January 11, 2018

Via Electronic Filing
Mr. Daniel Wolf
Executive Secretary
Minnesota Public Utilities Commission
121 Seventh Place East, Suite 350
St. Paul, MN 55101-2147

Re: ***In the Matter of the Application of Palmer's Creek Wind Farm LLC for a Large Wind Energy Conversion System Site Permit for the 44.6 MW Palmer's Creek Wind Project in Chippewa County, Minnesota.*** **Docket No. IP-6979/WS-17-265**

Dear Mr. Wolf:

In accordance with section 7.5.1 of the draft Site Permit for Palmer's Creek Wind Farm, Palmer's Creek respectfully submits the attached revised Avian and Bat Protection Plan prepared by Wenck Associates.

Sincerely,

Kate Carlton
Corporate Counsel
Fagen Incorporated
P.O. Box 159
Granite Falls, MN 56241

WENCK File #2759-0005-05
January 2018

Palmer's Creek Wind Farm
Avian and Bat Protection Plan

Prepared for:

Palmer's Creek Wind Farm, LLC

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Granite Falls, MN 56241

Prepared by:

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Table of Contents

Table of Contents (Cont.)

TABLES

FIGURES

APPENDICES

Documents Appended by Reference and Available in Site Permit Application and Environmental Assessment

1.0 Palmer's Creek Information

Palmer's Creek Wind Farm, LLC (Palmer's Creek, PCWF) proposes to construct the Palmer's Creek Wind Energy Facility (Project or PCWF), a Large Wind Energy Conversion System (LWECS), with a 44.6- megawatt (MW) nameplate capacity wind energy facility in Chippewa County, Minnesota (**Figures 1 and 2, Site Location Map and Site Detail Map, respectively**). The expected life of the Project is approximately 20 to 40 years. The Palmer's Creek Wind Farm will consist of:

- Two 2.3-MW and sixteen (16) 2.5-MW wind turbines,
- Underground electric collector lines,
- New central collector substation (Palmer's Creek Substation),
- Approximately 1000-foot long T-line interconnecting the Granite Falls Substation,
- O&M facility,
- Access roads connecting to each turbine,
- One permanent meteorological tower,
- Supervisory control and data acquisition (SCADA) system, and
- Temporary laydown yard.

An interconnection agreement with the Southwest Power Pool (SPP) to connect the Palmer's Creek Project to WAPA's Granite Falls Substation and associated transmission system will be executed. This interconnection is a federal action under the National Environmental Policy Act of 1969 (NEPA), and therefore an Environmental Assessment (EA), of which this Avian and Bat Protection Plan (ABPP) is part, was prepared.

Palmer's Creek is committed to its responsibility to be a good steward of the environment and to adhere to federal, state and local laws. Palmer's Creek wind project policy calls for wind projects to be designed, constructed, and operated in an environmentally sensitive manner and either avoid or minimize potential avian and bat impacts. Palmer's Creek understands that even with diligent design, construction and operation activities, avian and bat fatalities may occur, including species that are protected under federal and state laws, and therefore, has developed a ABPP for the Project to ensure:

- All Project-related actions comply with federal and state regulations;
- All Project-related actions comply with permit conditions;
- Project-specific species concerns are included in the ABPP, including avoidance and minimization measures;
- Public and private organizations are included in programs and research that minimize detrimental effects of bird and bat interactions with wind projects.
- The procedures described in this ABPP are followed;
- Palmer's Creek' staff and all relevant subcontractors receive the appropriate training pursuant to wildlife monitoring and reporting protocols; and,
- The documentation of bird and bat injuries and fatalities may provide the basis for future modifications to the ABPP.

This ABPP continues Palmer's Creek regulatory compliance through a proactive approach to reducing risk to birds and bats and their habitats.

2.0 Project Description and Overview

Palmer's Creek proposes to construct a LWECS with a 44.6-MW nameplate capacity wind energy facility in Chippewa County, Minnesota (Figures 1 and 2, Site Location Map and Site Detail Map, respectively). Palmer's Creek further proposes to interconnect the Project to the existing Granite Falls Substation within the project area boundary. The anticipated timeline for construction is January 15, 2018 to October 2018 with commercial operation date (COD) of September 15, 2018.

2.1 PROJECT LOCATION

The southern boundary of the project area is located approximately one mile north of the City of Granite Falls, Minnesota in Granite Falls Township, east of the Minnesota River (**Figure 1, Site Location Map**).

Table 2-1: Project Location.

County	Township Name	Township	Range	Sections
Chippewa	Granite Falls	116 North	39 West	3-10, 15-22, 27, 28, 29
Chippewa	Granite Falls	116 North	40 West	1, 12, 13

2.2 SIZE OF THE PROJECT AREA

The project area boundary is approximately 6,150 acres. The Project will place 18 turbines across the project area, connecting these turbines by access roads and transmission facilities. Project construction will result in land disturbance for:

- 18 turbines,
- approximately 14 miles of collection lines,
- an approximately 1,000-foot 115 kW transmission line,
- approximately 5.5 miles of new or upgraded roads,
- approximately 5.5 miles of temporary, construction access roads,
- approximately one acre for a new substation,
- approximately three acres of laydown area,
- one meteorological tower.

Project construction is anticipated to include temporary land disturbance of approximately 172 acres for Project construction. Permanent land disturbance will be approximately 12 acres for turbines and associated facilities. Refer to **Table 2-2, Temporary and Permanent Land Disturbance**.

Table 2-2: Temporary and Permanent Land Disturbance.

Cover Types	Temporary Disturbance	Permanent Disturbance
Barren Land (Rock/Sand/Clay)	0	0
Cultivated Crops	161	10
Deciduous Forest	1	0
Developed	7	0.6
Emergent Herbaceous Wetlands	1.1	0
Grassland/Herbaceous	0.5	0.1
Open Water	0	0
Pasture/Hay	1.2	0.6
Shrub/Scrub	0.1	0.1
Total	**171.9**	**11.4**

Source: NLCD, 2011.

3.0 Project Design

The Project was designed to optimize wind resources, while minimizing potential impacts to ecological and cultural resources (**Figure 2, Site Detail Map**).

3.1 DESCRIPTION OF LAYOUT AND SETBACK

The Project construction will occur primarily on agricultural land and will require regulatory setbacks. The current Project layout (**Figure 2, Site Detail Map**) may differ from the final construction layout, but Palmer's Creek anticipates the final layout will remain substantially similar to what is presented in the Site Permit Application and EA. Any project layout changes will be identified, evaluated, and discussed with the DOC-Energy, Environmental Review and Analysis (EERA) staff prior to beginning construction.

3.2 DESCRIPTION OF TURBINES AND TOWERS

Basic wind turbine components include a nacelle, hub, blades, tower and foundation. A wind turbine operates three propeller-like blades mounted to a hub, which forms the rotor.

3.2.1 Wind Turbine Design

Palmer's Creek plans to install two (2) 2.3-MW and sixteen (16) 2.5-MW horizontal axis wind turbines. **Table 3-1** provides a summary of the turbine characteristics. Each wind turbine will consist of three blades mounted to the rotor hub. The hub will be mounted to a turbine tower consisting of cylindrical monopoles. The towers will be constructed of high strength tubular steel, approximately 15 feet in diameter at the base, with internal joint flanges. Towers would be fabricated in three sections and assembled onsite. The tower color will be non-reflective light grey, and all surfaces will be multi-layer coated for protection against corrosion. Marking and lighting of the wind farm will be done in compliance with Federal Aviation Administration (FAA) regulations.

Table 3-1: Turbine Characteristics.

	GE 2.3	GE 2.5
Nameplate Capacity	2.3 MW	2.5 MW
Hub Height	262 feet (80 meters)	295 feet (90 meters)
Rotor Diameter	380 feet (116 meters)	380 feet (116 meters)
Total Height	452 feet (138 meters)	485 feet (148 meters)
Swept Area	113,411 feet (10,568 meters)	113,411 feet (10,568 meters)
Cut-in Wind Speed	6.7 mph (3 m/s)	6.7 mph (3 m/s)
Cut-out Wind Speed	56 mph (25 m/s)	56 mph (25 m/s)

	GE 2.3	GE 2.5
Rated Wind Speed	85 mph (38 m/s)	85 mph (38 m/s)
Rotor Speed	8 to 15.7 rpm	8 to 15.7 rpm

3.2.2 Foundations

The wind turbine foundations will typically be reinforced concrete spread foundations. The actual foundation for each turbine will be specifically designed based on geotechnical analysis of a 50-foot core sample at each turbine location combined with structural loading requirements for the turbine. The pedestal diameter for an approximate 262 feet tower is approximately 18 feet. In some cases, an area around a turbine may be covered in four inches of gravel, river rock, or crushed stone. The excavated area for the turbine foundations will typically be approximately 75 feet by 75 feet, approximately 0.1 acre. During construction, a larger area, approximately 300-foot diameter, will be used to lay down the rotors and maneuver cranes during turbine assembly.

3.2.3 Temporary Laydown and Crane Walks

An approximately three-acre temporary laydown area would be selected within the project area. Turbine components may be temporarily stored within this area before being moved to the final turbine sites (**Figure 2, Site Detail Map**). The location of the laydown area will be selected during final design; however, a preferred location will be an undeveloped or previously disturbed area that is flat (**Figure 4, Topographic Map**) and does not contain streams, wetlands (**Figure 8, Waterbodies and Wetlands**) or other environmentally sensitive resources.

In addition to the approximately 3-acre laydown area, temporary crane walk (**Figure 2, Site Detail Map**) disturbances will also be necessary for the Project. Crane walks are estimated to be 40 feet in width and will be located throughout the Project based on the shortest route to the next turbine in the construction sequence. However, cranes will utilize access roads if feasible. Where feasible, Palmer's Creek will make every effort to avoid streams, wetlands, and other environmentally sensitive resources. If avoidance is not possible, Palmer's Creek will acquire the necessary permits/approvals for Project construction and operation and will minimize impacts to the greatest extent possible.

3.2.4 Operation

Palmer's Creek Wind Farm, LLC will oversee all operations, maintenance, and management of the Project facilities through a service agreement with a qualified operations and maintenance (O&M) service. WTG and substation maintenance schedules and required outage durations are based on equipment manufacturer's recommendations and Palmer's Creek operating experience. O&M Service Provider will address both scheduled and unscheduled maintenance on the wind project, including repairs, replacement of parts and removal of failed parts. WTG maintenance will be performed as an on-going function during the life of the Project. Transformer and other substation maintenance will be completed on an annual basis and will be scheduled during times with minimal impact to production.

General maintenance includes maintaining Project structures, access roads, drainage systems and other facilities. General maintenance will be ongoing for the life of the project

and scheduled as needed. Palmer's Creek will operate a SCADA system located at the base section of each WTG, substation control building, and O&M building.

3.3 DESCRIPTION OF ELECTRICAL SYSTEM

3.3.1 Generator Step-up Transformers

A generator step-up transformer will be installed at the base of each wind turbine to increase the output voltage of the wind turbine to the voltage of the power collection system (34.5-kV). The transformers will be mounted on concrete pads and will be placed next to each wind turbine.

3.3.2 34.5-kV Electrical Collector Systems

Each wind turbine within the Project Area would be interconnected by communication and electrical power collection circuit facilities. These facilities would include underground feeder lines (collector lines) that would collect wind-generated power from each wind turbine and deliver it to the Palmer's Creek Substation.

This system would be used to route the power from each turbine to the Palmer's Creek Substation (collector substation) where the electrical voltage would be stepped up from 34.5 kV to 115 kV. The underground collector system would be placed in one trench and connect each of the turbines to the Palmer's Creek Substation. The estimated trench length is 73,920 feet (approximately 14 miles).

The underground collector circuits would consist of three power cables contained in an insulated jacket and buried at a minimum depth of four feet that would not interfere with farming operations. Access to the underground lines would be located at each turbine site and where the cables enter Palmer's Creek Substation. Due to the power carrying limits of underground cabling, two underground collector lines or circuits would be used to collect power from the individual turbines.

The underground electrical collector and communication systems generally would be installed by plowing, trenching or directionally drilling the cables. Using this method, the disturbed soils and topsoil are typically replaced over the buried cable within one day, and the drainage patterns and surface topography are restored to pre-existing conditions. In grassland/rangeland areas, disturbed soils would be re-vegetated with a weed-free native plant seed mix.

The fiber optic communication cables for the Project will be installed in the same trenches as the underground electrical collector cables and will connect the communication channels from each turbine to the control room in the Palmer's Creek Substation.

3.3.3 Substation and Switching Station

A new collector substation, Palmer's Creek Substation (**Figure 2, Site Detail Map**), will be constructed at the south end of the project area, on private land, where the 34.5-kV electric collection grid and fiber optic communication network will terminate. Palmer's Creek Substation will include a transformer to step up the voltage of the collection grid from 34.5-kV to 115-kV, above-ground bus structures to interconnect the substation components, breakers, a control building, relays, switchgear, communications and controls, and other

related facilities required for delivery of electric power to the adjacent 115-kV Granite Falls Substation.

The design of Palmer's Creek Substation is not finalized, but Palmer's Creek expects it will be enclosed by a chain link fence with dimensions roughly 110 feet by 170 feet. The substation components will be placed on concrete and steel foundations. Palmer's Creek Substation will be designed in compliance with Federal, State and local regulations, National Electrical Safety Code (NESC) standards, and other applicable industry standards and will be interconnected to the Granite Falls Substation, a WAPA-owned interconnection switchyard. The Palmer's Creek Substation will be located adjacent to the Granite Falls Substation, and the proposed transmission interconnection will consist of a 115-kV, 3-phase transmission line, approximately 1,000 feet in length between two facilities.

3.4 ASSOCIATED FACILITIES

There are several facilities associated with the Project that will be required for operation. These include project substation, collector lines, an approximate 1,000-foot 115 kV 3-phase transmission line, which have all been previously described. Other associated facilities include a permanent meteorological tower, SCADA building, O&M facility, and access roads.

3.4.1 Meteorological Tower

One temporary 200-foot meteorological tower and one temporary Sonic Detection and Ranging (SODAR) unit are currently installed within the project area. These temporary structures would be removed within approximately one year of Project construction. The Project will include installation of wind measurement equipment, such as a permanent 290-foot meteorological tower to house anemometers to measure the wind speed (**Figure 2, Site Detail Map**). The permanent tower will not have guy wires and will be lighted in compliance with FAA regulations.

3.4.2 O&M Facility

The precise location of the O&M facility has not been identified. It may be housed in offsite leased space or in a new structure in an undetermined location.

3.4.3 Access Roads

Approximately 5.5 miles of new or upgraded roads will be constructed to facilitate both construction and maintenance of the wind turbines (**Figure 2, Site Detail Map**). These roads have been designed to minimize length and construction impact. Initially, turbine access roads will be approximately 40 feet in width to accommodate the safe operation of construction equipment. Upon completion of construction, the turbine access roads will be reclaimed and narrowed to an extent allowing for the routine maintenance of the facility, or approximately 16 feet in width. The wind turbines will be accessible from gravel access roads, which will follow fence lines, field lines, and existing field access roads to the extent possible. Siting roads in areas with unstable soil will be avoided wherever possible. Roads will include appropriate drainage controls, including culverts and will be constructed in a manner to allow farm and/or land owner equipment to cross. The access road cross-sections will consist of graded soil, with soil stabilization, and surfaced with compacted base of course aggregate. Gates will be installed where access roads cross landowner fences.

4.0 Environmental Conditions

A Site Permit Application and EA were completed for the Project which provide greater detail of the environmental conditions and potential Project impacts. This ABPP is a part of those documents. The analysis was conducted following PUC procedures on siting LWECS and applicable portions of the Power Plant Siting Act, which was used to determine various exclusion and avoidance criteria considered in the selection of the project area.

Preliminary information used for evaluating environmental conditions and selecting the project area included agency queries to the Minnesota Department of Natural Resources (MNDNR), Minnesota State Historic Preservation Office (SHPO), Minnesota Department of Commerce (DOC), and Chippewa County.

The southern boundary of the project area is located approximately one mile north of the City of Granite Falls in Chippewa County, Minnesota in Granite Falls Township, east of the Minnesota River (**Figure 1, Site Location Map**). The project area is at approximately 1040 feet above mean sea level (amsl) above the Minnesota River valley at approximately 925 feet amsl (**Figure 4, Topographic Map**). The project area is comprised primarily of agricultural fields with dispersed rural homesteads (**Figure 2, Site Detail Map**).

4.1 VEGETATION

Cover types within the project area are summarized in **Table 4-1** and displayed on **Figure 3, Land Cover**. Cultivated crops comprise the vast majority of cover types in this area. Other cover types include pasture, grassland, and developed open space with some deciduous forest. The cover types other than cultivated crops are typically associated with rural residences including windbreaks, lawn, and pasture and grassland.

Table 4-1: Existing Cover Types of Palmer's Creek Wind Farm.

Cover Types	Total Acreage
Barren Land (Rock/Sand/Clay)	1
Cultivated Crops	5,157
Deciduous Forest	134
Developed	213
Emergent Herbaceous Wetlands	160
Grassland/Herbaceous	192
Open Water	5
Pasture/Hay	284
Shrub/Scrub	4
Total	**6,150**

Source: NLCD, 2011

4.2 WILDLIFE

Good habitat is found along the Minnesota River floodplain, nearby WMAs, and along some of the drainages in the project area. Agricultural production areas, such as cultivated crops, may be used on a temporary basis by birds and wildlife for foraging or short-term shelter.

The project area is primarily agricultural lands and does not contain significant wetland habitats (**Table 4-1, Existing Cover Types of Palmer's Creek Wind Farm and Figure 3, Land Cover**). The project area is adjacent to the Minnesota River, which provides large riverine and wetland habitats. The agricultural landscape and developments of the region have determined the type of wildlife present.

4.2.1 Birds

Migratory birds and waterfowl travel through Minnesota during the spring and fall of each year, as they alternate between summer breeding grounds in the northern portion of the continent and winter feeding ground in the southern half of the continent. The project area is located within the Mississippi River Flyway, which results in large spring and fall migrations of various bird species. During spring and fall migrations, flocks of migratory birds can number in the tens of thousands at traditional migratory staging areas and refuges. Migratory birds and waterfowl typically stage and rest in areas with significant amounts of wetland and open water habitats that provide sufficient food sources for the migration. The Minnesota River corridor is highly used by nesting, over-wintering, and migratory bald eagles.

The project area is adjacent to the Minnesota River and its floodplain. The Minnesota River valley provides a corridor of habitat for many birds and waterfowl. The project area is predominantly cropland, and the most common birds observed during the avian point count surveys are songbirds (66%, Wenck 2017). Canada goose (*Branta canadensis*) (0.40), American crow (*Corvus brachyrhynchos*) (0.25), unknown ducks (0.18) and unknown blackbirds (0.14) are most likely to be exposed (highest encounter rates) to collisions from wind turbines at PCWF. Cumulatively, surveys identified 5,368 avian individuals (64 different species) that were recorded during the eight fixed-PC surveys. The most frequently observed birds were European starling (*Sturnus vulgaris*) (19.63 percent of all birds observed/1,054 individuals), red-winged blackbird (*Agelaius phoeniceus*) (12.82 percent/688 individuals), American crow (10.54 percent/566 individuals), brown-headed cowbird (*Molothrus ater*) (6.99 percent/375 individuals), and Canada goose (6.48 percent/348 individuals). The remaining 59 species comprised approximately 43.54 percent of the total birds observed. Refer to Wenck (2017). **Appendix A, Avian Point Count Results, Final**. Cumulative overall mean bird use for all surveys was 18.64 birds/20 min. The overall mean use by non-raptors was 18.25 birds/20 min with the highest mean use with European starling (3.66 birds/20 min). The mean use for raptors/vultures/owls was 0.39 birds/20 min with the highest mean use with red-tailed hawk (0.16 birds/20 min). Cumulatively, the most common species present during the surveys was the field sparrow (13.54 percent of all surveys) (Wildlife Monitoring Report, Final, Wenck 2017).

Project siting will occur primarily on agricultural land that have been previously disturbed for cultivated crops and other agricultural practices. Minnesota Biological Survey (MBS) sites, native prairie, and wetland areas will be avoided.

The Project could affect birds due to collision mortality, displacement due to disturbance, habitat fragmentation, and habitat loss. Collision mortality rates are anticipated to be low.

The Project will not directly impact habitat in the project area. The Applicant has been coordinating with the MNDNR and USFWS. The results of the surveys will be used by permitting authorities to determine permit conditions based on the potential for impacts to wildlife.

Migratory birds and waterfowl will be most susceptible to impacts from the Project when taking off and landing at staging and resting areas, because these are the times they will be flying at heights that could cause collisions with WTGs. At other times during their migration, migratory birds and waterfowl will be flying at heights well above the maximum height of the WTGs.

WTGs closest to the Minnesota River are WTGs 1, 5, 9 and 12 (**Figure 2, Site Detail Map**). Avian collisions and subsequent mortality may be more likely with these WTGs than other WTGs in the project area. Lac qui Parle Dam is located about 16 miles north, and therefore, impacts to migration routes and patterns, resting and staging areas at the State Park or WMA are not anticipated.

