Palmer's Creek Wind Farm

Final Environmental Assessment
Chippewa County, Minnesota

Western Area
Power Administration

DOE/EA-2053
July 2018

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LIST OF ABBREVIATIONS

Abbreviation	Term/Phrase/Name
AADT	annual average daily traffic
APE	Area of Potential Effects
Applicant	Palmer's Creek Wind Farm, LLC
BA	Biological Assessment
BMP	Best Management Practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CREP	Conservation Reserve Enhancement Program
dBA	A-weighted decibels
DWSMA	Drinking Water Supply Management Area
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Administration
FPPA	Farmland Protection Policy Act
FSA	Farm Service Agency
GHGs	Greenhouse Gas Emissions
HAP	Hazardous Air Pollutant
IBA	Important Bird Area
kV	kilovolt
MBS	Minnesota Biological Survey
MNDNR	Minnesota Department of Natural Resources

Abbreviation	Term/Phrase/Name
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NAC	Noise Area Calculation
NEPA	National Environmental Policy Act of 1969
NHIS	Natural Heritage Information System
NHPA	National Historic Preservation Act
NLEB	Northern Long-Eared Bat
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O&M	Operations and Maintenance
OP	Observer Points
Palmer's Creek	Palmer's Creek Wind Farm, LLC
PEIS	Programmatic Environmental Impact Statement
PSD	Prevention of Significant Deterioration
PWI	Public Waters Inventory
PWP	Permanent Wetland Preserve
RIM	Reinvest in Minnesota
SGCN	Species in Greatest Conservation Need
SHPO	State Historic Preservation Office
SODAR	Sonic Detection And Ranging
SPP	Southwest Power Pool
SWPPP	Storm Water Pollution Prevention Plan

TCS	Tribal Cultural Specialist
Abbreviation	**Term/Phrase/Name**
THPO	Tribal Historic Preservation Offices
UGP	Upper Great Plains
UFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
VOCs	Volatile Organic Compounds
WAPA	Western Area Power Administration
WTG	Wind Turbine Generator

1. INTRODUCTION

Palmer's Creek Wind Farm, LLC (Palmer's Creek or Applicant) proposes to construct the Palmer's Creek Wind Farm (Project), a Large Wind Energy Conversion System, with a 44.6- megawatt (MW) nameplate capacity in Chippewa County, Minnesota (**Figure 1**). The project area consists of 18 wind turbines located on approximately 6,150 acres of privately owned land. The Project (Proposed Action) would also include associated access roads, a new collector substation, an operations and maintenance (O&M) facility, and associated transmission interconnection facilities. Palmer's Creek further proposes to interconnect the Project to an existing Western Area Power Administration (WAPA) substation, the Granite Falls Substation, which is within the project area boundary.

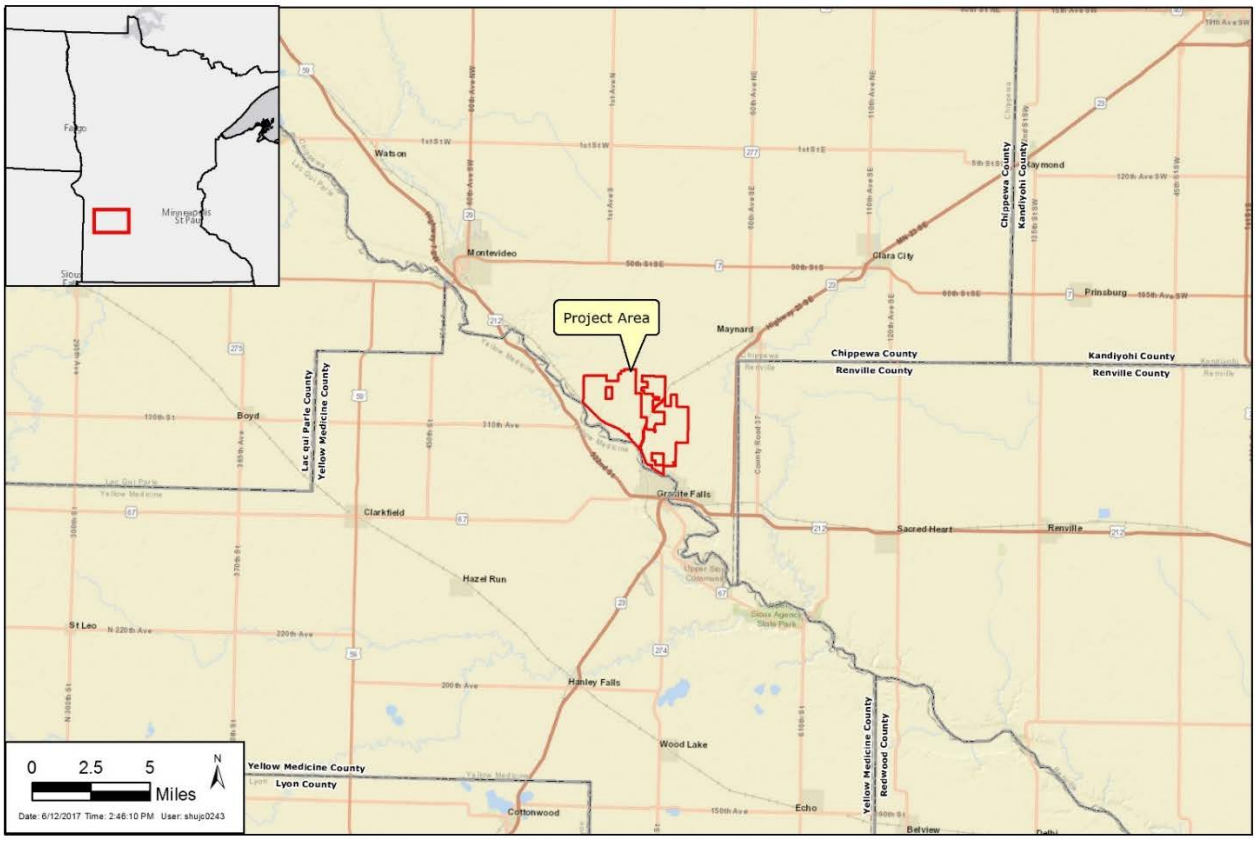

Figure 1: Site Location Map

The interconnection of the proposed Project to WAPA's transmission system is a Federal action under the National Environmental Policy Act of 1969 (NEPA). This Environmental Assessment (EA) tiers from the analysis conducted in the Upper Great Plains (UGP) Wind Energy Final Programmatic Environmental Impact Statement (PEIS), a document prepared jointly by WAPA and the U.S. Fish and Wildlife Service (USFWS) (WAPA and USFWS, 2015a). The UGP region encompasses all or parts of the States of Iowa, Minnesota, Montana, Nebraska, North Dakota, and South Dakota, including Chippewa County, Minnesota. The PEIS assesses environmental impacts associated with wind energy development and identifies best management practices (BMPs) to

avoid and minimize those impacts. As stated in the Executive Summary of the PEIS, if wind energy project developers are willing to implement the applicable evaluation process, BMPs, and conservation measures identified in the PEIS, the NEPA evaluation for that wind energy project may tier off the analyses in the PEIS. Applicable material from the PEIS is incorporated by reference in this EA in accordance with 40 Code of Federal Regulations (CFR) §§ 1502.20 and 1508.28. The analysis in this EA is Project-specific and focuses on site-specific issues that are not already addressed in sufficient detail in the PEIS. This EA is intended to be read in conjunction with the PEIS, and the EA and PEIS together comprise the NEPA documentation for this Federal action. Palmer's Creek has committed to implementing the applicable BMPs and conservation measures from the PEIS to allow for tiering.

1.1 WAPA's Purpose and Need

WAPA's purpose and need is to consider and respond to Palmer's Creek interconnection request in accordance with the Southwest Power Pool (SPP) Tariff and the Federal Power Act as described in Section 1.1.1 of the PEIS (WAPA 2015a). WAPA is currently operating under the SPP Tariff.

1.2 Palmer's Creek Goals and Objectives

Palmer's Creek goals and objectives for the Project are to provide an economically viable, reliable, and cost-effective source of renewable energy to users in Minnesota, the Dakotas and throughout WAPA's service area. To accomplish this, the Project must be technically, environmentally, and economically feasible, and therefore, Palmer's Creek needs:

- Reliable wind resources capable of producing enough power for the Project to be economically viable,
- Landowners willing to participate in the Project,
- Environmental conditions that allow the Project to comply with applicable environmental regulation at a reasonable cost,
- An interconnection agreement with WAPA to interconnect the project to WAPA's system,
- A transmission service agreement for transmission of power across WAPA's system lines, and
- A Power Purchase Agreement with a customer (power purchaser) at a price that is economically viable for the Project.

2. DESCRIPTION OF PROPOSED ACTION AND NO ACTION ALTERNATIVES

This EA analyzes two alternatives, the Proposed Action and the No Action Alternative.

2.1 Proposed Action

Palmer's Creek's Proposed Action is to construct and operate the Palmer's Creek Wind Farm and enter into an interconnection agreement with WAPA to connect the Palmer's Creek Project to WAPA's Granite Falls Substation. As part of the Proposed Action, WAPA would install necessary equipment in their existing substation to accept the generated power.

2.1.1 Palmer's Creek Wind Farm

The Palmer's Creek Wind Farm would consist of two (2) 2.3-MW and sixteen (16) 2.5-MW wind turbines with an aggregate nameplate capacity of 44.6 MW. The Project would also include:

- Underground electric collector lines,
- New central collector substation (Palmer's Creek Substation),
- Approximately 1000-foot long transmission line interconnecting the Granite Falls Substation,
- O&M facility,
- Access roads connecting to each turbine,
- One permanent meteorological tower,
- Supervisory control and data acquisition system, and
- Temporary laydown yard.

Figure 2 shows the proposed layout of the Project facilities. The expected life of the Project is approximately 20 to 40 years.

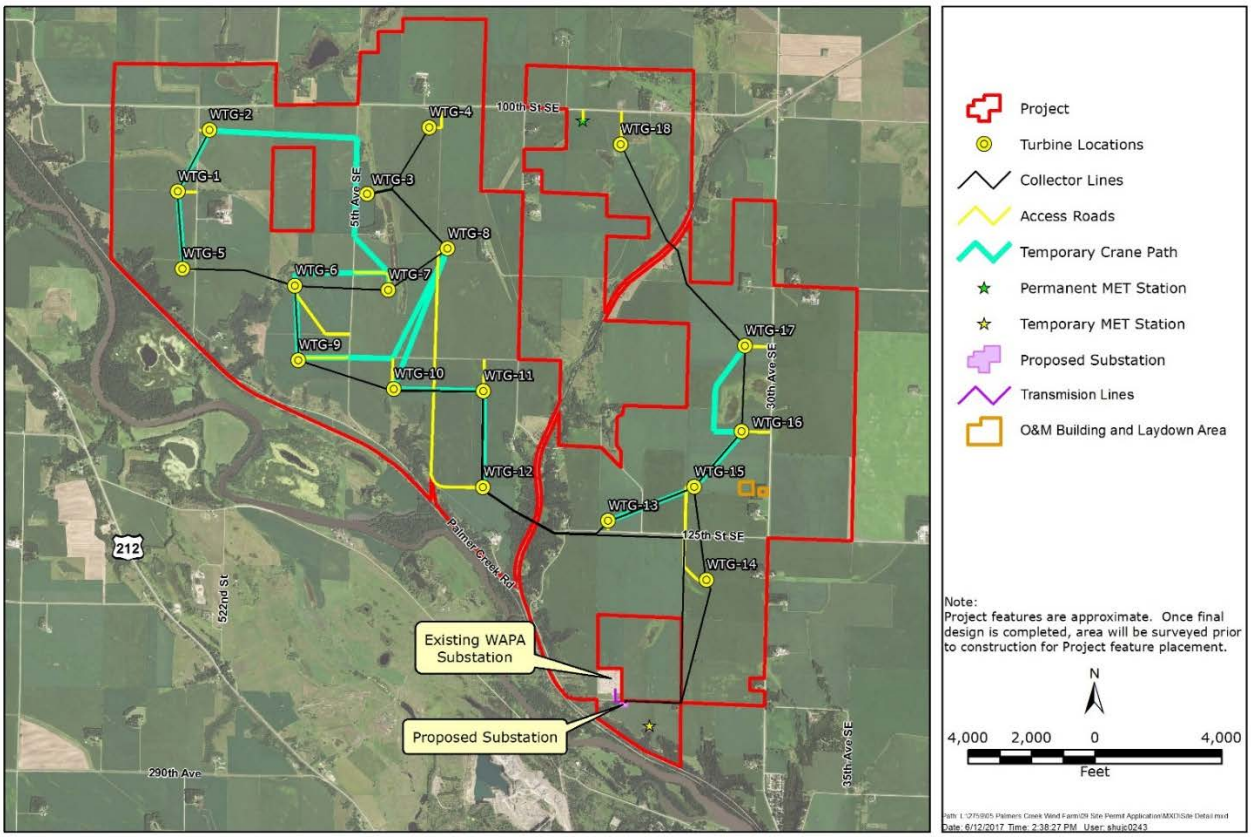

Figure 2: Site Detail Map

2.1.1.1 Wind Turbines

Palmer's Creek plans to install two (2) 2.3-MW and sixteen (16) 2.5-MW horizontal axis wind turbine generators (WTG) for the Project. Each turbine would have a hub height of between 262 and 295 feet and a turbine rotor diameter of approximately 380 feet. The total height of each turbine would be approximately 485 feet with a blade in the vertical position. Additional specifications for the proposed turbine model are provided for reference in **Appendix A** of this EA. Turbine towers would be cylindrical monopoles, approximately 262 to 295 feet in height. The towers would 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 would be non-reflective light grey, and all surfaces would be multi-layer coated for protection against corrosion. Marking and lighting of the wind farm would be done in compliance with Federal Aviation Administration (FAA) regulations.

2.1.1.2 Wind Turbine Foundations

The wind turbine foundations would typically be concrete spread foundations. The actual foundation for each turbine would 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 a 262-foot 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. Figure 3.3-1 in the PEIS shows a typical foundation under construction. The excavated area for the turbine foundations would typically be approximately 75 feet by 75 feet, approximately 0.1 acres.

During construction, a larger area (approximately 300 feet diameter) would be used to lay down the rotors and maneuver cranes during turbine assembly (See Figure 3.3-3 in the PEIS).

2.1.1.3 Generator Step-up Transformers

A generator step up transformer would 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-kilovolt (kV)). The transformers would be mounted on concrete pads and would be placed next to each wind turbine.

2.1.1.4 Access Roads

Approximately 5.5 miles of new or upgraded roads would be constructed to facilitate both construction and maintenance of the wind turbines. These roads have been designed to minimize length and construction impact. Initially, turbine access roads would be approximately 40 feet in width to accommodate the safe operation of construction equipment. Upon completion of construction, the turbine access roads would be reclaimed and narrowed to an extent allowing for the routine maintenance of the facility, or approximately 16 feet in width.

The wind turbines would be accessible from gravel access roads, which would follow fence lines, field lines, and existing field access roads to the extent possible. Siting roads in areas with unstable soil would be avoided wherever possible. Roads would include appropriate drainage controls, including culverts, and would be constructed in a manner to allow farm and/or land owner equipment to cross. The access road cross sections would consist of graded soil and surfaced with compacted aggregate base course. Final access road locations would be established with input from landowners. Gates would be installed where access roads cross landowner fences.

2.1.1.5 O&M Facility

An O&M facility, approximately 4,000 sq. ft. in size, will be necessary for office space, storage, and maintenance work. 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. Regardless of location, the O&M facility would be large enough to store heavy equipment, have sufficient parking, and water for domestic purposes. If the O&M facility is constructed on-site, the preferred location would be a previously disturbed area that is flat and does not contain streams, wetlands, or other environmentally sensitive resources. BMPs and other measures would be used to avoid and minimize potential impacts to environmentally sensitive resources.

2.1.1.6 Meteorological Towers and SODAR Units

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 would include installation of wind measurement equipment, such as a permanent 290-foot meteorological tower to house anemometers to measure the wind speed. The permanent tower would not have guy wires and would be lighted in compliance with FAA regulations.

2.1.1.7 Temporary Laydown/Stockpile Areas/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. The location of the laydown area would be selected during final design; however, a preferred location would be an undeveloped or previously disturbed area that is flat and does not contain streams, wetlands, or other environmentally sensitive resources.

In addition to the approximately three-acre laydown/stockpile area, temporary crane walk disturbances would also be necessary for the Project. Crane walks are estimated to be 40 feet wide and would be located throughout the Project based on the shortest route to the next turbine in the construction sequence.

2.1.1.8 34.5-kV Collector System

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 or trenching 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 would be installed in the same trenches as the underground electrical collector cables and would connect the communication channels from each turbine to the control room in the Palmer's Creek Substation.

2.1.1.9 Collector Substation (Palmer's Creek Substation)

A new collector substation, Palmer's Creek Substation, would be constructed at the south end of the project area, on private farmland, where the 34.5-kV electric collection grid and fiber optic communication network would terminate. Palmer's Creek Substation would 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 proposed adjacent 115-kV Granite Falls Substation.

The design of Palmer's Creek Substation is not finalized, but Palmer's Creeks expect it would be enclosed by a chain link fence with dimensions of roughly 110 feet by 170 feet. The substation components would be placed on concrete and steel foundations.

Palmer's Creek Substation would be designed in compliance with Federal, State and local regulations, National Electrical Safety Code standards, and other applicable industry standards and would be interconnected to the Granite Falls Substation, a WAPA-owned interconnection switchyard. The Palmer's Creek Substation would be located adjacent to the Granite Falls Substation, and the proposed transmission interconnection would consist of a 115 kV, 3-phase transmission line, approximately 1,000 feet in length, between the two facilities.

2.1.2 Project Life Cycle

Section 3 of the PEIS describes the activities likely to occur during each of the major phases of a typical wind energy project's life cycle – site testing and monitoring, construction, operation, maintenance, and decommissioning. The same project phases, with similar types of activities for each phase, would occur for this proposed Project. The expected life of the Project is approximately 20 to 40 years.

2.2 No Action Alternative

Under the No Action Alternative, WAPA would not approve an interconnection agreement to its transmission system. Although Palmer's Creek could still build the Project and transmit power using privately owned infrastructure, for the purposes of impact analysis and comparison, it is assumed that the proposed Palmer's Creek Wind Farm would not be built and the environmental impacts, both positive and negative, associated with construction and operation would not occur.

