cover	Detected (yes/no)
Turbine #:		Distance (m)		Direction		Photo ID	

Carcass ID	Date	Species	Easting	Northing	Veg. height	Percent cover	Detected (yes/no)
Turbine #:		Distance (m)		Direction		Photo ID	

Carcass ID	Date	Species	Easting	Northing	Veg. height	Percent cover	Detected (yes/no)
Turbine #:		Distance (m)		Direction		Photo ID	

¹ Coordinates should be recorded in UTM NAD83, Zone 17 North. Do not use Lat/Lon.

Carcass ID	Date	Species	Easting	Northing	Veg. height	Percent cover	Detected (yes/no)
Turbine #:		Distance (m)		Direction		Photo ID	

Carcass ID	Date	Species	Easting	Northing	Veg. height	Percent cover	Detected (yes/no)
Turbine #:		Distance (m)		Direction		Photo ID	

Carcass ID	Date	Species	Easting	Northing	Veg. height	Percent cover	Detected (yes/no)
Turbine #:		Distance (m)		Direction		Photo ID	

Carcass ID	Date	Species	Easting	Northing	Veg. height	Percent cover	Detected (yes/no)
Turbine #:		Distance (m)		Direction		Photo ID	

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Case No(s). 13-0197-EL-BGN, 16-1687-EL-BGA, 17-1099-EL-BGA

Summary: Notification of Compliance with Condition 13 of the Supplement - Bird and Bat Conservation

Strategy electronically filed by Mr. William V Vorys on behalf of Trishe Wind Ohio, LLC