Sunflower Wind Project

Final Environmental Assessment

DOE/EA 1966

U.S. Department of Energy
Western Area Power Administration

September 2014

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Acronyms and Abbreviations

ABPP	Avian and Bat Protection Plan
BBS	North American Breeding Bird Survey
BMP	Best Management Practices
CAA	Federal Clean Air Act
CRP	Conservation Reserve Program
CWA	Clean Water Act
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
EPC	engineering, procurement, and construction
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
DOE	U.S. Department of Energy (DOE)
MAPP	Mid-Continent Area Power Pool
MBTA	Migratory Bird Treaty Act
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NDAC	North Dakota Administrative Code
NDCC	North Dakota Century Code
NDDoH	North Dakota Department of Health
NDGFD	North Dakota Game and Fish Department
NDGS	North Dakota Geographic Survey
NEPA	National Environmental Policy Act
NHD	National Hydrologic Data
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
NWP	Nationwide Permit

O&M	Operations and Maintenance
Tariff	Open Access Transmission Service Tariff
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geographic Survey
Western	Western Area Power Administration
WMD	Wetland Management Districts
WMA	Wildlife Management Areas

1.0 INTRODUCTION

Sunflower Wind Project, LLC (Sunflower) proposes to develop the Sunflower Wind Project (Project), to be located on privately owned land in Stark and Morton Counties, North Dakota, (Figure 1). The 110 megawatt (MW) wind energy Project would interconnect to the U.S. Department of Energy (DOE) Western Area Power Administration (Western)'s Dickinson-Mandan 230 kilovolt (kV) transmission line, which crosses the Project Area. Interconnection would be at a new switchyard to be constructed, owned and operated by Western and located within the Project Area. Consideration of Sunflower's interconnection request by Western is a federal action requiring review under the National Environmental Policy Act (NEPA), 42 U.S.C. 4321 et. seq. Western has prepared this Environmental Assessment (EA) to comply with NEPA and its implementing regulations.

This EA identifies and analyzes the effects of Western's Proposed Action (to approve the interconnection request) and Sunflower's proposed Project and alternatives on the human and natural environment, and incorporates mitigation strategies for potential adverse impacts.

2.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

Under NEPA, the purpose and need for a proposed action help define the range of alternatives considered. Only "reasonable" alternatives need be considered (40 CFR 1502.14(A)), and reasonable alternatives must accomplish the underlying purpose and need of the applicant or the public that would be satisfied by the proposed federal action (33 CFR Ch. II, NEPA Deskbook p 138). Consequently, it is important to understand the purpose and need for the Project and the federal action from the perspective of both the applicant and Western as the NEPA lead agency.

2.1 Applicant's Purpose and Need

Sunflower's purpose is to provide an economically viable, reliable and cost-effective source of renewable energy to users in North Dakota and throughout Western's service area. To accomplish this purpose, the Project must be technically, environmentally and economically feasible. To that end, Sunflower needs for the following factors to be present:

- A reliable wind resource capable of producing enough power for the Project to be economically viable,
- Landowners willing to participate in the Project,
- Environmental conditions which allow the Project to comply with applicable environmental regulation at a reasonable cost,
- An interconnection agreement with Western to transmit power to a power purchaser, and
- A power purchase agreement for a duration and at a price which permits the Project to be economically viable.

2.2 Western's Purpose and Need

Western's purpose and need is to consider and respond to Sunflower's interconnection request in accordance with its Open Access Transmission Service Tariff (Tariff) and the Federal Power Act. Western's Tariff is filed with the Federal Energy Regulatory Commission (FERC) for approval.

Under the Tariff, Western offers capacity on its transmission system to deliver electricity when capacity is available. The Tariff also contains terms for processing requests for the interconnection of generation facilities to Western's transmission system. In reviewing interconnection requests, Western must ensure that existing reliability and service is not degraded. Western's Tariff provides for transmission and system studies to ensure that system reliability and service to existing customers are not adversely affected by new interconnections. These studies also identify system upgrades or additions necessary to accommodate the proposed project and address whether the upgrades/additions are within the project scope.

2.3 Alternatives Considered

This EA discusses two alternatives, the Proposed Action Alternative and the No-Action Alternative. Western's Proposed Action is to execute an interconnection agreement to connect the proposed Sunflower wind project to Western's 230-kV Dickinson-Mandan transmission line and allow the construction, maintenance, and operation of the certain electronic equipment and physical interconnection with Western's existing 230-kV Dickinson-Mandan line, along with approximately 4.5 miles of network upgrades to the existing 230-kV Ward-Mandan transmission line to accommodate the additional energy produced. A separate tap line will not be necessary as the interconnection switchyard will be directly under the Dickenson-Mandan transmission line. Access roads developed as part of Sunflower's proposed Project would be used to provide access to the interconnection location. At this time, Western has determined that there are no mitigation measures necessary for Western's Proposed Action.

The 110 MW wind project would operate under a 438,000 MWh annual production cap, which is the upper limit of which Western analyzes under an EA to comply with its obligations under NEPA.

Under the No Action Alternative, Western would not execute an interconnection agreement with Sunflower, and the wind project would not be constructed and interconnected with Western's transmission system. Western's determination not to approve the interconnection request could make the proposed project infeasible. Sunflower could continue to pursue the project by applying for interconnection with another transmission provider in the vicinity; however, Western could not speculate on whether access to alternative transmission is a technically and economically feasible option. The electrical generation capacity of the project could change depending on the transmission capacity of the alternative transmission provider and other factors could make the project infeasible. However, for the purposes of this EA, which discusses the potential impact of Western's decision, the No Action Alternative is considered to result in the Project not being constructed, and the environmental impacts associated with the Project would not occur.

These alternatives and Sunflower's proposed Project are described in greater detail in Section 3.

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Sunflower Wind Project
Environmental Assessment

Figure 1
Project Location

Morton and Stark Counties, ND
January 2014

- Project Area
- County Boundary
- Railroad
- Interstate Highway
- Federal Highway
- State Highway
- Ward to Mandan Line
- Existing Transmission Line (Over 230 kV)
- Stream or River
- City/Town

Canada

1:480,000 WGS84 UTM Zone 13N

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2.4 Required Permits and Approvals

The Project is likely to require the permits and approvals identified in Table 1. The permit requirements will depend on final Project design, and may include additional permits not shown in Table 1.

Table 1. Permits Potentially Required

Regulatory Authority	Legal Authority	Permit/Approval	Description	Trigger	Application Time	Website
Federal						
FERC	18 CFR 366.7	Exempt Wholesale Generator Status	Request for a determination that the utility is a wholesale generator of electric power and thus exempt from most FERC regulations that pertain to a public utility	Request by entity generating electric power for wholesale customers		
FERC	18 CFR Part 35	Market Based Rate Authorization	An entity seeking to make market-based rate sales of energy, capacity and ancillary services in the wholesale markets must first seek authorization from FERC	Request by entity generating wholesale electricity		
FAA	14 CFR Part 77	Notice of Proposed Construction or Alteration (Form 7460-1)	Notifies FAA of proposed structures that might affect navigable airspace. FAA reviews possible impacts to air safety and navigation, as well as the potential for adverse effects on radar systems.	• Construction or alteration of structures standing higher than 200 feet above ground level • Construction or alteration of structures near airports; 14 CFR 77.13 provides details • Siting within radar line-of-sight of an air defense facility	45 days	

Regulatory Authority	Legal Authority	Permit/Approval	Description	Trigger	Application Time	Website
FAA	14 CFR Part 77	Supplemental Notice (Form 7460-2)	Supplemental Notice provided to FAA in advance of beginning construction	Planned start of construction on project for which a Notice of Proposed Construction was required	5 days	
USACE	Clean Water Act (33 USC 1251 et seq) Section 404 (33 USC 1344)	CWA Section 404 Permit; individual, general or nationwide permit	Regulates discharge of dredged or fill materials into waters of the United States	Activities that may impact federal waters, including wetlands	45 days	
USFWS Region 6	ESA Section 7 16 USC 1536(a)(2)	Consultation pursuant to ESA Section 7.	Federal activities and non-Federal activities that receive Federal funding or require a Federal permit typically obtain incidental take authority through the consultation process under Section 7 of the ESA.	Federal action and the presence of listed species in or near the project area.	Prior to ground disturbing activities. Depending on project size and potential impacts to listed species – 1 to 6 months.	http://www.fws.gov/endangered/hcp/hcpbook.htm http://www.fws.gov/mount ain-prairie/endspp/
EPA	Clean Water Act Section 311, 40 CFR 112	Spill Prevention Control and Countermeasures (SPCC) Plan.	Required if any facility associated with the project (O&M or substation) has a tank holding more than 1,320 gallons.	Oil storage of more than 1,320 gallons of oil.	A copy of the plan will need to be maintained on file with the owner/operator and reviewed by the certifying engineer every five years.	
North Dakota Public Service Commission	Pursuant to North Dakota Century Code 49-22	Certificate of Site Compatibility.	For facilities with greater than 0.5 MW nameplate capacity.	Generation of power described in previous column.	180 days prior to construction (minimum).	http://www.psc.state.nd.us/ jurisdiction/electricity- laws.html

Regulatory Authority	Legal Authority	Permit/Approval	Description	Trigger	Application Time	Website
North Dakota Department of Health	Clean Water Act 33 USC 1342 NDAC 33-16-01	NPDES General Permit (Construction).	For stormwater discharges from construction activities.	Grading of more than 1 acre.	Permit to be filed prior to construction with a Stormwater Pollution Prevention Plan (SWPPP).	http://www.ndhealth.gov/WQ/Storm/Construction/ConstructionHome.htm
	NDAC 33-16-01	Septic Tank and Drainfield Permit.	Required for installation of septic system at O&M facility.	Installation of a septic system.	Prior to construction.	
North Dakota Highway Patrol		Overheight/ Overweight Permit.	Required to transport oversize loads on state maintained roads.	Project construction requires oversize/ overweight truck loads.	Prior to construction.	http://www.nd.gov/ndhp/permits/permits.html
State Historic Preservation Office (SHPO) and the Office of the State Archaeologist (OSA)	North Dakota Century Code 55-10; 49-22 And NHPA Section 106, 16 USC 470	Review and Coordination.	Section 106 Compliance is required if there is a federal permit or approval.	Interconnection request to Western.	Prior to construction.	
North Dakota Department of Game and Fish		Wildlife conservation recommend-ations.	Consultation will be required as part of by North Dakota PSC review of the Certificate of Site Compatibility.	Certificate of Site Compatibility Review by ND PSC.		
North Dakota State Water Commission	NDAC 889-03-01-10	Temporary Water Permit.	Required for temporary use of surface or groundwater.	Construction water used onsite.	Prior to construction; permit is valid for up to one year	http://www.swc.state.nd.us/4dlink9/4dcgi/GetSubCategoryRecord/Permits/Water%20Permits

Regulatory Authority	Legal Authority	Permit/Approval	Description	Trigger	Application Time	Website
Stark and Morton Counties	County Regulations (Morton and Stark)	Conditional Use Permit.	All proposed wind energy facilities in an agricultural zone must apply for a conditional use permit with County Planning Commission.	Wind energy facility in agricultural zone.	Prior to construction. Process takes about 3 months.	
	County Regulations- Morton Only	Wind Energy Facilities Permit.	Construction requirements (materials used, proximity to buildings, etc).	Wind development.	Prior to construction.	http://www.co.morton.nd.us/vertical/Sites/%7B90CBB59C-38EA-4D41-861A-81C9D E BD6022%7D/uploads/%7B5 A74CC6D-8D37-4C41-B6 76-1AE4A6040CDB%7D. PDF
	County Regulations (Morton and Stark)	Road Crossing/ Encroachment Permit.	Required for installation of service connections or extensions of existing underground utilities including crossing of county highways or for placing temporary obstructions on the right-of-way.	Working in or utility crossing of county road right-of-way.	Prior to construction.	
	County Regulations (Morton and Stark)	Building Permit.	Required if O&M building is constructed.	O&M Building.	Prior to construction.	

2.5 Public Participation

Western consulted with the federal, state and local agencies listed in Section 5 of this document in the development of this EA, in compliance with NEPA rules (Council on Environmental Quality [CEQ] NEPA Regulations, 40 CFR 1501.4(b). Western will consider comments on the Draft EA from agencies, tribes, landowners, and other interested parties in determining whether to issue a Finding of No Significant Impact (FONSI).

A public scoping meeting was held at the Hampton Inn and Suites in Dickinson, North Dakota on August 22, 2013, and a public open house meeting was held December 3, 2013 in Hebron, North Dakota at the Hebron Community Center.

A summary of these public meetings is included in Appendix A. The written comments received from agencies and the public during the scoping period and at the open house are included in Appendix B.

2.6 Reference to the Upper Great Plains Wind Energy Programmatic EIS

In March 2013 Western and the USFWS released the Draft Upper Great Plains Wind Energy Programmatic EIS (UGP Wind Energy PEIS; Western and USFWS 2013). The UGP Wind Energy PEIS is intended to address the majority of the environmental impacts that occur when wind energy projects are constructed, operated, maintained, and decommissioned in Western's Upper Great Plains Customer Service Region (UGP Region), which encompasses all or parts of the states of Iowa, Minnesota, Montana, Nebraska, North Dakota, and South Dakota. Based on Western's experience with existing projects, the PEIS identifies the range of potential environmental impacts expected for wind energy projects, and identifies Best Management Practices (BMPs), and avoidance and minimization measures that have been found to be effective in avoiding or reducing impacts on specific environmental resources, and that could be applied to satisfactorily eliminate, minimize, or reduce the environmental impacts for many wind energy projects.

As stated in the Executive Summary of the UGP Wind Energy PEIS, it is Western's intent that future wind energy project environmental analysis would tier off of the analyses and decisions embedded in the PEIS, and that additional project-specific NEPA analyses would refer back to the PEIS for relevant information, allowing subsequent NEPA documents to focus on site-specific issues and concerns. Both Western and the USFWS would continue to require site-specific NEPA evaluations for projects (including analysis of cumulative impacts), but those NEPA evaluations would tier off the analyses in the PEIS as long as the project developers are willing to implement the applicable evaluation process, BMPs, and mitigation measures identified in the PEIS and Record of Decision (ROD). The environmental procedures and mitigation strategies identified in the PEIS would be applied to interconnection requests made to Western by project developers and to requests for consideration of easement exchanges to accommodate wind energy project development on grassland and wetland easements managed by the USFWS within the UGP Region.

The Draft UGP Wind Energy PEIS includes practicable measures for avoiding or reducing environmental impacts, but recognizes that some measures may not be appropriate or effective in all situations. Consequently, the PEIS notes that Western and the USFWS would coordinate with project developers during project planning activities to identify the project-specific measures that would be applicable to each project.

This EA cannot tier from the UGP Wind Energy PEIS, since that document was in draft form and had not been adopted at the time of submittal of this EA. However, the Draft PEIS contains BMPs and avoidance and minimization measures which have been reviewed by Western, the USFWS and appropriate agencies, and which are unlikely to change substantially with adoption of the Final EIS and ROD. Sunflower has incorporated the BMPs and minimization measures identified in the Draft PEIS that are applicable to the Project, and will implement these measures along with other site-specific avoidance and minimization measures as identified in this EA.

3.0 DESCRIPTION OF THE ACTION ALTERNATIVES AND SUNFLOWER'S PROPOSED PROJECT

3.1 Western's Proposed Action and Sunflower's Proposed Project

Western's Proposed Action is to execute an interconnection agreement to connect Sunflower's proposed 110 MW wind energy facility to Western's Dickinson-Mandan transmission line. As part of the Proposed Action, Western would construct, own and operate a new interconnection switchyard adjacent to the transmission line, and would also make improvements to its Mandan-Ward transmission line as described in the following section.

Sunflower's proposed Project is a 110 MW wind energy generating facility with a maximum of 64 wind turbines. The Project is described in detail in the following sections.

3.1.1 Project Site

The Project Area for Sunflower's proposed Project encompasses approximately 12,709 acres of private lands in Stark and Morton counties, North Dakota (see Figure 2). The Project site was selected on the basis of the following factors:

- The site has a favorable wind profile.
- The location of the Dickinson-Mandan transmission line running through the Project Area eliminates the need for a Project-specific transmission line, lowering both the cost and the environmental impact of the Project.
- A Critical Issues Analysis completed in January 2011 (included in Appendix D) concluded that environmental constraints in the Project Area could be avoided or successfully mitigated.
- Wind energy projects are generally accepted in the local community, and local landowners are willing to participate in the Project.

The Project Area is located in the following sections of land:

- Township 139N, Range 90W:
  - Sections 19, 20, 21, 26 through 34;
  - South ½ Sections 18, 22, 23;
  - West ½ Section 35;
- Township 139N, Range 91W:
  - Sections 25, 26, 35, 36
- Township 138N, Range 90W:
  - Section 5;
  - North ½ Section 6;
- Township 138N, Range 91W:
  - North ½ Section 1

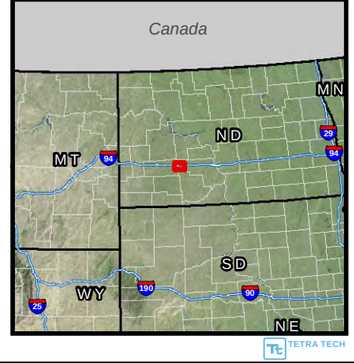
Sunflower has completed preliminary engineering, design and layout at a level sufficient to analyze the potential impacts of the Project. Preliminary locations of micrositing corridors, collection lines, the substation and interconnection switchyard, and access roads have been established (see Figure 3). Sunflower may follow construction of the Project with a second phase, or request to exceed the 438,000 MWh production cap noted above. If a second phase of the Project is proposed, Sunflower would complete additional environmental surveys and wind resource evaluations for the expanded Project Area as needed.