4.2.2 Bats

There are seven bat species known to occur in Minnesota – big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), little brown bat (*Myotis lucifugus*), northern long-eared bat (*Myotis septentrionalis*) and tri-colored bat (eastern pipistrelle, *Perimyotis subflavus*) (MNDNR 2016). The northern long-eared bat (*Myotis septentrionalis*), tricolored bat (*Perimyotis subflavus*), big brown bat (*Eptesicus fuscus*), and little brown bat (*Myotis lucifugus*) are all state-listed species of special concern.

There was a total of seven bat species documented during the course of the study. The tri-colored bat (formerly known as eastern pipistrelle) (*Perimyotis subflavus*) was documented at this site and is listed as a species of concern in the state of Minnesota. It was detected in small numbers but was found at every monitor. The northern long-eared myotis (*Myotis septentrionalis*) is a federally threatened species whose home range lies within the study site. However, no confirmed documentation was recorded here. Even though a total of 13 passes of which Kaleidoscope classified as MYSE (northern long-eared myotis) the P-value was given a 1 for every monitor indicating the likelihood of presence is near non-existent. All other species documented are of least concern. Of the seven species documented, the silver-haired bat (*Lasionycteris noctivagans*), hoary bat (*Lasiurus cinereus*) and big brown bat (*Eptesicus fuscus*) were among the most common, followed by the eastern red bat (*Lasiurus borealis*) and the little brown bat (*Myotis lucifugus*). Refer to *Acoustic Bat Report, NCE 2017*, appended by reference.

Bats typically utilize farm buildings and dead and dying trees with cavities and loose bark as roosting and maternity habitat. Bats typically use forests, riparian corridors and wetlands as feeding habitats due to higher nocturnal insect densities in these areas. There is minimal native vegetation that serves as wildlife habitat within the project area near direct areas of Project impact. For bats, the mean mortality rate at seventeen wind energy facilities in the Midwest is 9.6 bats per turbine per year (s.d. 24.1) (Stantec 2012). There are bats in the project area and some wind turbine collision bat mortality is likely to occur because of the Project. Compared to birds, less is known about bat populations and habitat preferences on a local, regional or national level. Bat mortality is likely to be greatest for migratory tree bat species, including hoary, eastern red and silver-haired bats during the fall migration period (Johnson 2005, Arnett et al. 2008).

4.2.3 Important Bird Areas

Part of the western side of the project area, near the Minnesota River, overlaps with the Upper Minnesota River Valley Important Bird Area (IBA). Refer to **Figure 5, Ecologically Significant Areas**. IBAs, identified by Audubon Minnesota in partnership with the MNDNR, are part of an international conservation effort aimed at conserving critical bird habitats. The Upper Minnesota River Valley IBA incorporates the riparian corridor and adjacent river valley and upland communities along the Minnesota River and provides excellent habitat for a wide variety of bird species. This IBA contains significant bird habitat in an intensely agricultural area and is a natural corridor for migrating birds. Over 200 species, including state-listed species and Species in Greatest Conservation Need (SGCN) are known to use the IBA.

4.2.4 Rare and Unique Wildlife

4.2.4.1 Minnesota NHIS Data

A query of the MNDNR Natural Heritage Information System (NHIS) was completed (MNDNR 2016) to determine if there are rare species or other significant features in the project area. Ecologically Significant Areas (ESAs) were identified within the project area (**Figure 5**). The ESA results are detailed in the Site Permit Application.

The NHIS query also identified state-listed bird and wildlife species in the project vicinity. Although there are no NHIS records for bats near the Project, the MNDNR indicated that all seven of Minnesota's bats can be found throughout Minnesota. The northern long-eared bat (*Myotis septentrionalis*), tricolored bat (*Perimyotis subflavus*), big brown bat (*Eptesicus fuscus*), and little brown bat (*Myotis lucifugus*) are all state-listed species of special concern. There was a total of seven bat species documented throughout the course of the surveys (Fall 2015 to Fall 2017) (NCE 2017). Three species of concern in the State of Minnesota were observed during the acoustic bat monitoring. These species included the tricolored bat, big brown bat and little brown bat. The tricolored bat was detected in small numbers but was found at every monitor. The northern long-eared myotis (*Myotis septentrionalis*) is a federally threatened species whose home range lies within the study site. However, no confirmed documentation was recorded here. Even though a total of 13 passes of which Kaleidoscope classified as MYSE (northern long-eared myotis) the P-value was given a 1 for every monitor indicating the likelihood of presence is near non-existent. Refer to *Acoustic Bat Report, NCE 2017*, appended by reference.

The NHIS query indicates a documented bald eagle (*Haliaeetus leucocephalus*) nest located just outside the project area (Section 11, T116N R40W) along the Minnesota River. This nest was active when checked in 2000, 2001, and 2005. Palmer's Creek completed point count surveys of bald eagles, and conducted aerial eagle nest surveys with 10 miles of the project area in April 2017. **Refer to Section 6.1.2 and 6.1.3 of this document.**

The NHIS indicated breeding season observations of two rare grassland birds: the lark sparrow (*Chondestes grammacus*), a state-listed species of concern, and the upland sandpiper (*Bartramia longicauda*), a SGCN. A minimum of 20 SGCN are known to use grassland habitat within the Minnesota River Prairie Ecological Subsection (where the Project is located). Potential impacts to grassland birds are a concern because many of these species are declining in number nationwide. There are small areas of grassland located within the project area, which may provide habitat for these species. The primary land disturbance for the Project will occur on cultivated, agricultural land, and will avoid

grassland areas. The lark sparrow was not identified during the avian studies. However, upland sandpiper was observed incidentally within the project area but was not identified during the avian point count surveys. Refer to **Appendix A, Avian Point Count Results, Final** (Wenck 2017).

4.2.4.2 Federal/Bat Species Known from County/Project Area Records

A list of federally threatened, endangered, candidate and proposed species was obtained for Chippewa County, Minnesota (MNDNR 2016) from the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) website (USFWS 2017). The Project Action and impact to Federal species are addressed by adherence to the Programmatic Biological Assessment Species Consistency Evaluation Form. The only Federally-listed bird and bat species with potential to occur is the northern long-eared bat. Refer to **Table 4-2, Federal/State Listed Bat Species**.

Table 4-2: Federal/State Listed Bat Species.

Scientific Names	Common Names	Status[1]	Documented in Project Area[2]
Eptesicus fuscus	Big Brown Bat	ST: Special Concern	Yes
Myotis lucifugus	Little Brown Myotis	ST: Special Concern	Yes
Myotis septentrionalis	Northern Myotis/ Northern Long-Eared Bat	ST: Special Concern F: Threatened	No
Perimyotis subflavus	Tri-colored Bat/Eastern Pipistrelle	ST: Special Concern	Yes

[1]Status = Federal Status (F), State Status (ST): E = endangered; T = threatened; P = proposed; C = candidate.
[2]Natural Heritage Information System (NHIS), or Eagle/Avian Point Count Surveys (**Appendix A**).

4.2.4.3 State Endangered, Threatened or Special Concern Species

A species is considered **endangered** if the species is threatened with extinction throughout all or a significant portion of its range within Minnesota. A species is considered **threatened** if the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range within Minnesota. A species is considered a species of **special concern** if, although the species is not endangered or threatened, it is extremely uncommon in Minnesota, or has unique or highly specific habitat requirements and deserves careful monitoring of its status. Species on the periphery of their range that are not listed as threatened may be included in this category along with those species that were once threatened or endangered but now have increasing or protected, stable populations (MNDNR 2015).

Minnesota state-listed species and Species in Greatest Conservation Need are identified in Minnesota's State Wildlife Action Plan (MNDNR 2015).

The northern long-eared bat (*Myotis septentrionalis*), tricolored bat (*Perimyotis subflavus*), big brown bat (*Eptesicus fuscus*), and little brown bat (*Myotis lucifugus*) are all state-listed species of special concern (MNDNR 2016, refer to **Table 4-2**).

The Natural Heritage Information System (MNDNR 2016) identified breeding season observations of two rare grassland birds: the lark sparrow (*Chondestes grammacus*), a state-listed species of concern (**Table 4-3, Federal/State Listed Bird Species**), and the upland sandpiper (*Bartramia longicauda*), a Species in Greatest Conservation Need.

Table 4-3: Federal/State Listed Bird Species.

Scientific Names	Common Names	Status[1]	Documented in Project Area[2]
Accipiter gentilis	Northern Goshawk	ST: Special Concern	No
Aegolius funereus	Boreal Owl	ST: Special Concern	No
Ammodramus bairdii	Baird's Sparrow	ST: Endangered	No
Ammodramus henslowii	Henslow's Sparrow	ST: Endangered	No
Ammodramus nelsoni	Nelson's Sparrow	ST: Special Concern	No
Anthus spragueii	Sprague's Pipit	ST: Endangered	No
Asio flammeus	Short-Eared Owl	ST: Special Concern	No
Athene cunicularia	Burrowing Owl	ST: Endangered	No
Buteo lineatus	Red-shouldered Hawk	ST: Special Concern	No
Calcarius ornatus	Chestnut-Collared Longspur	ST: Endangered	No
Calidris canutus	Rufa Red Knot	F: Threatened	No
Charadrius melodus	Piping Plover	ST: Endangered	No
Chondestes grammacus	Lark Sparrow	ST: Special Concern	Yes
Coturnicops noveboracensis	Yellow Rail	ST: Special Concern	No
Cygnus buccinator	Trumpeter Swan	ST: Special Concern	No
Empidonax virescens	Acadian Flycatcher	ST: Special Concern	No
Falco peregrinus	Peregrine Falcon	ST: Special Concern	No
Gallinula galeata	Common Gallinule	ST: Special Concern	No
Haliaeetus leucocephalus	Bald Eagle		Yes
Lanius ludovicianus	Loggerhead Shrike	ST: Endangered	No
Leucophaeus pipixcan	Franklin's Gull	ST: Special Concern	No
Limosa fedoa	Marbled Godwit	ST: Special Concern	No
Parkesia motacilla	Louisiana Waterthrush	ST: Special Concern	No
Pelecanus erythrorhynchos	American White Pelican	ST: Special Concern	Yes
Phalaropus tricolor	Wilson's Phalarope	ST: Threatened	No

Scientific Names	Common Names	Status[1]	Documented in Project Area[2]
Podiceps auritus	Horned Grebe	ST: Endangered	No
Progne subis	Purple Martin	ST: Special Concern	No
Rallus elegans	King Rail	ST: Endangered	No
Setophaga cerulea	Cerulean Warbler	ST: Special Concern	No
Setophaga citrina	Hooded Warbler	ST: Special Concern	No
Sterna forsteri	Forster's Tern	ST: Special Concern	No
Sterna hirundo	Common Tern	ST: Threatened	No
Tympanuchus cupido	Greater Prairie Chicken	ST: Special Concern	No
Vireo bellii	Bell's Vireo	ST: Special Concern	No

[1] Status = Federal Status (F), State Status (ST): E = endangered; T = threatened; P=proposed; C = candidate.
[2] Natural Heritage Information System (NHIS), or Eagle/Avian Point Count Surveys (**Appendix A**).

The Minnesota State Wildlife Action Plan (SWAP) Species of Greatest Conservation Need List (SGNL) includes several bird species observed in the project area (MNDNR 2015). No federal or state listed species were present in the project area. The American white pelican, a Species of Special Concern (SPC), was observed (3 observations, 16 individuals) during the avian surveys. The pelicans were flying within the RSA. Refer to **Appendix A, Avian Point Count Results, Final**. Several studies have shown the American white pelican has increased in abundance across its range over the past 20-25 years (Wires et al. 2005; Evans and Knopf 1993). This species is a colonial nesting species that selects large, shallow bodies of water with flat bare islands isolated from human disturbance (Coffin and Pfannmueller 1988). Nonlisted species (NL) are included on the SWAP for reasons of population decline or significant breeding or winter populations in Minnesota. Species that are NL that were observed within the project area include bobolink (*Dolichonyx oryzivorus*), belted kingfisher (*Megaceryle alcyon*), field sparrow (*Spizella pusilla*), northern harrier (*Circus cyaneus*), sedge wren (*Cistothorus platensis*), Swainson's hawk (*Buteo swainsoni*), upland sandpiper (*Bartramia longicauda*), western meadowlark (*Sturnella neglecta*), and the yellow-headed blackbird (*Xanthocephalus xanthocephalus*) (**Appendix A, Avian Point Count Results, Final;** see **Section 6.1.1.3**).

Bald Eagle
In 2007, the bald eagle was delisted from its federally threatened status in the lower 48 states, but it is still federally protected under the Bald and Golden Eagle Protection Act ("BGEPA"). It was also delisted in Minnesota in 2013.

Bald eagles associate with distinct geographic areas and landscape features, including nest sites, foraging areas, communal roost sites, migration corridors and migration stopover sites (USFWS 2013). They are typically found near water bodies, natural and manmade, due to the presence of fish. They prefer to nest, perch, and roost in old-growth or mature stands of trees, and they usually select a nesting tree that is the tallest among those in its vicinity, to provide visibility. Nesting trees are usually situated near a water body that supports fish, their main preferred prey. Results of eagle surveys are presented below in **Section 6.0**.

Based on agency discussions, eagle nesting areas will be avoided, as feasible. Additionally, due to the Minnesota River Valley being a significant migration corridor, MNDNR has recommended post-construction avian fatality monitoring, which Palmer's Creek will implement as part of this Site Permit.

5.0 Regulatory Framework and Agency Consultation

This ABPP is required by the Minnesota Department of Commerce (DOC) and Western Area Power Administration (WAPA) as part of the permitting process for the Project. Avian and bat surveys were voluntarily implemented at the beginning of the permitting process. This ABPP document has utilized the wildlife survey results from the monitoring period which was completed in Fall 2017. All pre-construction avian and bat survey results will be submitted to the United States Department of Energy, WAPA, United States Fish and Wildlife Service (USFWS), Minnesota Department of Natural Resources (MNDNR), and DOC. Palmer's Creek committed to the best management practices and conservation measures outlined by WAPA in the Upper Great Plains Wind Energy Final Programmatic Environmental Impact Statement (EIS), which eliminated the need for a formal Biological Assessment. However, Programmatic Biological Assessment for Upper Great Plains Region Wind Energy Development Program Impact Information and Consistency Determination were used for biological evaluation, including submittal of the Consistency Evaluation Forms.

5.1 REGULATORY FRAMEWORK

5.1.1 Federal Laws

5.1.1.1 Federal Endangered Species Act

The federal Endangered Species Act (ESA 1973) defines and lists species as "endangered" and "threatened" and provides regulatory protection for the listed species. The federal ESA provides a program for conservation and recovery of threatened and endangered species; it also ensures the conservation of designated critical habitat that the USFWS has determined is required for the survival and recovery of these listed species. Section 9 of the federal ESA prohibits the take of species listed by USFWS as threatened or endangered. Take is defined as follows: "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 that all federal agencies, including the USFWS, 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 are prohibited from authorizing, funding, or carrying out any action that will jeopardize the continued existence of a listed species or destroy or modify its critical habitat. As defined in the federal ESA, individuals, organizations, states, local governments, and other non- federal entities are affected by the designation of critical habitat only if their actions occur on federal lands; require a federal permit, license, or other authorization, or involve federal funding (ESA 1973).

5.1.1.2 Bald and Golden Eagle Protection Act

The federal Bald and Golden Eagle Protection Act of 1940 (BGEPA; 16 USC 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, purchase or barter, 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 (USFWS, n.d.). 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" (USFWS, n.d.). 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. Permits are issued to Native Americans to possess eagle feathers for religious purposes, and salvaged eagle carcasses can be sent to the National Eagle Repository in Colorado where they are redistributed to Native Americans. This effort is coordinated by a local USFWS office. 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 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.

Under the BGEPA, a final rule was published in May 2008, in the Federal Register (FR) that proposed authorization for take of bald eagles for those with existing authorization under the federal ESA where the bald eagle is covered in a Habitat Conservation Plan (HCP) or the golden eagle is covered as a non-listed species. The final rule also established a new permit category to provide expedited permits to entities authorized to take bald eagles through Section 7 incidental take permits. A proposed rule will later address authorization of take of (1) disturbance-type take of bald and golden eagles due to otherwise lawful activities and (2) eagle nests in rare cases where their location poses a risk to human safety or the eagles themselves.

In 2009, the USFWS issued a final rule on new permit regulations that would allow some disturbance of eagles "in the course of conducting lawful activities" (74 FR 46836–46879). Physical take of an eagle will only be authorized if every avoidance measure has been exhausted. Removal of nests will generally be permitted only in cases where the nest poses a threat to human health, or where the removal would protect eagles. Take permits may be issued when "necessary for the protection of…other interests in any particular locality" (USFWS 2009). Due to concerns about population declines, permits for take of golden eagles are likely to be restricted throughout the eagle's range (USFWS 2009). Considerations for issuing take permits include the health of the local and regional eagle populations, availability of suitable nesting and foraging habitat for any displaced eagles, and whether the take and associated mitigation provides a net benefit to eagles (74 FR 46836–46879, USFWS 2009). In April 2013, USFWS issued *Eagle Conservation Plan Guidance Module 1: Land-based Wind Energy (Version 2)* to address these new regulatory matters (USFWS 2013).

5.1.1.3 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA, 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 US and the Project area are protected under the MBTA. The birds, occupied nests and the contents of the nest (eggs or chicks) within the Project property are afforded protection pursuant to the MBTA. Unlike ESA and BGEPA, no permits are available to authorize incidental take of birds under the MBTA. Due to the potential for resident and migratory birds within the Project, development of this Avian and Bat Protection Plan was prepared to assist in complying with the MBTA.

5.1.2 State Laws

5.1.2.1 Wind Energy Site Permitting

The Wind Siting Act of Minnesota (Minnesota Statute Chapter 216F) requires that a site permit be issued from the PUC to build and operate a large wind energy conversion system (LWECS). According to the Statute, the siting of an LWECS must be compatible with environmental preservation, sustainable development, and the efficient use of resources (Minnesota Statute Section 216F.03). Further, the criteria considered by the PUC in designating LWECS sites must include the impact of the LWECS on humans and the environment (Minnesota Statute Section 216F.05). Palmer's Creek has designed the Project to comply with the PUC's wind turbine setback and siting guidelines, and other requirements set forth in Minnesota Rules Chapter 7854.

5.1.2.2 State Threatened and Endangered Species Laws

Per Minnesota Statute Section 84.0895, the MNDNR has adopted rules designating species meeting the statutory definitions of Endangered, Threatened, and Special Concern Species (ETSC). The resulting List of Endangered, Threatened, and Special Concern Species is codified as Minnesota Rules Chapter 6134. The Endangered Species Statute also authorizes the MNDNR to adopt rules regulating the treatment of species designated as endangered and threatened. These regulations are codified as Minnesota Rules, Parts 6212.1800 to 6212.2300. MNDNR defines endangered, threatened, and special concern species as follows:

- *Endangered (E)* – a plant or animal species that is threatened with extinction throughout all or a significant portion of its range in Minnesota.
- *Threatened (T)* – a plant or animal species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range in Minnesota.
- *Special Concern (SC)* – species that are not endangered or threatened, but are extremely uncommon in Minnesota, or have unique or highly specific habitat requirements and deserve careful monitoring of their status. Species on the periphery of their range that are not listed as threatened may be included in this category along with those species that were once threatened or endangered but now have increasing or protected, stable populations.

5.2 AGENCY GUIDANCE AND CONSULTATION

As part of the planning and design of the Project, Palmer's Creek consulted public and private available guidance materials including:

- Avian and Bat Protection Plan white paper (USFWS 2010)
- Avian Protection Plan Guidelines (APLIC and USFWS 2005)
- Suggested Practices for Avian Protection on Power Lines (APLIC 2006)
- Reducing Avian Collisions with Power Lines (APLIC 2012)
- Odell Wind Farm: Wildlife Assessment and Field Studies Tier 3 Report (Dunlap et al. 2013)
- Wildlife Baseline Studies for the Highmore Wind Resource Area, Hughes, Hyde and Hand Counties, South Dakota (Derby et al. 2010)
- Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to other Sources of Avian Collision Mortality in the United States (Erickson et al. 2001)
- Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments (Erickson et al. 2002)
- An Assessment of Direct Mortality to Avifauna from Wind Energy Facilities in North Dakota and South Dakota (Graff 2015)
- A Review of Bat Mortality at Wind Energy Developments in the United States (Johnson 2005)
- U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines (USFWS 2012)
- Wind Turbine Interactions with Birds, Bats, and their Habitats: A Summary of Research Results and Priority Questions (NWCC)
- Acoustic Bat Summary Report: Palmer's Creek Wind Farm (*Final*) (NCE 2017)
- Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Sollano County Resource Areas (Orloff and Flannery 1992)
- Towards Reliable Bird Surveys: Accounting for Individuals Present but not Detected (Thompson 2002)
- Upper Great Plains Wind Energy Final Programmatic Environmental Impact Statement (Western 2015)
- Bald Eagle Management Guidelines and Conservation Measures (USFWS, n.d.)
- National Bald Eagle Management Guidelines (USFWS 2007a)
- Eagle Permits; Take Necessary to Protect Interests in Particular Localities (USFWS 2009)
- Draft Eagle Conservation Plan Guidance (USFWS 2011)
- Eagle Conservation Plan Guidance: Land-based Wind Energy (Vers. 2) (USFWS 2013)
- Information for Planning and Conservation (IPaC) (USFWS 2017)
- Palmer's Creek Wind Farm, LLC.: Avian Point Count Survey Results (Wenck 2017)
- Wild Birds and Avian Influenza: An Introduction to Applied Field Research and Disease Sampling Techniques (Whitworth et al. 2007)
- Willow Creek Wind Project: Bird and Bat Conservation Strategy

A public scoping meeting was held on December 1, 2016, in Granite Falls, Minnesota. Federal, State, and local agencies were invited to the meeting and to provide comments regarding the Project. The public was invited through newspaper and radio announcements, and residents near the Project were invited to comment. The public scoping meeting documentation is included in Appendix I of the EA. Comments received regarding the proposed Project from agencies and the public are included in Appendix J of the EA.