3. AFFECTED ENVIRONMENT

This section briefly describes the physical and regulatory environment that would be affected by the Proposed Action or the No Action Alternatives. Resources addressed in the PEIS are discussed below, with additional site-specific information presented where appropriate.

3.1 Land Cover and Land Use

As described in Section 4.1 of the PEIS, land cover refers to the physical material at the surface of the earth, while land use addresses how people use the land. Additional land use considerations described in the PEIS include recreation, transportation, aviation, and radar.

3.1.1 Land Cover

The dominant land cover type that occurs within the project area is cultivated crops. 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. Land cover types within the Project Area are summarized in **Table 3-1** and displayed on **Figure 3**.

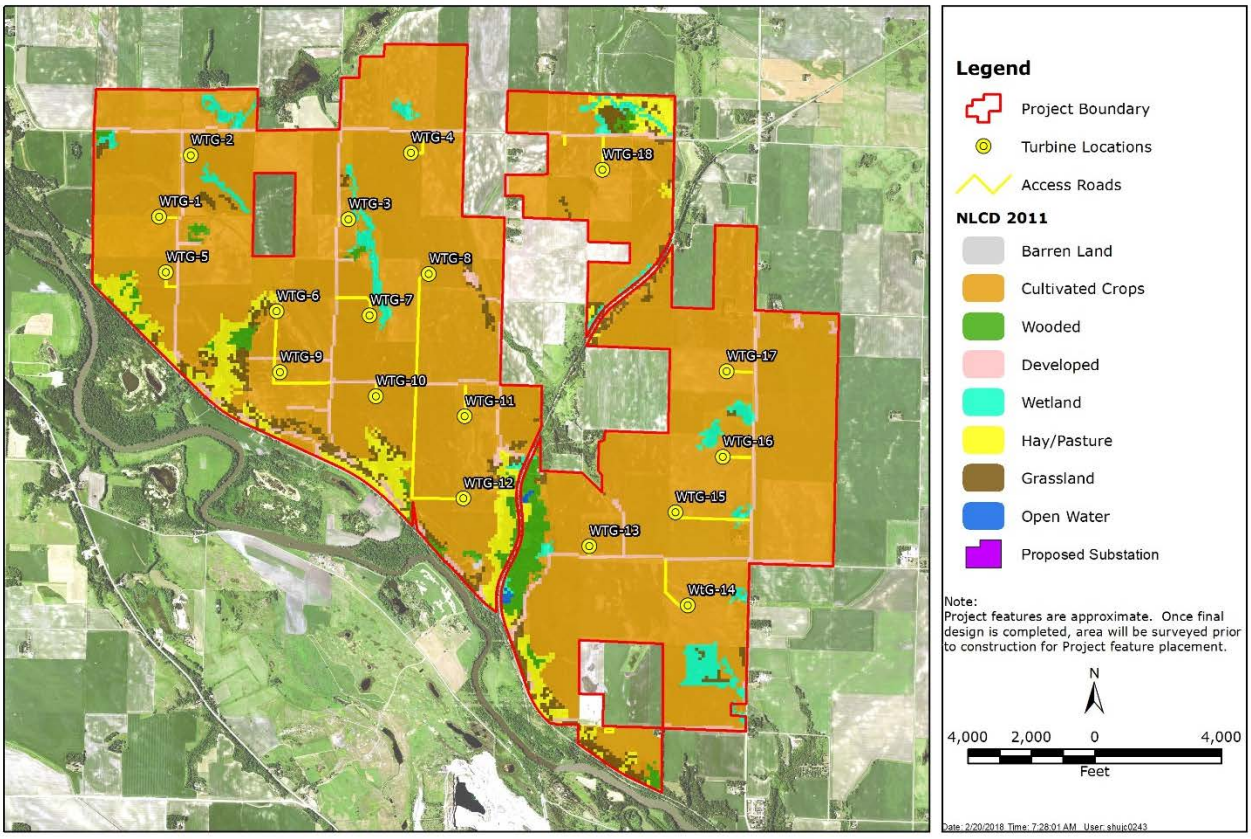

Figure 3: Land Cover

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

Land Cover Type	Area (acres)	Percentage of Project Area (%)
Barren Land (Rock/Sand/Clay)	1	0.0%
Cultivated Crops	5,157	83.8%
Deciduous Forest	134	2.1%
Developed	213	3.5%
Emergent Herbaceous Wetland	165	2.6%
Forested/shrub Wetland	29	0.3%
Grassland/Herbaceous	177	2.8%
Open Water	15	0.2%
Pasture/Hay	284	4.6%
Shrub/Scrub	4	0.1%
Total	6,150	100.0%

Source: NLCD, 2011 and NWI, 2015

3.1.2 Land Use

The project area contains 47 residences, a farm museum, and an electrical substation (Granite Falls Substation). Most of the area is farmlands or rural lands. Land use within the project area is agricultural, most of which is used for cultivated crops or grazing. There are also some areas of conservation lands enrolled in the Conservation Reserve Enhancement Program (CREP). The CREP pays landowners a yearly rental payment in exchange for removing environmentally sensitive land from agricultural production (USDA 2016). Although project turbines would not be located on CREP land, underground project components, such as collector lines, may cross through CREP land. There are other easements located within the vicinity of the project area primarily along the Minnesota River Valley. These include Reinvest in Minnesota (RIM) Reserve and Permanent Wetland Preserve (PWP) land conservation easements, as shown on **Figure 4**. The closest RIM easement is near the existing substation.

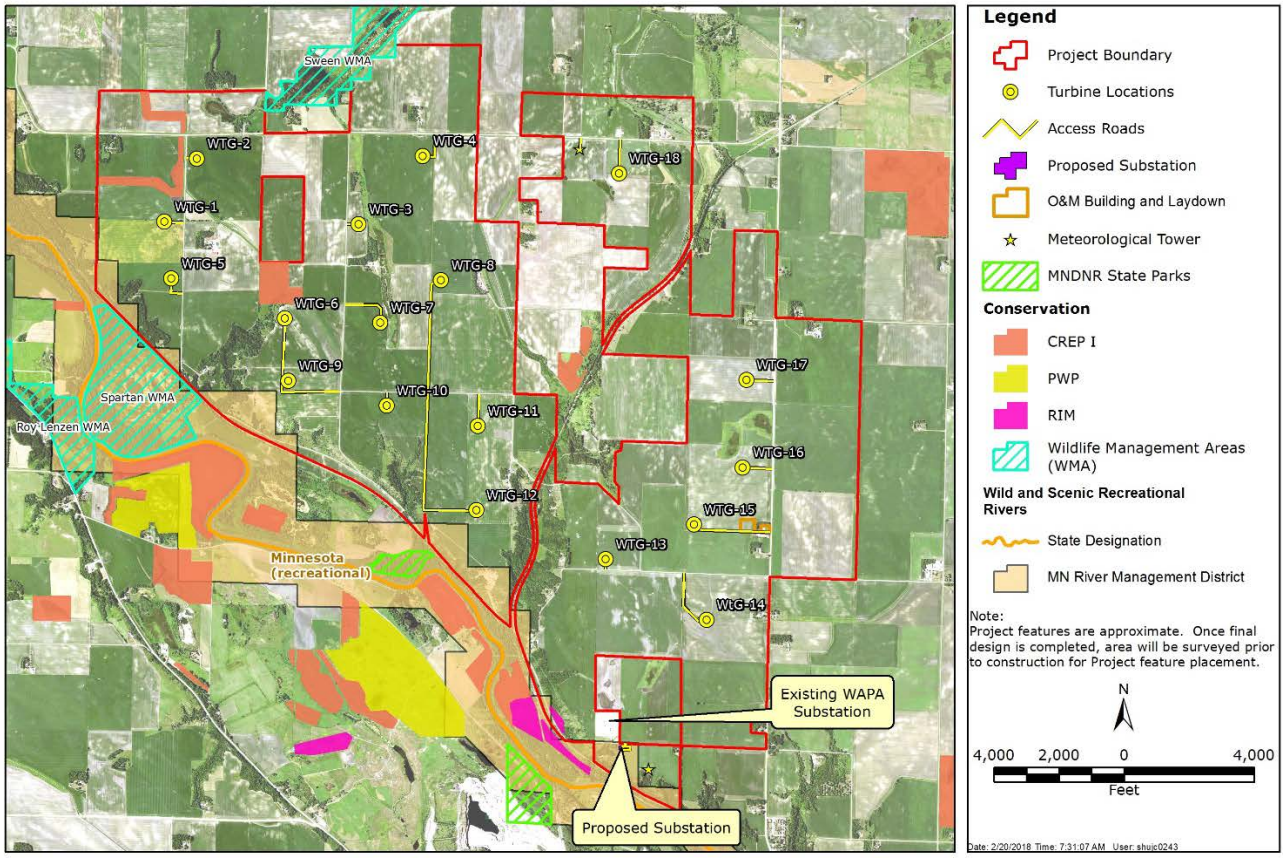

Figure 4: Recreation and Conservation Areas

3.1.2.1 Recreation and Conservation Areas

There are several recreation and conservation areas in the vicinity of the Project. The Minnesota River runs along the western boundary of the project area. The river provides recreational opportunities by watercraft, motor vehicle, and pedestrians. There are also roads in and adjacent to the project area that are part of the National Scenic Byway system, including County Road 5 (CR 5), Palmer Creek Road. Designation of the National Scenic Byway is intended "to strengthen Minnesota River Valley communities through both economic means (i.e., more visitors and tourism) and through a closer connection to the river and the Valley's exceptional history (i.e., through investments in recreational facilities, resource protection and interpretive programs)" (MRVSBA, 2001). Several other recreation resources near the project area include Prairie's Edge Casino and Resort, Fagen Fighters WWII Museum, and Yellow Medicine County Museum and Historical Society. All three businesses are located south of Granite Falls. The Upper Sioux Agency State Park is also located south of Granite Falls.

Wildlife Management Areas (WMA) are public lands, managed by the Minnesota Department of Natural Resources (MNDNR) for hunting, wildlife viewing, and general outdoor activities. Recreational areas within the project area are shown on **Figure 4**. The Spartan WMA is located on the southwestern border of the Project. A wind turbine would be located approximately one-quarter mile northeast of this WMA, and another turbine would be located approximately one-half mile east-southeast from the Spartan WMA. The Sween WMA is outside of the northern border of the

project area. The Sween WMA is approximately one-half mile northeast of a turbine site and approximately one-half mile northwest of a second turbine site. Both WMAs are known for deer, small game, forest upland birds, pheasants, and waterfowl (MNDNR 2016a, 2016b). The Spartan WMA is also known for turkey (2016a).

3.1.2.2 Transportation

The project area is bounded by both Chippewa County and Sparta and Granite Falls Township roads. To the north, CR 15/100th Street SE creates the northern boundary, to the east by CR 5/30th Avenue SE, and diagonally to the southwest by Palmer Creek Road. The township roads include Palmer Creek Road, 5th Ave. SE, 15th Ave SE, 115th St. SE, and 10th Ave. SE, 125th St. SE. As shown on **Figure 5**, many of the access roads would lead from the smaller township roads. All paved county roads have an axle restriction of 10 tons, and all gravel county and township roads have an axle restriction of 5 tons (Chippewa County Highway Dept., 2016a).

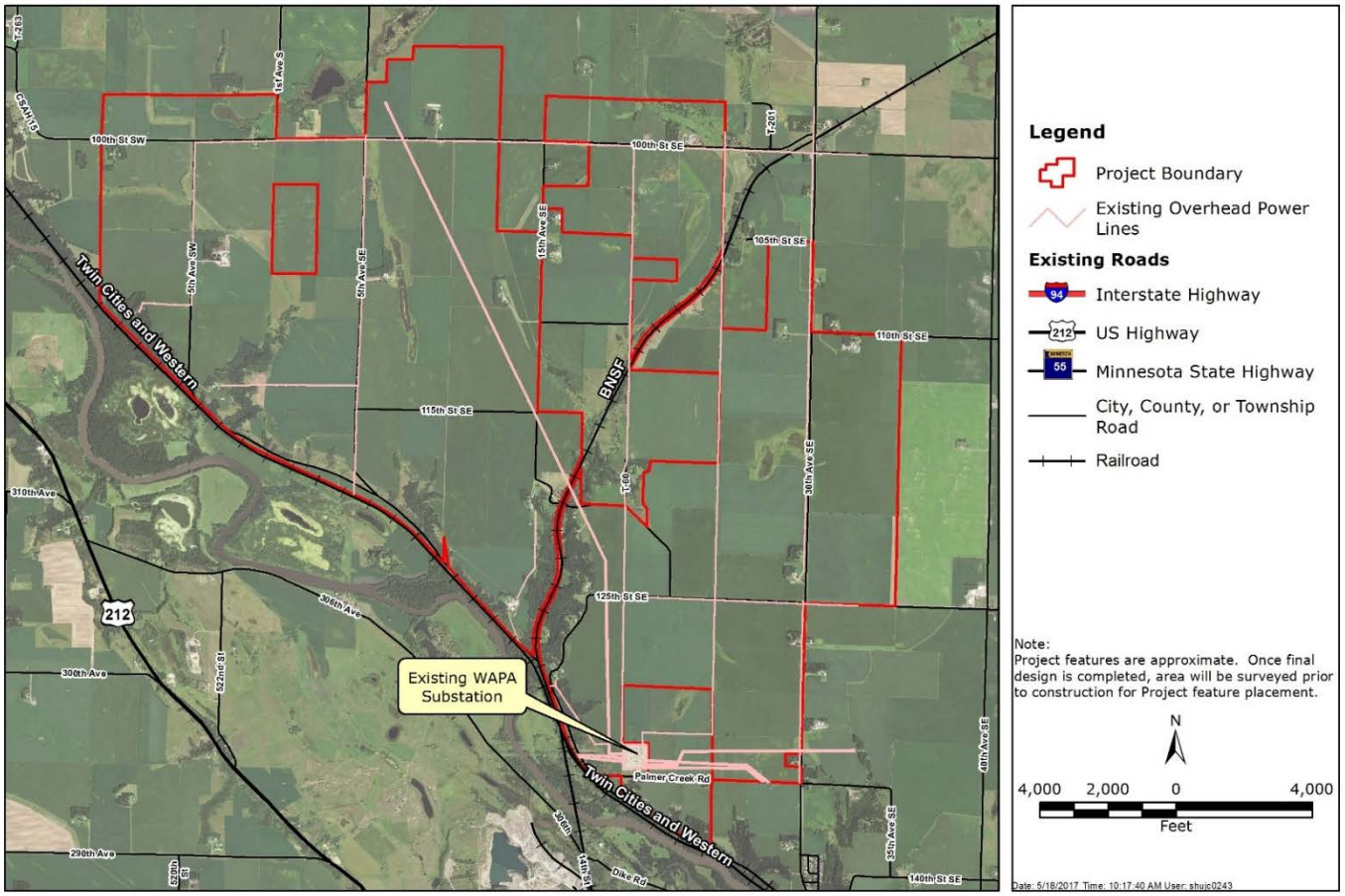

Figure 5: Existing Infrastructure

Annual Average Daily Traffic (AADT) data from Minnesota Department of Transportation (MnDOT) is provided in **Table 3-2**. The highest AADT based on recorded data near the project area is 1,000 vehicles per day on CR 5 between CR 15 and Granite Falls. Traffic counts in Granite Falls are significantly higher than those recorded north and east of the project area.

Table 3-2: AADT on Project Area Roads

Road Segment Description	AADT	AADT Year
CR 15 (100th St SW) between CR 7 and CR 6	275	2012
CR 15 (100th St SE) between CR 6 and CR 5 (30th Ave SE)	410	2012
CR 5 (30th Ave SE) between CR 15 and Granite Falls	1000	2013

Source: MnDOT 2014 Publication Traffic Volumes – Chippewa County

There are no airports located within the Project Area. The Granite Falls Municipal Airport/Lenzen-Roe-Fagen Memorial Field is located approximately 5.5 miles south of the project area. The Montevideo-Chippewa County Airport is approximately eight miles northwest of the project area. Both airports are small, regional airports without commercial service.

3.2 Geology and Soil Resources

The project area is located within the Central Lowland physiographic province. Section 4.2.1 of the PEIS includes a detailed discussion of this province which makes up the northeastern portion of the Interior Plains. Physiographic features of the Project Area consist of glaciated plains, also known as drift prairie, formed during the Wisconsinan Glaciation. Glacial features of the plains include ice-thrust hills, moraines, and eskers.

The project area is in the upper Minnesota River basin which includes all of Chippewa County. Most of the surficial geology of the project area consists of till with stream-modified surface. There are also fingers of organic deposits and stream sediment deposited by glacial melt in the area. Stream sediment along the Minnesota River is coarser with stratified layers of silt, clay, and sand (U of MN 1999). Soils in the area primarily consist of loams and clay loams with zero to six percent slopes.

Prime farmlands are subject to protection under the Farmland Protection Policy Act (FPPA) (Public Law [PL] 97-98, 7 United States Code 4201 et seq.). Most of the soils in the project area are considered prime farmland, farmland of statewide importance or prime farmland, if drained as shown on **Figure 6**. The FPPA requires potential impacts to prime farmlands to be identified and avoided as possible for federal projects. The Natural Resources Conservation Service works with a project proposer to identify farmlands and give a farmland conversion impact rating**.** The impact rating is used to determine avoidance actions as needed to minimize the conversion of farmland into nonagricultural lands.