Sunflower Wind Project
Environmental Assessment

Figure 2
Project Area

Morton and Stark Counties, ND
April 2014

- Project Area
- State Lands
- NDGFD PLOTS Land
- Economic Coal Deposits
- County Boundary
- Abandoned Mines
- Gravel Pit
- Existing Transmission Line
- Railroad
- Interstate Highway
- Federal Highway
- Stream or River
- City/Town



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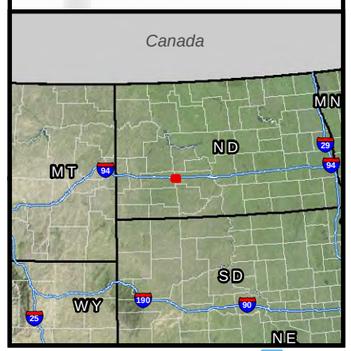
Sunflower Wind Project
Environmental Assessment

Figure 3
Project Layout

Morton and Stark Counties, ND
April 2014

- Project Area
- Preliminary Turbine Array Corridor
- Proposed Interconnection Switchyard
- Proposed Substation
- Approximate Underground Collection System Routing
- Approximate Access Road Routing
- County Boundary
- Interstate Highway
- Stream or River



Morton County

Stark County

Big Muddy Creek

Heart Butte Creek

Heart Butte Creek

Beaver Creek

Spring Creek

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3.1.2 Project Components

Sunflower's proposed Project would include the following components.

Turbines

The Project would include between 47 and 64 turbines, depending on the turbine model chosen. Sunflower is considering use of five potential turbine models, as indicated in Table 2.

Table 2. Potential Turbine Models

Specification	Turbine Option 1	Turbine Option 2	Turbine Option 3	Turbine Option 4	Turbine Option 5
Manufacturer	Vestas 2.0 V-110	Vestas 2.0 V-100	GE 1.7-100	GE 1.85-87	Siemens 2.3-108
Rated Output (MW)	2.0	2.0	1.7	1.85	2.3
Tower Height	80, 95m available (262 or 312 ft)	80, 95, 120m available (262, 312 or 394 ft)	80, 96m available (262 or 315 ft)	80m (262 ft)	80m (262 ft)
Rotor Diameter	110m (361 ft)	100m (328 ft)	100m (328 ft)	87m (285 ft)	108m (354 ft)
Total Height[\a]	150m (492 ft)	170m (558 ft)	146m (479 ft)	124m (407 ft)	134m (440 ft)
Minimum Ground to Rotor Clearance	25m (82 ft)	30m (98 ft)	30m (98 ft)	36.5m (120 ft)	26m (85 ft)
Rotor Swept Area (RSA)	9503 m^2 (102,289 ft^2)	7854 m^2 (84,540 ft^2)	7854 m^2 (84,540 ft^2)	5945 m^2 (63,991 ft^2)	9144 m^2 (98,425 ft^2)
Minimum (cut-in) Wind Speed	3 m/s (6.7 mph)	3 m/s (6.7 mph)	3m/s (6.7 mph)	3m/s (6.7 mph)	3m/s (6.7 mph)
Maximum (cut-out) Wind Speed	20 m/s (44 mph)	20 m/s (44 mph)	25 m/s (56 mph)	25 m/s (56 mph)	25 m/s (56 mph)
Total Number of Turbines (maximum)	55	55	64	59	47

\a Total height using the tallest turbine tower available as a conservative assumption.

Figure 4 shows a schematic of a typical wind turbine generator.

Turbines will be located within the identified turbine array corridors, which are approximately 1,000 feet wide (see Figure 3). Final turbine locations will be chosen during final engineering design to minimize environmental impacts to the greatest extent feasible based on the results of final surveys and selection of one of the turbine options noted in Table 2.

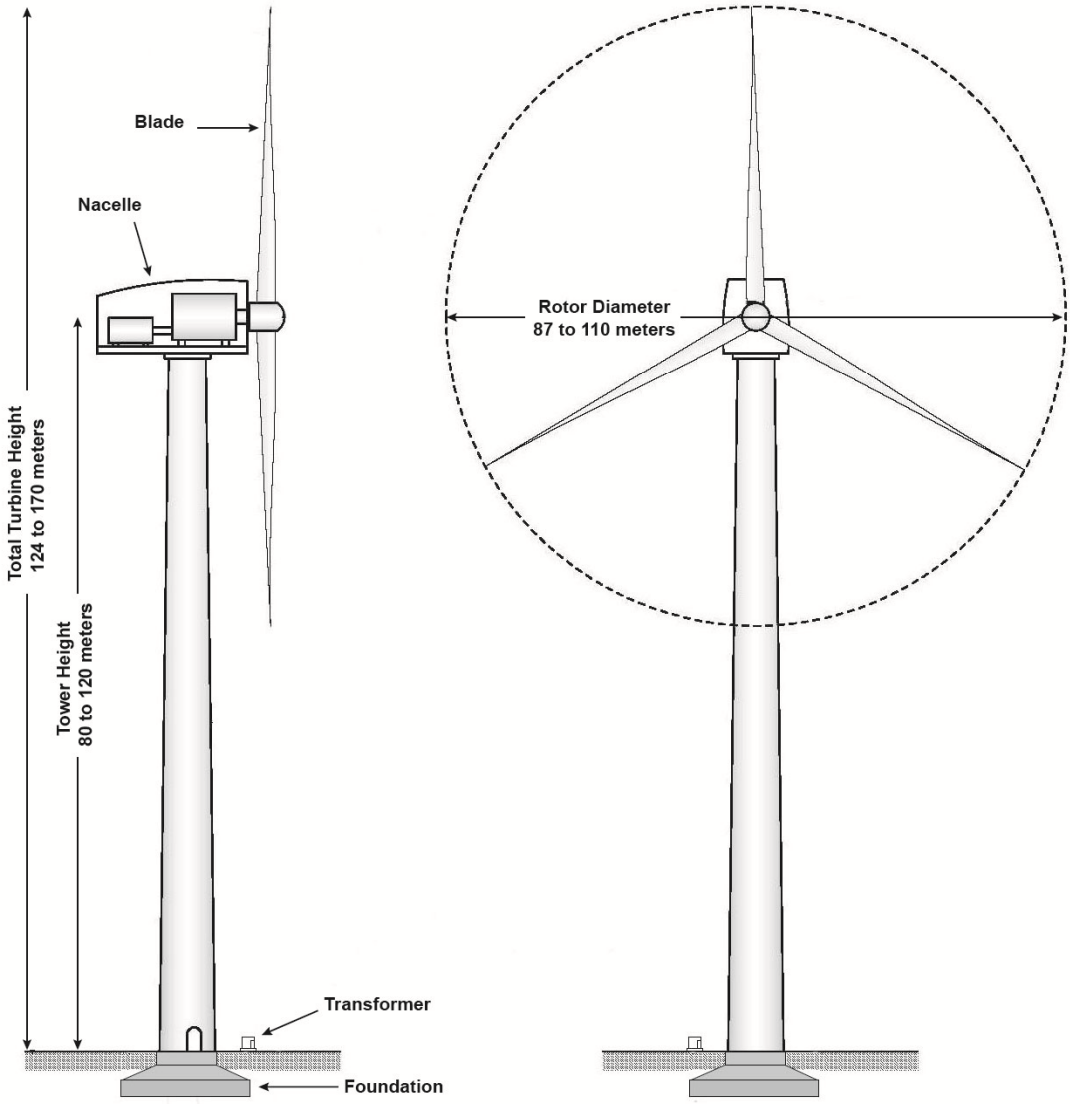

Figure 4. Schematic of Typical Wind Turbine

Lightning Protection

Each turbine will be equipped with a lightning protection system. The lightning protection system will be installed during foundation work, and will be designed for local soil conditions. The resistance to neutral earth will be in accordance with local utility or code requirements.

Foundations

Each turbine will rest on a concrete foundation. The final design of the foundations will be determined based on the results of geotechnical investigations and the turbine design chosen, however for the purpose of impact calculations, foundations are assumed to be circular, up to 65 feet across at the base, and to extend up to 12 feet below grade.

Aircraft Lighting

Some of the turbines will be equipped with aircraft warning lights as required by FAA Advisory Circular 70/7460-1, Obstruction Marking and Lighting. Chapter 2 of the Advisory Circular states that, "[a]ny temporary or permanent structure, including all appurtenances, that exceeds an overall height of 200 feet above ground level or exceeds any obstruction standard contained in 14 CFR Part 77, should normally be marked and/or lighted." The chapter notes that in some cases structures over 200 feet may not need to be marked or lighted if the aeronautical study shows that the structures would not impair aviation safety without markings.

Based on FAA Circular 70/7460-1K, Chapter 13, turbine lighting will most likely consist of an array of red flashing lights, synchronized to flash simultaneously. Lights are not required on all turbines; lights would be installed on turbines nearest the Project perimeter to define the outer boundaries of the obstruction area, and on select turbines within the Project such that lights are no more than 0.5 miles apart. Daytime lighting is not required. Sunflower will submit a Notice of Proposed Construction or Alteration to the FAA as required pursuant to 14 CFR 77 Subpart B, Section 77.5-7 and will base final lighting design on FAA recommendations.

Electrical Collection System

A step-up transformer will be used at each turbine location to raise the voltage to the power collection line voltage of 34.5 kV. The power from these transformers will be run through an underground collection system consisting of direct-buried cables, generally located alongside the Project access roads (see Figure 3).

The collection line cables would be laid in trenches approximately two feet wide and four feet deep; the cables will be buried a minimum of 42 inches deep. All trenches would be filled with compacted material and associated temporary impacts would be restored following burial of electrical cables. Sunflower does not anticipate the need to use any overhead collection lines. Should collection lines cross wetlands or other sensitive features, horizontal directional drilling (HDD) below the features will be used to avoid impacts if rerouting is not possible.

Project Substation and Interconnection Switchyard

The Project would include one substation to be constructed, owned and operated by Sunflower, where power from the turbines would be aggregated and stepped up to transmission line voltage. The Proposed Action includes one interconnection switchyard to be constructed, owned and operated by Western. Both would be located adjacent to the Dickinson-Mandan transmission line. The substation will be approximately 5 acres in size, and the interconnection switchyard will be approximately 3 acres in size. The 34.5 kV collection lines will terminate at the substation and voltage will be raised to 230 kV; power would then be routed to the adjacent interconnection switchyard, where facilities would be constructed to feed power into Western's transmission line. The approximate location of the substation and interconnection switchyard are shown on Figure 3; the final location may be adjusted prior to construction to minimize environmental impacts to the greatest extent practical.

Met Tower

The permanent met tower would be approximately 80 meters (262 feet) high when installed. The tower would be un-guyed and secured to a concrete foundation.

Access Roads

Access roads will be built to each turbine and the met tower and will be used during both construction and operation. Access roads will be initially constructed at 36 feet wide and will have an aggregate surface adequate to support the size and weight of construction and maintenance vehicles. The permanent roads will be narrowed to 16 feet wide following completion of turbine construction. Up to approximately 13.7 miles of access roads will be needed for the Proposed Action; however, the final length of access roads will be determined by the specific turbine locations in the final Project design. Access roads will be on private land and will not be open to public use.

Large construction cranes may spend as little as one day at each turbine site before moving on to the next. Cranes are sometimes moved cross-country rather than by using the developed access roads, especially where these roads are crossed by overhead utility lines. This type of cross-country walking enables the crane to be moved without complete de-rigging and disassembly, which is time-consuming and costly. Where cranes would travel cross-country, workers would lay down some form of cribbing, bedding or mats to support the weight of the crane without impacting the ground below. The cribbing or mats would be removed immediately following passage of the crane, to be re-used elsewhere.

Microwave Tower

A microwave communications tower may be constructed within the interconnection switchyard, in order to provide Western with remote data acquisition and facility control. The microwave tower would be approximately 30 meters (100 feet) in height, and would utilize a non-guyed steel lattice design.

Operation and Maintenance Facility

The Project will include an Operation and Maintenance (O&M) facility, which will consist of an approximately 5,000 square foot metal building with a fenced gravel parking area. The size of the entire facility would be approximately 5 acres. The location of the O&M facility will be selected during final design using the results of final resource surveys so as to minimize environmental impacts to the greatest extent practical.

The O&M facility will house the Supervisory Control and Data Acquisition (SCADA) system, which will allow control and monitoring of the wind farm. The SCADA communications system permits automatic, independent operation and remote supervision, thus allowing the simultaneous control of many wind turbines. The SCADA system will provide detailed operating and performance information for each wind turbine and will track each wind turbine's operational history.

Construction Laydown Area

Construction of the Project will require the establishment of one construction laydown area, which will be used for the temporary storage of construction materials and equipment, a concrete batch plant (if needed) and the construction office. The laydown area will cover a total of up to approximately 15 acres. The location of the laydown area will be selected during final design using the results of final resource surveys so as to minimize impact to sensitive resources.

Reconductoring of Western's Existing Transmission Line

Western's review of Sunflower's interconnection request has determined that a network upgrade is required to support the new electrical generation that would be created. Specifically, Western would need to upgrade the existing Mandan-Ward transmission line, which is approximately 4.5 miles long, with new conductor capable of carrying the additional electrical current. The location of this upgrade is shown on Figure 1.

Construction Procedures

The general sequence of activities through construction of the Project includes the following:

- Ordering components with long lead times, including towers, nacelles, blades, and transformers;
- Complete surveys needed for final locations of Project components;
- Final Project layout including turbine micrositing and road location;
- Soil borings, testing and analysis for final foundation design;
- Construction of access roads;
- Construction of underground collection lines;
- Construction of the Project substation and interconnection switchyard;
- Installation of tower foundations;
- Tower placement and wind turbine erection;
- Acceptance testing of facility; and

- Commencement of commercial production.

Construction Waste Management

Debris associated with construction may include construction materials such as packaging material, crates, reels, and parts wrapping. This debris may also include excess excavated soil and removed vegetation. Materials with salvage value will be removed from the Project Area for reuse. Excavated soils will be back-filled within the area of permanent disturbance and restored in compliance with applicable guidelines. If necessary, solid waste, including topsoil or other excavated materials not otherwise disposed of, would be temporarily stored within the corridor or within the temporary construction easements, and then transported to appropriate disposal facilities in accordance with federal, state, and local regulations.

Construction Management

Sunflower will engage the services of an engineering, procurement, and construction (EPC) contractor, which will have primary responsibility for construction management. The EPC contractor will use the services of local contractors where possible and appropriate.

Post-Construction Site Restoration

Following construction, areas not maintained as permanent facilities will be reclaimed for their prior land use. Reclamation will initially consist of grading to replace the approximate original contour and drainage of disturbed areas. Grading will include removal of any temporary structures. Following grading, salvaged topsoil will be spread and blended with adjacent areas to provide a growth medium for vegetation. Soil that has been compacted by equipment operation will be tilled to alleviate compaction. Where natural regrowth of vegetation is not anticipated, disturbed areas will be reseeded in accordance with landowner agreements or with regionally native species. Trees removed during construction operations will be replaced at ratios and using plant species to be determined in consultation with federal and state agencies as appropriate. Noxious weeds will be controlled in accordance with state regulations.

Commissioning

The Project will be commissioned after completion of the construction phase. The Project will undergo detailed inspection and testing procedures prior to final turbine commissioning. Inspection and testing will occur for each component of the wind turbines, as well as the communication system, meteorological system, obstruction lighting, high voltage collection and feeder system, and the SCADA system. Once testing is complete, the Project will begin commercial operations.

Construction Schedule

Construction of the Project would commence in early 2015, and continue through the year, requiring a total of approximately 10 months. Commercial operation would begin following testing and commissioning.

3.1.3 Project Operation and Maintenance

Project operation and maintenance consists of continuous remote monitoring through the SCADA system and regular on-site maintenance approximately every six months. On-site maintenance includes operational checks and tests and regular preventive maintenance.

3.1.4 Decommissioning

The Project would have an anticipated life of 30 years, based primarily on the projected life of the turbines. At the end of that period or at Sunflower's option, Project components may be upgraded and the Project continued in use, or the Project may be decommissioned. Prior to commencement of decommissioning, Sunflower will file a decommissioning plan with the North Dakota Public Service Commission which meets the requirements of NDAC 69-09-09-06.

In the event that the Project is decommissioned, all towers and turbine generators, transformers and overhead cables would be dismantled and removed. Underground cables would be removed to a minimum depth of 24 inches below ground. Foundations, buildings and ancillary equipment would be removed to a minimum depth of 36 inches below ground. Unless a landowner requested the retention of access roads or other disturbed areas, access road surface materials would be removed and all disturbed areas would be restored and reclaimed to approximate pre-Project contours. Areas disturbed by construction and decommissioning activities would be graded, topsoiled, and reseeded according to agency recommendations and landowner specifications.

In addition to Sunflower's regulatory obligations for infrastructure removal related to decommissioning, Sunflower's easements require the creation of a restoration fund. At the 11th year of operation, Sunflower is required to create a restoration fund through a federally chartered bank for each turbine associated with the Project and continue to make annual contributions through the life of the Project. The restoration fund is intended to secure Sunflower's obligations under its easements related to the decommissioning and removal of the project components. If Sunflower were to go bankrupt, the landowner would then have access to the restoration fund in order to pay for the removal costs associated with Project infrastructure.

3.2 No Action Alternative

Under the No Action Alternative Western would not execute an interconnection agreement with Sunflower, would not construct the interconnection switchyard or make improvements to the Mandan-Ward transmission line, and as discussed in Section 2.3, Western assumes that Sunflower's proposed Project would not be built. This alternative would avoid the potential environmental impacts of the Proposed Action and Sunflower's proposed Project; including the potential positive impacts such as the displacement of CO_2 emissions and the economic benefits to Stark and Morton Counties. Environmental conditions within the Project Area, as described in Section 4, would be expected to persist in their existing state.

4.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the existing environmental conditions and potential environmental impacts resulting from Western's Proposed Action and the construction, operation, and maintenance of Sunflower's proposed Project.

4.1 Scope of the Analysis

The sections that follow discuss the direct and indirect effects of the Proposed Action and the Project to each of the environment components analyzed. Direct effects are those which are caused by the Proposed Action and Project and occur at the same time and place (40 CFR 1508.8(a)). Direct effects would include, for example, the physical loss of habitat to new access roads, or potential direct mortality to birds from collision with turbine blades.

Indirect effects are those which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable (40CFR 1508.8(b)). Examples of indirect effect include impacts to predator species resulting from the direct loss of habitat for prey species, or impacts to bird species from the energy used in avoiding wind turbines.

Impacts may also be permanent or temporary. Permanent impacts are those which will last for the life of the Project, and include the establishment of permanent access roads, turbine foundations, the substation and interconnection switchyard, and the O&M building. Temporary impacts are those which would last only for the period of construction and then either cease or be restored. Examples of temporary impacts include temporary increases in traffic or housing demand during construction, or temporary impacts to habitat at construction laydown areas.

The analysis area for environmental impacts includes the full geographic extent of the potential effect to that resource. Most impacts would be limited to the Project Area; examples would be impacts to geology and soils or wetlands. Other impacts could extend off the Project site, such as potential impacts to raptors, which may nest off-site.