The local, state and federal agencies were contacted during the evaluation of the Project to determine potential impacts, identify avoid, minimization, and mitigation measures, and for guidance on permitting and approvals needed for the Project. These agencies included:

- Federal Aviation Administration
- U.S. Fish and Wildlife Service
- Minnesota Department of Transportation
- Minnesota Department of Natural Resources
- Minnesota Public Utilities Commission
- Minnesota State Historic Preservation Office
- Upper Minnesota Regional Development Commission
- Chippewa County
- City of Granite Falls

Section 106 tribal consultation was initiated by WAPA on November 10, 2016 with 12 different tribes. A tribal consultation meeting was held on April 24, 2017 at the Upper Sioux Indian Community near Granite Falls, Minnesota. A second tribal consultation meeting was held on May 4, 2017 in the same location. Additionally, the tribal cultural specialist (TCS) was invited from each tribe to participate in the cultural resources survey.

Palmer's Creek has met with and exchanged correspondence a number of times throughout the course of designing and reviewing the Project. This included conference calls and meeting with the MNDNR, USFWS, DOC and WAPA to discuss concerns regarding turbine placement and other Project design features. Survey protocols, monitoring requirements, specific species, and biological assessment requirements were also discussed at several meetings and through correspondence.

Following these agency discussions, turbines were shifted to minimize potential impacts to the Sparta Wildlife Management Area, and survey protocols for bald eagles and other avian species were updated. The bat surveys were also discussed and modified to suit agency requests. A meeting on January 18, 2017 between WAPA, DOC, USFWS and Palmer's Creek resulted in agreement to use the Consistency Evaluation Forms in place of a biological assessment since a programmatic BA had already been completed as part of the Upper Great Plains Wind Energy Final Programmatic EIS.

A meeting with the MNDNR was held on September 14, 2017 to discuss the results and next steps for the bat surveys. A final report was to be prepared and submitted after analysis. Refer to NCE 2017. The MNDNR has determined the project is "high-risk" for bats. Because of the high-risk status, additional years (3) and intensity (4 times per week) of fatality monitoring will occur.

Additional consultation has been ongoing with state and federal agencies to continue to work through the environmental review and permitting processes. This includes addressing comments received on the Site Permit Application and EA, including comments directly related to avian and bat species.

6.0 Pre-Construction Site Specific Wildlife Surveys & Risk Assessments

6.1 AVIAN USE SURVEYS

Wenck Associates, Inc. was contracted by Palmer's Creek Wind Farm, LLC to conduct several avian studies. The data from these studies were used to identify species, species groups or species of concern that are present in the project area and that may be at a higher risk of mortality and/or displacement. Passerine species have been the most abundant bird fatality at wind energy facilities outside California (Erickson et al. 2001 and Erickson et al. 2002), often comprising more than 80% of the bird fatalities. Both migrant and resident passerine fatalities have been observed (Erickson et al. 2001 and Erickson et al. 2002). Data are presented in several categories, and highlight federally listed species, state listed species, and species of concern (Wenck 2017, and **Appendix A, Avian Point Count Results, Final**)

6.1.1 Diurnal Fixed-Point and Incidental Avian Use

Avian surveys focus on inventory and monitoring with specific objectives that include: 1) an inventory of bird species in a specific project area; 2) determining the relative abundance of species; and 3) monitoring seasonal changes in species composition and relative abundance (Whitworth et al. 2007). Diurnal fixed-point surveys are one of the most common methods used to determine avian composition and abundance. Point counts not only focus on visual cues but also on auditory cues to give the observer an advantage in rough terrain. For some species, vocal cues may be the only reliable means of detection (Whitworth et al. 2007).

A total of 36 surveys were conducted over four seasons with seasons defined as summer (June 27, 2016–August 31, 2016 and May 14, 2017-June 17, 2017 [8 point count surveys]), fall (September 1, 2016–November 30, 2016 [12 point count surveys]), winter (December 1, 2016–February 25, 2017 [6 point count surveys]), and spring (February 26, 2017–May 15, 2017 [10 point count surveys]).

Survey data was used to evaluate avian use, behavior, and species composition during Spring and Fall migration and to determine Summer resident species at the project area.

Point counts were selected to capture a diverse range of habitats and at locations with the best possible viewshed. Eight point-count locations were selected for the avian point count surveys (Refer to **Figure 6, Point Count Locations**).

All observations within an 800-meter radius at each point count were recorded; any observations outside the 800-meter radius were considered incidental. Each point count survey lasted for 20 minutes; all audio and visual observations were recorded. Surveys were conducted by an experienced ornithologist. Surveys were rotated to cover all daylight hours to ensure each point count was surveyed at various times of the day. Data recorded for each observation included species, number of individuals, time, height above ground, behavior, and flight direction. A range finder and topographic maps were used as references to determine bird distances to the observer and flight heights. Birds not easily identifiable due to low light conditions and distance were identified to the lowest taxonomic level possible.

Twenty-minute survey periods provide adequate time to detect both raptors and non-raptors. Double counting may occur during the 20-minute survey because individuals may appear and disappear from view. Double-counting of birds is not problematic for this type of survey because the objective is to document use in terms of number of birds noted per 20-minute survey, not number of distinct individual birds.

The ability to detect all species within the 800-meter survey radius varies among species and potentially not all individuals within the survey area are counted. This variation in detectability results in an overestimate of mean use in conspicuous species and an underestimate of mean use in reclusive species (Thompson 2002).

Incidental avian surveys are used to obtain bird distribution and composition information between point count locations. Larger birds, such as game birds, raptors, and waterfowl, large flocks of smaller birds, and birds that are a rarity in the area are typically recorded during incidental surveys.

Incidental observations included observations that occurred while traveling between point count locations, pre- and post-point count survey time period, and outside the 800-meter radius circular plot. These observations were recorded but not used in the formal analysis.

Flight behavior was evaluated by calculating the proportion of flying birds that were observed flying below, within, or above the turbine rotor sweep area (RSA). The Project is comprised of two (2) 2.3-MW and sixteen (16) 2.5-MW horizontal axis wind turbines. Each will have an anticipated hub height between 80 and 90 meters and a rotor diameter of approximately 116 meters. Therefore, an RSA between 22 and 148 meters above the ground was used.

The encounter rate is the rate in which a species was observed flying through the RSA during the avian point count surveys at the project area and suggests potential mortality risk from flight behavior.

To estimate the rate at which a species flies through the RSA, the following equation was applied to every species observed in the PCWF:

Encounter Rate = A*P*f**P*t*

- A is the mean use of birds/20 minutes for a given species
- P*f* is the proportion of all activity observations for a given species that were flying
- P*t* is the proportion of flying observations that were within the turbine RSA

The encounter rate index is relative to the observations of species during the surveys and within the study area and cannot be extrapolated to the species that may use the project area in the future. The encounter rate index from this study does not take into consideration behavior (e.g. foraging, courtship), habitat use, and turbine avoidance differences between species.

Please refer to **Appendix A, Avian Point Count Results, Final; and Wildlife Monitoring Report, Final (Wenck 2017)**. Also, refer to **Section 4.2.1** of this ABPP.

6.1.1.1 Eagle/Raptor Use and Encounter Rate

The raptor annual mean use rate in the project area of 0.39 raptors/20 min was compared with 37 other wind energy facilities that implemented similar protocols. The raptor annual

mean use at these wind-energy facilities ranged from 0.09 to 2.34 raptors/20 min survey. Based on the results from these wind energy facilities, as summarized by Derby et al. 2010, a ranking of seasonal raptor mean use was developed: low (0-0.5 raptors/20 min. survey); low to moderate (0.5-1.0 raptors/20 min); moderate (1.0-2.0 raptors/20 min); high (2.0-3.0 raptors/20 min); and very high (> 3.0 raptors/20 min). Under this ranking, mean raptor use in the project area is considered low.

Approximately 48.15 percent of all raptor observations were within the RSA. The highest raptor encounter rate was red-tailed hawk and turkey vulture, each with 0.07 individuals flying within the RSA/20 min. The raptor encounter rate calculated is relatively low, however the percentage of raptor observations within the RSA during the surveys and the low annual mean use rate (raptors/20 minutes) does not eliminate the potential for mortality in the project area.

Bald eagles are frequent in the area as reported during the avian point count surveys. Refer to **Wildlife Monitoring Report, Final (Wenck 2017)**. Twenty-one (21) observations of bald eagles included twenty-seven (27) individuals, with 30.77 percent of the them observed flying within the RSA. Most of these eagles have been observed within one mile of the Minnesota River. The bald eagle encounter rate is 0.03.

High numbers of raptor fatalities have been documented at wind energy facilities (e.g. Altamont Pass), however other studies at wind energy facilities in the United States suggest that 3.2% of the total casualties were raptors (Erickson et al. 2001). Results from Altamont Pass in California suggest that species mortality is not all related to abundance (Orloff and Flannery 1992). Golden eagles, red-tailed hawks and American kestrels were casualties more often than predicted based on abundance. Based on species occurrence/abundance within PCWF, red-tailed hawks, turkey vultures and bald eagles may be at highest collision risk for the Project. High raptor use (greater than 2.0 birds/20 min) has been associated with high raptor fatality at wind facilities (AWWI 2014). Conversely, raptor fatality appears to be low when raptor use is low (less than 1.0 birds/20 min; AWWI 2014), which is the case for raptor use in this project area. Currently the project area has a raptor use of 0.39 birds/20 minutes.

Turkey vultures and red-tailed hawks are commonly associated with agricultural and grassland habitats which provide opportunities for foraging and activity associated with susceptibility to turbine-collisions (Thelander et al. 2003). In a recent study of raptor response to wind facilities, red-tailed hawks were observed engaging in high-risk behaviors at operational wind facilities (Garvin et al. 2011). Results from post-construction fatality monitoring studies indicate that red-tailed hawks are frequently found as turbine-related fatalities (228 records of red-tailed hawk from 27 studies – Tetra Tech 2012; Jain 2005, Grodsky and Drake 2011, Johnson and Erickson 2011). However, Garvin et al. (2011) documented that red-tailed hawks, despite high-risk behavior, also demonstrated collision avoidance behavior (Garvin et al. 2011). Thus, risk of turbine-related fatalities in the project area exists for red-tailed hawks, but turbine-related fatalities would be expected to be low. Project-related fatalities of red-tailed hawks, should they occur, are unlikely to have population-level impacts because red-tailed hawks are common nationwide (Sauer et al. 2011). Turkey vultures are also very common nationwide and Project-related fatalities, should they occur, would not have population-level impacts.

6.1.1.2 Non-raptor Use and Encounter Rate

Passerines make up a large proportion (66.26%), of the birds observed during the avian surveys in the project area and would be expected to make up the largest proportion of fatalities at the PCWF. Encounter rates indicate that unidentified blackbirds (0.14 birds/20 min) and red-winged blackbirds (0.11 birds/20 min) are most likely to be exposed to collisions from wind turbines in the project area. Other passerine and waterfowl species that flew through the RSA during the surveys include; Canada goose (0.40 birds/20 min) and American crow (0.25 birds/20 min). Refer to **Appendix A, Avian Point Count Results, Final**.

Passerine species have been the most abundant bird fatality at wind facilities outside California (Erickson et al. 2001, and 2002), often comprising more than 80 percent of the bird fatalities. Both migrant and resident passerine fatalities have been observed (Erickson et al. 2001, and 2002). Encounter rates indicate that the Canada goose, American crow, unknown duck, unknown blackbird and red-winged blackbird are likely to be exposed to collisions from wind turbines in the project area. The red-winged blackbird is commonly found as a turbine-related fatality (more than 20 records of post-construction fatality from 27 studies; Tetra Tech 2012, Johnson et al. 2000, Howe et al. 2002, TRC Environmental 2008, Gruver et al 2009, BHE Environmental 2010, Jain et al. 2011, Grodsky and Drake 2011). Thus, risk of turbine-related fatalities of red-winged blackbird, and perhaps other at risk non-raptors in the project area, should they occur, are unlikely to have population-level impacts because collision fatalities appears to have little effect on North American land bird populations (Arnold and Zink 2011).

There were other species that flew through the RSA during the PC surveys, but their frequency of occurrence and overall numbers were not high enough to warrant significant collision exposure (refer to **Appendix A, Avian Point Count Results, Final**; and Table 10 of **Wildlife Monitoring Report, Final (Wenck 2017)**).

6.1.1.3 Sensitive Species

One (1) Species of Special Concern (MNDNR 2015), American white pelican, *Pelecanus erythrorhynchos*) has been observed during the field surveys. Three (3) observations consisted of 16 individuals. Nonlisted species (NL) are included on the (Minnesota State Wildlife Action Plan (SWAP) for reasons of population decline or significant breeding or winter populations in Minnesota. Species that are NL that were observed within the project area include bobolink (*Dolichonyx oryzivorus*), belted kingfisher (*Megaceryle alcyon*), field sparrow (*Spizella pusilla*), northern harrier (*Circus cyaneus*), sedge wren (*Cistothorus platensis*), Swainson's hawk (*Buteo swainsoni*), upland sandpiper (*Bartramia longicauda*), western meadowlark (*Sturnella neglecta*), and the yellow-headed blackbird (*Xanthocephalus xanthocephalus*). Refer to **Section 4.2.4 Rare and Unique Wildlife** of this ABPP, and **Appendix A, Avian Point Count Results, Final**.

IPaC (USFWS 2017) identified seventeen (17) Birds of Conversation Concern that have the probability of using the project area. During the avian point count surveys only one these species was observed within the project area. This species was the bobolink (1 observation, 1 individual).

6.1.2 Eagle Use Surveys

Following Stage 2 of the Eagle Conservation Plan Guidance (USFWS 2013), eagle point count surveys were conducted to collect quantitative data on eagle presence that allows estimation of eagle exposure rate, which forms the basis of a risk assessment model. Eagle use surveys focused exclusively on eagles and occur at the eight (8) point count locations (**Figure 6, Point Count Locations**) used for point count surveys in 2016-2017. The objective of the eagle use survey was to document eagle movements and behavior within and adjacent to the study area in all four seasons to assess risk to eagles (primarily bald eagles). Eagle surveys are conducted by a qualified biologist and continued for one calendar year to capture temporal variation in eagle use of the study area.

Eagle use data is collected in 1-minute intervals so that the data can the translated into eagle exposure minutes. The data recorded for each survey includes the count start and stop times, eagle species observed, numbers and age classes of eagles seen, minutes of eagle flight in two height categories based on the USFWS Eagle Conservation Plan Guidance (< 200 and > 200 meters [m] above ground), notes on flight and other behaviors, and an individual identifier for each flight observation allowing it to be linked to a flight map. Each eagle flight observed was drawn on a topographic map or aerial image of the Study Area and digitized using a GIS so that eagle locations and behaviors can be overlaid with Project features. Each sampling point consisted of an 800-meter (0.5-mile) radius circle (0.77 square mile) that provided distant, unobstructed views and allowed visual observations of eagles and other large birds at a 2- to 3-mile distance. Numerical data was collected within 800-m-radius plots, but flight lines were documented across line-of-sight and were not limited to the 800-m-redius survey plot. A detailed protocol study-specific data sheets and data management plan is being adhered to and is utilized in the field.

Surveys were conducted once a month during the non-migration months (April-August). Surveys were conducted at a minimum of twice a month during the migration months (September-March), starting July 2016 and concluded in June 2017. Twenty (20) survey weeks were conducted. Individual surveys consisted of a 1-hour observation period at each of the eight point-count locations during each week of the surveys, for a total of 160 hours of observations. Surveys occurred in all weather conditions except when visibility is poor. These surveys were conducted outside of the twenty-minute avian point count surveys.

Eagle use surveys documented 19 bald eagles with 87 flight minutes, and 78.9 percent of the individuals were flying within the RSA. Most of these eagles have been observed within one mile of the Minnesota River. Eagles were observed less than 1 percent of the survey time (87 minutes observed/9,600 survey minutes). Of the 87 minutes in which eagles were observed, 78 minutes of observations were made with eagles flying within the RSA. The eagle point count surveys are reflective of the eagle data collected during the avian point count surveys, both with a relatively low encounter rate of 0.09 and 0.03, respectively (Wenck 2017). See also **Section 6.1.5, Eagle Collision Risk Analysis** within this ABPP.

Palmer's Creek has committed to continue eagle use surveys through 2018, during and through project construction.

6.1.3 Eagle/Raptor Nest Surveys

Raptors spend much of their time hunting and soaring within elevation ranges that correspond to the wind turbine rotor-sweep-area (RSA), making them susceptible to turbine blades (Erickson et al. 2002). Because raptors are long-lived species with low reproduction

rates, potential population impacts from collision-related mortality are of concern (Erickson et al. 2002). Although specific studies are lacking, adults and recently fledged young could be at particular risk of collision with turbines because of their higher use of areas near nest sites. Adult raptors often fly near nest sites during the breeding season to attend to young and deliver prey. After young raptors fledge, fledglings often spend significant amounts of time flying and roosting near nest locations until they become capable flyers and hunters. Additionally, construction activities near active nests during the breeding season may potentially result in disturbance or abandonment of nest sites.

Few raptor species that have been identified as nesting at wind energy facilities have been observed as fatalities at wind-energy facilities (Derby et al. 2010), therefore, the relationship is very low between the number of collision fatalities and raptor nests within or near project facilities. However, it is assumed that raptors nesting close to turbines would likely have a greater chance of being impacted from collision with turbines (Derby et al. 2010).

A raptor nest survey was conducted in the Spring of 2016 to locate raptor nests and determine nest activity status and the species using those nests. The initial surveys were conducted before tree leaf-out, to locate nests and to identify early breeding species. The project area and a 1-mile buffer area were surveyed from a vehicle using binoculars and spotting scopes. All raptor nest locations were documented with Global Positioning System (GPS) coordinates. Raptor species, height of nest, nest activity status, nest condition, substrate, and other relevant data were recorded for each nest. Additional visits were conducted when nests were found to document the activity status of nests located during the initial survey and to identify nesting attempts by late nesting raptors such as Swainson's hawks. Raptors may use nests intermittently among years as well as re-nest after a nest failure; therefore, early- and late-season nest surveys allow for a more accurate summary of breeding raptors.

A review of historical eagle nest data (MNDNR 2016) within one mile of the Project was completed at the request of PCWF. A bald eagle (*Haliaeetus leucocephalus*) nest has been documented in T116N R40W Section 11 just outside of the project boundary. This nest was active when checked in 2000, 2001, and 2005. This nest was found to be currently used by red-tailed hawk during the Spring 2017 aerial raptor nest survey. Refer to *Aerial Eagle/Raptor Nest Survey Report, Wenck 2017 (Apr 27)*, appended by reference.

An additional nest was located in the Spring of 2016 by Fagen, this nest was active in 2016 and is in T116N R39W Section 20, immediately outside of the project boundary. Fagen staff monitored nest use data in 2016 and continued monitoring from April thru August 10, 2017. (Michael Rutledge, Fagen Engineering, Personal Communication, December 2017). Refer to **Section 6.1.4** of this ABPP for eagle monitoring results.

An aerial (fixed-wing) raptor/eagle nest survey was conducted on April 20, 2017 that encompassed a 10-mile buffer of the project area (**Figures 9, 10 and 11**). For any nests observed, the following was recorded: GPS location, approximate nest height, nest substrate, nest size, actively used or non-use, and species using nest. Three active nests, three inactive nests and ten individuals (three on nest and seven in flight or perched) were observed during the April 20, 2017 aerial survey (**Figures 10 and 11; Table 6-1**). Except for Nest 3, all nests are approximately five miles or greater from the project area. Refer to *Aerial Eagle/Raptor Nest Survey Report, Wenck 2017 (Apr 27)*, appended by reference.

Table 6-1: Eagle Nests Within Palmer's Creek Wind Farm Analysis Area.

Nest Number	Status	Distance from Project Area	Latitude	Longitude
1	Active	4.9 miles	44.90855599	-95.70717782
2	Inactive	8.5 miles	44.73293894	-95.42223611
3	Active	0.3 miles	44.83149047	-95.56799484
4	Active	7.0 miles	44.72996346	-95.48105437
5	Inactive	10.0 miles	44.67489358	-95.53845803
6	Inactive	9.0 miles	44.68952578	-95.53443812

Eagle nest density within the analysis area is approximately one active nest per 102,000 acres.