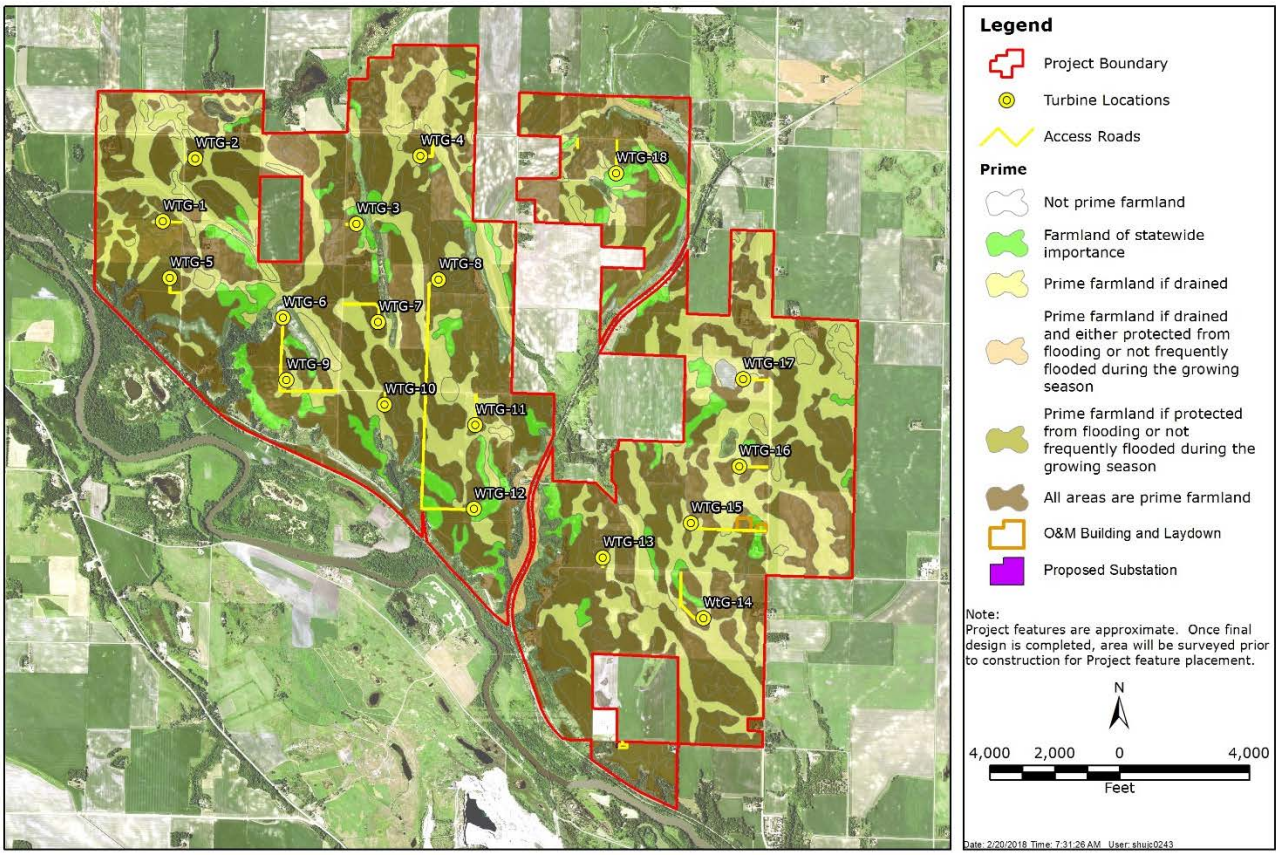

Figure 6: Farmland Soils

There are several active gravel mines located within five miles of the project area in Yellow Medicine County on the other side of the Minnesota River. There are six gravel mines located within five miles of the project area in Chippewa County, but none are within the project area boundary. The gravel mining operations are likely surficial quarries to remove glacial sand and gravel deposits. The risk for subsidence within the project area is considered negligible. The project area is not located in a region of Minnesota identified as prone to development of karst topography (MNDNR 2016), and the surficial gravel mining near the project area would likely not contribute to the potential for subsidence, which is typically correlated with underground mining.

The risk of seismic activity in the project area is very low. Earthquake shaking hazard maps have been developed by the U.S. Geological Survey (USGS) by combining faulting and seismicity information to show the level of horizontal shaking that may occur based on different ground motions and probabilities. In the project area, and most of Minnesota, the USGS 2014 Seismic Hazard Map indicates that the earthquake peak ground acceleration that has a 2 in 100 chance of being exceeded in a 50-year period is 2-4% g (where g is the acceleration due to gravity). From 2010 to 2015, there was only one earthquake recorded in Minnesota in 2014.

3.3 Water Resources

The project area is located within the Upper Mississippi River Basin surface water drainage system. Section 4.3.1 of the PEIS includes a detailed discussion of this drainage system. The project area has limited surface water and floodplain resources as it is primarily comprised of agricultural land. The Minnesota River is on the west side of the project area boundary. There are also waterbodies and small drainages in several places in or within close proximity to the project area. **Figure 7** shows public waterbodies, streams and ditches in the project area. The waterbodies identified on the MNDNR Public Waters Inventory (PWI) are County Ditch 70 and Palmer's Creek, and waterbodies located in the Sween WMA and the Spartan WMA.

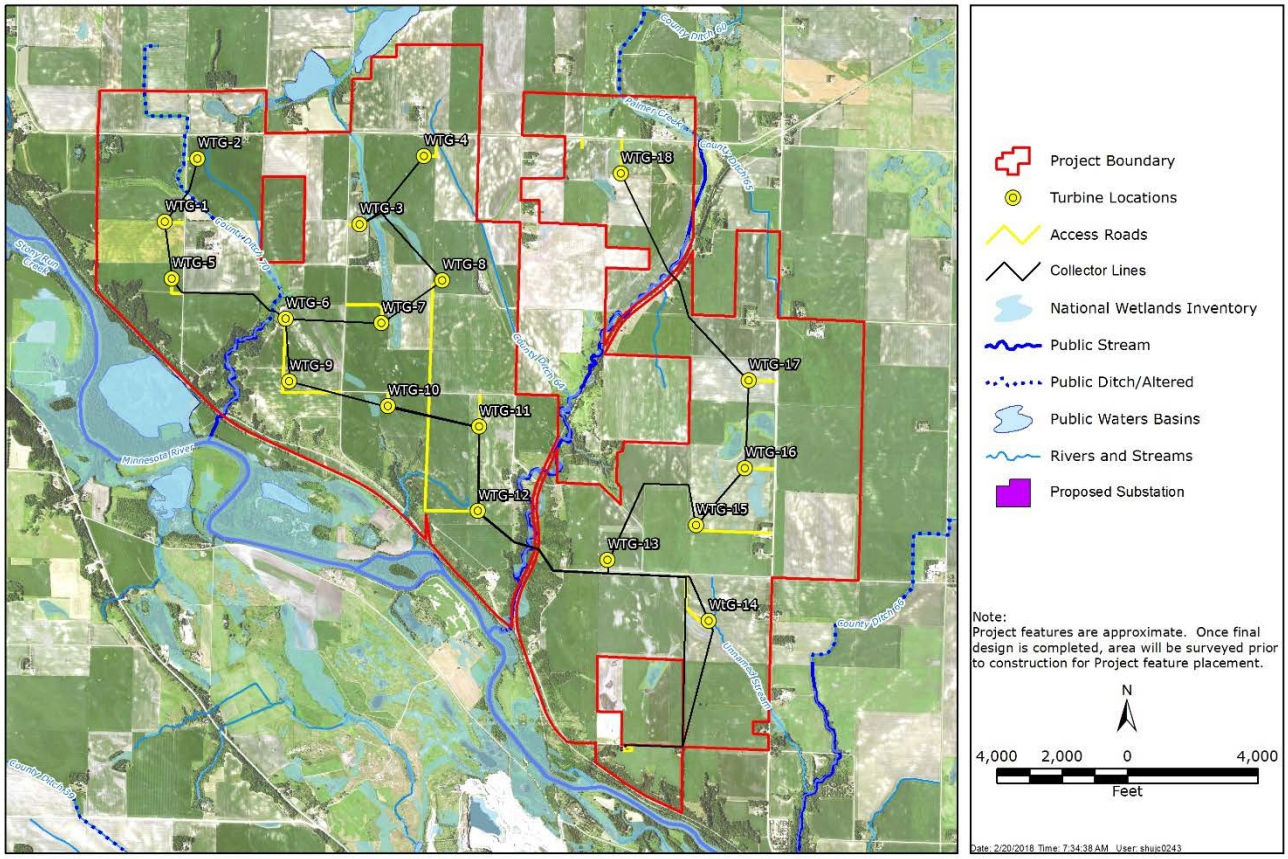

Figure 7: Waterbodies and Wetlands

Streams identified on the MNDNR PWI include Palmer Creek (eastern half of the project area) and an unnamed stream connected to a public drainage ditch in the western half of the project area. Several other drainages appear to be part of a larger drain tile system for the agricultural fields. These drainages were not identified on the MNDNR PWI.

The Minnesota River is a designated State Wild and Scenic River. Its shoreline and floodplain areas are managed through special regulations to protect floodplain and other sensitive resources. Federal Emergency Management Agency (FEMA) Maps 2700660155B and 2700660160B were reviewed for the project area. Most the project area is located in Zone C, defined as an area of minimal

flooding and outside of the 500-year or 0.2 percent-annual-chance flood (FEMA 1986A, FEMA 1986B). A narrow area along Palmer's Creek and the Minnesota River floodplain is considered Zone A, defined as areas of 100-year flood.

Based on a review of the National Wetland Inventory (NWI) data, there are approximately 210 acres of wetlands found within the project area (**Figure 7**). A detailed discussion of wetlands in the UGP Region is provided in Section 4.6.1.2 of the PEIS. The types of wetlands found in the project area are typical of this region and consist of approximately 165 acres of freshwater emergent wetlands and 29 acres of freshwater forested/shrub wetland. Freshwater ponds and riverine areas cover approximately five and 10 acres, respectively.

The project area is located within the Northern Great Plains Aquifer System, which includes five major aquifers: (1) lower Tertiary; (2) upper Cretaceous; (3) lower Cretaceous; (4) upper Paleozoic; and (5) lower Paleozoic (USGS, 1996). Section 4.3.2 of the PEIS includes a more detailed discussion of this aquifer system. Groundwater in the project area is approximately 25 feet below the surface (Bradt and Berg, 2000). The project area is estimated to have a mostly moderate geologic sensitivity of pollution of near-surface groundwater, with an estimate of years to decades for surface contaminants to reach near-surface groundwater (Bradt, 2000).

The Drinking Water Supply Management Area (DWSMA), which includes the Wellhead Protection Area, for the community of Granite Falls is located approximately 1.5 miles east of the project area. The DWSMA is considered to have a "Low Vulnerability" to potential pollution and estimated that it takes surface water ten years to reach the aquifer.

3.4 Air Quality and Climate

General air quality and climate conditions for Minnesota and the UGP Region are discussed in Section 4.4 of the PEIS. This section of the PEIS describes general meteorological conditions; existing emissions of criteria pollutants and volatile organic compounds (VOCs); the federally based air quality programs likely to affect activities associated with wind energy development; and greenhouse gas emissions (GHGs).

Most of the State of Minnesota is in attainment for all National Ambient Air Quality Standards (NAAQS) criteria pollutants with the exception of Dakota County for lead (U.S. Environmental Protection Agency [EPA], 2015). The nearest ambient air quality monitoring site to the project area is located in Marshall, Lyon County, Minnesota, which is southwest of the project area (MPCA, 2017). The primary emission sources that exist within the Project Area include agriculture related equipment and vehicles traveling along U.S. Highway 212. The nearest Prevention of Significant Deterioration (PSD) Class I Area to the project area is Boundary Waters Canoe Area Wilderness (Minnesota) and the Badlands National Park (South Dakota). Both of these areas are located approximately 300 miles northeast and southwest, respectively, of the project area. PSD Class I Areas are discussed in Section 4.4.2.3 in the PEIS.

3.5 Noise

Section 4.5 of the PEIS includes a discussion of noise and vibration and the existing acoustic environment in the UGP Region. The project area contains 47 residences, a farm museum, and an electrical substation (**Figure 8**). Most of the area is farmlands or rural lands. Wind is a large

contributor to existing ambient noise. Aside from wind, farming activities and occasional vehicular traffic would be the largest contributor to noise in the project area.

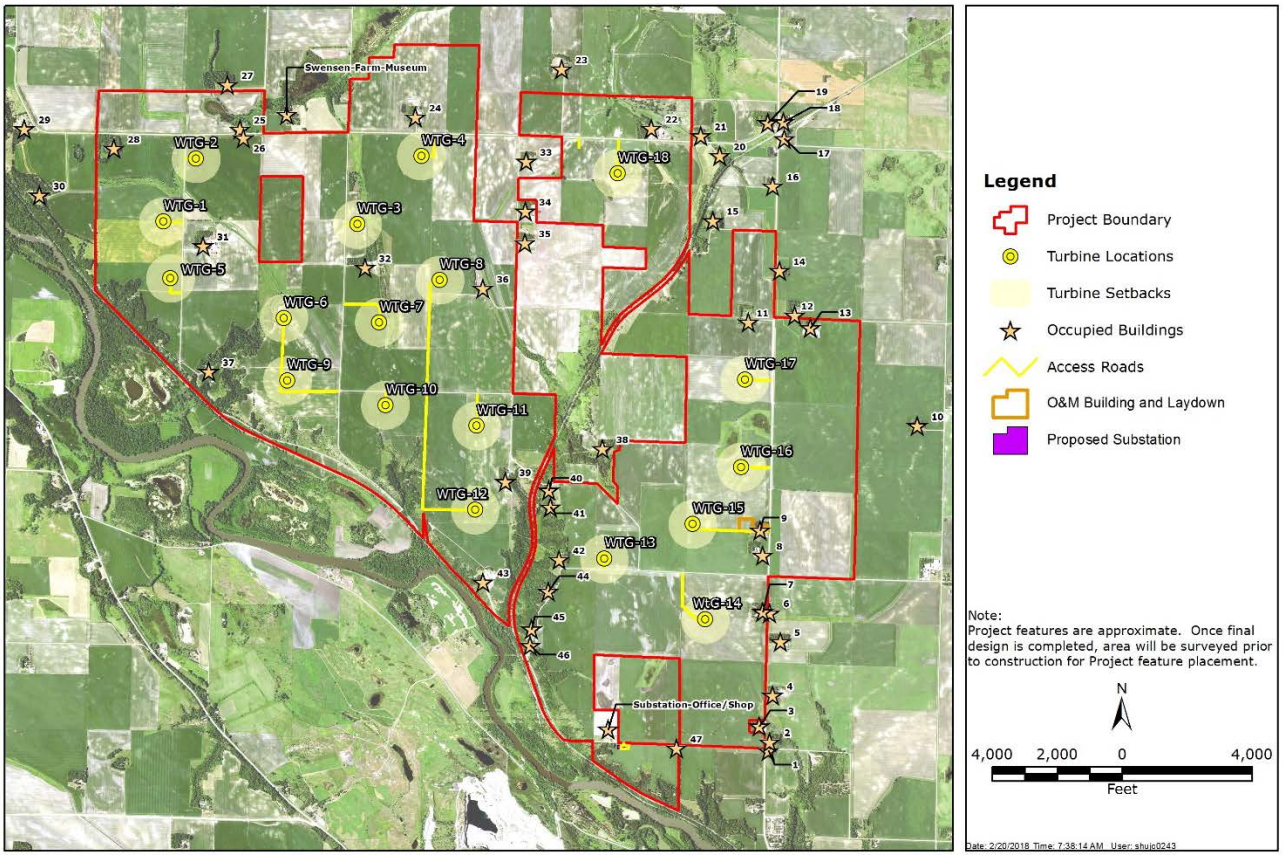

Figure 8: Occupied Buildings

In Minnesota, noise is regulated by the Minnesota Pollution Control Agency (MPCA) under Minnesota Administrative Rules 7030. Noise areas are classified as a 1, 2, or 3 based upon their land use activities (Minnesota Rules 7030.0050) and acceptable noise levels are defined for each Noise Area Classification (NAC) based on day or night times. For residential areas (NAC 1), including farm houses, noise levels should not exceed 60 dBA (daytime) and 50 dBA (nighttime) as measured from the nearest residence during 30 minutes of a one-hour period (referred to as the L50 level). Field assessment monitoring and noise modeling were conducted for the project area as part of the Noise Study. For monitoring locations within the project area, the current daytime L50 sound levels range from 20.3 dBA to 61.2 dBA. Current nighttime L50 levels range from 18.2 dBA to 51.2 dBA.

The monitoring and modeling results indicated that existing sound levels met or exceeded State daytime and nighttime noise standards. In general, the project area noise levels were within state standards. There were spikes in daytime noise levels at two monitoring sites, which were attributed to snowplows and railroad tracks. One monitoring site also had spiked nighttime noise levels, which was also attributed to snow plows. Additional detailed information can be found in the Noise Study (**Appendix B**).

3.6 Ecological Resources

Ecological resources (i.e., plant communities, wildlife, aquatic biota, and threatened, endangered, and special status species) within the UGP Region are discussed in Section 4.6 of the PEIS. The following sections describe the site-specific ecological resources within the project area.

3.6.1 Plant Communities

The project area is located within the Northwestern Great Plains Level III ecoregion. Section 4.6.1 and Appendix C of the PEIS include a detailed discussion of this ecoregion. Vegetation communities in this ecoregion and the project area are generally simple with a low diversity of species.

Since the mid-1800s, native prairie in Minnesota has been significantly reduced to about one percent of its extent. This is due to settlement and conversion of native prairie to agriculture, housing and other land uses. Conversion of prairie to farmland also typically included draining and ditching of wetlands. Additionally, fire suppression and planting of trees for windbreaks and other purposes, established trees in some areas where prairie or wetland may have been originally. Prairie and wetland habitats are a fraction of what they were before the mid-1800s, making these a unique resource in Chippewa County.

In general, only about one percent of the original native prairie in Minnesota remains. Specifically, Dry Hill Prairie (native prairie) is identified on the MNDNR Minnesota Biological Survey (MBS) (2007) map in several narrow areas along the railroad in the western portion of the project area. Dry Hill Prairie has well-drained soils that formed from glacial till on slopes and hilltops in large river valleys, such as the Minnesota River. Dominant grasses in Dry Hill Prairie typically include little bluestem, side-oats grama, porcupine grass, and prairie dropseed, with much Indian grass, big bluestem, and Leiberg's panic grass in dry-mesic areas such as mid-slopes. Common shrubs include leadplant, wolfberry, and prairie rose. Common forbs are rough blazing star, alumroot, silverleaf scurf pea, heart-leaved alexanders, prairie milk vetch, purple prairie clover, heath aster, prairie smoke, and hairy golden aster. Visual observations of the prairie areas indicated native prairie species are present but have been heavily invaded by eastern red cedar and smooth brome.

Wetlands identified by the NWI are shown on **Figure 7**. Wetlands found in the project area are comprised of freshwater emergent wetlands, freshwater forested/shrub wetland, freshwater ponds and riverine areas. Vegetation associated with freshwater emergent wetlands in Minnesota typically includes grasses, bulrush, spikerush, and various other marsh plants, such as cattail, arrowhead, pickerelweed, and smartweed. Vegetation in forested/shrub wetlands typically includes alder, willow, and dogwood. There is floodplain forest located near, but outside of the project area. The Silver Maple – (Virginia Creeper) Floodplain Forest (rare wetland) has a conservation status rank of S3 by the MNDNR, which may qualify this habitat as a rare natural community. This type of rare wetland is identified on the MNDNR MBS map as located in the Spartan WMA, which is outside of the project area boundary, as shown on **Figure 9**.