The preliminary Project layout presented in this EA describes turbine corridors but not the specific location of each turbine or the final turbine type to be used. For this reason, the analysis of the impacts of the turbines assumes both the turbine type and the Project layout with the largest potential impacts to each element of the environment. The turbine type used may not be the same for each analysis, for example the turbine with the largest rotor-swept area may not be the turbine with the loudest noise or the largest visual impact. The final turbine layout will be determined prior to construction and will reflect additional survey data, final engineering design, and Sunflower's ongoing process of avoidance and minimization.

Because conservative assumptions have been used throughout, final impacts are expected to be lower than those presented here. Both Sunflower and Western believe that the impacts presented in this EA represent reasonable worst-case estimates.

The analysis presented in the following sections also responds to the concerns expressed at the scoping meeting held on August 22, 2013, and agency concerns expressed at that meeting and

during ongoing consultation. The primary concerns expressed related to economic impacts to participating landowners.

4.2 Overall Ground Disturbance Impacts

- Table 3 presents overall Project temporary and permanent ground disturbance for each major Project component as well as Western's interconnection switchyard. The impact areas calculated are based on the preliminary facility layout shown in Figure 3. These values are considered worst-case impact estimates. The assumed number of turbines is a maximum number based on use of the GE 1.7-100, the turbine with the lowest output and therefore the largest number of turbines needed.
- The assumed 15-acre size for the laydown area is considered the largest area potentially needed.
- The impact area for access roads assumes that all access roads will be new construction, and does not include the use of existing farm roads.
- The impact area for collection lines assumes that the lines will be adjacent to existing or new access roads and will not be in existing disturbed areas. In fact, most collection lines will be located in the access road footprint and will not represent new impacts.

Table 3. Overall Temporary and Permanent Ground Disturbance

Project Component	Assumptions	Impact Multiplier	Permanent Impact (acres)	Temporary Impact (acres)
Turbines	Permanent: 65-foot diameter turbine pad; Temporary: Up to 200-foot radius around towers.	Up to 64 turbines	5.1 ac	184.5 ac
Access roads	Permanent: 16-foot finished width; Temporary: 36-foot initial construction width	13.7 miles of access roads	26.6 ac	33.2 ac
Substation	Permanent: Area within substation/ interconnection switchyard fenceline; Temporary impacts: None	5 acre fenced substation and 3 acre fenced interconnection switchyard	8 ac	0 ac
O&M facility	Permanent: 5-acre site; Temporary: none	5 acre site	5 ac	0 ac
Construction laydown area	Permanent: None; Temporary: Area within temporary fenceline	Up to 15 acre temporary site	0 ac	15 ac
Collection lines	8 feet wide temporary impact	19.3 miles collection lines	0 ac	18.7 ac
Totals			**44.7 ac**	**251.4 ac**

Reconductoring of segments of Western's Mandan-Ward transmission line would have minimal disturbance impacts. Reconductoring work would take place entirely within the existing transmission line right-of-way, and would utilize existing access roads and existing transmission support towers; no additional facilities or structures would be needed to complete that work.

4.3 Geology and Soils

This section discusses potential Project impacts to geology and soils, including prime farmland and farmland of statewide importance.

4.3.1 Existing Conditions

Elevation and Topography

Topography within the Project Area is slightly rolling to rolling, with the steepest topography occurring to the southwest. Elevation ranges from approximately 2,230 feet to 2,360 feet above sea level.

Geology and Mineral Resources

Surficial geology within the Project Area consists of glacial sediments deposited during the Holocene to Pre-Wisconsinan Period (Bleumle 1988, Clayton 1980; both cited in HRD 2011, see Appendix D). The primary deposits that define the Project Area are collapse/draped transition sediments. The glacial sediment is characterized by hummocky topography that has draped over and partially obliterated the topography existing before the glacial advance. An area of ring-shaped hummocks is located along the west end of the Project Area. The sediments are described as an unbedded, unsorted mixture of clay, silt, sand, and pebbles with a few cobbles and boulders. The glacial deposits can be as thick as 100 feet.

The bedrock geology of the Project Area consists of Sentinel Butte Formation from the Tertiary System. The Sentinel Butte Formation consists of gray-brown bentonitic claystone, siltstone, sandstone, and lignite. The sandstone is thin bedded and is generally fine-grained and silty. This formation can be up to 510 feet thick.

There is one economic coal deposit in the general area, to the southwest of the Project Area (see Figure 2). This deposit meets the minimum criteria established by coal companies operating surface mines in North Dakota (Murphy 2007; cited in HDR 2011, see Appendix D). This deposit has not been mined and does not represent an active mining area. No economic coal deposits were identified within the Project Area.

No active or previously active gravel pits are located within the Project Area. Ten gravel pits were identified within 3 miles of the Project Area, located primarily to the south. There is one known mine shaft or drift that has been identified approximately 0.75 miles west of the Project Area. This mine is listed in the PSC's Abandoned Mines database as a surface mine, and based on aerial photography of the site it appears to have been recently reclaimed; however, no other information about the mine is available.

Investigations of public maps and local geology did not identify any fossil collection sites in the immediate vicinity of the Project Area.

Seismic Risk

No recorded areas of seismic activity or subsidence were identified in the Project Area. According to the North Dakota Geographic Survey (NDGS), North Dakota is located in an area of very low earthquake probability. There are no known active tectonic features in south-central North Dakota and the deep basement formations underlying North Dakota are expected to be geologically stable (Bluemle 1991). This information is supported by U.S. Geographic Survey (USGS) seismic hazard maps, which show that the Project Area is located in an area with very low seismic risk (USGS 2008). Related geologic hazards, such as soil liquefaction, are therefore also unlikely.

Soil Resources

The U.S. Department of Agriculture (USDA) has mapped 86 soil map units within the Project Area (Figure 5; USDA 2009). These soils are primarily well-drained loams and silt loams derived from the underlying glacial deposits and, to a lesser extent, the underlying sandstones and siltstones.

According to the Soil Survey of Morton County (USDA 2002), wind erosion may be a hazard on most of the soils in Morton County. Water erosion is a severe hazard on gently rolling and steeper soils, and is greatest when the surface is bare.

Farmland

The Project Area consists mostly of farmland areas classified as not prime farmland[1] (76.6 percent). The remaining area is mostly farmland of statewide importance (22.3 percent). Figure 5 shows the prime farmland and farmland of statewide importance soil classifications.

According to NRCS soils data, about 23,781 acres, or 1.9 percent of Morton County, is considered Prime Farmland, and 327,369 acres, or 26.3 percent is classified as Farmlands of Statewide importance. In Stark County, approximately 28,666 acres, or 3.3 percent of the county, is considered Prime Farmland, and 226,619 acres, or 26.4 percent, is Farmland of Statewide Importance. These percentages are reasonably similar to the Project Area, as shown in Table 4. However, the acres of Prime Farmland or Farmland of Statewide Importance within the Project Area would be extremely small as a percentage of the total amount Prime Farmland or Farmland of Statewide Importance in the two-county area, at one quarter and on half of one percent. As described in Section 4.3.2, the amount of Prime Farmland or Farmland of Statewide Importance actually impacted by the Project would be a very small percentage of the Prime

[1] Prime farmland soils are defined in the USDA-NRCS Title 430 National Soil Survey Handbook, issued November 1996, as follows: “Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses. It has the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management” (USDA 1996).

Farmland or Farmland of Statewide Importance within the Project area, and an even smaller percentage of that within the two-county area.

Table 4. Farmland Soils

Farmland Soil Type	Acres in Project Area	Percentage of Project Area	Acres in Two-County Area	Acres in Project Area as a Percent of Two-County Area
Prime Farmland	129.4	1.02%	52,447	0.24%
Farmland of Statewide Importance	2,830.2	22.27%	553,988	0.51%
Not Prime Farmland	9,749.8	76.71%		
Project Area Total	**12,709.5**	**100%**		

Sunflower Wind Project
Environmental Assessment

Figure 5
Farmland and Hydric Soils

Morton and Stark Counties, ND
April 2014

Project Area

Preliminary Turbine Array Corridor

Proposed Interconnection Switchyard

Proposed Substation

Approximate Underground Collection System Routing

Approximate Access Road Routing

County Boundary

Hydric Soil Class

Mostly Hydric

Prime Farmland Class

Prime Farmland

Farmland of Statewide Importance

Morton County

Stark County

Canada

MN ND MT SD WY NE

1:40,000 WGS84 UTM Zone 13N

0 2 4 Miles

TETRA TECH

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4.3.2 Potential Impacts

A significant impact to geology and soils would occur if: 1) erosion results in irreversible impacts to other resources, or 2) there is a loss of mineral resources that are not available elsewhere.

Direct Impacts

The Project would result in direct, permanent impacts to soils through the establishment of turbine foundations, access roads, and the substation and interconnection switchyard, and the O&M facility. These impacts will remove soils from agricultural production for the life of the Project. The Project would result in temporary impacts at the construction laydown area, the portions of Project access roads used for construction and then reclaimed, and temporary construction areas surrounding each turbine.

The Project would create approximately 45 acres of permanent impact and 251 acres of temporary impact to soils. The specific soil types impacted will depend on the final Project design. Sunflower will avoid impacts to soils particularly sensitive to erosion as described below.

Based on preliminary design data, the Project would permanently impact up to 0.6 acres of Prime Farmland and 13.1 acres of Farmland of Statewide Importance, and would temporarily impact approximately 1.0 acre of Prime Farmland and 17.7 acres of Farmland of Statewide Importance. These preliminary impact figures represent approximately 0.04 percent and 0.46 percent of Prime Farmlands and Farmlands of Statewide Importance, respectively, within the Project Area. Impacts to Prime Farmland and Farmland of Statewide Importance are expected to be further reduced through final engineering design, as these soil types will be avoided to the extent practicable.

Because of the relatively gentle relief in the Project Area, the deliberate avoidance of steep slopes, and the use of appropriate BMPs during and following construction, the potential for soil loss due to erosion would be low. Impacts to hydric soils such as compaction are expected to be minimal due to the micrositing of Project facilities to avoid wetlands and other areas with hydric soils.

Sunflower will restore areas disturbed by construction to approximate pre-construction conditions. Soil erosion, compaction, and other related disturbance would be short-term, and would be minimized by implementing environmental protection measures including appropriate access road design and stormwater management BMPs, hazardous materials handling and spill response procedures, regular maintenance of access roads, decompaction of temporary disturbance areas as needed, implementing dust control measures to limit wind erosion and revegetation of disturbed areas. The loss of organic matter would be limited through implementation of stormwater management BMPs, and by stripping and stockpiling topsoil in disturbance areas and using stockpiled topsoils to finish restoration of temporary disturbance areas. With the proper implementation of environmental protection measures intended to prevent, minimize, and/or reclaim soil erosion, compaction, and spill effects, no unmitigated loss of highly productive soil would result from implementation of the Project.

The Project would not create direct impacts to mineral resources or other regional geology. No economic lignite deposits are located within the Project Area and no coal mining is present. Sand and gravel are plentiful locally and the presence of the Project would not necessarily prevent either from being mined in the Project Area. Direct impacts to geology and soils are therefore not anticipated to be significant.

Geologic hazards such as seismicity, landslide, or subsidence would not be concerns for the Project. The region is considered to be seismically stable, and no areas of subsidence, liquefaction, mass movement or other geologic hazards have been identified in the Project Area. Project facilities would be microsited to avoid such areas if any are identified during final design, and implementation of appropriate engineering design, primarily for turbine foundations, would reduce the impacts of geologic hazards to a non-significant level.

Reconductoring of the Mandan-Ward transmission line would cause no additional impacts to geology or soils. The work would take place entirely within Western's existing transmission right-of-way and would utilize existing access roads. No excavation or disturbance outside of already-disturbed areas would be necessary, so impacts to farmland soils would be avoided. No new structures or modifications to existing structures would be needed, so this component of the Project would not impact or be impacted by geologic conditions or hazards.

Indirect Impacts

The Project would have no indirect impacts to soils or geology.

Avoidance, Minimization and Best Management Practices

Impacts to Prime Farmland and Farmland of Statewide Importance will be minimized by siting wind turbines, access roads, and other permanent and temporary Project infrastructure off of these farmland soil types to the extent practical. The Project would make use of existing farm access roads as much as possible, and would place wind turbines at the edges of farm fields to minimize additional disruptions to cropland. Collector lines would generally be placed within or adjacent to the access roads to minimize impacts.

Sunflower will implement avoidance and minimization measures as identified in the Draft UGP Wind Energy PEIS (see PEIS section 5.2.3.1, and PEIS section 5.12.1.4), including the following:

- Avoid placement of wind energy facilities in areas with unsuitable seismic, liquefaction, slope, subsidence, settling, and flooding conditions.
- Minimize the extent of the project footprint, including improved roads and construction staging areas.
- Minimize ground-disturbing activities, especially during the rainy season.
- Use existing roads and disturbed areas to the extent possible.
- Site new roads to follow natural land contours; excessive slopes should be avoided.
- Site new roads to avoid stream crossings and wetlands and minimize the need to cross drainage bottoms.
- Surface new roads with aggregate materials, wherever appropriate.

- Restrict heavy vehicles and equipment to improved roads to the extent practicable.
- Control vehicle and equipment speed on unpaved surfaces.
- Conduct construction and maintenance activities when the ground is frozen or when soils are dry and native vegetation is dormant.
- Stabilize disturbed areas that are not actively under construction using methods such as erosion matting or soil aggregation, as site conditions warrant.
- Salvage topsoil from all excavation and construction activities to reapply to disturbed areas once construction is completed.
- Dispose of excess excavation materials in approved areas to control erosion.
- Isolate excavation areas (and soil piles) from surface water bodies using silt fencing, bales, or other accepted appropriate methods to prevent sediment transport by surface runoff.
- Use earth dikes, swales, and lined ditches to divert local runoff around the work site.
- Reestablish the original grade and drainage pattern to the extent practicable.
- Reseed disturbed areas with a native seed mix and revegetate disturbed areas immediately following construction.

Potentially applicable conservation measures for hazardous materials and wastes at wind energy facilities may include the following:

- Developers of wind energy facilities should prepare several plans addressing various aspects of hazardous materials and waste, including a hazardous materials and waste management plan, a construction and operation waste management plan, a fire management and protection plan, an integrated pest and vegetation management plan (if the facility will use pesticides/herbicides), and a spill prevention and emergency response plan. Such plans should include the following items:
    - Prepare a hazardous materials and waste management plan that addresses the selection, transport, storage, and use of all hazardous materials needed for construction, operation, and decommissioning of the facility for local emergency response and public safety authorities and for the regulating agency, and that addresses the characterization, on-site storage, recycling, and disposal of all resulting wastes. The plan should include a comprehensive hazardous materials inventory; Material Safety Data Sheets (MSDSs) for each type of hazardous material; emergency contacts and mutual aid agreements, if any; site map showing all hazardous materials and waste storage and use locations; copies of spill and emergency response plans (see below), and hazardous materials-related elements of a decommissioning/closure plan. The waste management plan should identify the waste streams that are expected to be generated at the site during construction and operation and address hazardous waste determination procedures, waste storage locations, waste-specific management and disposal requirements (e.g., selecting appropriate waste storage containers, appropriate off-site treatment, storage, and disposal facilities), inspection procedures, and waste minimization procedures. The plan should address solid

and liquid wastes that may be generated at the site in compliance with CWA requirements if a NPDES permit is needed.

  - Develop a fire management and protection plan to implement measures to minimize the potential for fires associated with substances used and stored at the site. The flammability of the specific chemicals used at the facility should be considered.
  - If pesticides/herbicides are to be used on the site, develop an integrated pest and vegetation management plan to ensure that applications will be conducted within the framework of managing agencies and will entail the use of only EPA-registered pesticides/herbicides that are (1) nonpersistent and immobile and (2) applied by licensed applicators in accordance with label and application permit directions, following stipulations regarding suitability for terrestrial and aquatic applications.

- All site characterization, construction, operation, and decommissioning activities should be conducted in compliance with applicable Federal and State laws and regulations, including the Toxic Substances Control Act of 1976, as amended (15 USC 2601, et seq.). In addition, any release of toxic substances (leaks, spills, and the like) in excess of the reportable quantity established by 40 CFR Part 117 should be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, Section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances should be furnished to the authorized officer concurrent with the filing of the reports to the involved Federal agency or State government.
- Pollution prevention opportunities should be identified and implemented, including material substitution of less hazardous alternatives, recycling, and waste minimization.
- Systems containing hazardous materials should be designed and operated in a manner that limits the potential for their release, and constructed of compatible materials in good condition (as verified by periodic inspections), including provision of secondary containment features (to the extent practical); installation of sensors or other devices to monitor system integrity; installation of strategically placed valves to isolate damaged portions and limit the amount of hazardous materials in jeopardy of release; and robust inspection and use of repair procedures.
- Dedicated areas with secondary containment should be established for off-loading hazardous materials transport vehicles.
- To the greatest extent practicable, “just-in-time” ordering procedures should be employed that would limit the amounts of hazardous materials present on the site to quantities minimally necessary to support continued operations. Excess hazardous materials should receive prompt disposition.
- Written procedures for the storage, use, and transportation of each type of hazardous material present should be provided, including all vehicle and equipment fuels.
- Authorized users for each type of hazardous material should be identified.
- Procedures should be established for fuel storage and dispensing, including shutting off vehicle (equipment) engines; using only authorized hoses, pumps, and other equipment in good working order; maintaining appropriate fire and spill response materials at

equipment-fueling stations; providing emergency shutoffs for fuel pumps; ensuring that fueling stations are paved; ensuring that both aboveground fuel tanks and fueling areas have adequate secondary containment; prohibiting smoking, welding, or open flames in fuel storage and dispensing areas; equipping the area with fire suppression devices, as appropriate; conducting routine inspections of fuel storage and dispensing areas; requiring prompt recovery and remediation of all spills, and providing for the prompt removal of all fuel and fuel tanks used to support construction vehicles and equipment at the completion of facility construction and decommissioning phases.