6.1.3.1 Eagle Mean Internest Distance

Eagle pairs that nest within one-half the mean project-area inter-nest distance are potentially susceptible to disturbance take and blade strike mortality, as these pairs and offspring may use the project footprint (USFWS 2013). The Eagle Conservation Plan Guidance (ECPG) recommends using the ½-MID to delineate territories and associated breeding eagles at risk of mortality or disturbance.

The 3 active bald eagle nests identified in the April 2017 aerial raptor survey (**Figure 11**) and the 1 active red-tailed hawk nest located in T116N R40W Section 11 (USFWS considers this an active eagle nest since it was historically documented as an eagle nest) were considered in this MID analysis following the ECPG.

The MID and 1/2-MID are presented in **Figures 12 and 13.** The analysis reveals the project area is situated within projected eagle territories. ½-MID boundaries covered all turbines, except WTG-18. These nesting eagles may be susceptible to mortality or disturbance. However, nearest eagle nest (red-tailed hawk nest in 2017) is situated 2,552 feet (0.48 miles) from the closest turbine (WTG-5). The nearest *active* eagle nest is located 4,662 feet (0.88 miles) from WTG-12. The project MID is 7,789.75 meters. The project ½-MID is 3,894.88 meters.

PCWF has shifted turbine placement from initial layout plans to minimize impacts to the Minnesota River and its associated ecosystem. See **Figure 2**.

PCWF has committed to implementing adaptive management strategies (i.e., apply new strategies as they evolve) for identifying and mitigating collision mortality at turbines and overhead lines.

6.1.4 Nesting Eagle Behaviors

A bald eagle nest was located Spring 2016 by Fagen. This nest was active in 2016 and 2017 and located in T116N R39W Section 20, immediately outside of the project area boundary. Fagen staff monitored this nest in 2016 and 2017 until all eaglets fledged (Michael Rutledge, Fagen Engineering, Personal Communication, December 2017). This nest was monitored for two 8-hour days/week during nesting season. "Local" flight data was recorded but not reported. "Local" flights were those where the birds merely changed perching locations within the immediate area. Flight vectors were reported for 8 compass points with the nest

area at the center point (N, NE, E, SE, S, SW, W, NW). A "non-local" flight was reported as being in any given vector when the flight either originated in the nest area and terminated out of view, or originated out of view and terminated in the nest area. Two data points are reported for each vector: Total Flights and Food Bearing Flights.

The non-local flights occurred most often to the northwest of the nest in 2016 and southeast of the nest in 2017. See **Table 6-2** below.

Table 6-2: Eagle Nest Monitoring (T116N, R39W, Section 20)

Direction	2016 Nesting Season June 9 to August 25		2017 Nesting Season April 4 to August 10	
	Total Flights	Food Bearing Flights	Total Flights	Food Bearing Flights
North	17	1	8	1
Northeast	12	1	9	0
East	7	0	33	7
Southeast	15	1	96	14
South	24	0	75	11
Southwest	6	0	33	4
West	13	0	38	3
Northwest	90	4	25	1
Totals	**184**	**7**	**317**	**41**

6.1.5 Eagle Collision Risk Analysis

Based on 160 1-hour surveys from July 28, 2016, through June 16, 2017, Wenck observed 19 Bald Eagles. Project-specific and turbine-specific estimates of eagle fatality were calculated following the Eagle Conservation Plan Guidance Module 1- Land-based Wind Energy, Version 2 from the U.S. Fish and Wildlife Service (FWS) Division of Migratory Bird Management, April 2013. Using survey data, the hazardous area, Wenck estimated a potential eagle fatality amount of 0.1-0.5 fatalities per year. This constitutes a Stage 2 Assessment of potential project impacts to bald eagles. Note that these calculations do not account for the proportion of the project area that is hazardous. The 18 turbines represent a hazardous area of 0.14-0.76% of the 6,150-acre project footprint.

All the observed eagles were within or below the rotor sweep area (RSA) and are considered in the eagle fatality calculations. The turbine is assumed to be 80-90 meters tall with a rotor diameter of 116 meters. The radius is therefore approximately 58 meters. There were an additional eight incidental observations of bald eagles over the surveys. Most of the bald eagles were observed along the Minnesota River and all from point count locations 1, 2, 3, and 4.

The probability of avoidance is high for bald eagles (USFWS 2009 and 2013). The exposure rate for PCWF is 0.27 eagle-min/km^2-hr. Estimated eagle fatalities per year is 0.102. Over a 30-year project life, this equates to 3 eagle fatalities. Using a hazardous area equal to the rotor swept area instead of the default 25m radius yields a high-end annual fatality rate of 0.6 eagles or 16.5 over the life of the project.

This annual eagle fatality rate means that the project area qualifies as a Category 2 – High or Moderate Risk to Eagles (USFWS 2013). A project qualifies for Category 2 if it:

1. Has an important eagle-use area or migration concentration site within the project area but not in the project footprint; or
2. Has an annual eagle fatality rate estimate between 0.03 eagles per year and 5% of the estimated local-area population size; or
3. Causes cumulative annual take of the local area population of less than 5% of the estimated local population size.

The annual eagle fatality estimate is above 0.03 eagles per year. The project site is located within the Bald Eagle Management Unit 3: Great Lakes area with an approximate eagle density from the 2009 US Fish and Wildlife Service Final Environmental Assessment: Proposal to Permit Take as Provided Under the Bald and Golden Eagle Protection Act of 0.062 bald eagles per square mile. When a 53-mile buffer is used, the 5% benchmark level is 6.9 eagles per year. Therefore, even using the conservative estimate of a 58-m radius hazardous area, the project would cause a cumulative annual take of less than 5% of the local area population (Wenck 2017).

6.2 ACOUSTIC BAT SURVEYS

New Century Environmental, LLC (NCE) initiated acoustic monitoring surveys to capture the diversity/abundance of bat species within the proposed Palmer's Creek Wind Farm, to meet due diligence with regulatory agencies (NCE 2017).

Staff of Fagen Engineering deployed five separate Anabat systems (Anabat® SD-2 ultrasonic detectors) to record bat activity throughout the study area, the first deployment was done with two of the Anabat recorders during the fall of 2015 and continued through 15 October 2016. Three additional Anabat recorders were launched on 03 August 2016. **Refer to Figure 7, Bat Monitor Locations.** The data collected from Fagen was sent to NCE. NCE then took the data and processed in zero-crossing through Kaleidoscope (Ver. 3.1.8) to confirm presence diversity and abundance of bat species. The software uses a presence/absent indicator by giving each species of bat a p-value. The lower the p-value, the more likely the species of bat is present. Bat presence, in the form of vocalization, was detected, identified by species, and catalogued, thereby allowing estimates of species occurrences, distribution and relative abundance.

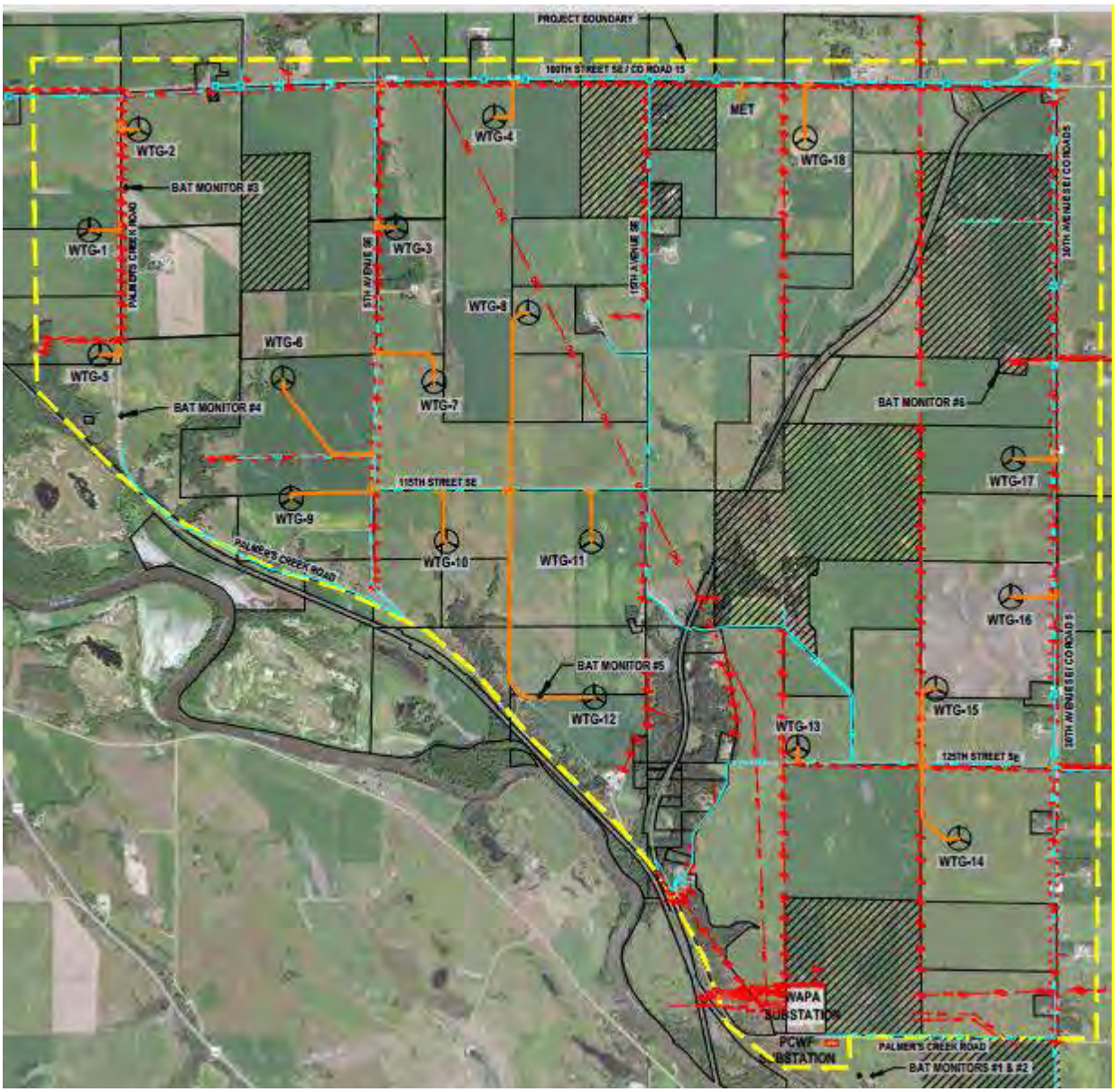

Figure 7. Bat Detector Locations at Palmer's Creek Wind Farm.

Bat Monitors (BM) 1 & 2 gathered data throughout the fall of 2015 and were deployed again in May of 2016. Monitors 3-5 were added in September of 2016.

Monitors 1 & 2 were deployed on September 13, 2015 and removed on October 11, 2015. They were deployed again on April 12, 2016, then removed on October 15. Monitor 3, Monitor 4 and Monitor 5 were deployed on August 3rd, 2016 then removed on October 15, 2016. The monitors were deployed for 287 trap nights.

From the five (5) Anabat recording systems, 232,116 sound files were recorded. Visual examination and filtering of files to eliminate extraneous noise (e.g., wind, insects, etc.) resulted in a total of 14,442 bat detections.

There was a total of six bat species documented throughout the course of the study (September-October 2015 and 2016). The tricolored bat, also known as the eastern pipistrelle (*Pipistrellus sublavus*) was documented at this site and is listed as a species of concern in the state of Minnesota. It was detected in small numbers but was found at every monitor except for monitor 1. The northern long-eared myotis (*Myotis septentrionalis*) is a federally threatened species whose home range lies within the study site. However no confirmed documentation was recorded here. Even though a total of five clicks of which Kaleidoscope classified as MYSE (northern long-eared myotis) the P-value was given a 1 for every monitor indicating the likelihood of presence is near non-existent. All other species documented are of least concern. Of the six species documented, the silver-haired bat (*Lasionycteris noctivagans*), hoary bat (*Lasiurus cinereus*) and big brown bat (*Eptesicus fuscus*) were among the most common followed by the little brown bat (*Myotis lucifugus*) and eastern red bat (*Lasiurus borealis*).

Staff of Fagen Engineering deployed four separate zero-crossing systems (**Figure 7**: Monitors 1, 2, 4 and 5) and two Wildlife Acoustics SM3 full-spectrum systems (**Figure 7**: Monitors 3 and 6) to record bat activity throughout the study area from 27 March through 16 October 2017. The data collected by Fagen Engineering was sent to NCE, where it was analyzed, as appropriate, with either Kaleidoscope version 3.1.8 (in zero-crossing mode) or Sonobat 3 (full-spectrum only) to evaluate diversity and abundance of bat species at the Palmer's Creek site. Bat presence, in the form of vocalization, was detected, identified by species, and catalogued, thereby allowing us to estimate species occurrences, distribution and relative abundance. Each detector had a total of 203 functioning detector nights (for a total of 1218 detector nights), with a preliminary average bat pass per detector night at 143.93 detected. This average is subject to some adjustment due to inter-related technological and ecological issues.

The site has significant bat activity from species shown to be at high risk of mortality at wind energy facilities in carcass surveys: the hoary, silver-haired, and eastern red bats, and the big and little brown bats (e.g., Gruver and Bishop-Boros 2015). Additionally, the big brown bat and little brown bat are also species of special conservation concern in Minnesota. The northern long-eared myotis is absent from the site, and the tricolored bat (which is also a species of special conservation concern in Minnesota) appears to be rare in the Palmer's Creek area (NCE 2017).

A corrected bat passes per detector night (BPDN) of between 50.7 and 34.8 is high for pre-construction surveys of potential wind energy sites in Minnesota, and is in the ballpark for what might be expected of the best bat habitat (Johnson et al. 2003). However, as the site's sampling is heavily biased toward the best bat habitat within or near the projected project footprint (due in part to regulator requests for sampling at specific sites), this is not too surprising, and it is reasonable to expect that the bat activity characteristic of the rotor area will be as much as 15 times less (Johnson et al. 2003). In total, if the net effect of accounting for the known high bias in habitat quality and the potential high bias due to improved data capture of new technology is taken into account, the Palmer's Creek site could have an adjusted BPDN <10. Consequently, bat mortality from the construction and operation of the proposed facility is likely within the normal range of such facilities in Minnesota (NCE 2017).

Palmer's Creek has committed to feathering the turbine blades. Feathering the blades when the wind is below the manufacturer's cut-in speed would reduce bat fatalities on the order of 70% at some sites without costing operators anything beyond operations time to implement the treatment, assuming the turbines are capable of being automated and do not require

manual adjustments to curtail, which is logistically and financially challenging. Feathering blades below the manufacturer's cut-in speed should be implemented at all facilities where possible (NWCC 2012). Palmer's Creek has committed that for all turbines and at all times, the hub would not be locked, but blades would be feathered to the wind such that revolution per minute would be minimal during periods when wind speed is less than the projects set cut-in speed [3.0 m/s].

7.0 Best Management Practices

7.1 WILDLIFE CONSERVATION MEASURES

Palmer's Creek has committed to implement several Best Management Practices (BMPs) and conservation measures for wildlife, derived from the Upper Great Plains Wind Energy Final Programmatic EIS (WAPA 2015). To implement these BMPs, several project plans and guidance documents will be developed for the Project prior to construction and operation. These plans will provide detailed information and implementation steps for BMPs that will benefit birds, bats, and their habitat. These plans are summarized in **Table 7-1, Summary of Project Plans and BMPs for Bird/Bat Protection**. Specific best management practices and conservation measures for birds and bat as they relate to the Project are identified in **Appendix B**. For the Project and Palmer's Creek to comply with the Site Permit Application and environmental assessment (EA), a detailed and complete list of BMPs were consulted on with DOC, MNDNR, USFWS and WAPA. This complete list is *appended by reference* and provided as an appendix in both the Site Permit Application and the EA for the Project.

Table 7-1: Summary of Project Plans and BMPs for Bird/Bat Protection.

Plan	Project BMPs Identified by Plan	Avian and Bat Protection Accomplished
Site Design Plans · Layout · Controlled Inspection/Cleaning Area · Excess Cut/Fill Placement · Profile · Erosion Control · Meteorological Towers · Re-fueling Areas · Engineered controls (e.g., fencing) · Drainage · Avoidance of important areas for wildlife · Utilize existing clearings in forests/shrublands · Consolidate facilities · Slope Stability Analysis · Co-location of t-lines, roads with existing/shared ROWs · Avoid aquifer conduits · Utilize dikes, swales, and lined ditches · Lighting guidelines	· Dust control · Erosion control · Site drainage · Ground disturbance · Use existing natural features (rocks, vegetation, drainage features) · Guy wires · Contamination · Safety · Fragmentation · Sediment transport · Lighting	· Dust control to minimize impacts to insects for forage. · Minimize impacts to habitat loss. · Guy wire marking to minimize avian/bat collision. · Engineered barriers prevent injury/death to unauthorized wildlife. · Avoidance of important wildlife areas minimizes direct/indirect impacts to birds/bats. · Fragmentation removes natural wildlife corridors/patterns. · Timed shut-off minimize light drawing insects, thus minimizes likelihood of birds/bats. · Downward-facing lights minimized horizontal and skyward illumination making unnatural light. Could confuse birds/bats.

Plan	Project BMPs Identified by Plan	Avian and Bat Protection Accomplished
Construction Plan · Explosives · Maintenance Activities	· Litter control · Ground disturbance	· Minimize impacts to habitat loss.
Decommission Plan · Contour · Hazardous Materials and Waste · Well removal · Subsoil decompaction	· Ground disturbance · Structure removal · Contamination · Vegetation establishment	· Contouring creates natural landscape to minimize fragmentation. · Minimize impacts to habitat. · Soil decompaction allows easy vegetation establishment.
Noxious Weed & Invasive Plant Control Plan · Facility Monitoring · Certified weed-free mulch · Surface Disturbance · Fill Materials · Clean vehicles · Blading avoidance of native vegetation	· Invasive species · Spread of invasive species · Revegetation	· Minimize impacts to habitat. · Invasive species out-compete natural species, can change ecological function.
Hazardous Materials Plan · Vehicle Maintenance · Excess excavation materials · Waste storage facilities · Storage, Use & Transportation · Drip pans	· Contamination · Erosion control	· Minimize impacts to terrestrial and aquatic habitat of birds/bats.
Integrated Pest & Vegetation Management Plan · Pesticides/herbicides	· Contamination	· Minimize impacts to terrestrial and aquatic habitat of birds/bats.
Site Restoration Plan · Restoration Timing · Temporary Use Areas · Contours · Weed-free native grasses, forbs, and shrubs · Road-cuts · Preserve specimen trees · Preserve nonhazardous rock outcroppings · Topsoil segregation and spread · Planting pockets	· Erosion control · Invasive weed control · Contours · Revegetation	· Minimize impacts to terrestrial and aquatic habitat of birds/bats. · Invasive species out-compete natural species, can change ecological function. · Contouring creates natural landscape to minimize fragmentation.

8.0 Monitoring Studies

Palmer's Creek Wind Farm has committed to conduct one year of eagle nest monitoring (refer to **Appendix D**); and avian and bat fatality monitoring for three years, 4 times per week (March 15 to November 15) and two times per month from December through January after the wind farm is operational. The fatality monitoring protocol is outlined in **Appendix C, Protocol: Post-Construction Avian and Bat Studies.** These protocols adhere to the Land-based Wind Energy Guidelines (USFWS 2013). These monitoring studies will be used to inform operational minimization measures to reduce the direct impact to birds and bats.