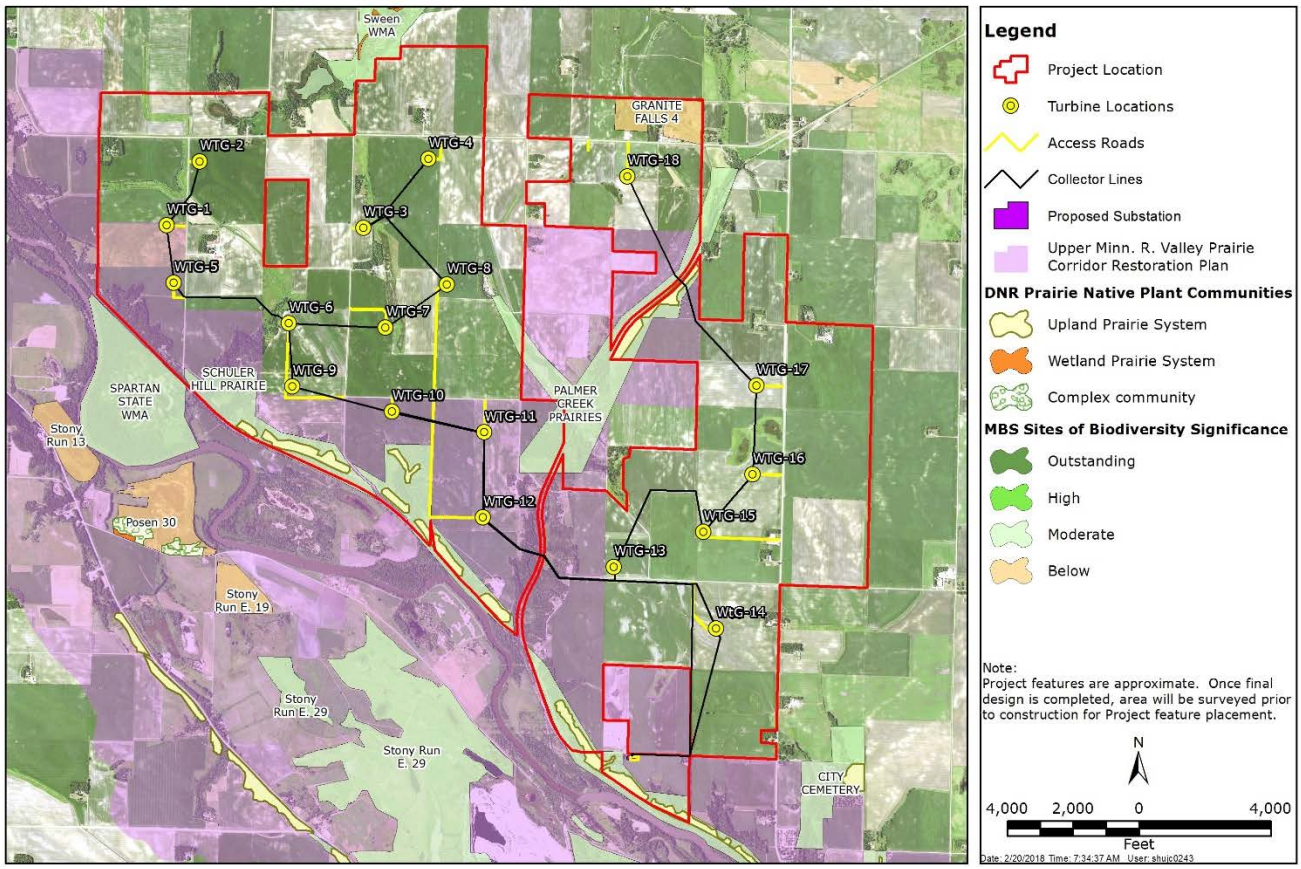

Figure 9: Ecologically Sensitive Areas

3.6.2 Wildlife

Information on wildlife, including reptiles, amphibians, birds, and mammals within the UGP Region, is discussed in Section 4.6.2 of the PEIS. Wildlife species in the project area are typical of those found in the region and discussed in the PEIS. Wildlife within the vicinity of the project area includes white-tailed deer, raccoons, skunk, coyotes, beavers, muskrats, and other small mammals. These species can be found in the project area, but will seek good habitat for foraging, breeding, and shelter. 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. The project area is adjacent to the Minnesota River, which provides large riverine and wetland habitats. The project area is approximately 16 miles southeast of the Lac qui Parle Dam, Lac qui Parle State Park, and Lac qui Parle WMA, approximately 33,000 acres, and managed by the MNDNR. The Lac qui Parle WMA includes a state game refuge, wildlife sanctuary, migratory waterfowl feeding and resting area, and controlled hunting zone. The agricultural landscape and developments of the region have influenced the type of wildlife present.

Wildlife surveys (Tier 1, 2, and 3 Analyses) were conducted for the Project between 2015 and

2017. Ongoing monitoring would continue during Project operation. Surveys were conducted to assess abundance, distribution, and potential wildlife habitat in the project area, with specific assessments conducted for raptors; threatened, endangered, and special status species; and bats. Detailed discussion of the methodology and results of the wildlife surveys conducted for the Project are reported in Palmer's Creek Wind Project Wildlife Assessment and Field Studies (Wildlife Report) (**Appendix C**) and Bird and Bat Conservation Strategy (**Appendix E**).

3.6.3 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 most common birds observed during the field surveys were red-winged blackbird (270 individuals), American crow (266 individuals), brown-headed cowbird (239 individuals), and barn swallow (180 individuals). These species comprised 45.6 percent of all individual birds observed. Overall, during the completed surveys 56 species were observed. Details of the survey results can be found in **Appendix C**.

A review of historical eagle nest data (MNDNR 2016) within one mile of the Project was completed. A bald eagle nest was documented in T116N R40W Section 11 just outside of the project boundary and greater than one mile west of the nearest WTG. 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. Details of the survey results can be found in **Appendix C**.

An additional nest, located in Minnesota River Valley (T116N R39W Section 20), was found during the Spring 2016 field surveys. This nest was active in 2016 and is immediately outside of the project boundary, approximately one mile southeast of the nearest WTG (WTG 12). Nest use was monitored in 2016 and continued from April thru August 10, 2017. (Michael Rutledge, Fagen Engineering, Personal Communication, December 2017). During routine nest monitoring in February 2018, a third active nest was identified immediately southwest of the project area. This nest is presumed to be newly constructed and is located approximately one mile south-southwest of WTG-5. Bald eagles were observed during the field surveys in the project area conducted from July 2016 to June 2017, totaling 19 bald eagles. Refer to **Appendix E** (**BBCS Section 6.1.4)** for detailed eagle monitoring results.

During the field surveys, Minnesota Listed Special Concern Species, the American white pelican, was observed with four individuals in flight.

Part of the western side of the project area, near the Minnesota River, overlaps with the Upper Minnesota River Valley Important Bird Area (IBA). 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.

3.6.4 Bats

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 are seven bat species known to occur in Minnesota – big brown bat, silver-haired bat, eastern red bat, hoary bat, little brown bat, northern long-eared bat, and tri-colored bat (formerly known as the eastern pipistrelle) (MNDNR 2016). The northern long-eared bat, tricolored bat, big brown bat, and little brown bat are all state-listed species of special concern. **Appendix D** provides descriptions of all the species, except the northern long-eared bat, which is described below.

There was a total of six bat species documented throughout the course of the surveys to date. Three species of concern in the state of Minnesota were detected during the acoustic bat monitoring (tricolored bat, big brown bat, and little brown bat).

Northern Long-eared Bat

The northern long-eared bat (NLEB), also known as the Northern Myotis, is widely distributed in Canada and throughout the eastern half of the United States, extending west through Minnesota to the western borders of the Dakotas. The NLEB is currently a federally threatened species and was designated in 1984 as a species of special concern in Minnesota, at which time it was known from only a few widely-distributed localities in the state. Subsequent survey work has documented additional locations in Minnesota and confirmed that the species can be found in the state in both summer and winter. A large hibernaculum was discovered in St. Louis County, and NLEBs have been found in most other caves and mines surveyed in Minnesota, though typically in low numbers (Bowman, 2016). The project area is located in an area of Minnesota with no documented NLEB hibernacula, although potentially suitable habitat, particularly for foraging and roosting, does exist.

The UGP Wind Energy Programmatic Biological Assessment (BA), prepared in conjunction with the PEIS, describes the NLEB in detail (WAPA and USFWS, 2015c). Additional information on the northern long-eared bat published subsequent to the PEIS and BA is available in the USFWS's 4(d) rule available online at http://www.fws.gov/Midwest/endangered/mammals/nleb/s7.html. Updated species-specific information and results of the preconstruction evaluations and wildlife surveys, including surveys for federally listed species (as warranted), conducted for the Project are reported in the wildlife report (**Appendix C**).

Acoustic bat monitoring surveys were conducted in the project area in Fall 2015, Spring and Fall

2016, and Spring and Fall 2017. Bats within the wind resource area were surveyed using a bat detector and laptop computer. The ultrasonic calls of foraging bats are displayed on the computer screen and permanently stored in electronic files. No confirmed documentation of the NLEB in the project area was recorded during the acoustic bat monitoring (see **Appendix D** for the Final Acoustic Bat Summary Report). As discussed in the wildlife report, NLEB have not been documented at the Palmer's Creek Wind Farm study site.

Old buildings and hollow trees are potential hibernacula sites during the winter, but caves and mines are the favored choice for hibernating bats, especially for the NLEB. NLEBs have been found in the winter in Minnesota in natural caves, sand mines, and deep iron mines. Hibernacula are shared between both sexes and often multiple species of bat. Preferred sites typically have high humidity levels, minimal airflow, and a constant temperature (Fitch and Shump 1979). Based on the preferred sites criteria, hibernacula sites within the study area are unlikely.

After spring emergence, bats migrate to summer roosting and foraging grounds. In summer, the NLEB is often associated with forested habitats (Fire-Dependent Forests, Mesic Hardwood Forests, and Floodplain Forests) where they make use of tree roosts, especially near water sources. Loose bark, broken tree limbs, cavities, and cracks in a tree can all be utilized by bats as roosting sites. The sexes tend to roost separately, with females forming small (~30 individuals) maternity colonies to bear and rear their offspring. Males often roost alone, as they do not have the same high temperature needs as maternity colonies.

Based upon the preferred sites criteria, summer roosting and foraging grounds could occur within the study area (Bowman, 2016).

3.6.5 Aquatic Biota and Habitats

The project area is located within the Upper Mississippi hydrologic region and within the Minnesota River Basin. Aquatic biota typical of this region is discussed in Section 4.6.3 of the PEIS. Aquatic habitat in the project area is limited to Palmer Creek, County Ditch 66, County Ditch 70, and the Minnesota River. The smaller streams and ditches support limited aquatic biota, including aquatic insects, crustaceans, and mollusks. These streams may have small fish. The Minnesota River supports aquatic biota similar to the small streams as well as significant native fish, such as walleye, small-mouth bass, and sunfish. There are also wetlands in and adjacent to the project area that provide habitat for birds, waterfowl, amphibians, reptiles, and small mammals.

3.6.6 Threatened and Endangered Species

3.6.6.1 Federally Listed Species

Section 4.6.4 of the PEIS describes the plant and animal species that are listed as threatened or endangered under the Endangered Species Act (ESA), or that are proposed or candidates for listing under the ESA, and that could occur within the UGP Region.

A list of federally threatened, endangered, candidate and proposed species was obtained for Chippewa County, Minnesota from the USFWS Information for Planning and Conservation website (USFWS 2017a). Federal species with potential to occur are described in **Table 3-3**.

Table 3-3: Federally-listed Species

Species/Critical Habitat	Status[1]	Potential to Occur in the Project Area	Habitat Description and Range in Minnesota
Northern Long-Eared Bat	T	Yes	Forested habitats, emergent wetlands, agricultural fields adjacent to forested habitat, caves and mines
Dakota Skipper	T/CH	No	High-quality mixed and tallgrass prairie
Poweshiek Skipperling	E/CH	No	High-quality mixed and tallgrass prairie

[1] Status Codes: E=federally listed endangered; T=federally listed threatened; P=federally proposed for listing; C=federal candidate for listing; and CH=designated critical habitat

Northern Long-eared Bat
The NLEB is a federally-listed species that was previously discussed in detail in Section 3.6.2.

Dakota Skipper
The Dakota skipper is a small butterfly found in the tallgrass and mixed-grass prairies of the Northern Great Plains. It is federally listed as a threatened species with designated critical habitat. There are no records for the Dakota skipper in the USFWS data base within the project area. There is no designated critical habitat within or near the project area. The closest designated critical habitat is located approximately 26 miles to the northwest straddling Chippewa and Swift County, Minnesota (USFWS 2017b). Native prairie is limited to a few rocky outcrops. Dakota skippers have a single flight per year occurring from the middle of June through the end of July (Dana 1991). Eggs hatch after incubating for 7–20 days; larvae shelter and forage at the bases of grass plants, overwintering at or below the ground surface (Dana 1991). Current data suggests that dispersal of Dakota skipper is very limited (USFWS 2014, 79 FR 63672), and individuals may be incapable of moving greater than one kilometer (0.6 miles) between patches of prairie habitat separated by structurally similar habitats (Cochrane and Delphey 2002). Roads and crop fields have been suspected to impede movements between patches, and movements are more likely along ridges than across valleys (Dana 1991). The Dakota skipper requires native prairie habitat for reproduction, foraging, and overwintering at or below ground, and do not typically move great distances between native prairie areas.

Poweshiek Skipperling
The Poweshiek skipperling is a small butterfly that requires high quality tallgrass prairie in both upland, dry areas as well as low, moist areas. It is federally-listed as an endangered species with designated critical habitat. There are no records for the Poweshiek skipperling in the USFWS data base within the project area. There is no designated critical habitat within or near the project area. The closest designated critical habitat is located approximately 26 miles to the northwest straddling Chippewa and Swift County, Minnesota (USFWS 2017c). Native prairie is limited to a

few rocky outcrops. Similar to the Dakota skipper, the Poweshiek skipperling larvae (caterpillars) hibernate during winter on the ground; they resume activity in spring and continue developing until they pupate and emerge as adult butterflies, which have a short lifespan of only one to two weeks between mid-June and mid-July. Adult butterflies feed on nectar from prairie flowers such as purple coneflower, blackeyed susan and palespike lobelia. (USFWS 2017)

Historically, Poweshiek skipperlings were found in tallgrass prairie and prairie fens from Manitoba to Iowa, with populations also found in Michigan and Wisconsin. According to the USFWS, the Poweshiek skipperling may have been extirpated from the Dakotas, Minnesota and Iowa within the last 10 years. During surveys in 2014, the species could be found only at a few limited sites in Michigan, Wisconsin, and in Manitoba. (USFWS 2017)

3.6.6.2 State Listed Species

A query of the MNDNR Natural Heritage Information System (NHIS) was completed to determine if there are rare species or other significant features in the project area (**Appendix J**). The results of the NHIS query indicated the presence of Ecologically Significant Areas: Prairie Core Area (Upper Minnesota River Valley); MBS sites of moderate biodiversity including Dry Hill Prairie remnants (native prairie), and Silver Maple – (Virginia Creeper) Floodplain Forest (rare wetland).

Dry Hill Prairie (native prairie) is identified on the MNDNR MBS (2007) map in several narrow areas along the railroad in the southwestern portion of the project area. MNDNR has indicated the native prairie areas may contain Missouri milk-vetch, a state-listed plant species of special concern, and Sullivant's milkweed, a state-listed threatened plant. Visual observations of prairie indicated native prairie species are present but have been heavily invaded by eastern red cedar and smooth brome.

Additionally, there are also several state listed species in or nearby the project area. **Table 3-4** provides a summary of the state listed species as identified by the MNDNR NHIS database. Special Concern (SC) species 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. SGCNs are species whose populations are rare, declining or vulnerable in Minnesota and may be at risk due to their dependence on certain rare or declining habitats, such as native prairie; or species that are subject to specific threats, such as invasive species, over exploitation or disease; or the species is stable in Minnesota but declining in a substantial part of their range outside of Minnesota.

Table 3-4: State-listed Species

Species	Status[1]
Northern Long-Eared Bat	SC
Tricolored bat	SC
Big brown bat	SC
Little brown bat	SC
Lark sparrow	SC
Upland sandpiper	SGCN

Species	Status[1]
American white pelican	SC
Gopher snake	SC
Western foxsnake	SGCN

Source: MNDNR 2016

3.7 Visual Resources

Visual resources within the UGP Region are discussed in Section 4.7 of the PEIS. The project area is rural with primarily flat agricultural fields and a few rolling hills and valley drainages. **Table 3-5** summarizes the distance from each WTG to the nearest residence. All residences are a minimum of 1,000 feet from each WTG.

Table 3-5: Nearest Residences to Wind Turbine Generators

WTG	Nearest Residence	Distance (ft.)	Direction From Turbine
1	31	1,600	East
2	25	1,700	Northeast
3	32	1,400	South-southeast
4	24	1,400	North
5	31	2,000	South-southeast
6	37	2,700	Southwest
7	32	2,000	North
8	36	1,000	Southeast
9	37	2,500	Northwest
10	39	4,000	Southeast
11	39	1,600	South-southeast
12	39	1,500	North-northeast
13	42	1,400	West
14	6	1,800	East-northeast
15	9	2,100	East
16	9	1,400	South
17	12	2,500	Northeast
18	22	2,000	North-northeast
2	Swenson Farm Museum	3,100	Southwest
14	Substation Office/Shop	4,400	Northeast

Scenic resources with sensitive viewsheds within the UGP Region are discussed in Section 4.7 of the PEIS. A scenic resource in the project area is the Minnesota River, which runs along the western boundary of the project area. Dike's Road, a township road, runs along the western edge of the Minnesota River and U.S. Highway 212 runs along the ridge of the west river bluff. The east

boundary of the project area is County Road 5 (CR 5). US Hwy 212 is part of the Minnesota River Valley National Scenic Byway. Designated alternate routes to the National Scenic Byway within the project area boundary include Palmer Creek Road from CR 5 to 5th Avenue SW to CR 15. Other scenic resources near the project area may include the Upper Sioux Agency State Park, and other conservation areas within and near the project area. Conservation areas within the project area are shown on **Figure 4**.