- Refueling areas should be located away from surface water locations and drainages and on paved surfaces; features should be added to direct spilled materials to sumps or safe storage areas where they can be subsequently recovered.
- Drip pans should be used under the fuel pump and valve mechanisms of any bulk fueling vehicles and during on-site refueling to contain accidental releases.
- Spills should be immediately addressed per the appropriate spill management plan, and cleanup and removal initiated, if needed. Operations and maintenance personnel should be trained in spill prevention and containment, and spill containment supplies should be located on site and be readily available.
- All vehicles and equipment should be in proper working condition to ensure that there is no potential for leaks of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials.
- Hazardous materials and waste storage areas or facilities should be formally designated and access to them restricted to authorized personnel. Construction debris, especially treated wood, should not be disposed of or stored in areas where it could come in contact with aquatic habitats.
- Design requirements should be established for hazardous materials and waste storage areas that are consistent with accepted industry practices as well as applicable Federal, State, and local regulations and that include, at a minimum, containers constructed of compatible materials, properly labeled, and in good condition; secondary containment features for liquid hazardous materials and wastes; physical separation of incompatible chemicals; and fire-fighting capabilities when warranted.
- Written procedures should be established for inspecting hazardous materials and waste storage areas and for plant systems containing hazardous materials; identified deficiencies and their resolution should be documented.
- Schedules should be established for the regular removal of wastes (including sanitary wastewater generated in temporary, portable sanitary facilities) for delivery by licensed haulers to appropriate off-site treatment or disposal facilities.
- During facility decommissioning, the following should occur: emergency response capabilities should be maintained throughout the decommissioning period as long as hazardous materials and wastes remain on-site, and emergency response planning should be extended to any temporary material and equipment storage areas that may have been established; temporary waste storage areas should be properly designated, designed, and equipped; hazardous materials removed from systems should be properly containerized and characterized, and recycling options should be identified and pursued; off-site transportation of recovered hazardous materials and wastes resulting from

decommissioning activities should be conducted by authorized carriers; hazardous materials and waste should be removed from on-site storage and management areas, and the areas should be surveyed for contamination and remediated as necessary.

BMPs to prevent soil erosion would be implemented during construction of the Project as required by the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit and the accompanying Project Erosion and Sedimentation Control Plan (ESCP). Sunflower expects that BMPs implemented through the NPDES permit would adequately capture those measures identified in the Draft PEIS.

Additional site-specific measures to further reduce impacts to soils may be identified and implemented as appropriate; however, impacts to soil resources are not expected to be significant.

4.4 Air Resources

4.4.1 Existing Conditions

A significant impact to air resources would result if federal or state air quality standards were exceeded during construction, maintenance, or operation of the Project.

The U.S. Environmental Protection Agency (EPA) and the North Dakota Department of Health (NDDoH) regulate air quality in North Dakota through implementation of the Federal Clean Air Act (CAA) (42 U.S.C. §§ 7401-7671q). The CAA requires the adoption of National Ambient Air Quality Standards (NAAQS) to protect the public health and welfare from the effects of air pollution. The CAA defines NAAQS as levels of pollutant above which detrimental effects on human health and welfare could occur. A state or region is given the status of “attainment” if the NAAQS thresholds have not been exceeded for any criteria pollutant, or “nonattainment” for a specific pollutant if the NAAQS thresholds have been exceeded for that pollutant. Standards are provided for sulfur dioxide (SO2), carbon monoxide (CO), nitrogen dioxide (NO2), ozone (O3) particulate matter less than 10 microns (PM10), particulate matter less than 2.5 microns (PM2.5), and lead (Pb), which are known as the criteria pollutants.

The entire state of North Dakota is in attainment of all state and federal air quality standards, and no exceedences have been reported for at least the past ten years[2]. Relatively high concentrations of total suspended particulates (dust) may occur in springtime from farming operations and strong winds; however these have not exceeded and are not likely to exceed NAAQS.

[2] Annual reports of the North Dakota Department of Health Air Quality Monitoring program were reviewed for the years 2000 to 2011; these and additional annual reports are available online at: http://www.ndhealth.gov/AQ/AmbientMonitoring.htm

4.4.2 Potential Impacts

Direct Impacts

Direct impacts to air quality would include temporary increases in vehicle emissions and dust during construction. All such impacts would be limited to the period of construction, and are not expected to cause an exceedance of any NAAQS.

The only emissions related to operation of the Project would be extremely minor exhaust emissions from maintenance vehicles. These emissions would not cause any detectable impacts to regional air quality.

Indirect Impacts

The only indirect impact of the Project would be positive, since the Project has the potential to lower the need for additional thermal power plants, and thus to improve overall air quality in the region.

Avoidance, Minimization and Best Management Practices

Sunflower will implement measures applicable to reducing air quality impacts, as identified in the Draft UGP Wind Energy PEIS (see PEIS section 5.4.2), including the following:

General measures applicable to multiple phases of project development include the following:

- Use surface access roads, on-site roads, and parking lots with aggregates or that maintain compacted soil conditions to reduce dust generation.
- Post and enforce lower speed limits on dirt and gravel access roads to minimize airborne fugitive dust.
- Minimize potential environmental impacts from the use of dust palliatives by taking the necessary measures to keep the chemicals out of sensitive terrestrial habitats and streams. The application of dust palliatives must comply with Federal, State, and local laws and regulations.
- Ensure that all pieces of heavy equipment meet emission standards specified in the State Code of Regulations, and conduct routine preventive maintenance, including tune-ups to manufacturer specification to ensure efficient combustion and minimum emissions. If possible, equipment with more stringent emission controls should be leased or purchased.
- Employ fuel diesel engines in facility construction and maintenance that use ultra-low sulfur diesel, with a maximum 15 ppm sulfur content.
- Limit idling of diesel equipment to no more than 10 minutes unless necessary for proper operation.

Measures applicable during construction activities include the following:

- Stage construction activities to limit the area of disturbed soils exposed at any particular time.

  - Water unpaved roads, disturbed areas (e.g., scraping, excavation, backfilling, grading, and compacting), and loose materials generated during project activities as necessary to minimize fugitive dust generation.
  - Install wind fences around disturbed areas if windborne dust is likely to impact sensitive areas beyond the site boundaries (e.g., nearby residences).
  - Spray stockpiles of soils with water, cover with tarpaulins, and/or treat with appropriate dust suppressants, especially when high wind or storm conditions are likely. Vegetative plantings may also be used to limit dust generation for stockpiles that will be inactive for relatively long periods.
  - Train workers to comply with speed limits, use good engineering practices, minimize the drop height of excavated materials, and minimize disturbed areas.
  - Cover vehicles transporting loose materials when traveling on public roads, and keep loads sufficiently wet and below the freeboard of the truck in order to minimize wind dispersal.
  - Inspect and clean tires of construction-related vehicles, as necessary, so they are free of dirt prior to entering paved public roadways.
  - Clean (e.g., through street vacuum sweeping) visible trackout or runoff dirt from the construction site off public roadways.
- No additional measures are considered necessary during normal operations of the Project, but some dust control measures discussed above may be applicable to minimize fugitive dust emissions from bare surfaces and unpaved access roads.
- Decommissioning activities generally mirror construction activities; thus, the same measures should be applied during decommissioning as would be applied during construction.

Additional site-specific measures may be identified and implemented to further reduce air quality impacts; however, impacts to air quality are not expected to be significant. Complaints regarding fugitive dust emissions will be addressed on a case-by-case basis with impacted parties.

4.5 Climate Change

4.5.1 Existing Conditions

The CEQ now requires that agencies consider the potential impacts of federal actions on climate change, as well as the potential impacts of climate change on a proposed action. In 2010, the CEQ released its Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions (CEQ 2010), to help explain how agencies should analyze the environmental effects of greenhouse gas (GHG) emissions and climate change when they describe the environmental effects of a proposed agency action.

In the Draft Guidance, CEQ establishes a minimum threshold for GHG emissions[3] that would warrant a greater level of scrutiny, and potentially the implementation of mitigation measures to reduce GHG emissions. Specifically:

> If a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2-equivalent [CO_2e] GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. For long-term actions that have annual direct emissions of less than 25,000 metric tons of CO_2-equivalent, CEQ encourages Federal agencies to consider whether the action's long-term emissions should receive similar analysis. (CEQ 2010)

CEQ considers 25,000 metric tons CO_2e per year to be a "useful indicator – rather than an absolute standard of insignificant effects – for agencies' action-specific evaluation of GHG emission and disclosure of that analysis in their NEPA documents." While there are no specific thresholds established for assessing the significance of climate change impacts, a meaningful impact may result if 1) the Project would result in direct emissions of 25,000 metric tons or more of CO_2e GHG emissions annually, or 2) anticipated changes to the climate would result in meaningful impacts to the function or safety of the Project over its expected lifespan.

The CEQ's threshold for potential significance is different than the thresholds for air quality permits under the EPA's Title V and Prevention of Significant Deterioration (PSD) programs, as established with the 2010 release of the Tailoring Rule. The Title V and PSD programs apply to new or modified major stationary air pollutant sources (e.g., power plants); the rules do not cover construction-related emissions from mobile sources (e.g., cranes, bulldozers, or construction worker vehicles).

Pursuant to the CEQ Guidance, agencies should also consider the potential impacts of global climate change on the proposed federal action. Climate change can affect the environment of a proposed action in a variety of ways. For instance, climate change can affect the integrity of a development or structure by exposing it to a greater risk of floods, storm surges, or higher temperatures. Climate change can increase the vulnerability of a resource, ecosystem, or human community, causing a proposed action to result in consequences that are more damaging than prior analysis of environmental impacts might indicate. Climate change could also magnify the damaging strength of certain effects of a proposed action. (CEQ 2010)

[3] GHGs are defined in the Draft Guidance as carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. The contribution of a given gas to the greenhouse effect is affected by both its abundance and its inherent characteristics, which include how efficient the molecule is at absorbing solar energy and its atmospheric lifespan. Each gas' global warming potential (GWP) is a relative measure of how much a GHG is estimated to contribute to global warming relative to CO_2. For example, methane captures solar energy more efficiently than CO_2, so has a GWP of 72 over a 20-year period as compared to a GWP of 1 for CO_2 over the same period. The fluorinated gases are highly efficient at capturing solar energy and also have very long lifespans in the atmosphere, so all have much higher GWP than CO_2. In order to simplify impact assessments, emissions are inventoried and assessed in terms of CO_2 equivalent (CO_2e).

The EPA, the US Global Change Research Program (USGCP), and other government and academic groups have been studying the effects of climate change for over 20 years. Information about climate change is available from the EPA on their website (EPA 2013). Similarly, the USGCP makes its findings readily available via its website (USGCP 2013). According to these two sources, in the Great Plains region, the effects of climate change observed to date and projected to occur in the future include, but are not limited to,

- Increases in average year-round temperatures;
- Increase in average winter temperatures of up to 7^{o}F above historical averages;
- Increases in extreme precipitation events, leading to flooding, increased erosion, and increases in contaminants in the water supply;
- More frequent and more extreme heat events and droughts,
- Increases in average temperatures and extreme heat or drought events have led to;
    - Northward spread of pests;
    - Northward spread in invasive weed species;
    - Decreases in soil moisture and water availability, which may lead to greater wind erosion and airborne particulates;
    - Increased stresses on livestock;
    - Decreased crop reliability;
    - Prairie potholes drying out more frequently, with resulting impacts to waterfowl and other species that rely on those water supplies;
- Increased demand for energy for heating and cooling;
- Increased stress on energy infrastructure from extreme weather events;
- Changing patterns of precipitation and snowmelt, which lead to:
    - Effects to hydropower production;
    - Decreased reliability in traditional water sources;
    - Potential for water shortages.
- Increased risk of disruptions to transportation infrastructure and delays in transportation;
- Impacts to human health related to;
    - Extreme heat, cold, or other extreme weather events;
    - Likely increases in the transmission of some diseases; and
    - Increases in allergic reactions to greater pollen production.

This is not intended to be a comprehensive list, but rather a summary of some of the most important and most noticeable effects of climate change.

4.5.2 Potential Impacts

Direct Impacts

Direct impacts of the Project would include GHG emissions during construction, operation, and decommissioning. GHG emissions from construction equipment and construction vehicle use are expected to be well below the 25,000 metric tons CO_2e per year threshold of potential significance. GHG emissions from decommissioning would be similar. The Project itself will not generate GHG emissions, so GHG emissions during the operational phase would be limited to

emissions from occasional maintenance operations. These are expected to be negligible. The Project would therefore not have a meaningful impact in terms of a contribution to climate change.

GHG emissions from a wind farm may be estimated using readily-available life cycle analysis (LCA) figures. An LCA is a cradle-to-grave assessment of the inputs and outputs of resources attributable to wind turbine manufacturing, transport of components and construction equipment, construction of the wind energy facility, operation of the facility, and decommissioning of the facility. Some LCAs factor in the use of recycled metals in manufacturing, recycling of components and materials at the end of the lifespan, and include reasonable expectations for replacement of major components such as blades, gearboxes or generators. A number of independent studies have been published, and several manufacturers including Vestas have completed their own LCAs for specific turbine models

Fripp (2009) compared life cycle and life stage GHG emissions from coal, natural gas and wind power generators. This study provided a summary of 32 primary wind turbine LCAs, and used the ten most recent cases to arrive at a "conservative" average GHG emission rate of 10.7 grams CO_2e per kilowatt-hour of energy produced (g CO_2e/kWh) by wind turbines over the entire lifespan of the wind energy facility. Of that, 10 g CO_2e/kWh (92 percent) is due to construction and decommissioning, and 0.63 g CO_2e/kWh (8 percent) comes during operation of the facilities. Approximately 46 percent of the total lifespan emissions would occur during construction only. Fripp notes that the total emissions rate has decreased as wind turbine technology has improved, allowing fewer turbines – and fewer construction emissions - to produce larger amounts of power. The emissions rate is also influenced by the load factor, or the ratio of the operating hours at nominal power divided by the total hours in a year; greater operating time at nominal wind speeds reduced the lifespan GHG emissions rate.

Based on the conservative GHG emissions rates used by Fripp, and using a conservative 30% load factor and an expected 30 year lifespan, the Project would result in a total of approximately 8,672.4 metric tons CO_2e produced over the lifespan of the 110 MW facility. Less than half of that would occur during the year of construction and again in the year of decommissioning, and a small portion would occur during operation of the Project. Using this method both the projected total lifespan emissions and the resulting annual emissions of the Project would be well below the 25,000 metric tons per year CO_2e threshold of potential significance established in the 2010 CEQ guidance.

In terms of impacts of climate change to the Project, only a few of the observed and predicted climate change effects directly relate to the function and safety of the Project. More frequent and extreme weather events may cause the wind turbines to automatically shut down for a longer period each year. More extreme precipitation events could affect foundation stability, wash out access roads, or lead to increased erosion and resulting water quality impacts.

None of the known or reasonably expected climate change effects is anticipated to seriously impact the overall function or safety of the Project. Such effects would be mitigated through appropriate design, construction, and operation and maintenance practices. The wind turbines

are designed to withstand extreme winds, ice, rains and heat, and incorporate a number of safety features that enable them to do so. These include automated cutoff functions in the event of wind speeds above design maximums, or in the event of ice buildup on the blades. Turbine foundations will be designed and constructed according to accepted engineering practices and with proper drainage to prevent potential instability in the event of severe precipitation events or flooding. Access roads will be designed, constructed, and regularly maintained with appropriate stormwater management features to reduce the likelihood of road damage and water quality degradation in the event of severe precipitation.

Reconductoring of the Mandan-Ward transmission line would enable it to better withstand severe weather events and additional demands on the transmission system that may be possible as a result of climate change.

Indirect Impacts

As described in the Draft UGP Wind Energy PEIS, the only potentially significant indirect effect of the Project on climate change would be positive; it would result in the reduction of emissions from existing and future thermal power plants. The Draft PEIS estimates that operation of a 50 to 300 MW wind energy facility could result in displacement of about 2.6 percent of CO_2 emissions from electric power systems, and up to 1.8 percent of CO_2 emissions from all source categories in North Dakota alone (see PEIS Table 5.4-2). The Draft PEIS goes on to note, however, that “these emissions offsets would only occur if wind generation actually displaced existing fossil-fueled generation. It is far more likely that any offsets would be of potential future fossil-fueled generation, since wind power would most likely be used to meet growth in generation load needs, and not existing load needs.”

While the specific amount of GHG emissions reduction is difficult to determine, there is little disagreement that some thermal power would be displaced, that this would be larger than the extremely small emissions from construction and operation of the Project, and therefore that the overall indirect impact of the Project to GHG emissions and any resulting climate change would be beneficial.

Avoidance, Minimization and Best Management Practices

Sunflower will implement measures applicable to reducing air quality impacts, as identified in the Draft UGP Wind Energy PEIS (see PEIS section 5.4.2) and listed above in Section 4.4.

Additional site-specific measures may be identified and implemented to further reduce air quality impacts; however, impacts to air quality and climate change are not expected to be significant.

4.6 Water Resources

This section describes Project impacts to groundwater and surface water resources.

4.6.1 Existing Conditions

Surface Water

Surface water in most of the Project Area flows southward to the Heart River, via Spring Creek, Beaver Creek, Heart Butte Creek, Big Muddy Creek and their many unnamed tributaries. Surface water in the northern edge of the Project Area flows northward via several unnamed tributaries to the East Branch Knife River.

As shown in Figure 6, streams and wetlands are present throughout the Project Area. Most streams are intermittent and in many cases function as drainage ways within tilled agricultural fields. There are no known surface water withdrawals for irrigation or other uses within the Project Area. There are no major rivers or traditional navigable waters found within the Project Area.

The Project is located in an area of North Dakota for which flood hazard areas have been mapped by FEMA. Two small areas of mapped 100-year floodplain occur within the western edge of the Project Area along one of the unnamed tributaries to Spring Creek.

Groundwater

Groundwater in the region supplies both public and private wells. Shallow groundwater typically follows local topography, while regional groundwater flow in the deeper bedrock aquifers is generally directed north and east toward Lake Sakakawea and the Missouri River (Trapp and Croft 1975, Ackerman 1980).

Groundwater in Morton and Stark Counties is found in both surficial and bedrock aquifers and is generally plentiful (Trapp and Croft 1975, Ackerman 1980). Review of driller logs available from the North Dakota State Water Commission database indicates that only one well has been drilled within the Project Area, a 438 foot-deep well in Morton County (SE1/4SE1/4-NW1/4, Sec. 20, T139N, R90W), tapping the Tongue River aquifer for stock watering purposes.