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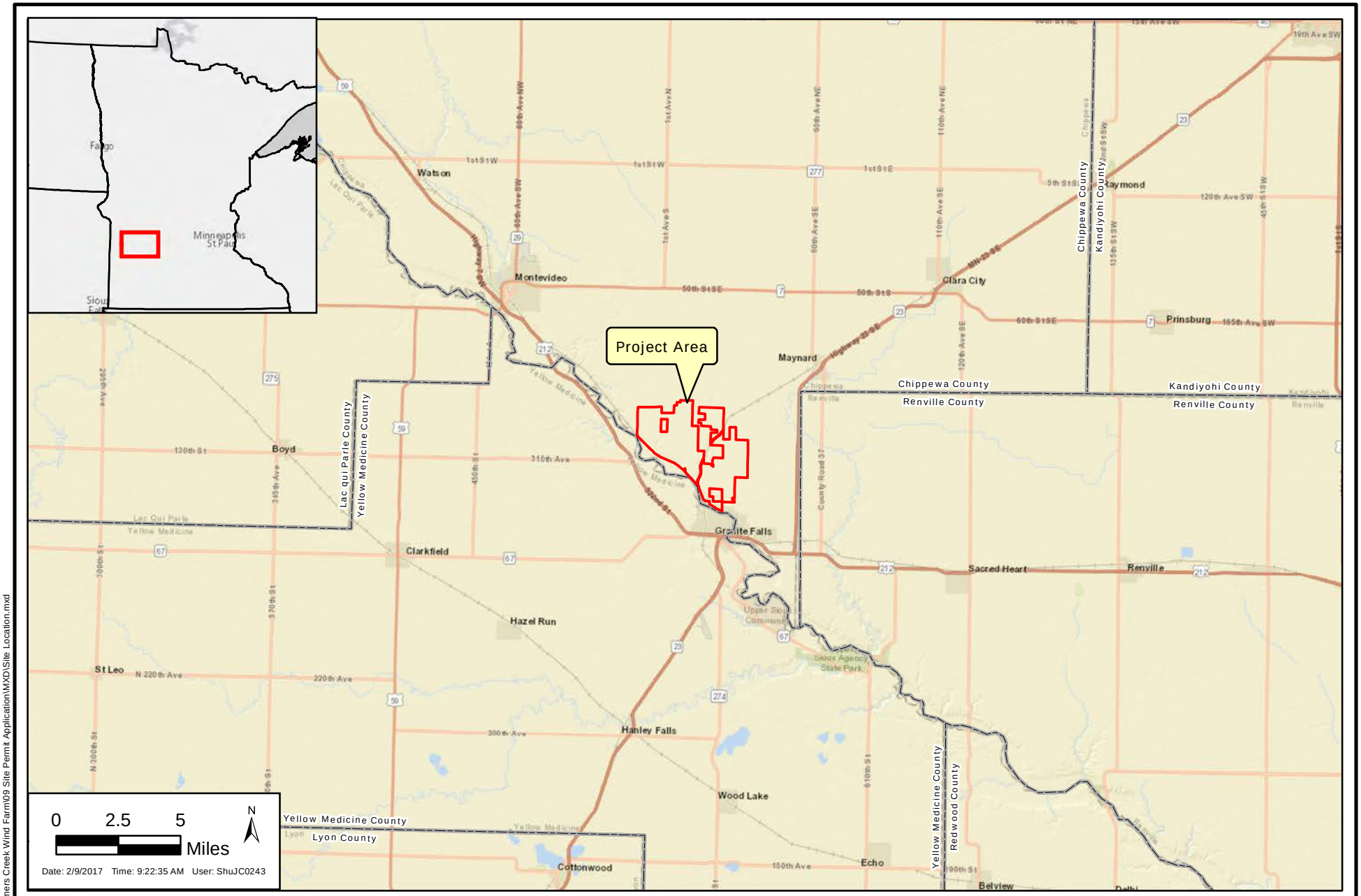
Figures



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PALMER'S CREEK WIND FARM, LLC

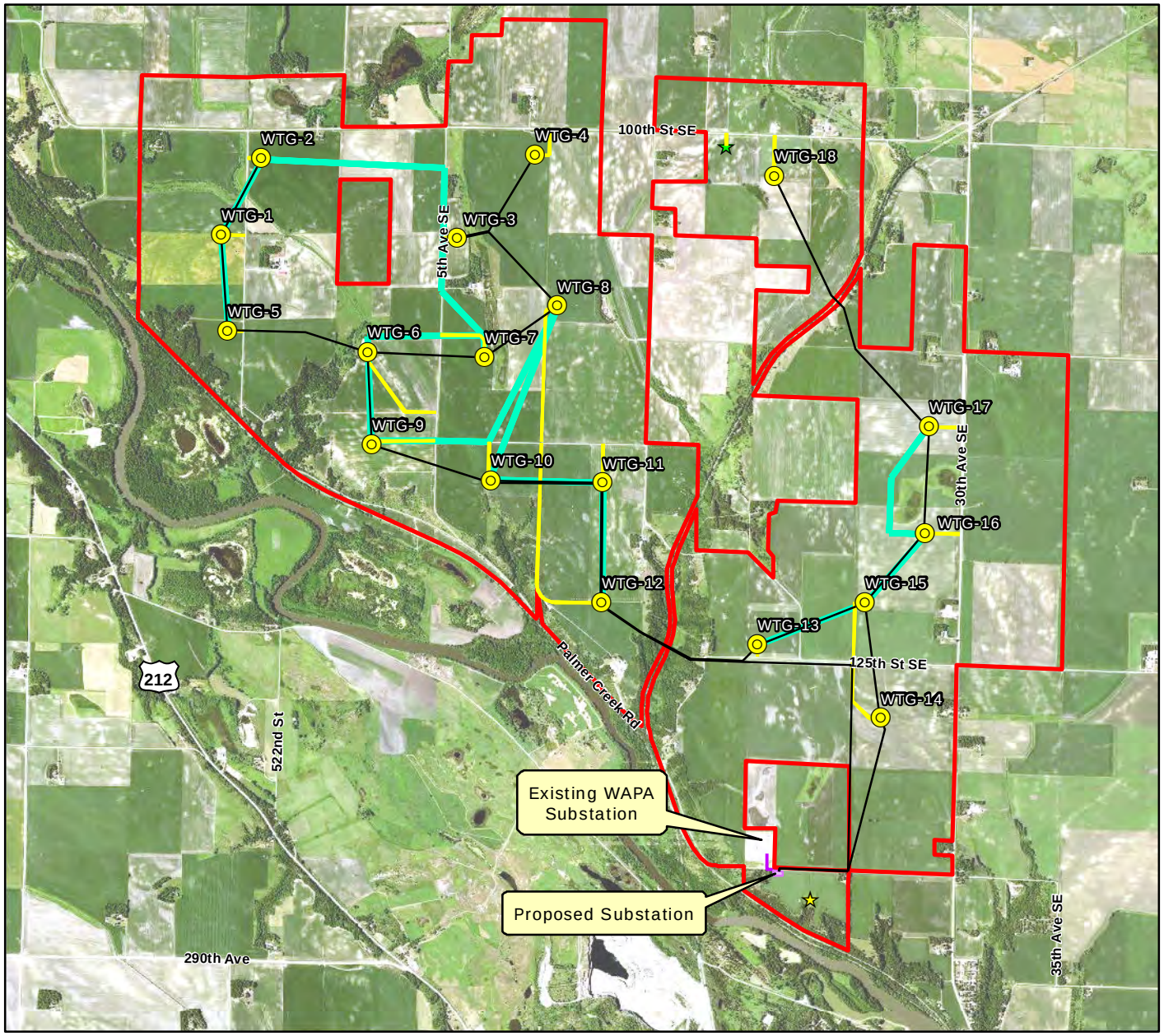
Site Location Map

WENCK ASSOCIATES

Responsive partner. Exceptional outcomes.

DEC 2017

Figure 1



Legend

- Project Boundary
- Turbine Locations
- Collector Lines
- Access Roads
- Temporary Crane Path
- Permanent MET Station
- Temporary MET Station
- Proposed Substation
- Transmision Lines

Note:
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.

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PALMER'S CREEK WIND FARM, LLC

Site Detail Map

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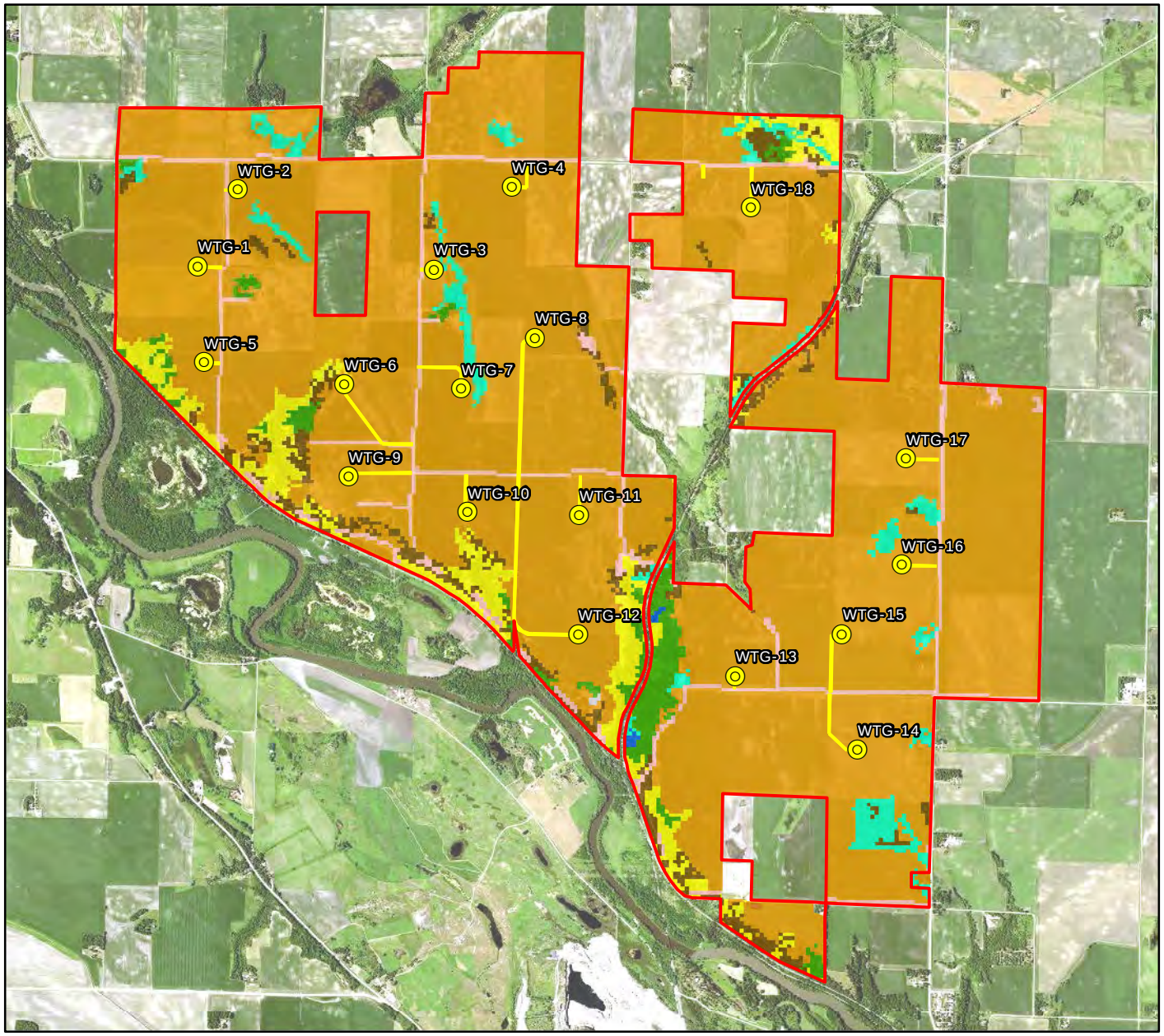
Figure 2



Legend

- Project Boundary
- Turbine Locations
- Access Roads

NLCD 2011

- Barren Land
- Cultivated Crops
- Wooded
- Developed
- Wetland
- Hay/Pasture
- Grassland
- Open Water
- Proposed Substation

Note:
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.

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PALMER'S CREEK WIND FARM, LLC

Land Cover

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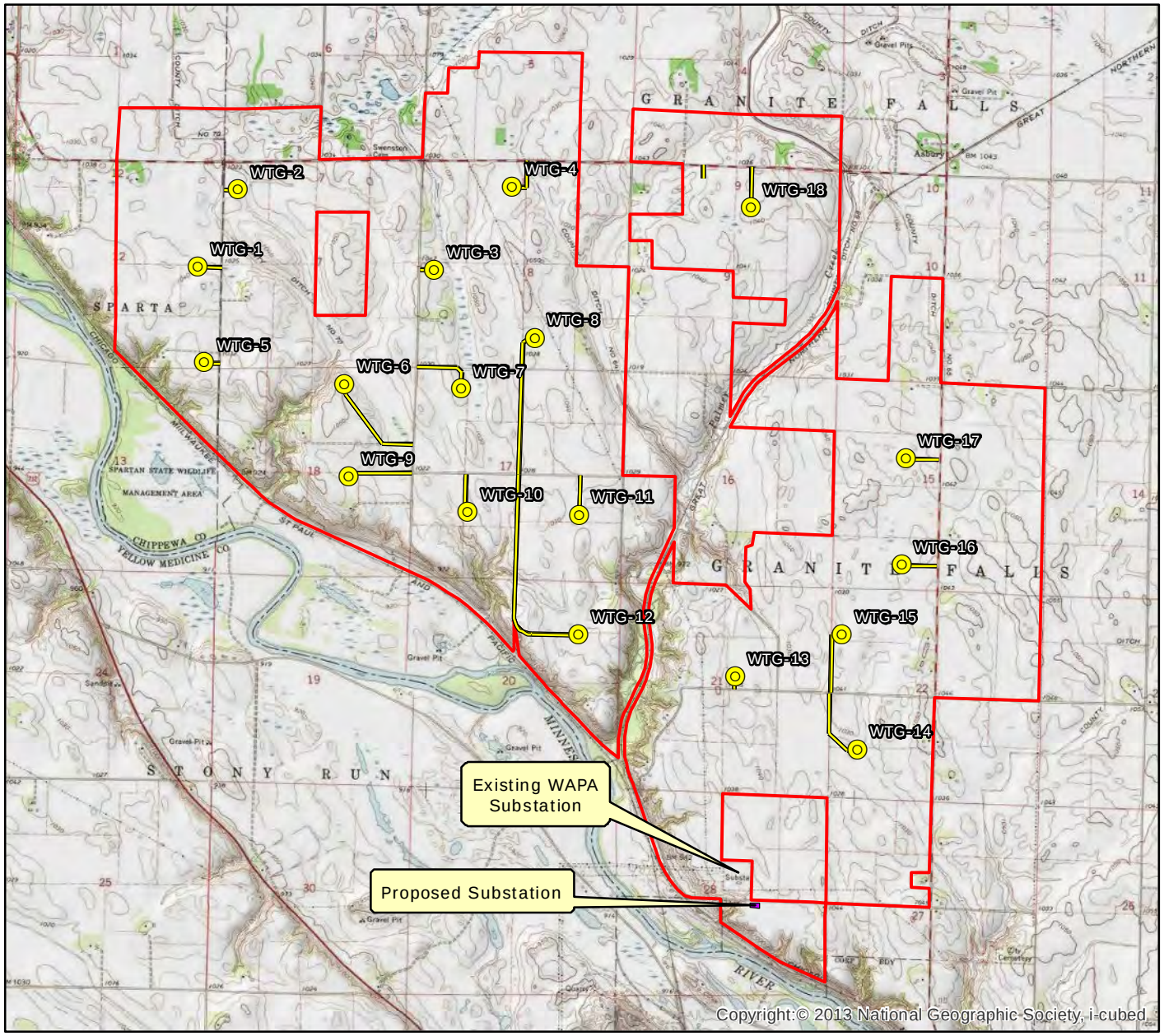
Figure 3



Legend

- Project Location
- Turbine Locations
- Access Roads
- Proposed Substation

Note:
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.

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PALMER'S CREEK WIND FARM, LLC

Topographic Map

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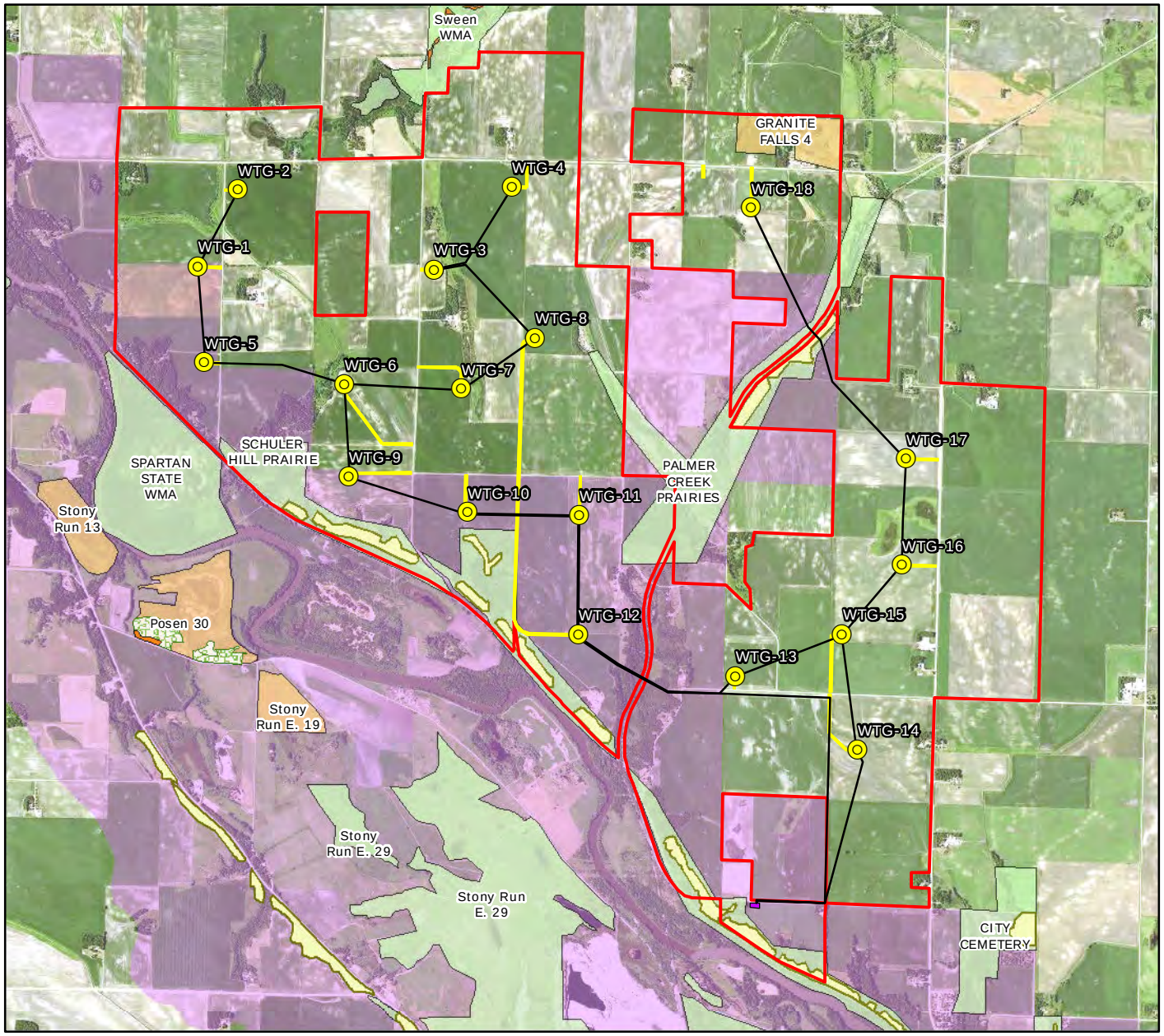
DEC 2017

Figure 4



Legend

- Project Location
- Turbine Locations
- Access Roads
- Collector Lines
- Proposed Substation
- Upper Minn. R. Valley Prairie Corridor Restoration Plan

DNR Prairie Native Plant Communities

- Upland Prairie System
- Wetland Prairie System
- Complex community

MBS Sites of Biodiversity Significance

- Outstanding
- High
- Moderate
- Below

Note:
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.