3.8 Paleontological Resources

As discussed in Section 4.8 of the PEIS, the UGP Region is composed of sedimentary rocks that have the potential to contain significant fossils; however, occurrence of significant fossils is rare. In the project area, Precambrian rocks exposed in the Granite Falls-Montevideo area, within the Minnesota River valley, consist of interlayered metamorphic rocks that are granitic gneiss, hornblende-pyroxene gneiss, garnet-biotite gneiss, and a heterogeneous sequence of interlayered gneisses (Himmelberg, 1968). Metamorphic rocks are formed from extreme pressure, heating, and movement over time. These extreme conditions are not conducive for fossils and Precambrian geologic units have a very low likelihood of containing recognizable paleontological resources (BLM 2016).

3.9 Cultural Resources

Section 4.9 of the PEIS describes the legal framework for managing cultural resources in the United States, including Federal agency responsibilities under Section 106 of the National Historic Preservation Act (NHPA). The PEIS also provides a brief overview of the cultural context of the UGP Region, or what is known about the settlement and past use of the Great Plain Region. Cultural resources consist of any historic and prehistoric district, site, building, structure, or object (usually) over 50 years of age. Indian Trust Assets (ITAs) and sacred sites are also considered cultural resources. ITAs are defined as legal interests in property held in trust by the United States government for Indian tribes and individuals, or property protected under United States law for Indian tribes and individuals. ITAs can include land, minerals, Federally-reserved hunting and fishing rights, Federally-reserved water rights, and in-stream flows associated with a reservation or rancheria (Indian Trust Asset and Trust Fund Management and Reform Act of 2002).

This area was first inhabited by Paleo-Indian tribes that moved through the area as they hunted native herding animals, such as bison. As time went on, tribes diversified their technologies to allow them to hunt, trap, fish, forage, craft wood products, and process plants. Eventually tribes became less migratory and settled into areas of Minnesota including areas near the Minnesota River, where sources of food and building materials were readily available.

The Homestead Act of 1862 and the development of railroads started moving European settlers west into Minnesota. The US Dakota War of 1862 pushed the Dakota people out of the area and onto reservations. Granite Falls became a city in 1889, growing from the construction of a dam and operation of a flour mill. In 1938, approximately 746 acres of land south of Granite Falls was returned to the Dakota Oyate Nation and the Upper Sioux Indian Community was created. An additional 654 acres of land was later added for a total of 1,440 acres comprising the Upper Sioux Community Reservation (BCA 2017).

A records search of the Minnesota State Historic Preservation Office (SHPO) files was conducted

on May 24, 2016, to identify known archeological sites, historic period structures, previous archeological surveys, and other cultural resources data within the area of potential effects (APE) for the Project (**Appendix H**). The literature search revealed 12 archaeological sites and 90 historical/architectural sites within a one-mile radius of the APE.

A cultural resources field study was conducted beginning in late 2016 and completed in Spring 2017 (BCA 2017). A Tribal Cultural Specialist (TCS) was invited from each consulting tribe to participate in the cultural resources survey, site recording, interpretation, and NRHP evaluations. Spirit Lake Nation sent one TCS, Ryan Longie. None of the other consulting tribes had an available TCS, and therefore, Dylan Youpee and Colma 'Jason' Dupree from the Fort Peck Assiniboine and Sioux Tribes and Russell Red Horn, an enrolled member of the Pine Ridge reservation who serves as a TCS for multiple Tribal Historic Preservation Offices (THPO) in the area, participated as representatives of Sioux tribes. Section 6.3 provides information about Section 106 Consultation with the tribes.

Field inventories were completed by BCA archaeologists and tribal participants from the Spirit Lake Nation and Fort Peck Assiniboine and Sioux Tribes in November 2016 (Stage I), the Fort Peck Assiniboine and Sioux Tribes in February 2017 (Stage II), and Spirit Lake Nation, Three Affiliated Tribes, and Flandreau Santee Sioux Tribe in March 2017 (BCA 2017a). Representatives from the Upper Sioux completed field surveys of the project area in June 2017.

The cultural resources study and fieldwork included a review of previously identified cultural resources, intensive pedestrian survey of the APE, and shovel tests. During the field survey, archaeologists verified the locations of several previously recorded cultural sites. Several site leads, and three new historical/architectural sites were identified and recorded.

Table 3-6 summarizes the sites evaluated in the project area. In addition, a light scatter of historic cultural material and a piece of workable lithic raw material were found but were not recorded as sites, following SHPO site form instructions.

Table 3-6: Cultural Resources Sites Within The Project APE

Site Number	Affiliation	Description	NRHP Evaluation
21CPa	Unknown	Site Lead: Gravel Pit NW of Granite Falls	Unevaluated
21CP9	Unknown	Previously recorded: Mounds	Unevaluated
21CP10	Unknown	Previously recorded: Mounds	Unevaluated
21CP11	Unknown	Previously recorded: Mounds	Not eligible
21CP77	Historical/Architectural	New site: Six foundations and one barn	Not eligible
21CP78	Historical/Architectural	New site: One flake	Not eligible
21CP79	Historical/Architectural	New site: Foundation, a House, a Garage/Barn, & a Pump House	Not eligible

Source: BCA 2017

The final design avoids all known eligible or unevaluated sites in the project area.

3.10 Socioeconomics

Section 4.10 of the PEIS discusses the socioeconomic environment potentially affected by the development of wind resources in the UGP Region. The PEIS describes 10 key measures of economic development: employment, unemployment, personal income, State sales and income tax revenues, population, vacant rental housing, State and local government expenditures and employment, and recreation. **Table 3-7** lists measures of economic development applicable to the project area.

The project is located in Chippewa County, a rural area in southwestern Minnesota, which has been experiencing a decreasing population trend since 1970 (Headwaters Economics 2017b). The local economy is primarily agricultural-based with tourism providing additional revenue. The Cities of Granite Falls and Montevideo are the nearest economic centers, both providing employment opportunities, goods and services, lodging, entertainment, and commercial and industrial businesses. Chippewa County has a slightly higher unemployment rate and lower annual median household income than the State of Minnesota. In general, since 1970, employment in Chippewa County has been increasing along with personal income, which increased by over 15% from 2000-2015 (Headwaters Economics 2017b). Between 2000 and 2015, agricultural jobs decreased by 25%,

which service and government jobs increased by approximately 30% and 14%, respectively. The top three industries in 2000 in Chippewa County were services, retail trade, and government (Headwaters Economics 2017b).

Table 3-7: Measures of Economic Development

Economic Development Measures (Year)	Chippewa County	Minnesota
Population (2010) (a)	12,441	5,303,925
Rental vacancy rate (2010) (a)	7.4%	7.8%
Unemployment rate (Dec 2016) (b)	4.8%	4%
Annual Median Household Income (2007-2011) (c)	$44,712	$57,243
State government expenditures (FY 2013) (d)	-	$32,264,081
State government employment (2015) (a)	-	68,386
State Income Tax Revenue (2016) (g)	-	$10,738,906,000
State and Local Sales Tax Revenue: Leisure and Hospitality Industry (2015) (e)	$8,105,404	$5,808,526,300
Total State Tax revenue (FY 2016 general sales tax) (g)	-	$32,361,078,000

(a) U.S. Census Bureau American FactFinder (accessed 2/16/17)
(b) MN Employment and Economic Development Website (accessed 2/16/17)
(c) Upper Minnesota Valley Regional Development Commission: 2010 Census Data for Chippewa County, MN
(d) Minnesota Management & Budget Historical Expenditures (June 27, 2014)
(e) 2015 Annual Minnesota Sales Tax Statistics For the Leisure and Hospitality Industry (accessed 5/19/17)
(f) Minnesota Department of Revenue: State and Local Tax Collections by Major Tax Category (1957-2021) (accessed 5/19/17)

3.11 Environmental Justice

As discussed in Section 4.11 of the PEIS, disproportionately high and adverse human health or environmental effects of Federal agency actions, programs, or policies on minority and low-income populations are required to be addressed by Executive Order 12898. Environmental justice also refers to meaningful involvement of all people, regardless of race, color, national origin or income. An environmental justice evaluation was completed based on the *Environmental Justice Guidance under the National Environmental Policy Act* (CEQ 1997) as discussed in the PEIS.

The Project is located approximately five miles north of the Upper Sioux Community, which is a federally-recognized Native American Sioux tribe. The majority of tribe members reside in Minnesota Falls Township with others located in Sioux Agency and Granite Falls Townships. The Upper Sioux Community operates the Prairie's Edge Casino Resort on their reservation land, which is approximately 1,300 acres, located in Minnesota Falls Township, south of the City of Granite Falls.

The percentage of minority and low-income residents was determined for townships in the project area and compared to Chippewa County and the state of Minnesota; Granite Falls city data was also reviewed for comparison.

Three townships were chosen for geographic analysis because poverty data was not readily available for the census tract in which the proposed Project is located, and the proposed Project is outside of city limits. Low-income populations were identified based on the percent below the poverty line. Based on the CEQ guidance, if the minority or low-income populations exceed 50 percent or exceed the county or State levels by greater than 20 percent (i.e., "meaningfully greater than the general population"), the area of geographic analysis would be defined as having a minority or low-income population.

Table 3-8 displays the percentage of minority and low-income residents as discussed above. The percentages of minority and low-income residents in Granite Falls and Sioux Agency Townships do not exceed 50 percent nor do they exceed Chippewa County or State levels by greater than 20 percent (Granite Falls city percentages are also not exceeded). Minnesota Falls Township percentage of minority and low-income residents do not exceed 50 percent, but exceed the county and State levels by greater than 20 percent for minority population. Based on the CEQ guidance, there are no minority or low-income populations in Granite Falls and Sioux Agency Townships, however Minnesota Falls Township has a minority population. None of these townships is located in the project area.

Table 3-8: Minority and Low-Income Populations

Location	Total Population (a)	Percent Minority (a)	Percent Below Poverty (b)
Granite Falls Township	253	3.6%	4.2%
Minnesota Falls Township	429	45.2%	13.4%
Sioux Agency Township	226	5.3%	12.6%
Granite Falls	2,897	10%	14.6%
Chippewa County	12,441	6.5%	12.2%
Minnesota	308,745,538	14.7%	11.3%

Source: U.S. Census Bureau (accessed via American FactFinder 5/19/17)
(a) Minority was calculated by subtracting the white population from the total population (2010 data).
(b) From 2011-2015 American Community Survey 5-year Estimates

As further described in Section 6.0 – Coordination, Palmer's Creek has been in regular contact and met with the Upper Sioux Community. Representatives of the tribe were also invited to participate in the cultural resources field study.

3.12 Hazardous Materials and Health and Safety

Hazardous materials are those substances that have the potential to cause harm to humans, animals or the environment, such as certain chemicals or areas that contain these materials, including waste disposal sites or other facilities using potentially harmful materials. Hazardous materials have the potential to threaten the health and safety of those that come into contact with these substances.

Safety issues can also be related to infrastructure, such as electrical transmission, airports or other facilities that have the potential to cause harm.

The project area includes an existing substation located in the southern part of the project area. This substation is enclosed by a fence and posted for trespassing as a safety measure. The existing substation was constructed to meet industry safety standards.

The Granite Falls Municipal Airport/Lenzen-Roe-Fagen Memorial Field is located approximately 5.5 miles south of the project area. The Montevideo-Chippewa County Airport, is approximately eight miles northwest of the project area. Both airports are small, regional airports without commercial service.

4. ENVIRONMENTAL CONSEQUENCES

This section describes the environmental consequences of the Proposed Action and the No Action Alternatives. Section 5 of the PEIS discusses the potential direct and indirect environmental impacts of wind energy development in the UGP Region and identifies BMPs and conservation measures to address impacts. As discussed below for each resource, the potential impacts of the proposed Project fall within the type and range of impacts identified in the PEIS. Additional site-specific impact information is presented below for each resource, where appropriate. Palmer's Creek would implement the applicable BMPs, avoidance, and minimization measures for this Project, which are derived from Section 5 of the PEIS and the Programmatic BA. **Appendix G** of this EA includes a list of the specific measures Palmer's Creek has committed to implement. Commitment to these measures allows for this EA to tier off the analysis in the PEIS.

4.1 Land Cover and Land Use

4.1.1 Proposed Action

General direct and indirect effects to land cover and land use from wind energy development are addressed in Section 5.1 of the PEIS, and those impacts are consistent with those expected for this specific Project.

Temporary Impacts

Palmer's Creek's proposed Project would result in temporary disturbance to approximately 172 acres (out of 6,150 acres), or 0.03 percent of the total project area, due to construction activities. The existing land cover in these areas is previously cultivated, agricultural land. Collection lines may be placed across CREP land causing temporary disturbance. The existing land cover would be removed for the duration of construction, typically one growing season, but would be re-vegetated with vegetation types matching the surrounding landscape, as specified in Section 5.6.2.3 of the PEIS. During construction, there could be temporary access disruptions to privately owned lands, typically lasting one season.

Permanent Impacts

The proposed Project would result in the permanent conversion of approximately 12 acres (out of 6,150 acres), or 0.002 percent of the total project area, of agricultural land to non-agricultural uses due to construction of the wind turbine foundations, access roads, and other associated facilities. The proposed Project activities that would have permanent impacts, such as turbines and access roads, are located outside of CREP, RIM and PWP easements.

There would be some permanent upgrades to existing gravel roads and temporary access impacts to local roads during the construction phase of the Project, but the Project would not result in any permanent impacts or closures to the area's ground transportation resources. Palmer's Creek would work with Chippewa County to obtain the appropriate access and use permits, and to minimize and mitigate the impacts to area transportation. Access roads and turbine pads would not be fenced off except for gates/cattle guards installed in landowner fences. Livestock and the landowners would be able to cross access roads and move about unimpeded.

The air traffic generated by the airports would not be impacted by the proposed Project. Palmer's Creek would follow FAA regulations for marking towers and would implement the necessary safety lighting. Notification of construction and operation of the wind energy facility has been sent to the FAA, and FAA-required conservation measures would be implemented.

Appendix G of this EA lists BMPs and conservation measures from Section 5.1.2 of the PEIS that are applicable to the Project and that Palmer's Creek has committed to implementing to avoid or minimize impacts to land cover and land use.

4.1.2 No Action Alternative

Under the No Action Alternative, there would be no Project developed and, therefore, no related changes to land cover or land use within the project area.

4.2 Geology and Soil Resources

4.2.1 Proposed Action

Section 5.2 of the PEIS describes impacts on soil resources from wind energy development and discusses the types of geologic hazards that may be encountered in the UGP Region. The potential impacts on geologic and soil resources that would result from the proposed Project are within the type and range of impacts identified in the PEIS.

Temporary Impacts

Prior to construction, soil borings would be performed at all wind turbine locations to develop the specific design and construction parameters. Laboratory testing of soil samples obtained from the site and geophysical surveys would be performed to determine the engineering characteristics of the site subgrade soils. If necessary, corrections to roadway and foundation subgrade would be prescribed depending on soil conditions and location of turbines and associated infrastructure would be adjusted as necessary.

Project construction would result in temporary impact to approximately 172 acres. Construction activities would result in removal of existing vegetation in the areas associated with the proposed Project components, potentially increasing the risk of soil erosion. Final siting of temporary laydown areas and access routes would be located based on shortest routes to minimize disturbance and would avoid environmentally sensitive resources where feasible. Placement of wind energy facilities and access roads in areas with excessive slopes would be avoided.

Construction of the Project would require coverage under the General Permit Authorization to Discharge Stormwater associated with construction activity under the National Pollutant Discharge Elimination System. This permit is issued by the MPCA. A condition of this permit is to develop and implement a site-specific Storm Water Pollution Prevention Plan (SWPPP). The SWPPP would be developed during civil engineering design of the Project and would incorporate BMPs to control erosion and sedimentation.

Permanent Impacts

Permanent impact to soils includes approximately 12 acres of soil disturbance (i.e., excavation, compaction, and mixing of soil layers) for construction of turbines and associated facilities

(including the proposed substation). There are no anticipated effects to geological resources as a result of the Project.

Implementation of the BMPs and conservation measures identified in **Appendix G** of this EA, derived from Section 5.2.3 of the PEIS, would avoid or minimize impacts on geological and soil resources.

4.2.2 No Action Alternative

No Project-related impacts on geological or soil resources would occur with the No Action Alternative.

4.3 Water Resources

4.3.1 Proposed Action

Section 5.3 of the PEIS discusses the potential impacts on water resources resulting from wind energy projects in the UGP Region. The potential impacts on water resources that would result from the proposed Project are within the type and range of impacts identified in the PEIS. As discussed in Section 3.3, water resources in the Project Area consist of wetlands, streams and the Minnesota River.

Temporary Impacts

Sedimentation in waterways would be minimized by implementing measures identified in the SWPP. Excavations would occur at depths of 10 feet or less, and therefore, are not anticipated to reach the groundwater in this area.

Permanent Impacts

Direct impacts to water resources, including PWI waterbodies, streams, wetlands, and rivers, would be avoided by siting permanent features in non-water areas whenever feasible, and using horizontal boring when infeasible to site features in non-water areas. The proposed Project occurs outside of the County Designated Flood Zone and Wild and Scenic River regulatory area, and therefore, no impacts to these resources are anticipated.

Indirect impacts, such as changes in runoff patterns or volume of runoff, impacts to groundwater or nearby aquifers or contamination of water resources have potential to occur. If a new O&M building is constructed on-site, a well would be drilled for domestic use to supply water for up to eight employees on site using restroom facilities. The Project would use and store small quantities of potentially hazardous materials. As discussed in Section 4.12, these materials would be stored, handled, and disposed of in accordance with all applicable laws and regulations, thus, groundwater contamination from these materials is not anticipated.

Implementation of the BMPs and conservation measures identified in **Appendix G** of this EA, derived from Section 5.2.3 of the PEIS, would avoid or minimize impacts on water resources associated with the Proposed Action.

4.3.2 No Action Alternative

No effects to water resources would occur as a result of the No Action Alternative.

4.4 Air Quality and Climate

4.4.1 Proposed Action

Section 5.4 of the PEIS describes potential impacts on ambient air quality and climate that could occur in the UGP Region from wind energy development. Potential impacts on air quality expected from the Project fall within the type and range of impacts identified in the PEIS.