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Sunflower Wind Project
Environmental Assessment

Figure 6
Surface Waters and Wetlands

Morton and Stark Counties, ND
April 2014

Morton County

Stark County

Long Butte

Big Muddy Creek

Heart Butte Creek

Beaver Creek

Spring Creek

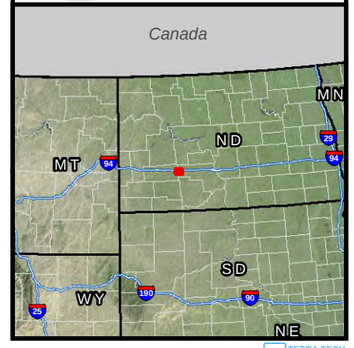
- Project Area
- Preliminary Turbine Array Corridor
- Proposed Interconnection Switchyard
- Proposed Substation
- Approximate Underground Collection System Routing
- Approximate Access Road Routing
- Existing Transmission Line
- County Boundary
- Interstate Highway
- 100 Year Flood Zones

NHD Stream Type

- Perennial Stream
- Intermittent Stream

NWI Wetland Type

- Freshwater Emergent Wetland
- Freshwater Forested/ Shrub Wetland
- Freshwater Pond
- Other Freshwater Wetland



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4.6.2 Potential Impacts

A significant impact to water resources would occur if 1) the Project causes an increase in susceptibility to on-site or off-site flooding due to altered surface hydrology; 2) the Project causes a violation of the terms and conditions of a NDDoH stormwater permit; 3) the Project causes a loss or degradation of surface water quality in violation of applicable standards; 4) the Project causes a withdrawal or diversion of sufficient volume to adversely affect senior water rights holders; or 5) the Project causes contamination of groundwater resources.

Direct Impacts

The Project would not result in the use of surface water, and there would consequently be no direct or indirect impacts either to water quantity or water quality. The Project would not impact mapped 100-year floodplain areas.

The only permanent use of groundwater would be through a well supplying water to the O&M facility for restroom and cleanup facilities. This well would require a water right permit for Industrial Use pursuant to NDCC 61-04, which would be obtained through an application to the ND State Water Commission. The small amount of groundwater withdrawn would not create a measureable impact to groundwater.

Project construction activities such as excavation and construction of foundations are unlikely to affect groundwater quality or flow patterns. If impacts were to occur, they would likely be minor and highly localized, and unlikely to adversely affect local water supply wells. As the design of the Project is finalized, facilities will be adjusted to avoid impacts to the few existing wells in the area.

Although it appears to be unlikely based on existing conditions, subsurface blasting may be required to excavate for turbine foundations. This could potentially fracture bedrock and affect groundwater flow in the immediate vicinity of the disturbance; however, potential blasting activities would not be deep enough to impact typically used aquifers in the region. In the event that subsurface blasting is required, a blasting plan would be developed and implemented to keep the impacts localized and fracture the least amount of bedrock necessary for construction. Potential disturbances due to blasting would be localized and temporary, with groundwater likely to resume its natural course of flow downgradient of the foundation.

Operation of the Project would involve periodic changing of lubricating fluids for the turbines, and may involve small quantities of hazardous materials to be kept and used onsite (e.g., herbicides used for noxious weed management). These materials will be managed according to the conservation measures described in the Draft UGP Wind Energy PEIS, which would prevent their release into surface or groundwater in the Project Area, as listed below.

Reconductoring of the Mandan-Ward transmission lines would have no impacts on ground or surface waters. This work would utilize existing access roads and other previously-disturbed areas, so no new impacts to surface waters or wetlands would occur. This work would not require water, either for construction or operation, beyond a minimal amount used for dust

control at active work sites. Dust control water would be obtained from an authorized source, such as a municipal supplier with adequate water rights, so this work would not adversely impact existing water rights or supplies.

Indirect Impacts

Neither action alternative would create indirect impacts to ground or surface water.

Avoidance, Minimization and Best Management Practices

Sunflower will implement measures to avoid or minimize impacts to water resources, as identified in the Draft UGP Wind Energy PEIS; applicable measures are found in the sections on Water Resources and Hazardous Materials (PEIS sections 5.3.2 and 5.12.1.4 respectively). Measures related to Hazardous Materials are listed above in Section 4.3.

Conservation measures related to Water Resources are as follows:

- Minimize the extent of land disturbance to the extent possible.
- Use existing roads and disturbed areas to the extent possible.
- Site new roads to avoid crossing streams and wetlands and minimize the number of drainage bottom crossings.
- Apply standard erosion control BMPs to all construction activities and disturbed areas (e.g., sediment traps, water barriers, erosion control matting) as applicable to minimize erosion and protect water quality.
- Apply erosion controls relative to possible soil erosion from vehicular traffic.
- Identify and avoid unstable slopes and local factors that can cause slope instability (groundwater conditions, precipitation, seismic activity, high slope angles, and certain geologic landforms).
- Identify areas of groundwater recharge and discharge and evaluate their potential relationship with surface water bodies and groundwater quality.
- Avoid creating hydrologic conduits between two aquifers (e.g., upper and lower).
- Construct drainage ditches only where necessary; use appropriate structures at culvert outlets to prevent erosion.
- Avoid altering existing drainage systems, especially in sensitive areas such as erodible soils or steep slopes.
- Clean and maintain catch basins, drainage ditches, and culverts regularly.
- Limit herbicide and pesticide use to nonpersistent, immobile compounds and apply them using a properly licensed applicator in accordance with label requirements.
- Dispose of excess excavation materials in approved areas to control erosion and minimize leaching of hazardous materials.
- Reestablish the original grade and drainage pattern to the extent practicable.
- Reseed (non-cropland) disturbed areas with a native seed mix and revegetate disturbed areas immediately following construction.
- When decommissioning sites, ensure that any wells are properly filled and capped.

Additional site-specific measures to further reduce impacts to water resources may be identified and implemented as appropriate; however, impacts to water resources are not expected to be significant.

4.7 Wetlands and Other Jurisdictional Waters

Waters of the United States include wetlands and streams which meet the definitions in 33 CFR Part 328; such waters are regulated by the US Army Corps of Engineers (USACE) under the Clean Water Act (CWA). Section 404 of the CWA, regulation of discharge of dredge/fill materials, is implemented by the USACE. A CWA Section 404 permit will be required only if the Project will permanently impact wetlands or other jurisdictional waters of the United States. The 404 permit is issued by the U.S. Army Corps of Engineers (USACE).

The CWA includes provisions for both individual and nationwide permits. If the Project impacts are larger than 0.5 acre of wetlands or 300 linear feet of stream bank, USACE would require an Individual Permit, which requires development of a formal mitigation plan. The district engineer may waive the 300-linear-foot limit for intermittent or ephemeral streams by making a written determination that the discharge will result in minimal individual and cumulative adverse effects. Individual permits require state water quality certification under CWA Section 401.

Nationwide permits are issued by the USACE under CWA Section 404 for projects expected to have minimal individual or cumulative effects. They do not require a mitigation plan and are pre-certified under CWA Section 401. Impacts of the Project to wetlands and streams that are less than the threshold limits for individual permits would be permitted under Nationwide Permit (NWP) Program 51 for renewable energy programs including wind power projects.

4.7.1 Existing Conditions

A preliminary assessment of the presence of potentially jurisdictional waters was performed using available desktop data including the National Wetlands Inventory (NWI) and National Hydrologic Data (NHD) data sets and high-resolution aerial photography. The use of aerial photography is appropriate for the Project Area since the area contains little tree cover and the boundaries of wetlands and streams are generally evident.

This preliminary assessment was used as a guide for avoidance and minimization, and to determine potential impacts of the Project. NHD and NWI data is not definitive as to classifications and existence of features, and any potentially jurisdictional water or wetland that would actually be impacted by the Project will be delineated, and a preliminary jurisdictional determination made, prior to construction.

Figure 6 shows the locations of wetlands and streams within the Project Area; these waters are scattered and relatively sparse. Wetlands are usually surrounded by tilled fields or pasture.

4.7.2 Potential Impacts

A significant impact to water wetlands or other jurisdictional waters would occur if the Project would create a loss or degradation of such resources in violation of a USACE permit.

It is Sunflower's intention to avoid all impacts to wetlands, regardless of jurisdictional status. As the Project layout is finalized, the specific location and configuration of access roads, turbine foundations and temporary construction areas, the Project substation and interconnection switchyard, the O&M facility, and the construction staging area will be adjusted to avoid all impacts to wetlands, and to avoid impacts to streams to the extent practicable. The implementation of these practices will enable Sunflower to avoid all impacts to wetlands, and to minimize impacts to streams such that either no permit would be required or the Project would qualify for a Nationwide Permit.

Some Project infrastructure, specifically electrical collector lines and access roads, cannot be designed to completely avoid streams. However, electrical collection lines would cross under streams using HDD, avoiding impacts to the streams at these locations. Access road stream crossings will be avoided if possible, and impacts at remaining necessary stream crossings would be minimized by reducing roadway widths to the extent feasible. Preliminary collection line and access road stream crossing locations are shown on Figure 6. A typical access road stream crossing is shown in Figure 7. Typical collection line drilled stream crossing is shown in Figure 8.

Direct Impacts

The only potential direct impact to jurisdictional waters would be the crossing of potentially jurisdictional streams by access roads. The Project is estimated to require approximately 14 access road crossings of potentially intermittent streams.

Based on the assumption of a 16 foot-wide permanent access road, the Project would result in a total of up to 224 linear feet of permanent impacts to intermittent streams. The total amount of impacts is estimated to be lower than the 300 linear foot threshold limit for an Individual Permit, indicating that these impacts can be permitted through the issuance of a Nationwide Permit. This estimate is considered conservative and adjustments to the Project are expected to further reduce the total impacts to streams.

Avoidance measures and compliance with the terms of the 404 permit would reduce the impacts of the Project to jurisdictional waters to a level of non-significance.

Reconductoring of the Mandan-Ward transmission line would have no impacts to wetlands. This work would utilize existing access roads and other previously-disturbed areas, so no new impacts to wetlands would occur.

Indirect Impacts

Indirect impacts could include impacts to water quality due to erosion and sedimentation, contamination of waters, or changes to local hydrology that would alter wetland conditions. Erosion and sedimentation would be limited through the implementation of appropriate stormwater management best management practices. These will be defined in the Project Erosion and Sediment Control Plan (ESCP), which is an integral part of the required NPDES Construction Stormwater Permit. Stormwater would be managed to infiltrate onsite, and would not be directed to flow into wetlands or natural streams. In addition, appropriate engineering

design of access road stream crossings, and proper maintenance of those roads, would limit water quality impacts at those crossings. Crossings would be designed to prevent changes to local hydrologic conditions and allow for free flow of streams.

Prevention of water contamination will be addressed through the implementation of appropriate hazardous materials handling procedures during construction, operation, and decommissioning of the Project. This will include the measures included in the Draft UGP Wind Energy PEIS as listed below. Key requirements include fueling or maintaining vehicles and construction equipment a sufficient distance from wetlands or streams; storing any necessary hazardous materials far from streams or wetlands, implementing proper handling controls, and implementing robust spill response procedures.

Avoidance, Minimization and Best Management Practices

In addition to the measures discussed above, Sunflower will implement the measures to avoid or minimize impacts to jurisdictional waters and wetlands identified in the Draft UGP Wind Energy PEIS; applicable measures are found in the sections on Water Resources and Hazardous Materials (PEIS sections 5.3.2 and 5.12.1.4 respectively), which are listed above in Sections 4.3 and 4.6. Additional measures are provided the Draft PEIS section on Aquatic Biota and Habitats (PEIS section 5.6.2), which are listed in Section 4.9 of this EA.

Additional site-specific measures to further reduce impacts to waters and wetlands may be identified and implemented as appropriate; however, impacts to waters and wetlands are not expected to be significant.

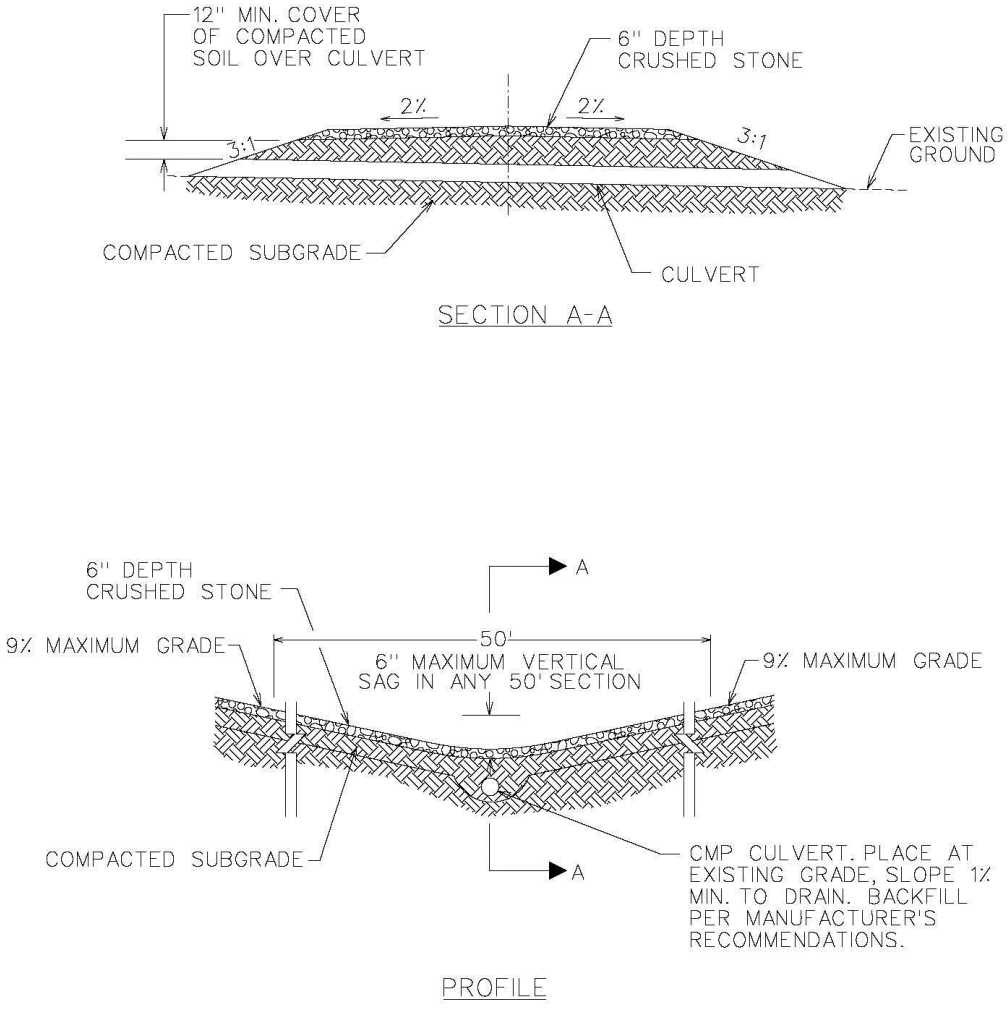

Figure 7. Typical Access Road Stream Crossing

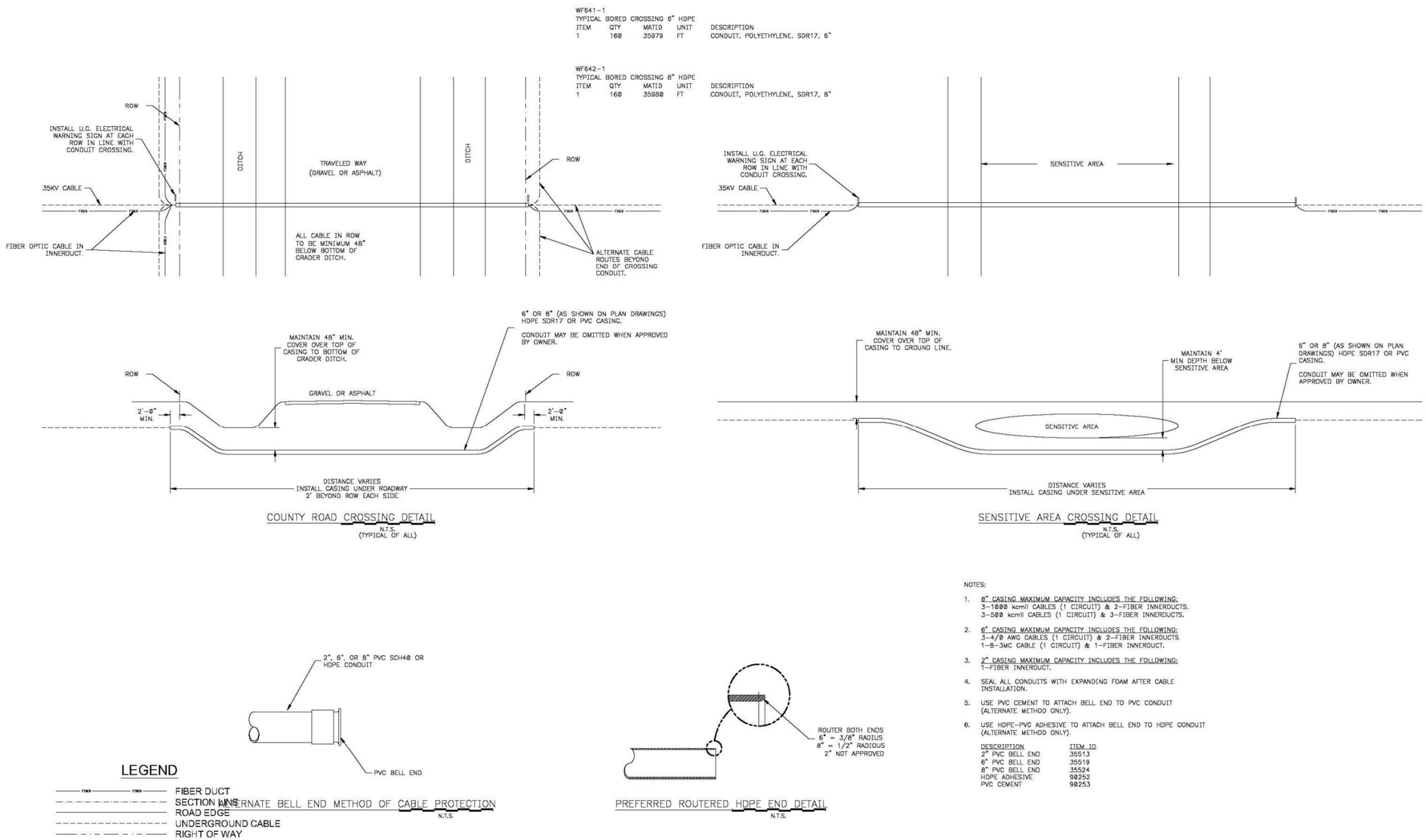

Figure 8. Typical Collector Line Drilled Stream Crossing

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4.8 Vegetation

4.8.1 Existing Conditions

Vegetation Communities

Vegetation within the Project Area includes crops interspersed with rangeland made up of fallow parcels or grassland. Typical crops include wheat, hay, barley, oats, and corn. In steeper terrain the primary land cover is grassland. Scattered areas may be classified as native prairie (areas of naturally occurring grasses and forbs) (USGS 2013). Riparian areas contain shrubs and small trees. Wetland basins are common, most are less than five acres and support seasonal surface water.