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PALMER'S CREEK WIND FARM, LLC

Ecologically Significant Areas

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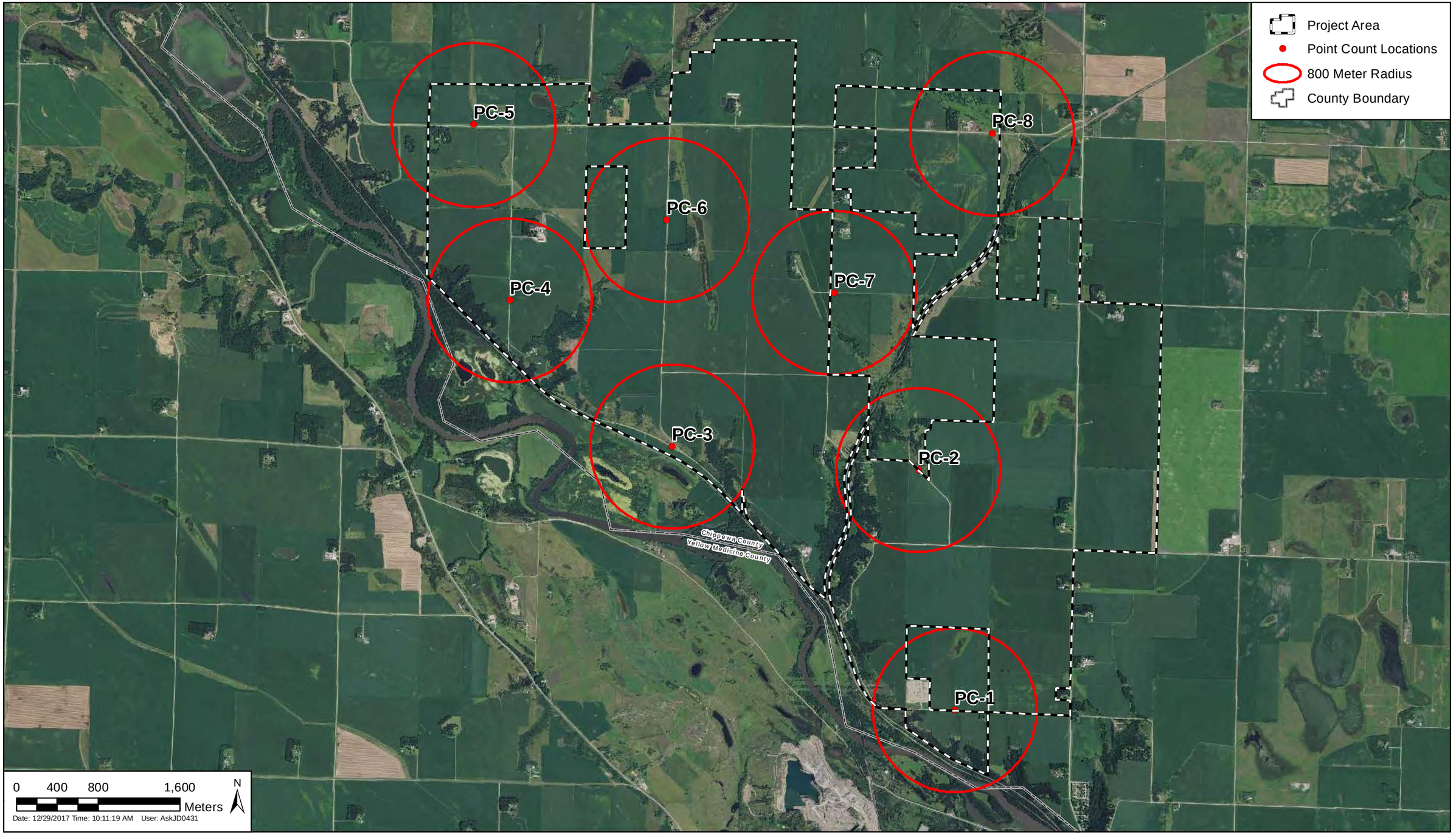
DEC 2017

Figure 5



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PALMER'S CREEK WIND FARM

Point Count Locations

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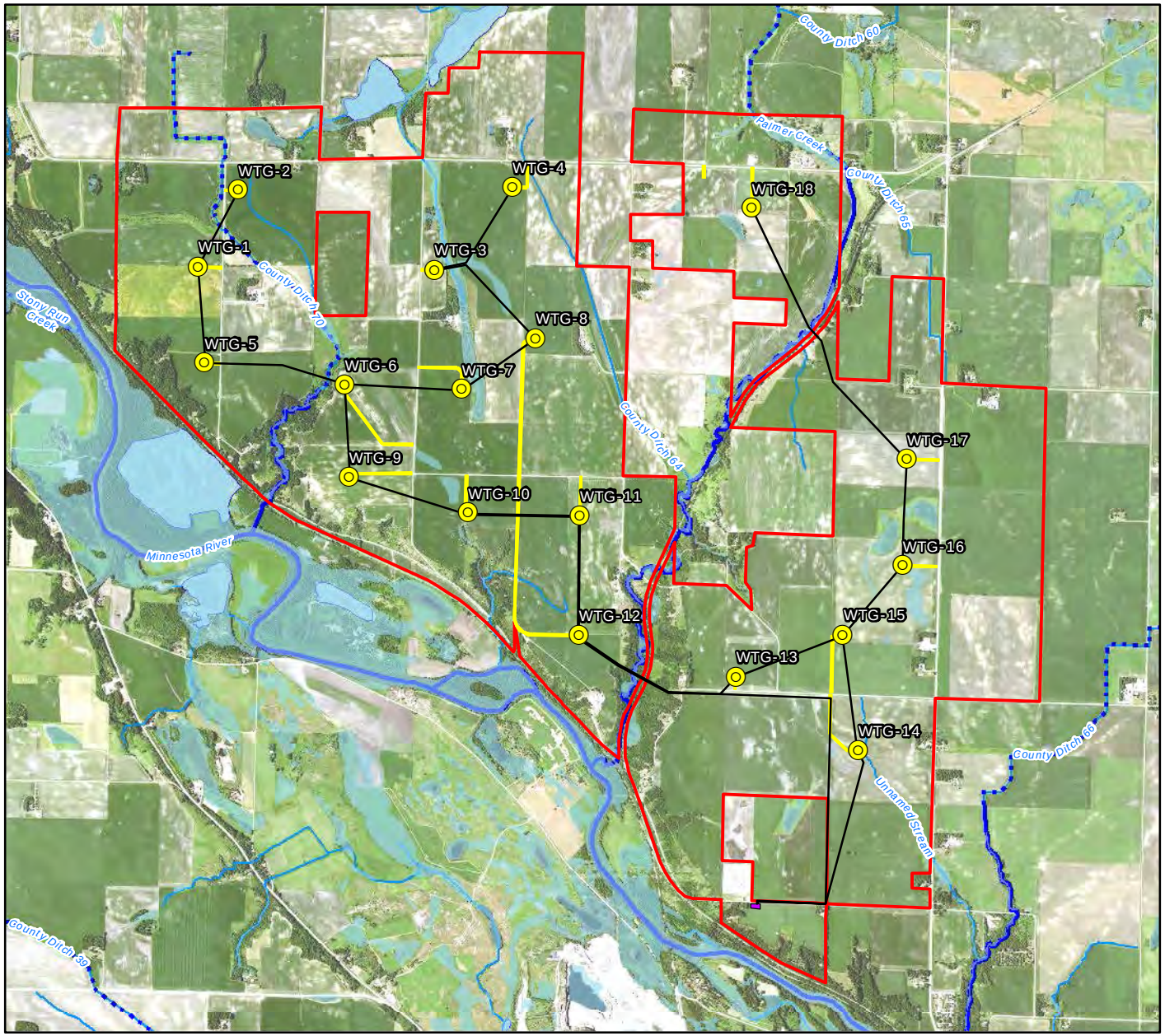
Figure 6



Project Boundary
Turbine Locations
Access Roads
Collector Lines
National Wetlands Inventory
Public
Public Ditch/Altered
Public Waters Basins
Rivers and Streams
Proposed Substation

Note:
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.

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PALMER'S CREEK WIND FARM, LLC

Waterbodies and Wetlands

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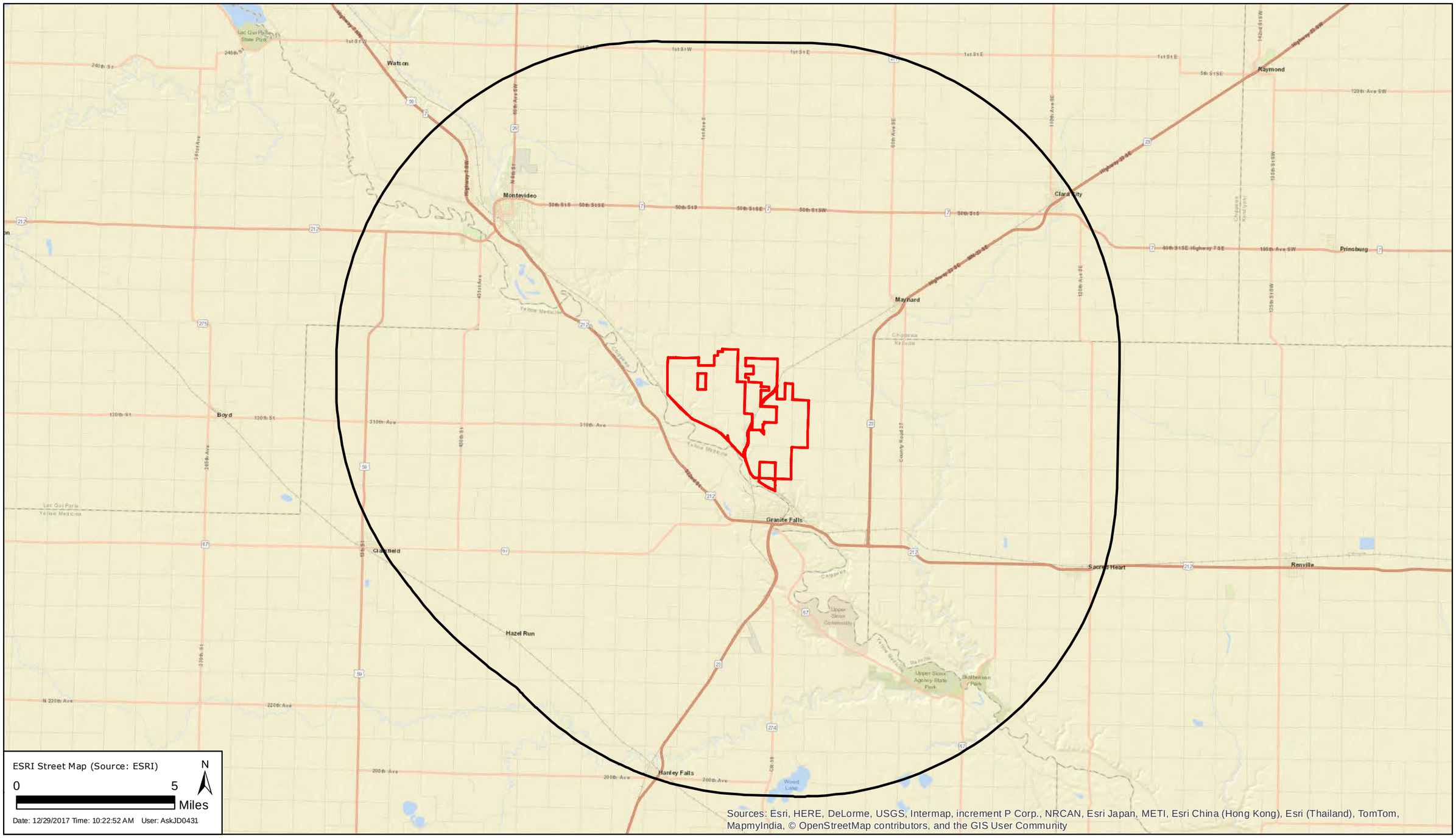
Figure 8



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PALMER'S CREEK WIND FARM, LLC

Fixed-Wing Aerial Eagle/Raptor Nest Analysis Area

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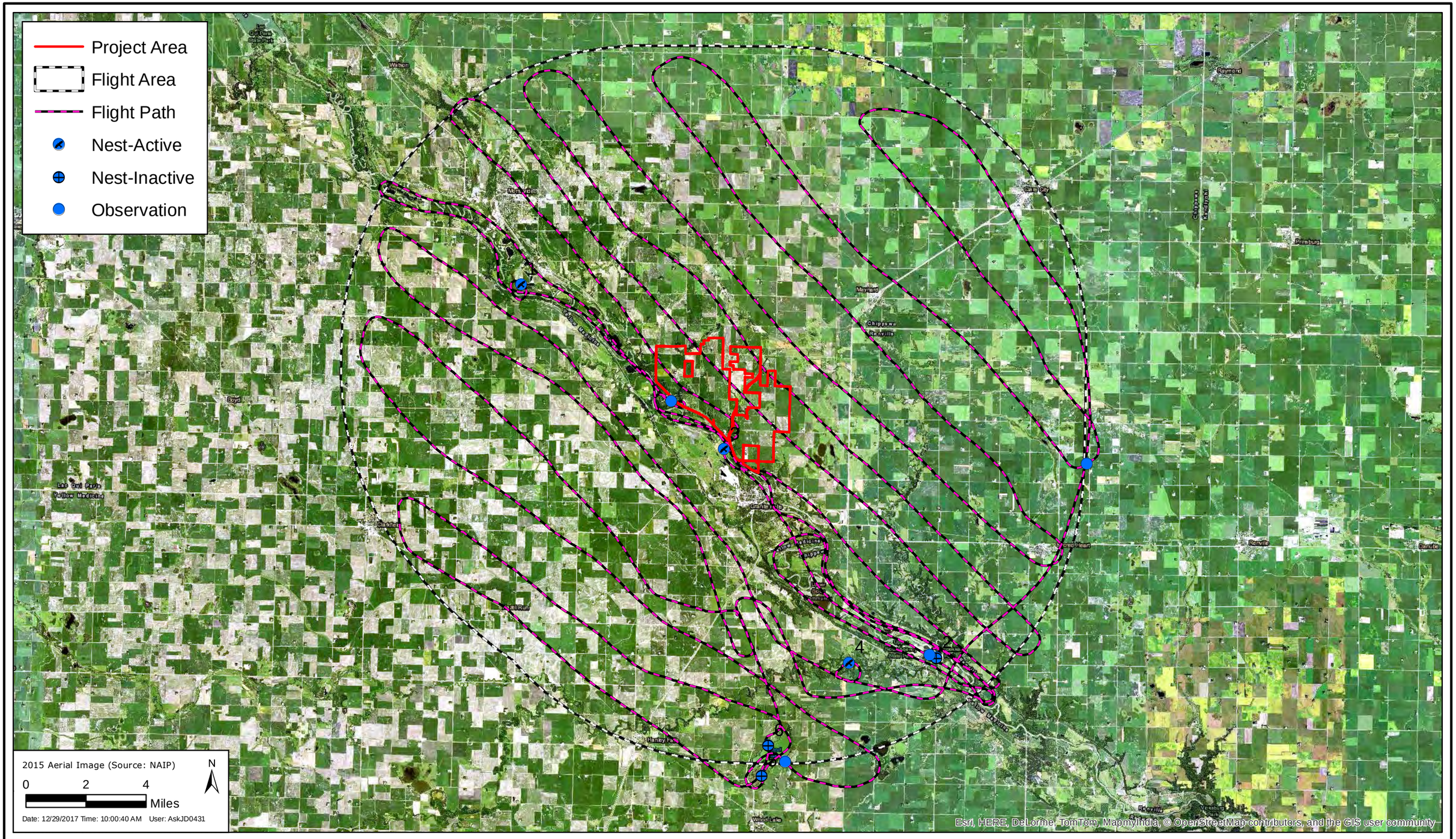
Figure 9



PALMER'S CREEK WIND FARM, LLC

Fixed-Wing Aerial Eagle/Raptor Nest Flight Path and Results

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Figure 10

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Project Area

Analysis Area

Red-tailed Hawk Nest-Active

Bald Eagle Nest-Active

Bald Eagle Nest-Inactive

2015 Aerial Image (Source: NAIP)

0 2 4 Miles

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Date: 12/29/2017 Time: 10:04:11 AM User: AskJD0431

Esri, HERE, DeLorme, TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

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PALMER'S CREEK WIND FARM, LLC

Eagle/Raptor Nest Locations

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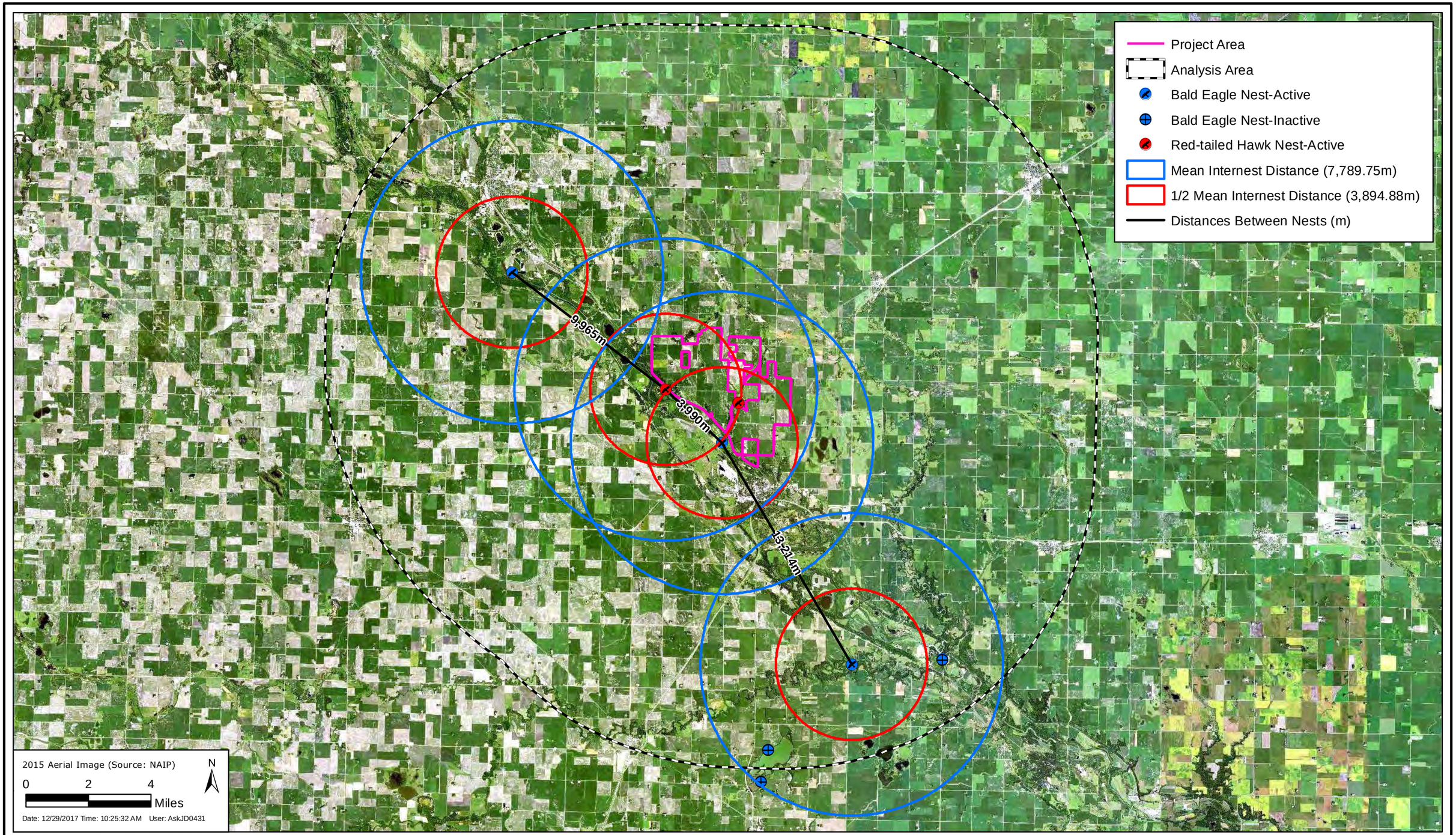
Figure 11



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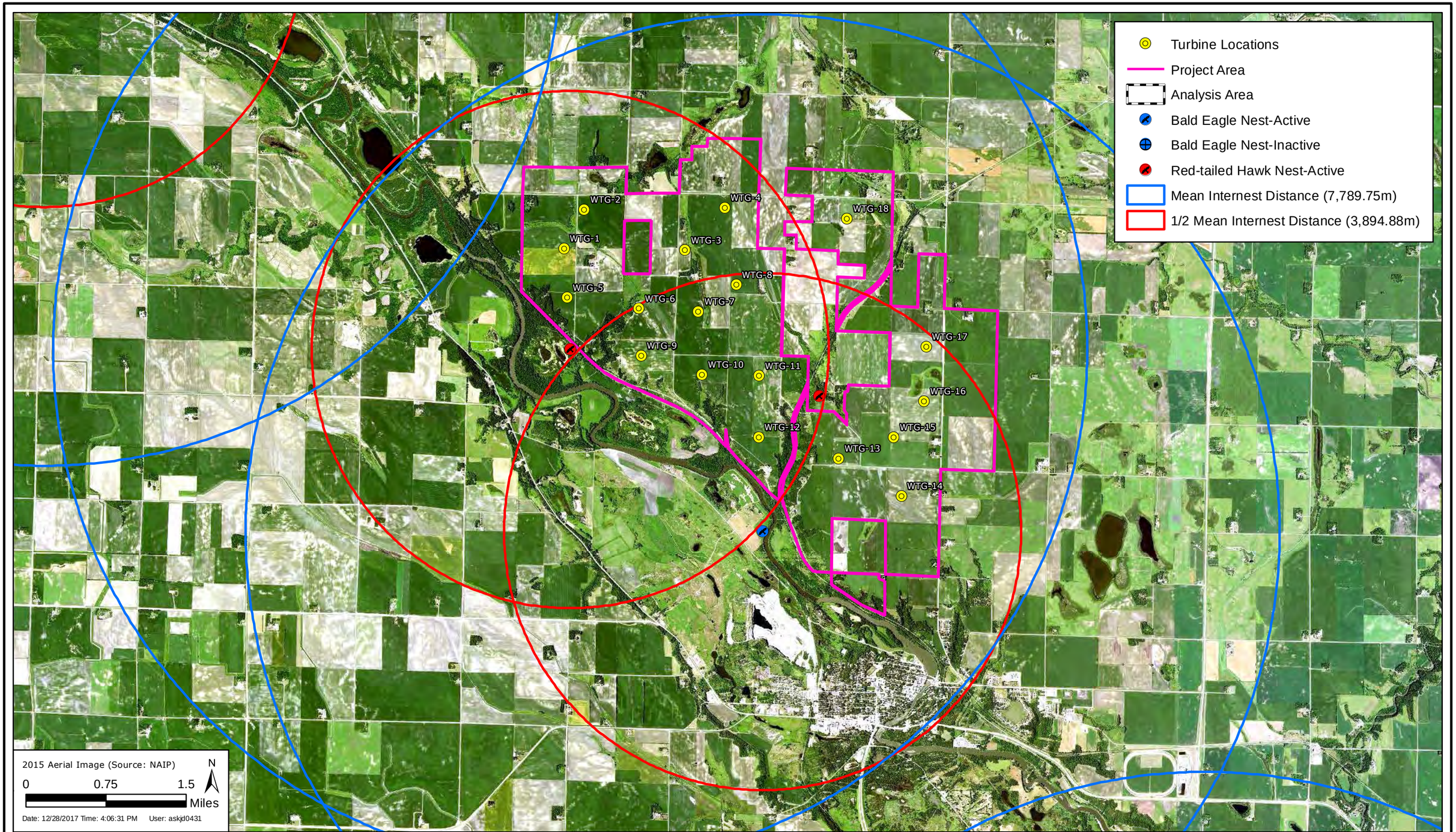
PALMER'S CREEK WIND FARM, LLC	WENCK Responsive partner. Exceptional outcomes.	DEC 2017
Nest Locations and Mean Internest Distance within 10-Mile Analysis Area		Figure 12