Temporary Impacts

Construction activities could release air emissions of criteria pollutants, VOCs, GHGs (e.g., carbon dioxide [CO2]), and small amounts of hazardous air pollutants (HAPs). During construction of the Project, fugitive dust emissions would temporarily increase due to truck and equipment traffic in the project area. Additionally, there would be short-term emissions from diesel trucks and construction equipment. Air quality effects caused by dust would be short-term, limited to the time of construction or decommissioning, and would not result in NAAQS exceedances or significantly contribute to GHG emissions.

Permanent Impacts

There would be no direct air emissions from operating wind turbines, because no fossil fuels are combusted. Negligible amounts of dust, vehicle exhaust emissions, and combustion-related emissions from diesel emergency generators would occur during maintenance activities. These emissions would not cause exceedances of air quality standards or have any negative impacts on climate change. Operation of WAPA's substation and the Palmer's Creek Substation could produce minute amounts of ozone and nitrogen oxides emissions as a result of atmospheric interactions with the energized conductors. Impacts on ambient air quality from these minor emissions during operation would be negligible. The proposed substation would employ sulfur hexafluoride-filled circuit breakers. Sulfur hexafluoride is a GHG, and, therefore, equipment leaks could contribute to air quality impacts. Equipment would undergo routine inspection and preventative maintenance to minimize such leaks, and if leaks did occur, the sulfur hexafluoride would be captured to prevent entering the atmosphere.

The Project could avoid considerable amounts of criteria pollutants, GHG, and HAP emissions that would otherwise have been generated from power plants burning fossil fuels. As discussed in Section 5.4.1.3 of the PEIS, operation of the Project could avoid from 1.4 percent up to 8.6 percent of air emissions from electric power systems in Minnesota, assuming the Project would displace fossil-fueled generation.

Implementation of the BMPs and conservation measures identified in **Appendix G** of this EA, derived from Section 5.4.2 of the PEIS, would avoid or minimize potential impacts on air quality and climate associated with the Proposed Action.

4.4.2 No Action Alternative

No Project-related impacts on air quality or climate would occur with the No Action Alternative.

4.5 Noise

4.5.1 Proposed Action

Section 5.5 of the PEIS discusses the potential impacts on the acoustic environment resulting from wind energy projects in the UGP Region. The expected potential noise impacts of the proposed Project are within the type and range of impacts identified in the PEIS.

Noise Study analysis indicated that construction and operation of the Project would contribute to increased noise levels. In general, the current background noise levels are within the state noise standards but exceeded state standards during the day (60 dBA) and night (50 dBA) on several occasions, as previously discussed in Section 3.5. Two turbine layout scenarios were modeled in the Noise Study (**Appendix B**) to determine the sound-related impact of the proposed wind farm.

Temporary Impacts

During construction, heavy equipment would be used to excavate WTG foundations, improve existing roads, construct new access roads, install collection lines, and construct the proposed substation and O&M facility. Construction activities would likely be heard by the receptors (i.e., homes) nearest the activity in the project area. Noise impacts from construction would be temporary. The Noise Study indicated that during construction activities, which would occur during daylight hours, the noise level would increase by as much as 2.8 dBA from the current levels.

Permanent Impacts

The proposed wind turbines are projected to generate an apparent sound level of approximately 107 dB output per the manufacturer's specifications adjacent to the turbine hub. All conditions were modeled slightly above the worst-case scenario at 109 dB. For a single turbine at an 80-meter hub-height, the worst-case resultant noise produced drops below 50 dBA at distances greater than approximately 160 meters (500 feet). Turbines would be located at least 1,000 feet away from the nearest receptor (i.e., home) (WSB 2017). Operation of the Project would increase noise levels by a maximum of 3.1 dBA during both daytime and nighttime hours.

Changes in sound levels less than 3 dBA are barely perceptible to the human ear (Bolt, Beranek and Newman, Inc., 1973). At most, construction and operation of the project would increase noise levels by 3.1 dBA. Depending on location relative to a WTG, the Project may cause a noticeable increase to daytime or nighttime noise levels, but the increase is close to the physical human ear perception limits.

Implementation of the BMPs and conservation measures identified in **Appendix G** of this EA, derived from Section 5.5.2 of the PEIS, would minimize noise impacts from the proposed Project.

4.5.2 No Action Alternative

With the No Action Alternative, there would be no Project-related noise impacts. Noise levels throughout the area would continue to exceed state-mandated thresholds.

4.6 Ecological Resources

Direct and indirect impacts to ecological resources from wind energy development are discussed in detail in Section 5.6 of the PEIS. Potential impacts to ecological resources expected from the proposed Project are within the type and range of impacts identified in the PEIS. These included impacts to plant communities, wildlife, regional wildlife, birds, bats, aquatic biota and habitat, and threatened and endangered species.

4.6.1 Plant Communities

4.6.1.1 Proposed Action

The Project would result in temporary and permanent impacts to vegetation. **Table 4-1** provides a summary of the estimated acres of vegetation disturbance from the Project. Information presented in the table is from the National Land Cover Dataset, which provides estimated vegetation types based on aerial photography interpretation, and therefore has not been field verified. Typical disturbance to vegetation includes removal, such as brush clearing or limited tree removal, compaction or trampling, and increased potential for introduction of invasive species.

Temporary Impacts

During construction, approximately 162 acres of agricultural land (cultivated crops and pasture/hay land) would be temporarily taken out of agricultural production for laydown areas and other construction activities. Roughly 10 acres of non-agricultural land would be temporarily disturbed during construction, including one acre of wetlands and one acre of forest. Directional drilling would be used to avoid direct impacts to wetland and other vegetation as needed to minimize impacts, including avoidance of grassland identified in the Native Prairie Protection Plan. After construction is complete, disturbed areas would be restored to their condition prior to construction. Restoration would include reseeding and planting trees, as determined during permitting.

Table 4-1: Temporary and Permanent Vegetation Disturbance (acres)

Cover Types	Temporary Disturbance	Permanent Disturbance
Barren Land (Rock/Sand/Clay)	0	0
Cultivated Crops	161	12
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**	**13.4**

Source: NLCD, 2011

Permanent Impacts
Approximately 12 acres of cultivated crop areas would be permanently cleared of vegetation and converted to non-agricultural uses due to the permanent Project footprint. Less than two acres of non-agricultural, non-native vegetation would be permanently disturbed.

Implementation of the BMPs and conservation measures identified in **Appendix G**, derived from Section 5.6.2 of the PEIS, would further protect plant communities during construction and operation of the Project.

4.6.1.2 No Action Alternative
No effects to vegetation would occur as a result of the No Action Alternative.

4.6.2 Wildlife

4.6.2.1 Proposed Action
Site-specific species and updated information for this Project are provided in Palmer's Creek Wind Project Wildlife Assessment and Field Studies (**Appendix C**) and Bird and Bat Conservation Strategy (**Appendix E**). Temporary and permanent impacts would occur to wildlife in the project area.

Temporary Impacts
During construction, wildlife would be disturbed by noise and human activity and potentially displaced as activities move into areas that are used for foraging and shelter. Wildlife using drainage areas, wetlands, and agricultural areas where construction activity disturbs may seek foraging habitat and shelter in other nearby areas within and adjacent to the project area, such as the WMA or Minnesota River area. Wildlife is anticipated to temporarily relocate with the ability to move back into the project area once construction in certain areas is complete.

Permanent Impacts
Most of the land that would be permanently impacted by the Project is cultivated agricultural land and does not provide long-term habitat. It offers seasonal foraging areas to wildlife, which would be impacted by Project facility placement. Wetlands, forested areas, and native prairie would be avoided, and therefore, permanent impacts to habitat are not anticipated. Due to the disturbance from Project construction, wildlife that relocates outside of the project area may not return as there is an abundance of habitat in close proximity to the project area. It is anticipated, however, that wildlife would eventually return and continue to migrate through the project area.

Implementation of the BMPs and conservation measures identified in **Appendix G**, derived from Section 5.6.2 of the PEIS, would further protect wildlife communities during construction and operation of the Project.

4.6.2.2 No Action Alternative
Effects to wildlife associated with existing transportation, agriculture, and other development would continue to occur as a result of the No Action Alternative. Current agricultural and other activities in the area would move wildlife to more suitable habitat found in the Minnesota River Valley, and primarily along undisturbed hillsides and drainages.

4.6.3 Birds

4.6.3.1 Proposed Action

The proposed Project would cause limited temporary disturbance. The Project could cause permanent impacts to birds due to collision mortality, displacement due to disturbance, habitat fragmentation, and habitat loss. Permanent disturbance would primarily be associated with the placement and operation of WTGs, which have the potential to cause collisions and mortality with birds.

Data collected through June 2017 suggest an overall low impact in the project area on the local avian community as compared to other upper Midwest wind farms. The low mean-use rate in the project area is primarily due to few common resident and migratory bird species. Raptor use was low for each raptor species detected. Although there is potential for turbine-related fatalities of unknown ducks, unknown blackbirds, red-winged blackbirds, American crow, ring-billed gulls, red-tailed hawks, and turkey vultures, fatalities are not expected to have population-level impacts. If avian fatality rates are similar to other wind facilities within the region, it is estimated the Project would result in fatality rates between 0.44 – 11.83 birds/turbine/year (0.49 – 7.17birds/MW/year). Collision mortality rates are anticipated to be low (**Appendix C- Wildlife Assessment and Field Studies Report**). The Project would not directly impact habitat in the project area.

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

Avian collisions and subsequent mortality may be more likely at WTGs located closest to the Minnesota River, WMAs, and wetland or wooded areas. The National Bald Eagle Management Guidelines (USFWS 2007) indicate wind turbines should be sited away from nests, foraging areas, and communal roosting sites. For nesting, a buffer distance of 660 feet from an active nest is recommended to avoid disturbance. Fledged juvenile eagles range from the nest up to one-quarter mile (USFWS 2007). According to the Montana Bald Eagle Management Plan (MDFWP 1994), structures that pose a hazard, such as overhead utility lines, should not be constructed within Zone II, which is considered the Primary Use Area within one-quarter mile of an active nest. The nearest WTG to a known active nest is greater than 3,000 feet, and therefore the project is exceeding the recommended buffer distance. Based on eagle nest data, the project area is situated within projected eagle territories (**Appendix C**).

Estimates for bald eagle fatality rates were calculated for the Project following the *Eagle Conservation Plan Guidance Module 1- Land-based Wind Energy, Version 2* (USFWS 2013), which constitutes a Stage 3 Assessment of potential project impacts to bald eagles. All the observed eagles were within or below the rotor sweep area and are considered in the eagle fatality calculations. Based on available data for the project site, the estimated bald eagle fatalities per year is approximately 0.03 and less than 5 percent of the estimated local population of eagles near the project area. Over the estimated 30-year project life, which ranges between 20-40 years, fatalities equate to 3 eagles. This estimated annual eagle fatality rate categorizes the project area as a Category 2 – High or Moderate Risk to Eagles, indicating the cumulative annual take of the local

area eagle population would be less than 5 percent of the estimated local population size.

The IBA follows the Minnesota River Valley. Project construction would occur outside of the IBA. Birds following the river valley would migrate through the project area and have the potential to collide with WTGs. Lac qui Parle Dam is located about 16 miles north, and therefore, impacts to migration routes and patterns and resting and staging areas at the State Park or WMA are not anticipated.

Palmer's Creek shifted turbine placement from initial layout plans to minimize impacts to the Minnesota River and its associated ecosystem. The four turbines closest to the Minnesota River Valley have been shifted farther from the river as recommended by MNDNR through ongoing coordination and correspondence. Palmer's Creek has also 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. Implementation of the BMPs and conservation measures identified in **Appendix G**, derived from Section 5.6.2 of the PEIS, would further protect bird populations during construction and operation of the Project.

4.6.3.2 No Action Alternative

No new effects to birds would occur under the No Action Alternative.

4.6.4 Bats

4.6.4.1 Proposed Action

For bats, the mean mortality rate is 9.6 bats per turbine per year (Stantec 2012). There are bats in the project area and some wind turbine collision bat mortality would likely occur from 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).

Implementation of the BMPs and conservation measures identified in **Appendix G**, derived from Section 5.6.2 of the PEIS, would avoid and minimize potential impacts to bats during construction and operation of the Project.

4.6.4.2 No Action Alternative

No new effects to bats would occur under the No Action Alternative.

4.6.5 Aquatic Biota and Habitats

4.6.5.1 Proposed Action

As described in Section 4.6.3, impacts to wetlands and streams would be avoided by siting facilities away from aquatic resources and implementing SWPPP requirements. Implementation of BMPs and conservation measures identified in **Appendix G**, derived from Section 5.6.2 of the PEIS, would protect aquatic biota and habitats.

4.6.5.2 No Action Alternative

No effects to aquatic biota or habitat would occur as a result of the No Action Alternative.

4.6.6 Threatened and Endangered Species

4.6.6.1 Federally Listed Species

4.6.6.1.1 Proposed Action

Palmer's Creek has committed to implement the conservation measures identified in the Programmatic BA applicable to species in the project area. With implementation of these measures, the Palmer's Creek Project *may affect, but is not likely to adversely affect***,** federally-listed species.

For programmatic consultations that tier off of the PEIS, a Project Consistency Evaluation Form and individual Species Consistency Evaluation Forms (CEFs) have been developed for the listed, candidate, or proposed species that may occur within the UGP Region. The project and species forms are used as a tool for documenting and verifying that project proponents have complied with the requirements of the programmatic BA and are consistent with Tiers I, II, and III of the *U.S. Fish and Wildlife Service Land- Based Wind Energy Guidelines* (USFWS 2012c). The forms that document agency verification (WAPA and the USFWS) that the Project is in compliance with the Programmatic BA are included in **Appendix F** of this EA.

Northern Long-eared Bat

Potential direct and indirect effects to the northern long-eared bat from wind energy development in the UGP Region are analyzed in detail in Sections 5.5.6 and 5.6.6, respectively, of the PEIS.

No northern long-eared bats were detected in the project area in pre-construction surveys and hibernacula are unlikely in the area due to a lack of adequate habitat. The project area is not currently affected by white nose syndrome, and there are no known hibernacula within 0.25 mile of the Project or roost trees within the project area. Northern long-eared bats migrate only short distances between winter hibernacula and summer roosting habitat. As there are no known hibernacula in Chippewa County, the presence of northern long-eared bats within the project area is unlikely.

Dakota Skipper and Poweshiek Skipperling

The Dakota skipper and Poweshiek skipperling require similar habitat (i.e., native prairie) and have similar lifecycle characteristics. Therefore, the discussion about the potential impacts to these species has been combined. There are no records for the Dakota skipper and Powesheik skipperling in the US Fish and Wildlife Service data base within the project area. There is no designated critical habitat. The project area contains relatively small areas of native prairie. Native prairie is limited to a few rocky outcrops, which do not contain the appropriate botanical species to support the Dakota skipper and/or Poweshiek skipperling. The native prairie areas are outside of the construction limits of the Project, and would therefore not be disturbed.

The Project has been designed to avoid native prairie, where Dakota skippers and Poweshiek

skipperlings complete their life cycle, by following established utility corridors along active roadways and previously disturbed areas, such as cultivated or managed agricultural areas. Therefore, the Project would not cause additional fragmentation of habitat, new barriers to dispersal, loss of connectivity, changes in distribution or isolation of known populations. There is no indication that the Project would result in biologically meaningful or measurable changes to the existing habitat, individuals, or population of Dakota skipper or Poweshiek skipperling due to the lack of suitable habitat within the project area.

4.6.6.1.2 No Action Alternative

No effects to threatened and endangered species would occur as a result of the No Action Alternative.

4.6.6.2 State Listed Species

4.6.6.2.1 Proposed Action

The Project would not directly impact important bird habitat or IBAs in the project area. MBS sites, native prairie, and wetland areas would be avoided if possible. 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. As recommended by the MNDNR through ongoing coordination and correspondence, WTG-5, WTG-9, WTG-10, and WTG-12 have been shifted a minimum of 200 feet farther from the Minnesota River Valley to reduce potential bird mortality.

The Project is not anticipated to adversely impact populations of state-listed bird species, such as the American white pelican, upland sandpiper, and lark sparrow. The Project is also not anticipated to adversely impact populations of state-listed bats (NLEB, tricolored bat, and big brown bat) and snakes (gopher snake and western fox snake). Please refer to **Table 3-4** for a complete list of state-listed species that may occur in the project area. Post-construction monitoring is required to determine Project impact on bird mortality.

The USFWS and MNDNR have provided guidance for avian surveys. Palmer's Creek has agreed to avoid eagle nesting areas, as feasible. Additionally, due to the Minnesota River Valley being a significant migration corridor, post-construction avian fatality monitoring would be required, including bat monitoring.

Implementation of the BMPs and conservation measures identified in **Appendix G**, derived from Section 5.6.2 of the PEIS, would further protect state-listed species during construction and operation of the Project.

4.6.6.2.2 No Action Alternative

No effects to state-listed species would occur as a result of the No Action Alternative.

4.7 Visual Resources

4.7.1 Proposed Action

Section 5.7 of the PEIS describes potential visual impacts that could occur in the UGP Region from wind energy development. The potential visual impacts of the proposed Project would fall within the type and range of impacts identified in the PEIS. Visual impacts to the landscape attributable to the Project would depend on the extent to which the existing landscape is already altered from its natural condition, the number of viewers (residents, travelers, visiting recreational users, etc.) within visual range of the area, and the degree of public or agency concern for the quality of the landscape. The primary direct visual impacts associated with the proposed Project would result from the introduction of the numerous vertical lines of the 18 wind turbines into the generally strongly horizontal landscape found in the Project Area.

As discussed in Section 3.7, viewers of the Project would include occupied residences within and adjacent to the Project Area, travelers along U.S. Highway 212, and recreation users of the Minnesota River valley. The magnitude of the visual impacts associated with the Project would depend on many factors, including distance of the proposed wind energy facility from viewers, weather and lighting conditions, the presence and arrangements of lights on the turbines and other structures, and viewer attitudes. Viewer attitudes are very subjective, and their reactions to visual changes may be influenced by several non-visual factors, such as positions on renewable energy and wind power and on financial considerations.

A preliminary viewshed analysis was completed in December 2016 (BCA 2016), which evaluated three observer points (OPs): Granite Falls city center and two on the Upper Sioux Reservation. Follow up viewshed analysis, visual impact assessments, and three-dimensional (3-D) virtual simulations were completed for the Project in June 2017 to evaluate the visibility of the Project from 18 additional OPs (BCA 2017b). The OPs included the city center of Granite Falls, two observation points on the Upper Sioux Reservation, architectural structures, and the scenic byway along the river (BCA 2016 and 2017). Eight OPs were identified during coordination with the Minnesota SHPO and are located within Granite Falls. The remaining 10 OPs are located along the Minnesota River Valley National Scenic Byway.