The vegetation communities within the Project Area were described using available desktop information and current aerial photography in spring 2013 (see Appendix C, WEST Habitat Mapping Memo). These communities are shown in Figure 9 and Table 5.

Table 5. Mapped Vegetation Communities in the Project Area

Vegetation Community	Total (Acres)	Percentage of Survey Area
Cropland	12,940	28.9
Grassland	8,324	37.9
Developed	485	2.2
NWI Wetlands	110	0.5
Deciduous Trees	102.5	0.5
Shrubs	17	0.1
Unknown Trees	3	<0.1
Water	1	<0.1
Total	21,983	100%

The Study Area for vegetation cover was slightly different than the Project Area; however, review of aerial photos and on site reconnaissance indicates that the vegetation communities are similar throughout the area and the percentages of each vegetation community presented in this table are very likely representative.
Values over 1 acre are rounded to the nearest acre.

Noxious and Invasive Weeds

North Dakota has listed twelve species which are considered noxious weeds (NDCC 63-01.1). The Stark County Weed Board lists two additional weed species (black henbane and hoary cress); Morton County does not list additional noxious weed species (NDDA 2013a).

The North Dakota Weed Mapper (NDDA 2013b) indicates that Canada thistle is present along many of the roads within and surrounding the Project Area. None of the other state or county listed weeds are known to be present.

Rare Plant Populations

There are no federal listed, proposed, or candidate species known to occur in Stark or Morton counties. North Dakota does not have a state endangered or threatened species list. North Dakota's list of Species of Conservation Priority includes only one plant, the western prairie fringed orchid, which is not known to occur in Stark and Morton counties.

4.8.2 Potential Impacts

A significant impact to vegetation resources would occur if the Project resulted in: 1) a loss of habitat resulting in the listing of or an adverse impact on the continued existence of plant or animal species; 2) uncontrolled expansion of noxious weeds; or 3) the removal of habitat important to the continued survival and reproduction of wildlife species.

Direct Impacts

The Project would result in direct, permanent impacts to vegetation communities through the establishment of turbine foundations, access roads, and the substation, interconnection switchyard and O&M facility. The Project would result in temporary impacts at the construction laydown area, the portions of Project access roads used for construction and then reclaimed, and temporary construction areas surrounding each turbine.

The Project would create approximately 45 acres of permanent impact and 251 acres of temporary impact. These impacts would be distributed between cropland and grassland, with extremely small impact to developed area (existing roads), and no impacts to wetlands, trees, shrubs or water.

Reconductoring of the Mandan-Ward transmission line would have no impacts to native grassland or other sensitive vegetation communities. This work would utilize existing access roads and other previously-disturbed areas, so no new impacts to sensitive vegetation communities would occur.

Indirect Impacts

The Project would not create indirect impacts to vegetation communities.

Avoidance, Minimization and Best Management Practices

Sunflower will continue to avoid and minimize impacts to prairie and riparian habitats during the final design process. Remnant native prairie may be present at scattered locations throughout the Project Area. During final design Sunflower will use the aerial photography and the results of further on-site investigations to locate turbines, access roads and collection lines on previously disturbed land to the maximum extent practical.

Sunflower will implement measures to avoid or minimize impacts to sensitive habitats and measures to control the spread of invasive species as identified in the Draft UGP Wind Energy PEIS (see Section 5.6.2), as follows:

- Minimize the size of areas in which soil would be disturbed or vegetation would be removed.
- Reduce habitat disturbance by keeping vehicles on access roads and minimizing foot and vehicle traffic through undisturbed areas.
- Initiate habitat restoration of disturbed soils and vegetation as soon as possible after construction activities are completed. Restore areas of disturbed soil using weed-free native grasses, forbs, and shrubs, in consultation with land managers and appropriate agencies such as State or County extension offices or weed boards.
- Develop a plan for control of noxious weeds and invasive plants that could occur as a result of new surface disturbance activities at the site. The plan should address monitoring, weed identification, the manner in which weeds spread, and methods for treating infestations. Require the use of certified weed-free mulching.
- Establish a controlled inspection and cleaning area for trucks and construction equipment arriving from locations with known invasive vegetation problems. Visually inspect construction equipment arriving at the project area and remove and contain seeds that may be adhering to tires and other equipment surfaces.
- Regularly monitor access roads and newly established utility and transmission line corridors for the establishment of invasive species. Initiate weed control measures immediately upon evidence of the introduction or establishment of invasive species.
- Do not use fill materials that originate from areas with known invasive vegetation problems.
- Access roads, utility and transmission line corridors, and tower site areas should be monitored regularly for the establishment of invasive species, and weed control measures should be initiated immediately upon evidence of the introduction of invasive species.
- Regularly inspect access roads, utility and transmission line corridors, and tower site areas for damage from erosion, washouts, and rutting. Initiate corrective measures immediately upon evidence of damage.
- Salvage and reapply topsoil excavated during decommissioning activities to disturbed areas during final restoration activities.
- Reclaim areas of disturbed soil using weed-free native shrubs, grasses, and forbs. Restore the vegetation cover, composition, and diversity to values commensurate with the ecological setting.

Introduction of noxious weeds will be mitigated through prompt revegetation with native species or restoration of prior land use, and through ongoing monitoring and control programs.

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Sunflower Wind Project
Environmental Assessment

Figure 9
Land Cover

Morton and Stark Counties, ND
April 2014

Morton County

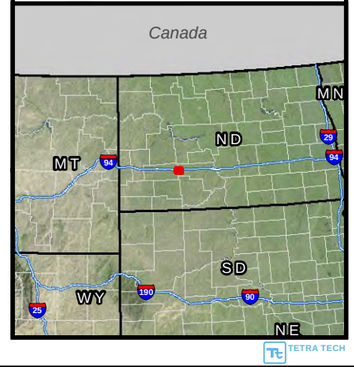
Stark County

94

- Project Area
- Preliminary Turbine Array Corridor
- Proposed Interconnection Switchyard
- Proposed Substation
- Approximate Underground Collection System Routing
- Approximate Access Road Routing
- County Boundary
- Interstate Highway

WEST Land Cover

- NWI wetland
- Crop
- Deciduous Trees
- Developed
- Grass
- Shrubs
- Trees
- Water



1:40,000 WGS84 UTM Zone 13N

0 2 4 Miles

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4.9 Wildlife

This section describes the wildlife resources in the Project Area and potential Project impacts.

Although the evaluation of wildlife resources focuses on the Project Area (Figure 2), some discussion of impacts at a regional scale is included in order to evaluate potential impacts to highly mobile wildlife such as migratory birds. Existing literature and other information related to known species distributions, including endangered, threatened, proposed, candidate, and sensitive species; migration pathways; and wetlands and unique habitats within the Project Area, were reviewed for relevance. Federal and state threatened, endangered, proposed and candidate species are addressed in Section 4.10; this section addresses non-listed wildlife, including Birds of Conservation Concern and North Dakota Species of Conservation Priority.

4.9.1 Data Sources

Sunflower used available on-line data sources for initial characterization of the wildlife resources in the Project Area; these are discussed in Appendix C. Sunflower conducted the following field surveys to document wildlife use of the Project Area:

- Raptor nest survey,
- Avian point count surveys (spring, summer, fall and winter),
- Bat acoustic monitoring,
- Grouse lek surveys, and
- Whooping crane stopover evaluation.

A copy of each of these survey reports is provided in Appendix D.

The survey protocols that were utilized for field surveys that have been completed for the Project were developed based on the USFWS's Wind Energy Guidelines (USFWS 2012) and based on recommendations from the USFWS North Dakota Field Office. Incidental observations were recorded for terrestrial species during the avian point count surveys. The Study Area for these surveys covered approximately 22,000 acres, and varied slightly from the Project Area. However, the Study Area is considered representative of the Project Area, as review of aerial photos and on site reconnaissance indicated that the vegetation communities are similar throughout the area, and thus wildlife use is similar to the Study Area. Lek, raptor nest, and eagle nest surveys included 0.5-mile, 1-mile, and 10-mile buffers on this Study Area. The results of these surveys are reported below. Survey methods and results are presented in Appendix C.

4.9.2 Existing Conditions

Wildlife species observed within the Project Area are typical of agricultural, grassland, woodland, and wetland habitats.

Raptor Nests

For the purposes of the Project, raptors are defined as kites, accipiters, buteos, harriers, eagles, falcons, and owls. Surveys for nests of all raptor species included the Study Area plus a 1-mile

buffer. Aerial surveys, including for eagle nests, were carried out in accordance with guidance provided in the USFWS Inventory and Monitoring Protocols (Pagel et al. 2010). Eagle surveys included the Study Area plus a 10-mile buffer because the USFWS defines the area nesting population for golden eagle to be the "number of pairs of golden eagles known to have a nesting attempt during the preceding 12 months within a 10-mile radius of a golden eagle nest" (USFWS 2013e). Golden eagles are not present; however this EA uses the same approach for bald eagles.

Eighteen raptor nests representing five species were documented within the Study Area and associated buffers during the 2013 aerial survey spring and summer ground-based avian point count surveys (Table 7). During the surveys two buffers were surveyed. No eagle nests were recorded within the Study Area or the 1-mile buffer. Five bald eagle nests (1 active and 4 inactive/unoccupied) were recorded within the 10-mile buffer. At the time this EA was written, the Project Area had shifted from when surveys were conducted, which resulted in inventoried nests being located more than 10 miles from the Project Area; these nests are presented in the EA for completeness.

The closest bald eagle nest to the Project was located along Haymarsh Creek, approximately 7.5 miles northeast of the Project Area; this nest was unoccupied at the time of surveys. The one active bald eagle nest observed was located along the Heart River, approximately 10.8 miles south of the Project Area. Based on these distances there is potential that important use areas for bald eagles may exist within 10 miles of the Project.

Of the 13 other raptor nests identified, 4 were within the Project Area. All four of these nests were occupied at the time of the survey (Table 6). Nests belonging to three Species of Conservation Priority were documented: bald eagle, Swainson's hawk, and burrowing owl. Of these species, bald eagle and burrowing owl are also Birds of Conservation Concern.

Table 6. Raptor Nest Status and Distance to the Project Area

Nest ID[/a]	Species	Nest Status	Distance to Project Area (mi) [/b]
BAEA_Nest4	Bald eagle	Occupied, active	10.8 [/c]
BAEA_Nest1	Potential bald eagle	Unoccupied, inactive	7.5
BAEA_Nest2	Potential bald eagle	Unoccupied, inactive	8.6
BAEA_Nest3	Potential bald eagle	Unoccupied, inactive	9.8
BAEA_Nest5	Potential bald eagle	Unoccupied, inactive	11.3 [/c]
SF-9	Burrowing owl	Occupied, active	Within
SF-5	Great horned owl	Occupied, active	Within
SF-1	Great horned owl	Occupied, active	0.5
SF-2	Great horned owl	Occupied, active	0.5
SF-8	Red-tailed hawk	Occupied, active	Within
SF-6	Red-tailed hawk	Occupied, active	0.5
SF-11	Red-tailed hawk	Occupied, active	0.1
SF-3	Swainson's hawk	Occupied, active	Within
SF-7	Swainson's hawk	Occupied, active	1.0
SF-13	Swainson's hawk	Occupied, active	0.5
SF-12	Unknown raptor	Occupied, active	0.5
SF-4	Unknown raptor	Unoccupied, inactive	0.5
SF-10	Unknown raptor	Unoccupied, inactive	0.4

/a Nest IDs as assigned in WEST Raptor Nest Survey Report (Appendix C)
/b distances are approximate.
/c Boundary changes resulted in greater than 10 miles from the Project Area but presented here for completeness.

Avian Use

Sunflower contracted WEST to conduct fixed-point avian surveys in 2013 to estimate seasonal and spatial use of the study area by birds in order to identify potential avian impacts associated with construction and operation of the Project. The surveyors also recorded incidental wildlife observations to document birds detected outside of the standardized surveys. Birds observed incidentally were excluded from avian use calculations.

Sixty-eight unique bird species were identified during spring and summer 2013 point count surveys and incidentally. No federally endangered, threatened or candidate species were recorded. Nine Birds of Conservation Concern were recorded, and sixteen North Dakota Species of Conservation Priority were recorded, including two bald eagles. North Dakota Species of Conservation Priority are discussed below under State Species of Conservation Priority.

Passerines were the most abundant bird type observed, accounting for 84.2% of all observations. Waterbirds, represented almost entirely by sandhill cranes (*Grus canadensis;* 350 observations), were the second most abundant bird type observed in the study area, representing 6.1% of all observations. A total of 79 diurnal raptors were observed, accounting for 1.4% of all individuals recorded. Northern harrier (*Circus cyaneus*) and Swainson's hawk (*Buteo swainsoni*) were the most commonly observed raptor species (20 and 19 individuals,

respectively). Two individual bald eagles (*Haliaeetus leucocephalus*) were observed in the spring. No listed or candidate avian species were observed.

Species diversity of birds observed reflected the grassland and agricultural habitat within the Study Area. Species of open grassland habitats were dominant, but species that utilize woodlands and wetlands were also observed interspersed throughout the Study Area.

A far greater number of bird observations occurred in the spring season (5,338) compared to summer (454). Although the spring season had almost twice as many surveys conducted, it is unlikely that doubling the number of surveys in summer would have resulted in the total number of birds observed to approach those recorded in spring. Lapland longspur and common redpoll had the highest number of individuals recorded and were only observed in the spring. In total, 26 bird species were recorded in spring that were not recorded in the summer, while only four species were observed in the summer that were not recorded in the spring. Overall, diurnal raptors were also more common in the spring; birds observed during the spring likely included migrating individuals.

Grouse Leks

Sunflower contracted WEST to conduct sharp-tailed grouse lek aerial surveys in April and May 2013, in order to determine the approximate location of sharp-tailed grouse leks and provide general information on sharp-tailed grouse use within and immediately adjacent to the Project Area during peak lekking activity (early April through mid-May). Eight confirmed (birds observed in courtship behavior at the same location during more than one survey) and five possible (birds observed in courtship behavior during only one survey) leks were recorded.

Five of the confirmed leks and two of the possible leks were identified within the Project Area. The three additional confirmed leks that are outside of the Project Area are approximately 0.25 miles to the north, and 1.5 miles and 2.5 miles to the south. Three additional potential lek sites were identified outside the Project Area. The maximum number of sharp-tailed grouse recorded on leks ranged from 7 to 30 (Table 7).

Table 7. Sharp-tailed Grouse Lek Status and Distance to Project Area

Lek ID	Lek Status	Maximum number of individuals	Distance to Project Area (mi)
1	confirmed	21	Within
2	possible	12	0.5
3	possible	14	Within
4	possible	8	1
5	confirmed	8	0.25
6	confirmed	9	Within
7	confirmed	18	2.5
8	confirmed	16	Within
9	possible	7	Within
10	confirmed	25	Within
11	confirmed	29	1.5
12	confirmed	30	Within
13	possible	18	0.8

Bats

Of the 47 bat species in the United States, ten occur in North Dakota and may potentially occur within the Project Area based on current known distribution ranges, including the little brown bat (*Myotis lucifugus*), silver-haired bat (*Lasionycteris noctivagans*), big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), western long-eared myotis (*M. evotis*), western small-footed myotis (*M. ciliolabrum*), Keen's myotis (*M. keenii*), northern long-eared myotis (*M. septentrionalis*) and long-legged myotis (*M. volans*) (ASM 2007, NatureServe 2008, BCI 2009). None of the species that potentially occur within the Project Area are federally listed as threatened or endangered. Three of the species that could potentially occur within the Project Area – hoary bat, silver-haired bat, and eastern red bat – are highly migratory and are found in the greatest abundance in North Dakota during late May through early September (Cryan 2003).

Sunflower contracted WEST to complete a study of bat activity during summer and fall 2013 (see report in Appendix C). Acoustic monitoring surveys were conducted at three meteorological tower stations within the Project Area between June 12 and October 23, 2013. Three ground-based AnaBat detectors were used to record bat activity; one of these was paired with another elevated AnaBat detector placed at approximately 148 feet (45 meters) above ground level to record bats flying near rotor heights. The detectors were programmed to start recording approximately 30 minutes before sunset and turn off approximately 30 minutes after sunset each night.

The standard metric used for measuring bat activity was the number of bat passes per detector-night, and this metric was used as an index of bat activity in the Project Area. To assess potential for bat fatalities, bat activity in the Project Area was compared to existing data at other wind energy facilities in the Midwest.

Bat activity was consistently higher – nearly twice as high on average – at the ground-based detectors than at the elevated detector. Research suggests that bat activity in the rotor-swept heights may be more representative of bat exposure to turbines and potential fatalities. Because bat activity was generally lower at the raised met tower station than ground level stations, there may be a lower potential risk of collision with turbines than if the call rates were similar at both the ground and at the raised station. Bat activity was relatively low in the summer and higher in the fall, peaking from August 4 to August 10, and steadily decreasing thereafter. Most bat fatality studies at wind energy facilities in the US have shown a peak in fatalities in August and September (the fall migration period) and generally lower mortality earlier in the summer and very low mortality during the spring.

Bat activity recorded by ground detectors at met towers during the fall migration period (1.70 ± 0.20 bat passes per detector-night) was the lowest activity when compared to all publicly-available reports from wind energy facilities in Midwest, and the third lowest when compared to all facilities in North America with similarly-collected activity data, potentially indicating low direct impacts to bats.

Other Wildlife Species

During spring and summer 2013 surveys for the Project, surveyors recorded incidental wildlife observations. Non-avian wildlife observed included coyotes, mule deer, porcupines, pronghorn, thirteen-lined ground squirrels, a white-tailed jackrabbit, and western chorus frogs.