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PALMER'S CREEK WIND FARM, LLC

Project Area Mean Internest Distance

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Figure 13

Appendix A

Avian Point Count Results, Final (Wenck 2017)

Species	Group	Obs	Ind	Fly	Mean Use per 20 min	Percent Composition	No. Surveys Species Observed	Frequency (% Surveys)	Proportion Ind. Flying	Proportion Ind. Flying Below RSA	Proportion Ind. Flying Within RSA	Proportion Ind. Flying Above RSA	Encounter Rate	N	NE	E	SE	S	SW	W	NW	Var
European Starling	SB	34	1054	990	3.66	19.63%	8	2.78%	93.93%	98.69%	1.31%	0.00%	0.05	3.13%	0.00%	0.00%	0.00%	5.76%	0.00%	0.00%	0.61%	90.51%
Red-winged Blackbird	SB	52	688	676	2.39	12.82%	34	11.81%	98.26%	95.27%	4.73%	0.00%	0.11	0.15%	0.59%	0.00%	9.32%	7.69%	7.69%	23.37%	0.59%	50.59%
American Crow	C	73	566	360	1.97	10.54%	29	10.07%	63.60%	80.00%	20.00%	0.00%	0.25	23.06%	6.39%	10.28%	5.56%	20.28%	4.72%	13.61%	7.22%	8.89%
Brown-headed Cowbird	SB	33	375	325	1.30	6.99%	27	9.38%	86.67%	100.00%	0.00%	0.00%	0.00	4.62%	1.85%	2.46%	5.54%	12.92%	16.31%	14.77%	4.31%	37.23%
Canada Goose	WF	34	348	250	1.21	6.48%	12	4.17%	71.84%	12.00%	46.00%	42.00%	0.40	7.20%	0.00%	2.40%	24.80%	24.00%	7.20%	0.00%	34.40%	0.00%
Horned Lark	SB	53	199	171	0.69	3.71%	18	6.25%	85.93%	100.00%	0.00%	0.00%	0.00	2.92%	1.17%	1.75%	1.17%	11.11%	0.58%	16.37%	3.51%	61.40%
Barn Swallow	SB	26	188	188	0.65	3.50%	26	9.03%	100.00%	100.00%	0.00%	0.00%	0.00	0.00%	0.00%	1.06%	0.00%	0.00%	0.00%	0.00%	0.00%	98.94%
Rock Pigeon	PD	49	172	166	0.60	3.20%	26	9.03%	96.51%	92.77%	7.23%	0.00%	0.04	24.10%	6.02%	7.23%	7.83%	4.22%	0.60%	7.23%	8.43%	34.34%
Blue Jay	C	58	148	81	0.51	2.76%	38	13.19%	54.73%	100.00%	0.00%	0.00%	0.00	11.11%	12.35%	13.58%	8.64%	13.58%	8.64%	13.58%	8.64%	9.88%
American Goldfinch	SB	38	146	146	0.51	2.72%	33	11.46%	100.00%	98.63%	1.37%	0.00%	0.01	14.38%	5.48%	31.51%	10.27%	17.12%	5.48%	2.05%	0.68%	13.01%
Wild Turkey	GB	10	139	0	0.48	2.59%	2	0.69%	0.00%	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Snow Bunting	SB	6	109	109	0.38	2.03%	0	0.00%	100.00%	100.00%	0.00%	0.00%	0.00	0.00%	15.60%	0.00%	0.00%	15.60%	0.00%	18.35%	0.00%	50.46%
Field Sparrow	SB	44	107	62	0.37	1.99%	39	13.54%	57.94%	100.00%	0.00%	0.00%	0.00	6.45%	0.00%	3.23%	3.23%	3.23%	3.23%	1.61%	0.00%	79.03%
Dark-eyed Junco	SB	13	100	100	0.35	1.86%	6	2.08%	100.00%	100.00%	0.00%	0.00%	0.00	7.00%	0.00%	0.00%	0.00%	0.00%	0.00%	20.00%	5.00%	68.00%
Common Grackle	SB	14	89	89	0.31	1.66%	8	2.78%	100.00%	84.27%	15.73%	0.00%	0.05	2.25%	4.49%	1.12%	25.84%	21.35%	5.62%	5.62%	33.71%	0.00%
Black-capped Chickadee	SB	16	80	76	0.28	1.49%	9	3.13%	95.00%	100.00%	0.00%	0.00%	0.00	0.00%	0.00%	2.63%	0.00%	0.00%	10.53%	6.58%	0.00%	80.26%
Unknown Duck	WF	12	74	52	0.26	1.38%	5	1.74%	70.27%	0.00%	100.00%	0.00%	0.18	26.92%	0.00%	0.00%	71.15%	0.00%	1.92%	0.00%	0.00%	0.00%
Mallard	WF	17	60	31	0.21	1.12%	4	1.39%	51.67%	45.16%	6.45%	48.39%	0.01	58.06%	19.35%	0.00%	3.23%	6.45%	0.00%	0.00%	9.68%	0.00%
Unidentified Sparrow	SB	5	60	59	0.21	1.12%	0	0.00%	98.33%	100.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	44.07%	0.00%	55.93%
American Robin	SB	26	53	30	0.18	0.99%	16	5.56%	56.60%	100.00%	0.00%	0.00%	0.00	13.33%	0.00%	23.33%	13.33%	20.00%	6.67%	3.33%	10.00%	10.00%
Red-tailed Hawk	RVO	41	45	43	0.16	0.84%	18	6.25%	95.56%	39.53%	46.51%	13.95%	0.07	16.28%	9.30%	4.65%	23.26%	16.28%	6.98%	9.30%	9.30%	4.65%
Unknown Blackbird	SB	1	40	40	0.14	0.75%	1	0.35%	100.00%	0.00%	100.00%	0.00%	0.14	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
American Tree Sparrow	SB	5	38	37	0.13	0.71%	5	1.74%	97.37%	100.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	35.14%	64.86%
Ring-necked Pheasant	GB	23	37	8	0.13	0.69%	10	3.47%	21.62%	100.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	75.00%	0.00%	12.50%	12.50%	0.00%	0.00%
Mourning Dove	PD	23	34	24	0.12	0.63%	17	5.90%	70.59%	95.83%	4.17%	0.00%	0.00	45.83%	0.00%	12.50%	4.17%	4.17%	8.33%	25.00%	0.00%	0.00%
Tree Swallow	SB	13	30	30	0.10	0.56%	9	3.13%	100.00%	100.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.33%	10.00%	86.67%
Turkey Vulture	RVO	15	28	28	0.10	0.52%	9	3.13%	100.00%	14.29%	75.00%	10.71%	0.07	0.00%	0.00%	21.43%	14.29%	3.57%	0.00%	7.14%	46.43%	7.14%
Bald Eagle	RVO	21	27	26	0.09	0.50%	6	2.08%	96.30%	34.62%	30.77%	34.62%	0.03	19.23%	11.54%	0.00%	19.23%	23.08%	3.85%	0.00%	15.38%	7.69%
Cedar Waxwing	SB	8	27	22	0.09	0.50%	6	2.08%	81.48%	100.00%	0.00%	0.00%	0.00	0.00%	0.00%	36.36%	31.82%	31.82%	0.00%	0.00%	0.00%	0.00%
Ring-billed Gull	GT	6	25	25	0.09	0.47%	6	2.08%	100.00%	32.00%	68.00%	0.00%	0.06	0.00%	0.00%	0.00%	4.00%	8.00%	0.00%	8.00%	12.00%	68.00%
Killdeer	SH	16	23	11	0.08	0.43%	11	3.82%	47.83%	100.00%	0.00%	0.00%	0.00	36.36%	0.00%	18.18%	0.00%	0.00%	0.00%	0.00%	0.00%	45.45%
Common Yellowthroat	SB	12	22	0	0.08	0.41%	12	4.17%	0.00%	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Yellow Warbler	SB	5	21	14	0.07	0.39%	3	1.04%	66.67%	100.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	92.86%	0.00%	0.00%	7.14%	0.00%
Snow Goose	WF	2	20	20	0.07	0.37%	2	0.69%	100.00%	10.00%	0.00%	90.00%	0.00	0.00%	0.00%	0.00%	90.00%	10.00%	0.00%	0.00%	0.00%	0.00%
Clay-colored Sparrow	SB	13	17	0	0.06	0.32%	12	4.17%	0.00%	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Northern Flicker	WP	8	17	17	0.06	0.32%	6	2.08%	100.00%	100.00%	0.00%	0.00%	0.00	0.00%	29.41%	0.00%	17.65%	29.41%	17.65%	5.88%	0.00%	0.00%
American White Pelican	WB	3	16	16	0.06	0.30%	1	0.35%	100.00%	0.00%	100.00%	0.00%	0.06	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	18.75%	81.25%	0.00%
Western Meadowlark	SB	4	15	14	0.05	0.28%	3	1.04%	93.33%	100.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	50.00%	35.71%	0.00%	14.29%	0.00%	0.00%
Savannah Sparrow	SB	2	15	7	0.05	0.28%	0	0.00%	46.67%	100.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
Downy Woodpecker	WP	14	14	9	0.05	0.26%	10	3.47%	64.29%	100.00%	0.00%	0.00%	0.00	11.11%	0.00%	11.11%	33.33%	11.11%	11.11%	22.22%	0.00%	0.00%
Bank Swallow	SB	1	12	12	0.04	0.22%	1	0.35%	100.00%	100.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
Chipping Sparrow	SB	10	11	6	0.04	0.20%	8	2.78%	54.55%	100.00%	0.00%	0.00%	0.00	33.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	66.67%
Vesper Sparrow	SB	6	10	0	0.03	0.19%	6	2.08%	0.00%	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Song Sparrow	SB	7	9	0	0.03	0.17%	5	1.74%	0.00%	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Yellow-headed Blackbird	SB	4	8	7	0.03	0.15%	2	0.69%	87.50%	100.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
Eastern Bluebird	SB	3	8	8	0.03	0.15%	2	0.69%	100.00%	100.00%	0.00%	0.00%	0.00	12.50%	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%	62.50%	0.00%
Sedge Wren	SB	5	5	0	0.02	0.09%	5	1.74%	0.00%	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Least Flycatcher	SB	4	5	1	0.02	0.09%	4	1.39%	20.00%	100.00%	0.00%	0.00%	0.00	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Swainson's Hawk	RVO	4	5	3	0.02	0.09%	3	1.04%	60.00%	66.67%	33.33%	0.00%	0.00	0.00%	0.00%	0.00%	33.33%	33.33%	33.33%	0.00%	0.00%	0.00%
Belted Kingfisher	SB	4	4	3	0.01	0.07%	3	1.04%	75.00%	100.00%	0.00%	0.00%	0.00	66.67%	0.00%	0.00%	0.00%	33.33%	0.00%	0.00%	0.00%	0.00%
Eastern Kingbird	SB	3	4	2	0.01	0.07%	3	1.04%	50.00%	100.00%	0.00%	0.00%	0.00	50.00%	0.00%	0.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Rough-legged Hawk	RVO	3	4	4	0.01	0.07%	2	0.69%	100.00%	25.00%	25.00%	50.00%	0.00	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Eastern Wood-Pewee	SB	3	3	0	0.01	0.06%	3	1.04%	0.00%	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Grasshopper Sparrow	SB	2	2	0	0.01	0.04%	2	0.69%	0.00%	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Great Blue Heron	WA	2	2	2	0.01	0.04%	2	0.69%	100.00%	50.00%	50.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	50.00%	0.00%	0.00%	50.00%	0.00%
Northern Harrier	RVO	2	2	2	0.01	0.04%	0	0.00%	100.00%	100.00%	0.00%	0.00%	0.00	0.00%	0.00%	50.00%	0.00%	50.00%	0.00%	0.00%	0.00%	0.00%
American Kestrel	RVO	1	1	1	0.00	0.02%	1	0.35%	100.00%	100.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Blue-winged teal	WF	1	1	0	0.00	0.02%	0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Bobolink	SB	1	1	0	0.00	0.02%	1	0.35%	0.00%	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cooper's Hawk	RVO	1	1	1	0.00	0.02%	0	0.00%	100.00%	0.00%	100.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%
Marsh Wren	SB	1	1	0	0.00	0.02%	1	0.35%	0.00%	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Upland Sandpiper	SH	1	1	0	0.00	0.02%	0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Willow Flycatcher	SB	1	1	0	0.00	0.02%	1	0.35%	0.00%	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Wilson's Snipe	SH	1	1	0	0.00	0.02%	1	0.35%	0.00%	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		919	**5,368**	**4,404**	**18.64**	**100.00%**			**82.04%**				**1.53**	**7.86%**	**2.38%**	**3.63%**	**7.68%**	**10.13%**	**4.25%**	**9.33%**	**6.06%**	**48.67%**

Appendix B

Applicable Bird/Bat Best Management Practices and Conservation Measures

Best Management Practices (BMPs)	References	Project Application
Construction: Communication and other local utility cables shall be buried, where feasible.	VR-26, VRP 5-194	See Design Plans-Layout Plans.
Construction: Construction debris shall be removed from the site.	LU-3,LUP 5-14	X
Construction: Excess cut/fill materials shall be hauled in or out to minimize ground disturbance and impacts from fill piles. Material sources have been identified and will be obtained locally. Backfill will be utilized around turbines. Topsoil will be dispersed so farmers can farm again.	VR-22, VRP 5-193	See Construction Plans.
Construction: If needed during construction, only use explosives within specified times and at specified distances from sensitive wildlife or surface waters as established by the appropriate Federal and State agencies.	ER-7, ERP 5-130	X
Construction: Litter must be controlled and removed regularly during construction.	VR-30, VRP 5-194	X
Construction: Minimize the area disturbed during the installation of meteorological towers (i.e., the footprint needed for meteorological towers and associated laydown areas).	ER-2, ERP 5-129	See Design Plans-Layout Plans.
Construction: All construction activities will not occur during nesting season for ground nesting birds. If construction cannot be avoided during the nesting season, for grassland birds, nesting habitat will be made unsuitable (i.e., mowing) before nesting season begins. If that is not possible, a trained monitor will search for nests just before construction begins.	ER-3, ERP 5-129	See Design Plans-Layout Plans.
Decommissioning: All aboveground and near-ground structures, including turbines and ancillary structures, shall be removed from the site during decommissioning.	ER-23, ERP 5-132, VR-39, VRP 5-195	See Decommission Plan.
Decommissioning: Facilities constructed on Federal lands should follow the decommissioning recommendations provided in the USFWS's Land-Based Wind Energy Guidelines (USFWS 2012b).	ERP 5-132	See Decommission Plan.
Decommissioning: Salvage and reapply topsoil excavated during decommissioning activities to disturbed areas during final restoration activities.	ER-24, ERP 5-132	See Decommission Plan.
Decommissioning: When decommissioning sites, ensure that any wells are properly filled and capped.	WR-10, WRP 5-33	See Decommission Plan.
Design: Existing rocks, vegetation, and drainage patterns shall be preserved to the maximum extent possible.	VR-12, VRP 5-193	See Design Plans.
Design: No guy wires will be used. All permanent meterological towers will be free-standing. If guy wires are necessary for temporary structures, they shall be equipped with line marking devices.	ER-8, ERP 5-130	See Design and Layout Plans.
Design: Power collection cables or lines on the site should be buried in a manner that minimizes additional surface disturbance (e.g., collocating them with access roads).	VR-26, VRP 5-194, ERP 5-129	See Design, Layout and Construction Plans.
Design: Tower lighting will be in compliance with the 2016 Federal Aviation Administration guidance.		See Design Plans.
General: Conduct construction and maintenance activities when the ground is frozen or when soils are dry and native vegetation is dormant.	SR-5, SRP 5-25	See Construction Plan.
General: Facilities and off-site surrounding areas shall be kept clean of debris, "fugitive" trash or waste, and graffiti. Scrap heaps and materials dumps shall be prohibited and prevented. Materials storage yards, even if thought to be orderly, shall be kept to an absolute minimum. Surplus, broken, disused materials and equipment of any size shall not be allowed to accumulate.	VR-35, VRP 5-194	X
Haz. Materials: Dispose of excess excavation materials in approved areas to control erosion and minimize leaching of hazardous materials.	SR-8, SRP 5-26	See Hazardous Material Plan and Erosion Control Plan.
Haz. Materials: Hazardous materials and waste storage areas or facilities shall be formally designated and access to them restricted to authorized personnel. Construction debris, especially treated wood, shall not be disposed of or stored in areas where it could come in contact with aquatic habitats.	HM-16, HM 5-249	See Hazardous Material Plan and Design Plans.
Wildlife/Vegetation: If pesticides/herbicides are to be used on the site, develop an integrated pest and vegetation management plan to ensure that applications will be conducted within the framework of managing agencies and will entail the use of only EPA-registered pesticides/herbicides that are (1) nonpersistent and immobile and (2) applied by licensed applicators in accordance with label and application permit directions, following stipulations regarding suitability for terrestrial and aquatic applications.	HM-3, HMP 5-247	See Integrated Pest & Vegetation Management Plan.

Best Management Practices (BMPs)	References	Project Application
Haz. Materials: Limit herbicide and pesticide use to nonpersistent, immobile compounds and apply them using a properly licensed applicator in accordance with label requirements.	WR-6, WRP 5-33	See Integrated Pest & Vegetation Management Plan.
Haz. Materials: Prepare a hazardous materials and waste management plan that addresses the selection, transport, storage, and use of all hazardous materials needed for construction, operation, and decommissioning of the facility for local emergency response and public safety authorities and for the regulating agency, and that addresses the characterization, on-site storage, recycling, and disposal of all resulting wastes. The plan shall include a comprehensive hazardous materials inventory; Material Safety Data Sheets (MSDSs) for each type of hazardous material; emergency contacts and mutual aid agreements, if any; site map showing all hazardous materials and waste storage and use locations; copies of spill and emergency response plans (see below), and hazardous materials-related elements of a decommissioning/ closure plan. The waste management plan shall identify the waste streams that are expected to be generated at the site during construction and operation and address hazardous waste determination procedures, waste storage locations, waste-specific management and disposal requirements (e.g., selecting appropriate waste storage containers, appropriate off-site treatment, storage, and disposal facilities), inspection procedures, and waste minimization procedures. The plan shall address solid and liquid wastes that may be generated at the site in compliance with CWA requirements if a NPDES permit is needed.	HM-1, HMP 5-247	See Hazardous Materials Plan.
Maintenance: Promptly dispose of all garbage or human waste generated on site in order to avoid attracting nuisance wildlife.	ER-15, ERP 5-131	X
Maintenance: Clean and maintain catch basins, drainage ditches, and culverts regularly.	WR-5, WRP 5-33	X
Maintenance: Refueling areas shall be located away from surface water locations and drainages and on paved surfaces; features shall be added to direct spilled materials to sumps or safe storage areas where they can be subsequently recovered.	HM-12, HMP 5-248	See Design Plan-Refueling Areas.
Maintenance: Wind facilities and sites shall be actively and carefully maintained during operation. Wind energy projects shall evidence environmental care, which would also reinforce the expectation and impression of good management for benign or clean power.	VR-32, VRP 5-194	X
General: Minimize ground-disturbing activities, especially during the rainy season.	SR-1, SRP 5-25	X
Maintenance: Invasive species will be regularly monitored.	VR-32, VRP 5-194	See Invasive Species Prevention Plan.
Restoration: A site restoration plan shall be in place prior to construction. Restoration of the construction areas shall begin immediately after construction to reduce the likelihood of visual contrasts associated with erosion and invasive weed infestation and to reduce the visibility of affected areas as quickly as possible. Weed-free native grasses, forbs and shrubs will be used during re-seeding operations. No trees will be cleared/removed (all treed areas will be bored or avoided).	VR-9, VRP 5-192	See Site Restoration Plan and Invasive Species Prevention Plan.
Safety: Drip pans shall be used under the fuel pump and valve mechanisms of any bulk fueling vehicles and during on-site refueling to contain accidental releases.	HM-13, HMP 5-248	X
Safety: Use proper signage and/or engineered barriers (e.g., fencing) to limit access to electrically energized equipment and conductors in order to prevent access to electrical hazards by unauthorized individuals or wildlife.	HS-9, HSP 5-257	X
Siting: Avoid locating wind energy developments in areas of unique or important recreation, wildlife, or visual resources. When feasible, a wind energy development should be sited on already altered landscapes.	LUP 5-14	See Design-Layout Plan.
Siting: Consolidate infrastructure wherever possible to maximize efficient use of the land and minimize impacts. Existing transmission and market access should be evaluated and use of existing facilities should be maximized.	LUP 5-14	See Design-Layout Plan.
Siting: Consult with Federal, State, and county agencies; tribes; property owners; and other stakeholders as early as possible in the planning process to identify potentially significant land use conflicts and issues and State and local rules that govern wind energy development.	LUP 5-14	This Avian and Bat Protection Plan is part of the Site Permit Application (requirement for MN Dept. of Commerce and associated agencies).
Siting: Minimize the extent of land disturbance to the extent possible.	WRP 5-33	See Design-Layout Plan. Temporary land disturbance of approximately 172 acres for project construction. Permanent land disturbance will be approximately 12 acres for turbines and associated facilities.
Siting: Through site design, the number of structures required should be minimized. Activities should be combined and carried out in one structure, or structures should be collocated to share pads, fences, access roads, lighting, etc.	VRP 5-190	See Design-Layout Plan.
Vegetation: Reduce habitat disturbance by keeping vehicles on access roads and minimizing foot and vehicle traffic through undisturbed areas.	ER-4, ERP 5-130	X
Wetlands/Vegetation: For wetland and grassland easements, coordinate closely with the USFWS or USDA during initial project planning to ensure that wetland and grassland easements are avoided to the extent practicable.	LUP 5-15	Coordinated as part of the Site Permit Application.