Table 4-2 provides a summary of the OPs and potential visual impact of the Project on each OP.

Table 4-2: Summary of the OPs and Visual Impact

OP	Association	WTG Visibility	Visual Impact	Distance from nearest WTG
OP1	Olof Swensson Farmstead	Visible	High	0.60 miles
OP2	Andrew J. Volstead House	Not Visible	None	1.88 miles
OP3	Julian A. Weaver House	Not Visible	None	2.04 miles
OP4	Prentice St. in Granite Falls	Not Visible	None	1.60 miles
OP5	Prentice St. in Granite Falls	Not Visible	None	1.84 miles
OP6	Prentice St. in Granite Falls	Not Visible	None	2.00 miles

OP	Association	WTG Visibility	Visual Impact	Distance from nearest WTG
OP7	Prentice St. in Granite Falls	Not Visible	None	2.07 miles
OP8	12th Ave. & 7th St. in Granite Falls	Not Visible	None	2.09 miles
OP9	U.S. Highway 212, Scenic Byway	Visible	Moderate-Low	3.58 miles
OP10	U.S. Highway 212, Scenic Byway	Not Visible	None	3.18 miles
OP11	U.S. Highway 212, Scenic Byway	Not Visible	None	2.50 miles
OP12	U.S. Highway 212, Scenic Byway	Not Visible	None	3.05 miles
OP13	U.S. Highway 212, Scenic Byway	Not Visible	None	1.91 miles
OP14	U.S. Highway 212, Scenic Byway	Visible	Moderate-High	1.59 miles
OP15	U.S. Highway 212, Scenic Byway	Visible	Moderate-High	1.21 miles
OP16	U.S. Highway 212, Scenic Byway	Visible	Moderate-High	1.35 miles
OP17	U.S. Highway 212, Scenic Byway	Visible	Moderate-Low	1.91 miles
OP18	U.S. Highway 212, Scenic Byway	Visible	Low	2.04 miles
OP19	Granite Falls City Center	Visible	Low	2.12 miles
OP20	Upper Sioux Reservation West	Not Visible	None	5.09 miles
OP21	Upper Sioux Reservation East	Visible	Moderate	6.51 miles

* Please note that this data is from a digital rendering and the project results may differ slightly.
Source: BCA, 2017c

Figure 10 shows the locations of the OPs relative to the project area, including the OP locations in the City of Granite Falls, along U.S. Highway 212, and the Upper Sioux Reservation.

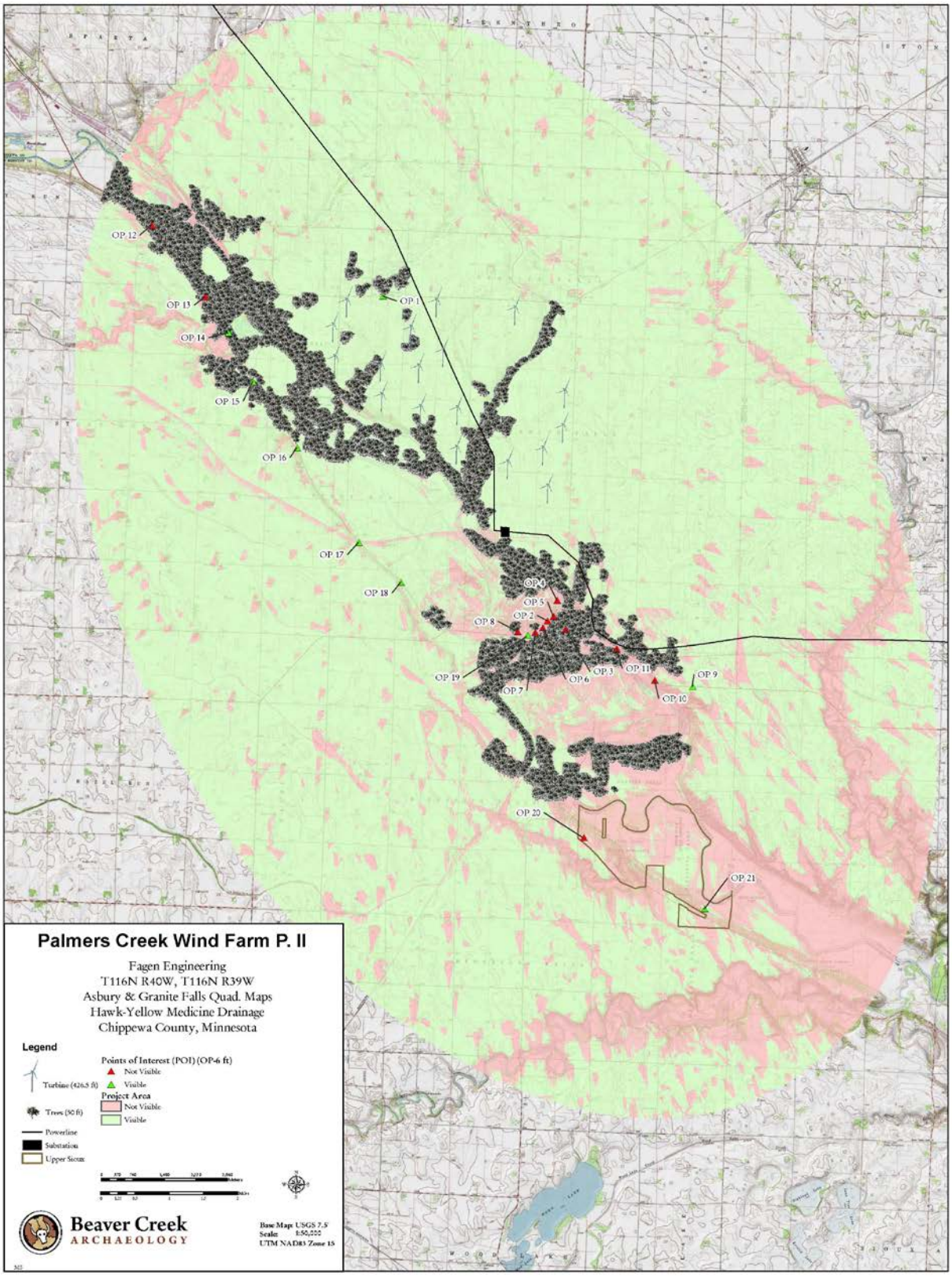

Figure 10: Observer Points Evaluated for Visual Impacts

The viewshed analysis indicated that two WTGs would be visible from the city center of Granite Falls. The results of the viewshed analysis, a visual impact assessment, and ground truthing (BCA 2017) indicate the Project would not be seen from the majority of the town of Granite Falls and concluded the Project would have limited visual effect on Granite Falls.

Up to 15 WTGs would be visible from the east OP on the Upper Sioux Reservation (BCA 2016).

WTGs would not be visible from most residences. However, WTGs would interrupt some horizon views within the project area and in some areas outside of the project area boundary. The proposed substation would be located next to the existing substation and is not anticipated to result in a significant visual impact. There would be no visual impact on the OPs provided by WAPA in consultation with the Minnesota SHPO, with the exception of the Olof Swenson Farmstead. The Olof Swenson Farmstead has some tree vegetation, but not enough to significantly block the view of the Project.

Within the project area, the Project would be visible along CR 15, which runs along the north edge of the project area. While traveling Palmer Creek Road in the river floodplain, travelers would not have a good view of the WTGs due to the location of the WTGs above on the bluff and existing tree cover along the bluff slope. Those using the Minnesota River Valley National Scenic Byway alternate routes would be directly adjacent to the proposed substation. The Project would not be seen from the majority of the scenic byway due to tree vegetation and topography adjacent to the road. The viewshed analysis (BCA 2017) concluded the Project would have a limited visual effect on U.S. Highway 212, a portion of the Minnesota River Valley National Scenic Byway.

Minnesota River Valley National Scenic Byway technical staff were contacted regarding potential impacts from the Project. If the viewshed of the Byway has significant impacts to its scenic nature, the Byway could lose national designation. Based on the viewshed analysis (BCA 2017), substantial visual impacts to the Byway are not anticipated relative to the existing transmission lines, substations, and other visible infrastructure in the area.

Consideration of viewsheds during design and construction would help reduce potential impacts to the viewshed and Scenic Byway. The WTGs would be lit to meet the minimum FAA regulations, which require red flashing, strobe, or pulsed obstruction lights at night. No daytime lighting is required (FAA 2016).

Implementation of the BMPs and conservation measures identified in **Appendix G**, derived from Section 5.7.1.3 of the PEIS, would help reduce visual impacts from the proposed Project. The viewshed analysis also recommended planting a tree row along the southern edge of the Swenson Farmstead site to reduce visual impacts.

4.7.2 No Action Alternative

With the No Action Alternative, there would be no Project-related visual changes in the Project Area.

4.8 Paleontological Resources

4.8.1 Proposed Action

Section 5.8 of the PEIS discusses the potential of wind energy development activities to impact paleontological resources in the UGP Region. Ground-disturbing activities, most of which take place during construction, represent the greatest impacting factor to paleontological resources. Based on the presence of metamorphic rocks and associated geology in the project area, the risk for impacts to paleontological resources from the Project is very low (BLM 2016). The construction of the turbine foundations would have the greatest potential to affect fossil-bearing formations. Foundations for substation equipment, while not nearly as deep, could also affect fossil-bearing formations at the substation and switchyard sites.

Implementation of the BMPs and conservation measures identified in **Appendix G**, derived from Section 5.8.1.6 of the PEIS, would minimize potential paleontological resource impacts.

4.8.2 No Action Alternative

No paleontological resource impacts would occur as a result of the No Action Alternative.

4.9 Cultural Resources

4.9.1 Proposed Action

Section 5.9 of the PEIS describes the wind energy development activities with a potential to affect cultural resources. The project area is in the Prairie Lake Region (Region 2), which is in southwestern and south-central Minnesota. From a regional perspective, material from any cultural period (Paleo-Indian to modern) could be expected to be encountered in any archaeological region.

Field surveys identified one site within the APE; this site was recommended as ineligible for the NRHP, and no avoidance is required (**Appendix H**). In consultation with the Upper Sioux, Palmer's Creek has agreed to shift the proposed substation and a turbine away from areas of concern identified by the THPO. A second turbine could not be shifted due to the limiting topography, so an agreement was reached to have tribal monitors at this location during construction.

During Project construction and operation activities, Palmer's Creek would physically avoid NRHP-eligible properties and unevaluated properties, which are being treated as eligible for purposes of this Project. It is WAPA's practice to avoid all sites potentially eligible for listing in the NRHP.

Table 4-3 provides a summary of the avoidance measures identified for each site. If an unevaluated site cannot be avoided, it would be evaluated for NRHP eligibility, and the criteria for adverse effects would be assessed.

Table 4-3: Avoidance Measures for Previously Recorded Cultural Resources Sites

Site Number	Avoidance Measures
21CPa	No avoidance necessary
21CP9	Avoidance
21CP10	Avoidance
21CP11	No avoidance necessary
21CP77	No avoidance necessary
21CP78	No avoidance necessary
21CP79	No avoidance necessary

Source: BCA 2017

If cultural resources were to be found during construction activities, all work would cease at that location and the notification and protection protocols identified in **Appendix G** would be followed. As such, the Project is not anticipated to adversely affect historic resources. The SHPO concurred with this determination on July 19, 2018.

With implementation of the minimization measures identified in **Appendix G**, derived from Section 5.9.1.6 of the PEIS, significant cultural resources in the project area would be identified and appropriately protected during Project development activities.

4.9.2 No Action Alternative

There would be no cultural resources impacts with the No Action Alternative.

4.10 Socioeconomics

4.10.1 Proposed Action

The direct and indirect socioeconomic impacts produced from construction and operation of wind energy facilities in the UGP Region are described in Section 5.10 of the PEIS. The anticipated short-term and long-term economic impacts associated with the proposed Project are consistent with the type and range of impacts identified in the PEIS.

Temporary Impacts

The number of short-term construction jobs created is expected to be approximately 100. Any increase in the local population due to construction would be temporary. There would likely not be sufficient trained local labor to fill the number of jobs available. Non-local construction workforce would probably be located within an approximately 40-mile radius that would include Willmar, Montevideo, and Redwood Falls, MN and workers could commute to the project area. Construction labor could also commute to the site from South Dakota from cities such as Brookings or Watertown, both approximately 90 miles from the project area. The need for additional temporary or permanent housing in the project area would be unlikely.

Construction activities for the Project would be short-term, and any short-term effects to local businesses would most likely be beneficial.

Permanent Impacts
Operation of the Project has the potential to create long-term beneficial impacts to Chippewa County's tax base. The Project would provide a new source of property taxes for the County, thus increasing the potential tax revenues. These increased revenues could be used to improve local government or community services, benefitting all local residents. Local spending during the construction and operation periods would result in additional personal income, as well as increased State and local tax revenue. Landowners who participate in the Project would receive the most direct economic benefit from lease payments for wind turbines and roads located on their property. These payments would provide a predictable supplementary source of income for the life of the Project, which is expected to be 20 to 40 years.

The Project would generate approximately five long-term jobs, which would have a positive effect on local income levels. The salary range for these jobs would be between $30,000 and $70,000, annually. These long-term positions could bring additional people into the County and positively contribute to the local economy.

Section 5.10 of the PEIS discusses potential impacts to property values from wind farm projects, indicating no evidence that wind turbines decreased property values. It is anticipated that the proposed Project would have similar implications on property values in the project area to those described in the PEIS.

4.10.2 No Action Alternative
The No Action Alternative would not result in new jobs for construction or operation of the Project. It would also not result in new tax revenue for Chippewa County.

4.11 Environmental Justice
Minority populations are located approximately five miles south of the project area. Palmer's Creek has been in ongoing discussions with the Upper Sioux Community regarding the Project and working with the tribe to avoid and minimize impacts. No disproportionately high and adverse human health or environmental effects are expected from the Project. No further environmental justice analysis is required for either the proposed Project or No Action Alternative in accordance with the provisions of EO 12898.

4.12 Hazardous Materials and Health and Safety

4.12.1 Hazardous Waste

4.12.1.1 Proposed Action
Section 5.12 of the PEIS discusses the possible adverse impacts resulting from the presence and use of hazardous materials and the generation, management, and disposal of wastes. The use of lubricants and other potentially hazardous materials are necessary for proper equipment operation of the Project. These materials would be used in small quantities on an as needed basis

for equipment maintenance. A small amount of turbine hydraulic fluids and lubricants would be contained within the nacelle of the individual WTGs. A small amount of hydraulic fluid, lubricating oil, grease and solvents would be stored in appropriate containers in the O&M Facility. When fluids or oils are replaced, the waste substances would be disposed of at an appropriate hazardous materials management disposal facility or landfill.

Palmer's Creek would implement the appropriate minimization strategies identified in Section 5.12.1.4 of the PEIS to eliminate or reduce adverse impacts from Project-related hazardous materials and wastes. Section 3.9 of the PEIS provides a discussion of the amounts and types of hazardous materials that would be present at a wind farm during its construction, operation, and decommissioning phases. These same amounts and types of hazardous materials would also be anticipated for the Palmer's Creek Wind Farm. Based on the small quantities, use of proper storage, spill cleanup, and regulated disposal methods, impacts from hazardous materials are not anticipated.

4.12.1.2 No Action Alternative

There would be no Project-related hazardous materials impacts with the No Action Alternative.

4.12.2 Health and Safety

4.12.2.1 Proposed Action

Health and safety concerns of wind energy development are discussed in Section 5.13 of the PEIS. Palmer's Creek would implement the BMPs and conservation measures identified in **Appendix G**, derived from Section 5.13.4 of the PEIS, for protection of wind energy facility and transmission line workers and for the protection of public health and safety during the various phases of Project development associated with the Project.

Several safety hazards are associated with wind turbines, including turbine height, high winds, and rotating machinery. Wind turbines are designed with safety features including wind sensors and brakes. Wind sensors prompt the turbine to turn and face oncoming wind to maximize efficiency and prevent damage during high winds. WTGs also include brakes to stop the turbine during emergencies and control rotation speed.

WTG safety features require regular, ongoing maintenance for proper operation, which requires personnel to inspect and repair the nacelle and other parts of the turbine. Precautions are taken to prevent falls and other injuries. Precautions to prevent accidents including training and use of proper equipment.

Palmer's Creek has sited the proposed WTGs for the Project a minimum of 1,000 feet from residences. When maintenance of the WTG is conducted, trained personnel are required to use safety equipment to prevent injury and accidents. The proposed substation would be fenced and posted for trespassing to minimize potential public safety impacts. Safety measures would be included in the substation design to comply with industry standards and applicable regulations.

As indicated in Section 5.13.3 of the PEIS, Palmer's Creek is responsible for ensuring the operability and reliability of their systems. To do so, they must evaluate the potential risks from

all credible events, including natural disasters (earthquakes, storms, etc.) as well as mechanical failure, human error, sabotage, cyber-attack, or deliberate destructive acts, recognizing intrinsic system vulnerabilities, the realistic potential for each event/threat, and the potential consequences. The proposed Project is not anticipated to be at any unusual risk for accidents or acts of sabotage or terrorism.

Due to the height of the WTGs, FAA Form 7460-1 must be completed and submitted when a construction permit is filed or at least 45 days before the start date of Project construction, whichever is earliest. Based on distance and FAA compliance measures, the Project is not anticipated to cause impacts to the Granite Falls Municipal Airport/Lenzen-Roe-Fagen Memorial Field or the Montevideo-Chippewa County Airport.

4.12.2.2 No Action Alternative

There would be no Project-related health or safety concerns with the No Action Alternative.

5. CUMULATIVE IMPACTS

The cumulative impacts of past, present, and future actions on resources within the UGP Region are analyzed in Section 6 of the PEIS. The contribution of cumulative impacts associated with the proposed Project are within the scope of the cumulative impacts analysis in the PEIS. The PEIS (Section 2.4) projected wind energy development through the year 2030 for the UGP Region, and the proposed Project is part of that projected development.

Past and present impacts to soils and vegetation in the project area are primarily related to agriculture from cultivated crops and livestock, and therefore, the top soil layers have been disturbed, and mixed and native vegetation have been removed. The project area is crossed by existing roads, a railroad track, and high voltage transmission lines connecting to an existing substation. Noise levels in the project area are consistent with rural areas and at times exceed the state noise standards.