Birds of Conservation Concern

The Project Area is located in USFWS Bird Conservation Region (BCR) 17 (Badlands and Prairies). The USFWS has compiled a list of bird species that represent the highest conservation priority and without which conservation actions are likely to become candidates for listing under the ESA. Table 8 lists Birds of Conservation Concern that were observed during surveys (WEST 2013 Appendix C).

Table 8. Birds of Conservation Concern

Common Name	Scientific Name	Habitat Type	Habitat Details
Bald Eagle	*Haliaeetus leucocephalus*	Forest and Wetland	Lots of trees with abundant water such as streams and lakes.
Prairie Falcon	*Falco mexicanus*	Native Prairie/ Canyons/Mountains	Occupy treeless open terrain. Nests in foothills and mountains with cliffs and escarpment.
Upland Sandpiper	*Bartramia longicauda*	Native Prairie/ Grassland	Inhabit mixed-grass prairie, local extensive tracts of wet meadow, grazed tall-grass prairie, tame haylands, CRP fields, and mowed or burned railroad or highway rights-of-way.
Marbled Godwit	*Limosa fedoa*	Wetlands	Breeds on grassy plains, wet meadows and vegetated sloughs, near rivers and streams.
Burrowing Owl	*Athene cunicularia*	Native Prairie/ Grassland	Prefer open areas within grasslands where soils are well drained with sparse vegetation.
Short-eared Owl	*Asio flammeus*	Grassland	Require open areas with dense herbaceous covering for nesting.
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Grassland/Forest	Inhabits open woodland, parks, gardens, edges and clearings near forests, and cultivated areas.
Loggerhead Shrike	*Lanius ludovicianus*	Grassland	Prefer open habitat comprised of grasses and forms with bare ground and low shrubs.
Grasshopper Sparrow	*Ammodramus savannarum*	Grassland	Found in prairies, pastures and hay fields.

Source: BCC 2008

The USFWS list of Birds of Conservation Concern includes the Sprague's pipit which is a federal candidate species. This species is discussed below in the Section 4.10; however, this species was not detected during surveys. All of the Birds of Conservation Concern species observed during surveys are also State Species of Conservation Priority (see Tables 8 and 9).

State Species of Conservation Priority

The NDGFD has identified 100 species of conservation priority, or those in greatest need of conservation in the state (NDGFD 2008). These species are categorized into three levels according to the need for conservation:

- Level I - Species in greatest need of conservation
- Level II - Species in need of conservation, but have had support from other wildlife programs
- Level III - Species in moderate need of conservation, but are believed to be on the edge of their range in North Dakota

Table 9 shows Level I species that have been documented in the Missouri Slope Region including Stark and Morton Counties.

Table 9. Species of Conservation Priority Level I in the Missouri Slope Region

Common Name	Scientific Name	Habitat Type	Habitat Details
Swainson's Hawk	*Buteo swainsoni*	Native Prairie/ Grassland/Forests	Require native prairie or cropland that includes thickets of natural tree growth, brush margins of native forested tracts or shelterbelts.
Ferruginous Hawk	*Buteo regalis*	Native Prairie	Confined to very limited areas of native prairie, usually those with hilly terrain or with low-grade topsoil that has not been altered by the plow or lower quality from overgrazing.
Upland Sandpiper	*Bartramia longicauda*	Native Prairie/ Grassland	Inhabit mixed-grass prairie, local extensive tracts of wet meadow, grazed tall-grass prairie, tame haylands, CRP fields, and mowed or burned railroad or highway rights-of-way.
Long-billed Curlew	*Numerius americanus*	Native Prairie/ Grassland	Inhabit dry, native grasslands.
Wilson's Phalarope	*Phalaropus tricolor*	Wetland	Found in swales along ephemeral streams and various types of ponds and lakes that contain expanses of shallow water that are interspersed with, or adjacent to, wet-meadow vegetation.
Sprague's Pipit	*Anthus spragueii*	Native Prairie	Prefer native medium to intermediate height prairie. In short grass prairie landscape, can often be found in areas with taller grasses. More abundant in native prairie than in exotic vegetation. Requires relatively large areas of appropriate habitat.
Grasshopper Sparrow	*Ammodramus savannarum*	Native Prairie	Prefer open prairies with intermittent brush, avoids heavy brush cover.
Baird's Sparrow	*Ammodramus bairdii*	Native Prairie /Grassland	Inhabit native prairie; structure may be more important than plant species composition. Nesting may take place in tame grasses (found in Crested Wheat, while avoids Smooth Brome). Areas with little to no grazing activity are required.
Lark Bunting	*Calamospiza melanocorys*	Native Prairie/ Grassland	Found in short-grass & mixed-grass communities as well as fallow fields, roadsides, and hayfields.
Chestnut-collared Longspur	*Calcarius ornatus*	Native Prairie/ Grassland	Located in tracts of heavily grazed or hayed mixed-grass prairie or mixed-grass/short-grass prairie.
Plains Spadefoot	*Spea bombifrons*	Native Prairie/ Grassland/Cropland	Found in the dry prairies, sagebrush communities, and farm fields.
Western Hognose Snake	*Heterodon nasicus*	Native Prairie	Prefer sandy or gravelly habitats like sand prairies, very open portions of prairies, or sand dunes with very little cover.
Black-tailed Prairie Dog	*Cynomys ludovicianus*	Native Prairie/ Grassland	Require short-grass prairie habitats. They avoid heavy brush and tall grass areas due to the reduced visibility these habitats impose.

North Dakota's list of Species of Conservation Priority includes five species that are also listed as federally threatened or endangered: the interior least tern, piping plover, pallid sturgeon, whooping crane and gray wolf. These species are discussed below in Section 4.10.

In a letter dated September 19, 2013 (see Appendix B), the NDGFD did not list particular species of concern that may be found in the Project Area; rather, the agency noted that disturbance of native prairie and wetlands are of primary concern with regard to wind energy development.

In WEST's Wildlife Surveys Report (see Appendix C), 16 North Dakota Species of Conservation Priority were observed in or near the Project Area. These included 6 Level I species and 10 Level II species (Table 10).

Table 10. Species of Conservation Priority Observed During 2013 Wildlife Surveys

Common Name	Scientific Name	Conservation Priority Level
sharp-tailed grouse	*Tympanuchus phasianellus*	2
northern harrier	*Circus cyaneus*	2
Swainson's hawk	*Buteo swainsoni*	1
bobolink	*Dolichonyx oryzivorus*	2
upland sandpiper	*Bartramia longicauda*	1
willet	*Catoptrophorus semipalmatus*	1
burrowing owl	*Athene cunicularia*	2
lark bunting	*Calamospiza melanocorys*	1
northern pintail	*Anas acuta*	2
grasshopper sparrow	*Ammodramus savannarum*	1
marbled godwit	*Limosa fedoa*	1
loggerhead shrike	*Lanius ludovicianus*	2
bald eagle	*Haliaeetus leucocephalus*	2
redhead	*Aythya americana*	2
prairie falcon	*Falco mexicanus*	2
red-headed woodpecker	*Melanerpes erythrocephalus*	2

WEST identified three Swainson's hawk nests during surveys in spring 2013. One is located within the Project Area, and the other two are 0.5 and 1 mile from the Project Area (see Appendix C).

4.9.3 Potential Impacts

Direct Impacts

Direct permanent effects include mortality or injury due to collisions with turbines, guy wires, or transmission lines and mortality of ground and shrub nesting birds and possibly nests by construction vehicles and ground clearing activities. The reconductoring of the Mandan-Ward transmission line for the Project will not increase potential impact to wildlife species discussed in this EA, as these transmission lines are already present and reconductoring would not significantly alter their design.

Direct temporary effects to birds may include temporary displacement from the construction area due to construction noise and activity. Construction noise and activity may result in a reduction in nesting activity in the immediate vicinity, and construction could result in the temporary loss of nests of ground-nesting species.

Raptors

Eighteen raptor nests representing five species were documented during 2013 surveys, of which 5 were bald eagle nests. Four raptor nests were located in the Project Area, although none were eagle nests. Two observations of bald eagles flying through the area confirm the potential utilization of the area by bald eagles; however, the probability of mortality with Project facilities is low. Mean raptor use in the Project area in spring and summer is 0.53 and 0.35 raptors/plot/20-min survey, respectively (WEST 2013). When compared to other wind energy facilities, the mean annual raptor use ranged from 0.06 raptors/20-min survey to 2.34 raptor s/20-min survey. Based on the results from these facilities, a ranking of mean annual raptor use was developed as: low (0 – 0.5 raptors/plot/20-min survey); low to moderate (0.5 – 1.0); moderate (1.0 – 2.0); high (2.0 – 3.0); and very high (over 3.0; Strickland et al. 2011). Using this ranking, mean raptor use in the Project Area is considered to be low to moderate with the most abundant raptors at the project being northern harrier, Swainson's hawk, and red-tailed hawk.

Waterbirds and Waterfowl

Water birds primarily use the Project Area during migration between their southern wintering grounds and northern summer habitat, and are not resident year-round. Nine waterbird and waterfowl species were observed during surveys in the spring and summer of 2013: sandhill crane, blue-winged teal, Canada goose, gadwall, mallard, northern pintail, northern shoveler, redhead, and tundra swan. Of these species, sandhill crane and Canada goose had observed flights of individuals initially observed at the rotor swept height. However, empirical evidence suggests that waterfowl and waterbird mortality is not proportional to pre-construction mean use by these species (Erickson et al 2004, Anderson et al. 2005, Jain et al. 2007). Based on the available evidence, waterfowl and waterbirds do not seem vulnerable to direct impacts.

Passerines

Passerines (songbirds) were the most abundant bird type observed during surveys. Migrant passerines are found more often in post-construction mortality monitoring compared to other groups of birds (Arnett et al. 2007, Strickland and Morrison 2008, Strickland et al. 2011). Although nocturnal migrants comprise the majority of songbird fatalities, the proportion of migrating songbirds killed at any given wind project during migration is reported to be low (Strickland et al. 2011). Locally breeding songbirds may experience lower mortality rates than migrants because many of these species tend not to fly at turbine heights during the breeding season, except some species with aerial flight displays in the rotor swept area (Pickwell 1931, Johnson and Erickson 2011).

During the avian surveys, 4,875 small birds were observed. The Lapland longspur was observed 1,530 times, and the horned lark and red-winged blackbird were both observed over 600 times. Lapland longspur is found in large flocks, hence the large numbers seen during

surveys. Although fatalities of horned lark and red-winged blackbird have been documented at other wind energy facilities (Tetra Tech 2012), if fatalities occur at the Project, they are unlikely to have population-level impacts.

Grouse

During spring and summer avian point county surveys, 39 sharp-tailed grouse observations were recorded. During spring lek surveys, 13 confirmed and possible leks were observed in or near the Project Area, with as many as 30 birds at a single lek. Particular concern over the effects of development on grouse has been raised by agencies and non-governmental groups with respect to grouse species (USFWS 2012). Studies of grouse and development have suggested that some species of grouse respond to transmission lines, improved roads, buildings, oil and gas wells, and communication towers by avoiding these facilities (Pitman et al. 2005, Pruett et al. 2009, Johnson et al. 2012). However, other studies have found no evidence of an avoidance response to transmission lines or wind facilities (Johnson et al. 2012, Sandercock et al. 2013). Although some studies have concluded that avoidance of development is a response to the height of the structure or that the structure might provide a perch for hunting raptors, Walters et al. (2014) found that, in most published studies, the effect of the height of a structure could not be conclusively isolated from the other effects of energy development. Further, Walters et al. (2014) found no evidence to support or reject the hypothesis that grouse avoid tall structures due to increased predation risk. Thus, while some evidence exists that grouse avoid development, the mechanism responsible for the observed patterns remains unclear (Walters et al. 2014). Based on surveys, grouse are present in the Project Area. Sunflower will negotiate an appropriate buffer distance from grouse leks with agencies with jurisdiction, and will restrict construction activities during grouse breeding season to the extent practicable.

Bats

Overall, there is a low likelihood of occurrence for bat species for the entire Project Area. Should bats occur in the Project Area, the potential for direct impacts (e.g., mortality resulting from turbine collisions or barotraumas) will be minimized by turbine siting away from areas of potential bat activity such as wetlands. Based on the available data, it is expected that bat fatalities at the Project, while likely low overall, will be highest during late summer and early fall at potential turbine locations.

Birds of Conservation Concern

Nine Birds of Conservation Concern were observed during surveys. Impacts to Birds of Conservation Concern would be avoided or minimized through the implementation of measures identified in the Draft UGP Wind Energy PEIS as listed below.

Species of Conservation Priority

Sixteen North Dakota Species of Conservation Priority were observed during wildlife surveys, and an additional seven are known to occur in Stark and Morton counties. None of the five Species of Conservation Priority that are also ESA-listed have been documented to occur in the

Project Area. Impacts to Species of Conservation Priority would be avoided or minimized through the implementation of measures identified in the Draft UGP Wind Energy PEIS as listed below.

Other Wildlife

Mobile species such as deer, antelope or other mammals would be expected to avoid the Project construction areas. Direct impacts to non-avian wildlife species would generally be limited to direct mortality to small mammals, amphibians and non-mobile species resulting from construction of the Project access roads, turbine pads, and the substation and interconnection switchyard. Such impacts would not be significant given that the habitats to be disturbed and their resident species are not rare or unique.

Indirect Impacts

The presence of wind turbines may alter the landscape so that wildlife use patterns are affected, displacing wildlife away from the Project facilities and suitable habitat. In addition to direct effects through collision mortality, wind energy development results in indirect effects such as direct loss of habitat where infrastructure is placed and indirect loss of habitat through behavioral avoidance and perhaps habitat fragmentation.

Indirect permanent effects including displacement may occur as a result of alterations to the landscape or food availability. Construction also reduces habitat effectiveness because of the presence of access roads and gravel pads surrounding turbines (WEST 2010b, 2011). The greatest concern with displacement effects for wind energy facilities in the United States has been where these facilities have been constructed in grassland or other native habitats (Leddy et al. 1999; Mabey and Paul 2007). Three studies on grassland bird species have shown reduced use of habitat near wind turbines (WEST 2010b). A study of a wind energy facility in Minnesota showed the area of reduced use extended about 100 meters from the turbines, while studies of wind energy facilities in Oregon and Washington showed the area of reduced-use extended approximately 50 meters from the turbines. Based on these studies, there could be a reduction in habitat use by grassland species at the Project site, and this area could extend from approximately 50 to 100 meters from the turbines. Effects to feeding, resting, migrating birds, and breeding birds have been documented at wind energy facilities around the United States (WEST 2010b, 2011; Erickson et al. 2004). It is not known whether birds habituate to wind energy facilities over time, but research on this topic is ongoing.

Indirect impacts to non-avian wildlife would include displacement and loss of habitat for mobile species such as deer or antelope. These effects would not be significant given that displacement in response to construction would be short-term, and the habitat to be lost is common throughout the area.

Avoidance, Minimization and Best Management Practices

Sunflower will implement measures during construction, operations and decommissioning to avoid or minimize impacts to wildlife as identified in the Draft UGP Wind Energy PEIS Section 5.6.2, as follows:

Measures applicable to Project planning and design:

- Follow the recommendations provided in the U.S. Fish and Wildlife Service Land-Based Wind Energy Guideline (USFWS 2012b) and, as appropriate, the Eagle Conservation Plan Guidance Module 1 – Land-based Wind Energy Version 2 (USFWS 2013e). In addition, follow guidelines or recommendations developed by individual States (e.g., IDNR 2011; Kempema 2009; Nebraska Wind and Wildlife Working Group 2011) to address potential effects of wind energy development on ecological resources.
- Prepare a Bird and Bat Conservation Strategy. The overall goal of such a plan is to reduce or eliminate avian and bat mortality. The wind energy facility developer should work closely with the Service and the appropriate State wildlife agencies to identify protective measures to include in the plan. These would include project design measures, construction phase measures, operational phase measures, and decommissioning phase measures. Post-construction monitoring may be needed to validate the preconstruction risk assessment and allow the facility operators to implement adjustments based on identified problems. Results of monitoring activities shall be reported to the appropriate State or Federal agency in a timely manner. If bat monitoring is appropriate for the site, installation of bat acoustic monitors should be considered at the time meteorological towers are installed to reduce costs and minimize delays by collecting data early in the site review process.
- Review existing information on species and habitats in the project area. Identify important, sensitive, or unique habitat (including large contiguous tracts of grassland cover/habitat) and biota in the project vicinity and site, and design the project to avoid, minimize, or mitigate potential impacts on these resources. Avoidance is the preferred choice for minimizing impacts. The design and siting of the facility should follow appropriate guidance and requirements from the Service, State permitting agencies, and other resource agencies, as available and applicable. In addition, attention should be paid to project placement that may be within or near Important Bird Areas or Important Migratory Shorebird Stopover Sites, or where bird species of conservation concern are known to occur.
- Contact appropriate Federal and State agencies (including State entities responsible for permitting energy development projects) early in the planning process to identify potentially sensitive ecological resources known to be present or likely to be present in the vicinity of the wind energy development.
- If appropriate, conduct surveys for presence of Federal- and State-protected species and other species of concern and the habitats for such species that have a reasonable potential to occur within the project area based on habitat characteristics. Consult with the Service and/or appropriate State agency to identify species likely to be present and appropriate survey techniques, determine permit needs, and identify/apply species-specific avoidance and minimization measures.
- Evaluate potential avian and bat use (including the locations of active nest sites, colonies, roosts, and migration corridors) of the project and use data to plan turbine (and other structure/infrastructure) locations to minimize impacts.