Best Management Practices (BMPs)	References	Project Application
Wildlife/Vegetation: Contact appropriate Federal and State agencies (including State entities responsible for permitting energy development projects) early in the planning process to identify potentially sensitive ecological resources known to be present or likely to be present in the vicinity of the wind energy development.	WRP 5-128	Coordinated as part of the Site Permit Application.
Wildlife/Vegetation: Do not locate individual meteorological towers in or adjacent to sensitive habitats or in areas where ecological resources known to be sensitive to human activities are present.	WRP 5-129	See Design-Layout Plan.
Wildlife/Vegetation: Review existing information on species and habitats in the project area. Identify important, sensitive, or unique habitat (including large contiguous tracts of grassland habitat) and biota in the project site and vicinity, and design the project to avoid, minimize, or mitigate potential impacts on these resources. Avoidance is the typically the most effective, and therefore preferred, choice for minimizing impacts. The design and siting of the facility should follow appropriate guidance and requirements from Western and the USFWS (as specified for each species in the selected alternative in the Final PEIS) as well as those required by State permitting agencies, and other resource agencies, as available and applicable. For birds specifically, attention should be given to project placement that may be within or near Important Bird Areas (http://netapp.audubon.org/iba) or Hemispheric or Regional Western Hemisphere Shorebird Reserve Network sites (http://www.whsrn.org/whsrn-sites), or where bird species or habitats of conservation concern are known to occur. The IBA Program has identified the most essential areas for birds, and conservation of these areas will provide for long-term protection of biodiversity. Sources of information on these important habitats can be found at http://ecos.fws.gov/ipac, http://www.avianknowledge.net, and http://web4.audubon.org/bird/iba.	WRP 5-127	This Avian and Bat Protection Plan is part of the Site Permit Application (requirement for MN Dept. of Commerce and associated agencies).
Wildlife: Avoid constructing turbines in areas of concentrated prey base for raptors (e.g., prairie dog towns).	ERP 5-130	Aerial raptor nest surveys were conducted in Spring 2017. See Sections 6.1.2, 6.1.3, 6.1.4 and 6.1.5 of this Avian and Bat Protection Plan.
Wildlife: Consult with the appropriate natural resource agencies to avoid scheduling construction activities during important periods for wildlife courtship, breeding, nesting, lambing, or calving that are applicable to sensitive species within the project area.	ERP 5-130	This Avian and Bat Protection Plan is part of the Site Permit Application (requirement for MN Dept. of Commerce and associated agencies).
Wildlife: Establish buffer zones around known raptor nests, bat roosts, and biota and habitats of concern if site evaluations show that proposed construction activities would pose a significant risk to avian or bat species of concern.	ER-6, ERP 5-130	This Avian and Bat Protection Plan is part of the Site Permit Application (requirement for MN Dept. of Commerce and associated agencies).
Wildlife: Evaluate potential avian and bat use (including the locations of active nest sites, colonies, roosts, and migration corridors) of the project and use data to plan turbine (and other structure/infrastructure) locations to minimize impacts.	ERP 5-128	See Section 6.0 of this Avian and Bat Protection Plan.
Wildlife: Evaluate the potential for the wind energy project to adversely affect bald and golden eagles in a manner consistent with the Eagle Conservation Plan Guidance (USFWS 2013a). Early in the planning of transmission interconnection and wind farm location, coordination with USFWS Field Offices regarding the guidance is highly recommended. Documented occurrence of eagles can be acquired from the local USFWS Ecological Services office, State wildlife agencies, or State natural heritage databases in some cases, although on-site surveys may be needed. In accordance with the USFWS's Land-Based Wind Energy Guidelines (USFWS 2012b), surveys during early project development should identify all important eagle use areas (nesting, foraging, and winter roost areas) within the project's footprint. If recent data are available on the spacing of occupied eagle nests for the project-area nesting population, these data can be used to delineate an appropriate boundary for the project area. If appropriate survey data are unavailable, the USFWS suggests that the project area, for the purpose of evaluating potential effects on eagles, be defined as the project footprint together with areas within 10 mi (16 km) of the footprint boundary. As described in the USFWS's Land-Based Wind Energy Guidelines (USFWS 2012b), project developers should evaluate the need to develop an ECP.	ERP 5-128	See Sections 6.1.1.1, 6.1.2, 6.1.3, 6.1.3.1, 6.1.4, 6.1.5 of this Avian and Bat Protection Plan.
Wildlife: Follow the recommendations provided in the USFWS's Land-Based Wind Energy Guideline (USFWS 2012b) and, as appropriate, the Eagle Conservation Plan Guidance (USFWS 2013a). In addition, follow guidelines or recommendations developed by individual States (e.g., IDNR 2011; Kempema 2009; Nebraska Wind and Wildlife Working Group 2011) to address potential effects of wind energy development on ecological resources.	WRP 5-126	See Sections 6.1.1.1, 6.1.2, 6.1.3, 6.1.3.1, 6.1.4, 6.1.5 of this Avian and Bat Protection Plan.
Wildlife: If appropriate, conduct surveys for presence of Federal- and State-protected species and other species of concern and the habitats for such species that have a reasonable potential to occur within the project area based on habitat characteristics. Consult with the USFWS and/or appropriate State agency to identify species likely to be present and appropriate survey techniques, determine permit needs, and identify/apply species-specific avoidance and minimization measures.	WRP 5-128	Coordination with Federal and State agencies is occuring as this document is included in the Site Permit Application process.
Wildlife: If significant impacts on Important Bird Areas (IBAs) or similar ecologically important avian areas are not avoided, minimized, or mitigated, then this Final PEIS would not apply and a separate project specific NEPA evaluation must be developed and approved by the appropriate responsible federal agency prior to project construction.	WRP 5-128	This Project adheres to the Final PEIS.

Best Management Practices (BMPs)	References	Project Application
Wildlife: In the absence of long-term mortality studies, monitor regularly for potential wildlife problems including wildlife mortality. Report observations of potential wildlife problems, including wildlife mortality, to the appropriate State or Federal agency in a timely manner, and work with the agencies to utilize this information to avoid/minimize/offset impacts. The Ecological Services Division of the USFWS shall be contacted. Development of additional mitigation measures may be necessary.	ER-22, ERP 5-131	See this document, Avian and Bat Protection Plan.
Wildlife: If mortality monitoring indicates that it is necessary, **i**ncreasing turbine cut-in speeds (i.e., prevent turbine rotation at lower wind velocity) in areas of bat conservation concern during times when active bats may be at particular risk from turbines. For all turbines and at all times, the hub would not be locked, but blades would be feathered to the wind such that revolution per minute would be minimal during periods when wind speed is less than the projects set cut-in speed [3.0 m/s].	ER-20, ERP 5-131	Cut-in speeds = 6.7 mph (3 m/s) for both GE 2.3 and GE 2.5 turbines.
Wildlife: Instruct employees, contractors, and site visitors to avoid harassment and disturbance of wildlife, especially during reproductive (e.g., courtship and nesting) seasons. Pets shall not be allowed on the project area. If breeding wildlife is observed, the site supervisor will be notified and the wildlife will be avoided.	ER-21, ERP 5-131	X
Wildlife: Place marking devices on any newly constructed or upgraded transmission lines, where appropriate, within suitable habitats for sensitive bird species.	ER-14, ERP 5-131	X
Wildlife: Prepare a Avian and Bat Protection Plan (ABPP). The overall goal of such a plan is to reduce or eliminate avian and bat mortality; implementation of a ABPP builds support for a FONSI when projects tier from the PEIS. The wind energy facility developer should work closely with the USFWS and the appropriate State wildlife agencies to identify protective measures to include in the plan. These would include project design measures, construction phase measures, operational phase measures, and decommissioning phase measures. A minimum of 1 yr of post-construction monitoring is needed to validate the preconstruction risk assessment and allow the facility owner to adjust operations based on identified problems. Based on project location in proximity to occupancy, habitat, and other attributes that may increase the risk to birds and bats, multiyear post-construction monitoring may be necessary at some project sites. It is of paramount importance that post-construction surveys are accurate estimates of fatality at wind power facilities. Simple carcass counts at wind energy facilities are inaccurate and underestimate the total number of fatalities because not all carcasses are found due to factors such as unsearchable terrain, carcass removal by scavengers, and less than perfect searcher efficiency. Post-construction surveys for mortality must be robust and standardized to provide reliable results upon which to base adaptive management decisions. For these reasons, using a fatality estimator model is critical. The USFWS recommends a model like the Evidence of Absence model developed by Huso et al. (2014). The user's guide and software developed to estimate bird and bat fatalities at wind-power facilities (Dalthorp et al. 2014) can be found at http://pubs.usgs.gov/ds/0881. The Evidence of Absence software provides for comparison of various combinations of search coverage, search interval, and searcher efficiency that all produce the same overall level of carcass detection probability. Results of monitoring activities shall be reported to the appropriate State or Federal agencies in a timely manner. If bat monitoring is appropriate for the site, installation of bat acoustic monitors should be considered at the time meteorological towers are installed to reduce costs and minimize delays by collecting data early during the site review process.	WRP 5-126	See this document, Avian and Bat Protection Plan.
Wildlife: The transmission lines shall be designed and constructed with regard to the recommendations in Avian Protection Plan Guidelines (APLIC and USFWS 2005), in conjunction with Suggested Practices for Avian Protection on Power Lines (APLIC 2006) and Reducing Avian Collisions with Power Lines (APLIC 2012), to reduce the operational and avian risks that result from avian interactions with electric utility facilities.	ER-1, ERP 5-128	See this document, Avian and Bat Protection Plan.
Wildlife: Tier to the Final Programmatic EIS. The responsible federal agency will use a tiered NEPA evaluation to document avoidance, minimization, or mitigation of impacts to important bird habitat (e.g., established private, State, or federal special management areas for birds, IBAs, Regional Western Hemisphere Shorebird Reserve Network, [http://www.whsrn.org/whsrn-sites], etc.) to achieve no significant impact to avian resources. On a project-by-project basis, developers should contact local USFWS offices early in the planning process to identify areas of conflict with specific avian species or important bird habitat. Developers shall work with USFWS and Western to develop avoidance, minimization, or mitigation measures to adequately demonstrate their project will have no significant impact on avian resources. In these cases, individual projects determined to be consistent with the selected alternative in the Final PEIS will require a FONSI to document consistency.	ER 5-127	X
Wildlife: Turn off unnecessary lighting at night to limit attraction of migratory birds. Follow lighting guidelines, where applicable, from the Wind Energy Guidelines Handbook. This includes using lights with timed shutoff, downward-directed lighting to minimize horizontal or skyward illumination, and avoidance of steady-burning, high-intensity lights.	ER-19, ERP 5-131	X

Appendix C

Protocol: Post-Construction Avian and Bat Studies

December 29, 2017

Protocol - Post Construction Avian and Bat Studies
Palmer's Creek Wind Farm

This document is prepared in conformance with the **U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines** and serves as the Post Construction Avian and Bat Study Protocol for the Palmer's Creek Wind Farm (PCWF), located north of Granite Falls, Chippewa County, Minnesota. The purpose of the proposed protocol is to satisfy the requirements of the PCWF Avian and Bat Protection Plan. The anticipated tasks include:

- Post-Construction Fatality Monitoring, including Searcher Efficiency Trials and Carcass Removal Trials

Post Construction Fatality Monitoring

Post Construction Fatality Monitoring will be conducted for the first three years of operation in accordance with Tier 4 of the U.S. Fish and Wildlife Service' Land-Based Wind Energy Guidelines and designed to answer the following questions:

- What are the fatality rates for the project?
- What are the fatality rates for species of concern?
- How do the estimated fatality rates compare to the predicted rates?
- Do fatalities vary within the project site in relation to site characteristics?
- How do the fatality rates compare to other projects in similar landscapes?
- What is the composition of fatalities in relation to migrating vs. resident birds/bats?
- Do the data suggest the need to employ measures to reduce impacts?
- All eighteen turbines will be monitored.

Carcass searches will be conducted for three full years, commencing within 60 days of COD, as allowed by weather conditions and safety considerations.

- Four times per week from March 15 until November 15
- Twice per month from December through February

The following information will be recorded at each turbine site:

- Weather conditions
- Ground cover conditions
- Start and finish times of survey
- Potential prey species, other than birds, observed within the survey area

Potential scavenge items, other than birds, will be either buried or removed.

Ten turbines will be included in the carcass searches, including Turbines #1, 2, 5, 9, 10 and 12. The survey area will be a 60-meter radius around each turbine.

Searches will take place at 10-meter transects out to 60 meters with a search area of 10 m centered on the transect centerline (5 m on each side). During periods of snow cover or other unsafe conditions, search patterns and methods may be modified to include different transect patterns and/or road and pad searches. Modified search methods will be documented in the permanent field notes.

All searches, with or without fatalities, shall be recorded on an Incident Report Form (Attached).

The USFWS, MNDOC, MNPUC and MNDNR (Interested Parties) shall be notified if:

- 5 or more dead or injured non-listed avian or bat species are discovered within a survey week, or;
- 1 or more dead or injured state threatened or endangered species or species of special concern, or;
- 1 or more dead or injured federally listed species, or;
- 1 or more dead or injured bald or gold eagle.

The specimen(s) shall be geo-located and the coordinates provided to Interested Parties.

Searcher Efficiency Trials

Searcher Efficiency Trials shall be conducted to estimate the proportion of carcasses found by searchers.

A minimum of 100 carcasses/year will be used for the trials.

Trials will be conducted during each season (spring, summer, fall, winter).

Carcasses representing small, medium and large birds/bats will be used.

Carcasses will be discreetly marked before placement.

The location of all placed carcasses will be marked with GPS.

All field personnel involved in Fatality Monitoring will be involved in Searcher Efficiency Trials.

A carcass missed by the searcher but found by the trial conductor shall be considered “Available-Not Detected”.

A carcass missed by the searcher and not found by the trial conductor shall be considered “Unavailable”. It will be assumed that this carcass was scavenged or otherwise removed.

At the end of each trial, the searcher efficiency will be calculated.

Unless being used for Carcass Removal Trials, all carcasses placed will be removed after Searcher Efficiency Trials have concluded.

Carcass Removal Trials

Carcass Removal Trials will be conducted to estimate the average length of time a carcass remains in the area and is potentially detectable.

Removal can be by scavenging or by other means, such as being buried or concealed during cultivation.

Carcasses will be placed in various locations under turbines and their location recorded by GPS.

The carcasses will be checked every day for the first four days, and then on day 7, 10, and 14, after which all remains will be removed and disposed of.

Reporting

An Annual Report shall be submitted to the Interested Parties by March 30 of the following year. The Annual Report shall:

1. Identify fatalities, including location and date of discovery;
2. List Total number of fatalities for each Quarter;
3. Include adjusted fatality estimates for each season and for small, medium and large birds, as well as bats
4. Include an analysis of spatial, seasonal and habitat relationships to the fatalities
5. Present standardized results using accepted statistical analyses

Personnel

Post Construction Avian and Bat Studies performed at Palmer’s Creek Wind Farm will be supervised by Michael Rutledge, a qualified biologist. All team members participating in the surveys will receive a minimum of 6 hours of classroom and field training.

Palmer's Creek Wind Farm Fatality Monitoring Survey Data Form
Site Summary

Observer Name: _____ Survey Start Time: _____

Date: _____ Survey End Time: _____

Turbine ID: _____

Weather:

- ¨ Clear
- ¨ Partly Cloudy
- ¨ Overcast
- ¨ Fog
- ¨ Rain

Temperature (Beginning of survey): _____

Ground Cover/Visibility Class: ¨ **A** ¨ **B** ¨ **C** ¨ **D**

Prey Species On-Site: ¨ No ¨ Yes, Complete below

Species: _____

Distance from Turbine _____

Direction from Turbine _____

Fatalities Discovered: ¨ No ¨ Yes, Complete Incident Report Form for each fatality

Total Fatalities: _____

Injuries Discovered: ¨ No ¨ Yes, Complete Incident Report Form for each injury

Total Injuries: _____

Notes:

***Ground Cover Type/Visibility Class:**
A-More than 90% bare ground, sparse vegetation less than 6" tall
B-More than 25% bare ground, mostly sparse vegetation less than 6" tall
C-Less than 25% bare ground, less than 25% of vegetation is more than 12" tall or ground is rocky/scrubby
D-Less than 25% bare ground, more than 25% of vegetation is more than 12" tall

Incident Report Form

¨ Bird ¨ Bat Identification Number________________________________

Species (If known)____

Carcass : ¨ Complete ¨ Dismembered ¨ Partial

Carcass Condition: ¨ Fresh ¨ Decomposing ¨ Desiccated

Time Since Death: ¨ < 1 day ¨ < 1 week ¨ > 1 week ¨ Unknown

Notes:____

¨ Bird ¨ Bat Identification Number________________________________

Species (If known)____

Carcass : ¨ Complete ¨ Dismembered ¨ Partial

Carcass Condition: ¨ Fresh ¨ Decomposing ¨ Desiccated

Time Since Death: ¨ < 1 day ¨ < 1 week ¨ > 1 week ¨ Unknown

Notes:____

¨ Bird ¨ Bat Identification Number________________________________

Species (If known)____

Carcass : ¨ Complete ¨ Dismembered ¨ Partial

Carcass Condition: ¨ Fresh ¨ Decomposing ¨ Desiccated

Time Since Death: ¨ < 1 day ¨ < 1 week ¨ > 1 week ¨ Unknown

Notes:____

¨ Bird ¨ Bat Identification Number________________________________

Species (If known)____

Carcass : ¨ Complete ¨ Dismembered ¨ Partial

Carcass Condition: ¨ Fresh ¨ Decomposing ¨ Desiccated

Time Since Death: ¨ < 1 day ¨ < 1 week ¨ > 1 week ¨ Unknown

Notes:____

***Procedure for Carcass Marking**

Photograph carcass front and back with pen or other item in picture for size reference. Save Images.

From Main Screen, tap "Mark Waypoint". Tap on "Edit" on the next screen. Tap on numeric field at top of screen. Enter Carcass Identifier using the following format: Two digit Turbine # (ex. OT01, CC01), dash, six digit date, dash, four digit sample number. Tap the checkmark at the bottom of the screen to save your entries. Tap on the three lines icon at the bottom of the screen and select "Change Photo". Select the best photo of the carcass in question and then select "Use" from the bottom of the screen. Tap "Save" at the bottom of the screen and you are done.

Appendix D

Eagle Nest and Use Monitoring Protocol

Eagle Nest and Use Monitoring
Eagle Nest and Use Monitoring will be used to determine whether the eagles are using areas within the Project for foraging or other activities.

Monitoring will continue for one year of operation, at a minimum.

Any eagle nest located will be monitored a minimum of 2 days per week, 8 hours per day, from the time the nest is discovered and active until the chicks fledge.

Data recorded during monitoring will include the following:

- Date and time of observations
- Weather conditions
- Flight paths
- Flight heights
- Habitats used
- Number of chicks

After the one year of monitoring, operations personnel will continue to survey for new bald eagle nests within the project area for the life of the permit.

Results of the Post-Construction Eagle Nest Monitoring will be reported in an Annual Report to the PUC, the USFWS and MNDNR.

Personnel
Post-Construction Avian and Bat Studies performed at Palmer's Creek Wind Farm will be supervised and/or performed by Michael Rutledge, a qualified biologist.


WENCK
Responsive partner.
Exceptional outcomes.