Additionally, there are a number of wind development projects in the UGP Region. There are 28 known wind projects within 55 miles of the project area and another 117 wind projects within 150 miles (USGS 2014). **Table 5-1** provides a summary of the wind projects within 55 miles of the project area.

Table 5-1: Wind Projects Within 55 Miles of Project Area

Wind Project	Number of Turbines	Miles to Project Area
Lac qui Parle Valley School Wind Farm	1	25
Redwood Falls Wind	2	29
Willmar Wind	2	32
Adams Community Wind	12	37
Marshall Wind	9	38
Danielson Wind	12	39
Borderline Wind Project	1	46
Lakeview Ridge Wind	1	46
Shaokatan Hills	18	49
Buffalo Ridge 1&2	129	50
Shaokata Power Partners Wind	2	50
Lakota Ridge	15	50
North Shaokatan Wind	18	51
Lake Benton 1	143	52
Salty Dog 1	3	52
University of Minnesota - Morris	2	53

Wind Project	Number of Turbines	Miles to Project Area
Hope Creek LLC	3	53
Buffalo Ridge Wind	73	53
U of Minnesota-Morris	2	54
Soliloquy Ridge LLC	3	54
Spartan Hills LLC	3	54
Florence Hills LLC	3	54
MinnDakota Wind	100	54
Ruthton Ridge 1 LLC	3	54
Hadley Ridge LLC	3	54
Ruthton Ridge 2 LLC	3	54
Winter's Spawn LLC	3	54
Lake Benton 2	138	55

Source: USGS 2104

The construction and operation of the Project, in combination with these other existing and proposed wind farms, as well as other private and public development occurring within 55 miles of the project area, could contribute to cumulative impacts on resources within the UGP Region, which would be similar to those described in the PEIS. A summary of cumulative impacts analyzed for each resource area under the PEIS's preferred alternative (of which this Project is a part) is provided in Table 6.3-2 of the PEIS.

With the implementation of conservation measures, the Project would avoid or minimize impacts to the resources described above and therefore, would not measurably contribute to cumulative effects on resources from other past, present, and reasonably foreseeable future actions.

6. COORDINATION

Public involvement is a key component of the federal environmental review process. Involvement began with a scoping meeting, held on December 1, 2016, in Granite Falls, Minnesota. Federal, State, and local agencies, as well as tribes and members of the public, were invited to the meeting and asked to provide input on the Project and any relevant issues that should be analyzed in the EA. The scoping meeting was advertised through newspaper and radio announcements, a project website, and individual letters to residents near the Project, agencies, and tribes.

WAPA circulated the draft EA for public review and comment on October 12th, 2017. Comments on the draft EA were accepted through November 15th, 2017.

Public involvement documentation is included in **Appendix I**. A summary of comments received and responses are included in **Appendix J.**

6.1 Federal Agencies

The Federal agencies that were contacted for the purpose of the EA are:

- FAA
- USFWS
- U.S. Department of Agriculture, Natural Resource Conservation Service and Rural Utilities Service
- FEMA
- Federal Highway Administration
- U.S. Army Corps of Engineers
- Bureau of Land Management
- Bureau of Indian Affairs

6.2 State and Local Agencies

The State and local agencies that were contacted for the purpose of the EA are:

- MnDOT
- MNDNR
- Minnesota Public Utilities Commission
- Minnesota SHPO
- Minnesota Office of the Governor
- Minnesota Indian Affairs Council
- Minnesota Department of Commerce
- Upper Minnesota Regional Development Commission
- Chippewa County – Commissioners, Highway Department, Land and Resource Management, Emergency Management Departments
- City of Granite Falls
- Minnesota and Chippewa County Soil and Water Conservation Districts

6.3 Native American Tribes and Associated Bodies

Pursuant to Section 106 of the NHPA and its implementing regulations (36 CFR § 800.4), WAPA initiated Section 106 tribal consultation regarding the proposed project with the following 12 tribes

on November 10, 2016: the Cheyenne and Arapaho Tribes of Oklahoma; Flandreau Santee Sioux Tribe; Santee Sioux Nation; Lower Sioux Indian Community; Prairie Island Indian Community; Spirit Lake Tribe; Sisseton-Wahpeton Oyate Nation; Upper Sioux Indian Community; Iowa Tribe of Kansas and Nebraska; Fort Belknap Indian Community; Apache Tribe of Oklahoma; and Menominee Indian Tribe of Wisconsin. The Upper Sioux Community and the Cheyenne and Arapaho Tribes of Oklahoma were the only tribes to respond to WAPA's request for information and invitation for consultation. WAPA received two responses, one from the Upper Sioux Community requesting that staff from their THPO be allowed to conduct a Tribal survey and one from the Cheyenne & Arapaho Tribes indicating they knew of no historic properties in the APE.

On April 24, 2017, a follow-up e-mail was sent to the tribes inviting them to a tribal consultation meeting organized by WAPA and the Upper Sioux Community THPO and offered to meet with any tribes individually at a later date. Three tribes responded: The Prairie Island Indian Community THPO responded that they would not be in attendance; the Flandreau Santee Sioux THPO responded that two of their representatives would be at the meeting; while the Santee Sioux Nation THPO indicated his support for the Upper Sioux Community during the Project. No tribes requested an individual meeting. The tribal consultation meeting was held on May 4, 2017 at the Prairie's Edge Casino. Representatives of the Upper Sioux Community THPO were in attendance and one staff member from the Flandreau Santee Sioux Tribe THPO arrived near the end of the meeting.

In addition to the consultation meeting, all cultural resource reports provided to WAPA by Palmer's Creek were submitted to the tribes for review and comment. No comments were received.

The Upper Sioux Community THPO conducted a cultural resource investigation in the summer of 2017. The THPO identified three areas of concern. These areas were identified in a one-page summary letter submitted to WAPA on June 29, 2017. On August 17, 2017, representatives from WAPA, Palmer's Creek, and the Upper Sioux THPO met on site to visit these areas and discuss potential avoidance measures. Palmer's Creek agreed to shift project facilities away from these locations. One project facility could not be shifted due to the limiting topography, so an agreement was reached to have tribal monitors at this location during construction.

6.4 Non-Governmental Organizations

The non-governmental organizations that were contacted for the purpose of the EA are:

- Minnesota River National Scenic Byway Commission
- Chippewa County Historical Society
- Sierra Club, North Star Chapter
- The Nature Conservancy, Minnesota Chapter
- Ducks Unlimited, Minnesota Chapter
- Izaak Walton League of America, Minnesota Division
- Audubon Society
- Pheasants Forever

7. LIST OF PREPARERS

Table 7-1 identifies the personnel responsible for the preparation of this EA.

Table 7-1: List of EA Preparers

Name	Agency/Firm	Title
Christina Gomer	WAPA	NEPA Coordinator (Natural Resources Specialist)
Louis Hanebury	WAPA	UGP Environmental Protection Specialist (Biologist)
David Kluth	WAPA	UGP Archeologist
Matthew Marsh	WAPA	UGP Environmental Manager
Mike Rutledge	Fagen Engineering	Environmental Services Director
Amy Denz	Wenck, Inc.	Environmental Review Manager

8. REFERENCES

Audubon. 2016. Minnesota Important Bird Areas. Available online: http://mn.audubon.org/conservation/minnesota-important-bird-areas (Accessed November 2016).

Beaver Creek Archaeology (BCA). 2016. Viewshed Analysis: Palmer's Creek Wind Farm, LLC., December 2, 2016.

BCA. 2017a. A Phase I Reconnaissance Survey of the Palmer's Creek Wind Project in Chippewa County, Minnesota. Reiners, L., Bohner C., Brooks, B. April, 2017.

BCA. 2017b. A Virtual Viewshed Analysis, Visual Impact Assessment, and Ground Truthing of Palmer's Creek Wind Project in Chippewa County, Minnesota. June 2017.

Bolt, Beranek and Newman, Inc., Fundamentals and Abatement of Highway Traffic Noise, Report No. PB-222-703. Prepared for Federal Highway Administration, June 1973.

Bowman, Melissa. 2016. Rare Species Guide. Minnesota Department of Natural Resources. <http://www.dnr.state.mn.us/>.

Bureau of Land Management (BLM). 2016. Potential Fossil Yield Classification System. Retrieved from Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands: https://www.blm.gov/policy/im-2016-124. Accessed July 8, 2016.

Chippewa County 2005. Zoning Ordinance Section 12 – Windpower Management. Adopted: February 15, 2005. Available online: http://www.co.chippewa.mn.us/Ordinance%20Section%2012%20Windpower%20Mgt.pdf. Accessed September 2016.

Chippewa County 2014. *The 2013-2023 Chippewa County Water Plan*. Available online: http://www.co.chippewa.mn.us/Chippewa%20County%20Water%20Plan.pdf. Accessed September 2016.

Chippewa County Highway Department 2016a. *Spring Load Restrictions.* Available online: http://www.co.chippewa.mn.us/highway9.htm. Accessed September 2016.

Chippewa County Highway Department 2016b. *Road Construction 2017-2021.* Available online: http://www.co.chippewa.mn.us/HWY%20Five%20Year%20Plan.pdf. Accessed September 2016.

Dana, R. P. 1991. Conservation management of the prairie skippers Hesperia dacotae and Hesperia ottoe. Station Bulletin 594-1991 (AD-SB-5511-S), Minnesota Agricultural Experiment Station, University of Minnesota, St. Paul, Minnesota.

EAPC Wind Energy (EAPC) 2016. Palmers Creek Wind Project Microwave Beam Study. Granite Falls, MN. October 15, 2016. Authored by Chester Harvey (GIS Specialist), checked by Nick Laskovski (Project Analyst), and approved by Robert Sherwin (Managing Partner).

Federal Aviation Administration (FAA) 2016. Advisory Circular: Obstruction Marking and Lighting (AC No. 70/7460-1L). October 8, 2016. Available online: http://www.faa.gov/documentlibrary/media/advisory_circular/ac_70_7460-1l_change_1_obstruction_marking_and_lighting_10062016.pdf. Accessed October 2016.

Federal Emergency Management Agency (FEMA) 1986A. Flood Insurance Rate Map, Panel 155 of 170. Community Panel Number 2700660155B, effective June 17, 1986. Available online: http://map1.msc.fema.gov/idms/IntraView.cgi?KEY=64511988&IFIT=1. Accessed September 2016.

FEMA 1986B. Flood Insurance Rate Map, Panel 160 of 170. Community Panel Number 2700660160B, effective June 17, 1986. Available online: http://map1.msc.fema.gov/idms/IntraView.cgi?KEY=64581656&IFIT=1. Accessed September 2016.

Federal Register 79:206 (24 October, 2014) pp. 63672-63748.

Fitch, J. H., and K. A. Shump, Jr. 1979. *Myotis keenii*. Mammalian Species 121:1-3.

GE Renewable Energy 2016. 2.0-2.4 MW Platform website. Available online: https://www.gerenewableenergy.com/wind-energy/turbines/23-107.html. Accessed September 2016.

Headwaters Economics. 2017a. Populations at Risk: Minnesota Non-Metro. May 19, 2017.

Headwaters Economics. 2017b. Economic Profile System (EPS): A Profile of Socioeconomics Measures. May 19, 2017.

Johnson, Jolene. 2017. Email correspondence: Gravel mines in Yellow Medicine County near the project area. February 16, 2017.

Midwest Rural Energy Council (MREC). 2014. Wind Turbines and Farm Stray Voltage. February 2014.

Minnesota Department of Health (MNDH) 2016. Minnesota Well Index Mapper. Available online: https://apps.health.state.mn.us/cwi/#. Accessed: September 2016.

Minnesota Department of Natural Resources (MNDNR). 2011. Minnesota Prairie Conservation Plan (2011). Available online: http://www.dnr.state.mn.us/prairieplan/index.html (Accessed November 2016).

MNDNR. 2016. Minnesota Regions Prone to Surface Karst Feature Development, Series GW-01. Roberta Adams, John Barry, and Jeff Green.

MNDNR. 2016a. Spartan Wildlife Management Area. Available online: http://www.dnr.state.mn.us/wmas/detail_report.html?id=WMA0026100. Accessed September 2016.

MNDNR 2016b. Sween Wildlife Management Area. Available online: http://www.dnr.state.mn.us/wmas/detail_report.html?id=WMA0092000. Accessed September 2016.

MNDNR. 2016c. Natural Heritage Information System Correspondence #ERDB 20160322-0002, July 5, 2016.

MNDNR. 2006. Tomorrow's Habitat for the Wild and Rare: An Action Plan for Minnesota Wildlife, Comprehensive Wildlife Conservation Strategy. Division of Ecological Services, Minnesota Department of Natural Resources.

Minnesota Management and Budget. 2014. Historical Expenditures: General Fun and All Funds: Actual and Estimated Expenditures and Transfers, Updated End of 2014 Legislative Session. June 27, 2014.

Minnesota Management and Budget. 2014. Price of Government: State and Local Government Revenues. End of 2014 Legislative Session.

Minnesota Pollution Control Agency (MPCA). 2017. Minnesota Air Monitoring Sites, 2017. https://www.pca.state.mn.us/air/minnesota-air-monitoring-sites

Minnesota Public Utilities Commission (MNPUC) 2008. In the Matter of Establishment of General Permit Standards for the Siting of Wind Generation Projects Less than 25 Megawatts. Order Establishing General Wind Permit Standards. Docket No. E, G-999/M-07-1102. January 11, 2008. Available online: http://mn.gov/commerce/energyfacilities/documents/19302/PUC%20Order%20Standards%20and%20Setbacks.pdf. Accessed October 2016.

Minnesota Department of Revenue. 2015 Annual Minnesota Sales Tax Statistics For the Leisure and Hospitality Industry (accessed 5/19/17)

Minnesota Department of Revenue. State and Local Tax Collections by Major Tax Category (1957-2021) (accessed 5/19/17)

Minnesota State Interagency Working Group on EMF Issues 2002. *A White Paper on Electric and Magnetic (EMF) Policy and Mitigation Options.* September 2002. Available online: http://www.capx2020.com/Images/EMFWhitePaper2002.pdf. Accessed February 2017.

Montana Department of Fish, Wildlife and Parks (MDFWP). 1994. Montana Bald Eagle Management Plan. July 1994.

National Institute of Environmental Health Sciences, National Institutes of Health (NIEHS) 1999. *Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields.* May 4, 1999. Available online: https://www.niehs.nih.gov/health/assets/docs_f_o/report_powerline_electric_mg_predates_508.pdf. Accessed February 2017.

National Land Cover Database (NLCD). 2011. From Homer et al. 2015 Completion of the 2011 National Land Cover Database for the conterminous United States-Representing a decade of land cover change information. *Photogrammetric Engineering and Remote Sensing*, v. 81, no. 5, p. 345-354. Accessed online February 2015 at: http://www.mrlc.gov/nlcd2011.php.

New Century Environmental, LLC (NCE). 2016. Final Acoustic Bat Summary Report: Palmer's Creek Wind Farm, LLC., November 10, 2016

U.S. Census Bureau (USCB), 2010a; 2010 Demographic Profile; generated by Alicia Showalter; using American Fact Finder; http://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml; (September 2016).

USCB, 2010b; 2010 -2014 American Community Survey 5-Year Estimates; generated by Alicia Showalter; using American Fact Finder; http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF;http://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml (September 2016).

U.S. Department of Agriculture (USDA), Farm Service Agency 2016. *Landowners & Conservationists: Conservation Reserve Enhancement Program.* Available online: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=lown&topic=cep. Accessed October 2016.

U.S. Department of Energy, Western Area Power Administration and U.S. Department of the Interior, U.S. Fish and Wildlife Service (WAPA) 2015. *Upper Great Plans Wind Energy Final Programmatic Environmental Impact Statement*. Billings, MT. April 2015. Available online: https://www.wapa.gov/regions/UGP/Environment/Pages/ugp-nepa.aspx. Accessed September 2016.

U.S. Fish and Wildlife Service (USFWS). 2007. National Bald Eagle Management Guidelines. May 2007.

USFWS. 2013. Eagle Conservation Plan Guidance Module 1- Land-based Wind Energy, Version 2. USFWS Division of Migratory Bird Management. April 2013

USFWS. 2014. (79 FR 63672) Endangered and Threatened Wildlife and Plants; Threatened Species Status for Dakota Skipper and Endangered Species Status for Poweshiek Skipperling.

USFWS. 2017a. Information for Planning and Conservation (IPaC). Web Application. Available online at: https://ecos.fws.gov/ipac/. Accessed May 2017.

USFWS. 2017b. Dakota Skipper Critical Habitat. Available online at: https://www.fws.gov/midwest/Endangered/insects/dask/fCHmaps/daskchMN.pdf. Accessed May 2017.

USFWS. 2017c. Poweshiek Skipperling Critical Habitat. Available online at: https://www.fws.gov/midwest/Endangered/insects/posk/fCHmaps/poskchMN.pdf. Accessed May 2017.

U.S. Geological Survey (USGS). 2014. USGS 2014 Seismic Hazard Map: Two-percent probability of exceedance in 50 years map of peak ground acceleration.

USGS. 2015. Onshore Industrial Wind Turbine Locations for the United States up to March 2014. Online data and metadata. May 2015.

USGS. 2016. Earthquake Statistics: Earthquake Counts by State 2010-2015 (M3+). Accessed online: http://earthquake.usgs.gov/earthquakes/browse/stats.php. February 16, 2017.

Upper Minnesota Valley Regional Development Commission (UMVRDC). 2010 Census Data for Chippewa County, Minnesota.

University of Minnesota (U of MN). 1999. Regional Hydrogeoloic Assessment, RHA-4, Part A. Plate 1 – Surficial Geology. Carrie J. Patterson, Alan R. Knaeble, Sara E. Gran, and Stephanie J. Phippen with support from the Minnesota Department of Natural Resources.

Wenck. 2016. Palmer's Creek Wind Farm, LLC.: Avian Point Count Survey Preliminary Results. November 20, 2016.

Western Area Power Administration (WAPA). 2015a. Upper Great Plains Wind Energy Programmatic Environmental Impact Statement-Final. Vol. 1. USDOE-WAPA and USDOI-USFWS.

WAPA. 2015b. Upper Great Plains Wind Energy Programmatic Environmental Impact Statement-Final. Vol. 2: Appendices A-F. USDOE-WAPA and USDOI-USFWS.

WAPA. 2015c. Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program. USDOE-WAPA and USDOI-USFWS.

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