- The transmission lines should be designed and constructed with regard to the recommendations in Avian Protection Plan Guidelines (APLIC and Service 2005), in conjunction with Suggested Practices for Avian Protection on Power Lines (APLIC 2006) and Reducing Avian Collisions with Power Lines (APLIC 2012), to reduce the operational and avian risks that result from avian interactions with electric utility facilities. For example, transmission line support structures and other facility structures should be designed to reduce the likelihood of electrocution with proper spacing of components and by the use of line marking devices, where warranted and appropriate, to reduce the likelihood of collision.
- Evaluate the potential for the wind energy project to adversely affect bald and golden eagles in a manner consistent with the Service's Eagle Conservation Plan Guidance (Service 2013e). Early in the planning of transmission interconnection and wind farm location, coordination with Service's North Dakota Field Office with respect to the guidance will continue. Data regarding documented occurrence of eagles has been acquired from the local U.S. Fish and Wildlife Ecological Services office, State wildlife agencies, or State natural heritage databases. In accordance with the Service's Land-Based Wind Energy Guidelines (Service 2012b), surveys during early project development should identify all important eagle use areas (nesting, foraging, and winter roost areas) within the project's footprint. Consistent with Tier 3 of the Service's Land-Based Wind Energy Guidelines, no active eagle nests were located during the 2013 surveys within a10-mi (16-km) radius of a project footprint. Under the Service's Eagle Conservation Plan Guidance, the site categorization for this project based on mortality risk to eagles is a likely Category 3, in that it is a minimal risk to eagles. If eagle use areas occur within a 10-mi (16-km) radius of a project footprint, Sunflower Wind will consult with the North Dakota Field Office about the development of an Eagle Conservation Plan (ECP).
- Use existing roads to the maximum extent feasible to access a proposed project area. Install meteorological towers and conduct other characterization activities (e.g., geotechnical testing) as close as practicable to existing access roads.
- Minimize the area disturbed during the installation of meteorological towers (i.e., the footprint needed for meteorological towers and associated laydown areas).
- Do not locate individual meteorological towers in or adjacent to sensitive habitats or in areas where ecological resources known to be sensitive to human activities are present.
- Schedule the installation of meteorological towers and other characterization activities to avoid disruption of wildlife reproductive activities or other important behaviors (e.g., do not install towers during periods of sage-grouse nesting).
- Avoid or minimize the use of guy wires on meteorological towers. Equip any needed guy wires with line marking devices.

Measures applicable during construction:

- Consult with the appropriate natural resource agencies to avoid scheduling construction activities during important periods for wildlife courtship, breeding, nesting, lambing, or calving that are applicable to sensitive species within the project area.

- Instruct employees, contractors, and site visitors to avoid harassment and disturbance of wildlife, especially during reproductive (e.g., courtship and nesting) seasons. Pets should not be allowed on the project area.
- Establish buffer zones around known raptor nests, bat roosts, and biota and habitats of concern if site evaluations show that proposed construction activities would pose a significant risk to avian or bat species of concern.
- If needed during construction, only use explosives within specified times and at specified distances from sensitive wildlife or surface waters as established by the appropriate Federal and State agencies.
- Minimize the use of guy wires on permanent meteorological towers. If guy wires are necessary, they should be equipped with line marking devices.
- Place marking devices on any newly constructed or upgraded transmission lines, where appropriate, within suitable habitats for sensitive bird species.

Measures applicable during operations phase:

- Turn off unnecessary lighting at night to limit attraction of migratory birds. Follow lighting guidelines, where applicable, from the Wind Energy Guidelines Handbook (page 50, items 10 and 11, in Service 2012b). This includes using lights with timed shutoff, downward-directed lighting to minimize horizontal or skyward illumination, and avoidance of steady-burning, high-intensity lights.
- Increasing turbine cut-in speeds (i.e., prevent turbine rotation at lower wind velocity) in areas of bat conservation concern during times when active bats may be at particular risk from turbines (Arnett et al. 2011).[4]
- Instruct employees, contractors, and site visitors to avoid harassment and disturbance of wildlife, especially during reproductive (e.g., courtship and nesting) seasons. Pets should not be allowed on the project area.
- In the absence of long-term mortality studies, monitor regularly for potential wildlife problems including wildlife mortality. Report observations of potential wildlife problems, including wildlife mortality, to the appropriate State or Federal agency in a timely manner, and work with the agencies to utilize this information to avoid/minimize/offset impacts. The Ecological Services Division of the Service shall be contacted. Development of additional mitigation measures may be necessary.

Measures applicable during decommissioning:

- All turbines and ancillary structures should be removed from the site.

Additional site-specific measures to further reduce impacts to wildlife may be identified and implemented as appropriate; however, impacts to wildlife are not expected to be significant.

[4] The bat survey report from WEST (see Appendix C) notes that, “Bat activity recorded at the SWP by ground detectors at met towers during the [fall migration period] was the lowest activity when compared to all publicly-available reports from facilities in Midwest and the third lowest when compared to all facilities in North America with similarly-collected activity data (Appendix A), potentially indicating low direct impacts to bats.” Based on the WEST analysis, it is not expected that turbine cut-in speeds would be warranted for Sunflower.

4.10 Threatened, Endangered, Proposed, and Candidate Species

The ESA, as administered by the USFWS, mandates protection of species federally listed as threatened or endangered and their associated habitats. The ESA makes it unlawful to "take" a listed species without special exemption. Take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or attempt to engage in any such conduct." Significant modification or degradation of listed species' habitats is considered "harm" under ESA regulations and projects that have such potential will require consultation with USFWS. Candidate species receive no statutory protection from the USFWS; however, they do receive full protection once listed. In addition, federal action agencies may elect to treat candidate and proposed species as listed.

Protected species (a collective term for ESA-listed threatened, endangered, proposed and candidate species) are discussed in the Draft UGP Wind Energy PEIS and the associated Programmatic Biological Assessment. However, because these documents had not been finalized at the time of this EA, consultation pursuant to Section 7 of the ESA is required. Sunflower has consulted with the USFWS service as required by the ESA, and a Biological Assessment is provided in Appendix E. Sunflower has requested an informal conference for two proposed species and one candidate species although they do not meet the threshold pursuant to Section 7 of the ESA. These species are the northern long-eared bat (*Myotis septentrionalis*), rufa red knot (*Calidris canutus rufa*), and Sprague's pipit (*Anthus spragueii*), which are discussed in the following section. On August 11, 2014, Western submitted a request for concurrence with the determination for the Biological Assessment on the Sunflower Wind Project to the USFWS and a concurrence letter from the USFWS is expected in September, 2014 and the final date will be noted in the FONSI.

4.10.1 Existing Conditions

The USFWS provides federally threatened, endangered, and candidate species data at the county level for public use. According to the USFWS, Stark County has three endangered species, two proposed species and one candidate species, and Morton County has five endangered species, one threatened species, two proposed species and one candidate species (see Table 11; USFWS 2010). There are no protected plant species known to occur in the Stark or Morton counties.

Table 11. Federally Listed and Candidate Species in Stark and Morton Counties

Common Name	Latin Name	County	Habitat	Status
Black-footed Ferret	*Mustela nigripes*	Morton, Stark	Prairie dog complexes	Endangered
Gray Wolf	*Canis lupus*	Morton, Stark	Frequently observed in Turtle Mountains	Endangered
Interior Least Tern	*Sternula antillarum*	Morton	Missouri River and Yellowstone sandbars; beaches;	Endangered
Piping Plover**	*Charadrius melodus*	Morton	Missouri River sandbars, alkali beaches	Threatened
Pallid Sturgeon	*Scaphirhynchus albus*	Morton	Bottom dwelling, Missouri and Yellowstone Rivers	Endangered
Whooping Crane	*Grus Americana*	Morton, Stark	Palustrine wetlands and cropland ponds	Endangered
Sprague's pipit	*Anthus spragueii*	Morton, Stark	Native prairie	Candidate
Northern Long-eared Bat	Myotis septentrionalis	Unknown***	Caves, mines and deciduous forests	Proposed
Rufa red knot	*Calidris canutus rufa*	Unknown***	Coastal areas and wetlands	Proposed

Source: USFWS 2010

** Designated Critical Habitat for piping plover is located on the following water bodies: Lake Audubon, Lake Sakakawea, and the Missouri River. All of these water bodies are located north and east of the Project Area.

*** Species has not been defined at a county level in North Dakota.

Black-footed ferret

Historically, black-footed ferrets occupied much of the Great Plains region of North America, collocating with prairie dog (*Cynomys* sp.) colonies and complexes. Black-footed ferrets depend on prairie dog complexes for food and habitat. Prairie dogs and black footed ferrets prefer level topography in grasslands, steppe, and shrub steppe. Plowed lands, forests, wetlands, and water are avoided (USFWS 1988). There are no records of recent black-footed ferret occurrences in North Dakota but there is potential for reintroduction (USFWS 2008b, cited in HDR 2011, included in Appendix D).

No black-footed ferrets were observed during WEST's wildlife surveys of the Project Area (see Appendix C). In addition WEST did not report prairie dog colonies in the Project Area; therefore, no suitable habitat is available for black-footed ferrets due to no prairie dog colonies in the area.

Whooping Crane

The whooping crane is protected by both state and federal laws in the United States. It was listed as endangered in the United States in 1970 under the Endangered Species Preservation Act of 1966 (16 USC Section 668aa(c)) and then under the ESA in 1973. Critical habitat was designated in 1978. Under the North Dakota Comprehensive Wildlife Conservation Strategy Guide (NDGFD, 2005), the whooping crane is a Level III Species of Conservation Priority, defined as "North Dakota's species having a moderate level of conservation priority but are believed to be peripheral or non-breeding in North Dakota" (NDGFD, 2005)

One self-sustaining wild population of whooping cranes currently exists in the world. Members of this population breed primarily within the boundaries of Wood Buffalo National Park in

Canada and migrate through the central United States en route to the wintering grounds at Aransas National Wildlife Refuge along the Gulf Coast of Texas. This flock is referred to as the Aransas-Wood Buffalo National Park Population. Due to intensive management, this population has increased from 15 birds in 1941 to 263 as of the start of spring migration in 2010 (WCCA 2010). The migration route is well defined and 95 percent of all observations occur within a 200-mile wide corridor during spring and fall migration (CWS and USFWS 2007). The USFWS subdivides this corridor into 5 percent increments starting at 75 percent. The Project Area is within the area encompassing 85 to 90 percent of confirmed whooping crane sightings, and is approximately 71 mi (114.2 km) west of the migration corridor centerline.

Sunflower contracted WEST to complete an analysis of potential whooping crane habitat in the Project Area (see Whooping Crane Habitat Review report in Appendix C). The habitat review and analysis evaluated whether the proposed Project Area represented high, average or low potential whooping crane habitat as compared to nearby alternate locations of the same dimensions located a few miles to the north, south, east and west. The potential whooping crane habitat analysis included a comparison of land cover from the National Land Cover Database, National Wetland Inventory, and 2012 NAIP aerial imagery within the proposed Project Area and the four alternate areas.

WEST also used the methodology of a study developed by The Watershed Institute (Watershed Institute 2012) where habitat in Kansas was assessed based on its potential suitability to quantify and compare whooping crane habitat within the study areas. This assessment first screens all wetlands within the study areas for minimum size, visual obstructions, and disturbances. Those wetlands left are then quantified by their size, density of wetlands around them, distance to food, whether they are natural or manmade, and their water regime as a means to quantify suitability. The Watershed Institute determined that a score of 12 or higher represented suitable whooping crane habitat.

Wetlands in the Project Area were rated with scores from four to 13 with a mean suitability score of 8.5; mean suitability scores and ranges for the other four reference areas were similar. The mean score and most of the individual wetland scores are much lower than the reference score determined to be suitable potential habitat in Kansas (a score of 12 or more).

No whooping cranes were observed during spring and summer avian use surveys (see Appendix C). Nevertheless, whooping cranes may migrate over the Project Area and there is potential for roosting or foraging use, however based on the findings of the WEST assessment, the Project Area does not provide significant potential habitat nor does it provide unique habitat compared to adjacent areas. Although the Project Area is within the defined migration corridor, no whooping cranes have been documented within the Project Area. The closest confirmed sighting in 2010 is approximately 15 miles northwest of the Project Area.

In addition, a study was presented at the 2012 National Wind Coordinating Collaborative meeting describing avoidance behavior of whooping and sandhill cranes at a wind farm in South Dakota (Nagy et al. 2012). Sandhill cranes altered flight trajectory away from turbines when flying within the height of the rotor-swept area more often than when flying above the rotor-

swept area. It is likely that whooping cranes will respond similarly and move around wind turbines.

In 2007 the USFWS and the Canadian Wildlife Service released the International Recovery Plan (Third Revision; CWS and USFWS 2007) for the whooping crane. That plan includes recovery strategies and actions to be implemented to improve the likelihood of whooping crane population recovery. The strategies and actions described in the International Recovery Plan are echoed in the avoidance and minimization measures and BMPs identified in the Draft UGP Wind Energy PEIS, as listed below.

In a letter dated September 19, 2013, the NDGFD provided comments to Sunflower regarding the Project (see Appendix B); whooping cranes were not specifically addressed in that letter. The primary concerns expressed included limiting impacts within native prairie to the extent possible; avoiding wetlands and alternations to surface drainage patterns; and placing electrical collection lines underground where possible, and applying appropriate APLIC design standards for any necessary above-ground segments.

The USFWS provided comments on the Project in a letter dated December 20, 2013, in response to scoping (see Appendix B). The letter notes the presence of potentially suitable roosting and feeding habitat for whooping cranes in the Project Area, and recommends mapping wetlands within one mile of all turbines, and analyzing the potential effects to migrating whooping cranes from loss of use of habitat in the Project Area for migration stopovers. The USFWS recommended that "if a whooping crane is sighted within one mile of the project while it is under construction, that all work cease within one mile of that part of the project and the [USFWS] be contacted immediately. In coordination with the [USFWS], work may resume after the bird(s) leave the area," The USFWS further recommended the installation of visual marking devices on existing transmission lines within one mile of potentially suitable whooping crane habitat. The USFWS letter includes general recommendation to avoid or minimize impacts to existing high value habitat types, including native prairie, woodlands, wooded draws and riparian forests be avoided whenever possible. It also recommends minimizing impacts to wildlife and habitat by reseeding disturbed native prairie; minimizing grassland disturbance by using fewer, larger turbines and fewer access roads; using self-standing towers (no guy wires); avoiding wetland fill; replacing unavoidable wetland impacts with functionally equivalent wetlands; and utilizing appropriate erosion control measures to prevent water quality degradation. Sunflower is developing a bird and bat conservation plan for the Sunflower Wind Project that will utilize recommendations from the USFWS and other agencies to minimize impacts to the degree possible based on the best available science for the species of concern that may occur in the vicinity of the Project.

Pallid Sturgeon

The pallid sturgeon historically occupied the Mississippi and Missouri rivers and their major tributaries (USFWS 1990a). The reason for decline of the sturgeon has been water control and development projects on the Mississippi and Missouri rivers. The sturgeon still occupies

portions of the main stem of the Missouri River. There is no pallid sturgeon habitat in the Project Area.

Interior Least Tern

The interior population of the least tern was listed as an endangered species in 1985 (USFWS 1985a). In North Dakota, the interior least tern is primarily found on sandbars on the Missouri River between the Garrison Dam and Lake Oahe, in the reservoirs, and on the Missouri and Yellowstone Rivers upstream of Lake Sakakawea (USFWS North Dakota Ecological Field Services Office 2008). This tern nests on barren sandbars on the Missouri River and feeds on small fish in the river (USFWS 1990b). As of 2008, approximately 100 pairs were known to breed in North Dakota (USFWS 2008b). Critical habitat for the interior least tern has not been designated.

No interior least terns were observed during spring and summer avian use surveys (see WEST report in Appendix C). There is no suitable breeding or stopover habitat within or near the Project Area.

Piping Plover

The Great Plains population of the piping plover was listed as a threatened species in 1985 (USFWS 1985b). The piping plover breeding range stretches from south central Canada into the Midwest United States. The majority of piping plover breeding pairs found in the United States are concentrated in Montana, the Dakotas, and Nebraska. This population of piping plover winters in the Gulf of Mexico. The plover nests in 23 counties in North Dakota, primarily in alkali wetlands in the Missouri Coteau and on barren sandbars in the Missouri River and system reservoirs. Reasons for decline of the piping plover include habitat loss and nest depredation in the wetlands. The main reason for decline of the species along the Missouri River is habitat loss due to water development projects (e.g. Fort Peck Dam, Garrison Dam, and Oahe Dam) and loss of wetlands due to agriculture and other developments.

Critical habitat for the piping plover was designated on September 11, 2002 (USFWS 2002). There is no USFWS-designated critical habitat for the piping plover in the Project Area (50 CFR Part 17). The closest critical habitat is located along Lake Sakakawea approximately 45 miles north of the Project Area.

No piping plovers were observed during spring and summer avian use surveys (see WEST report in Appendix C). There is no suitable breeding or stopover habitat within or near the Project Area.

Gray Wolf

The gray wolf was listed as an endangered species in 1978 (USFWS 1978). In 2003, the USFWS downlisted the two northern subpopulations (western and eastern distinct population segments) to threatened (USFWS 2003). While additional decisions regarding the western populations of gray wolf have been made more recently, the eastern population remains listed as threatened. Once common throughout North Dakota, the last confirmed sighting in the state

was 1991, although there have been more recent but unconfirmed reports of sightings in the Turtle Mountains in the north-central portion of the state. The presence of wolves in most of North Dakota would likely remain sporadic and consist of occasional dispersing animals from Minnesota and Manitoba (USFWS 2008a).

There were no incidental observations of gray wolves during spring and summer avian use surveys (see WEST report in Appendix C).

Sprague's Pipit

The Sprague's pipit is closely tied with native prairie habitat and breeds in the north-central United States in Minnesota, Montana, North Dakota and South Dakota as well as south-central Canada (Jones 2010). The USFWS reviewed the conservation status of Sprague's pipit to determine whether the species warrants protection under the ESA. The status review found that listing Sprague's pipit as threatened or endangered is warranted, but that listing the species at this time is precluded by the need to complete other listing actions of a higher priority (Jones 2010). Currently the Sprague's pipit remains a candidate species for listing under the ESA and is also protected under the MBTA. Conversion of native prairie to agriculture and overgrazing in much of this species' range continue to cause declines on breeding and wintering grounds (Jones 2010).

No Sprague's pipits were observed during spring and summer avian use surveys (See Appendix C).

Northern Long-eared Bat

On October 2, 2013, the northern long-eared bat was proposed for federal listing as endangered under the ESA throughout its range (USFWS 2013a). The range of this species includes eastern and north central United States, including North Dakota. Habitat includes caves and mines for hibernating during the winter, called hibernacula, as well as underneath bark, in cavities or crevices of live and dead trees in the summer for roosting. This medium sized bat (approximately 3.0 – 3.7 inches) with a wing span of 9 -10 inches is distinguishable from other bats by its long ears (USFWS 2013b).

Threats to the northern long-eared bat include white nose syndrome, impacts to hibernacula and impacts to summer habitat. No hibernacula are known from North Dakota and no known mines, caves or other cave-like structures occur in the Project Area. In addition, there is very little potential summer habitat in the Project Area, therefore, habitat is limited for northern long-eared bats.

Rufa Red Knot

On September 27, 2013 the rufa red knot was proposed for federal listing as threatened under ESA (USFWS 2013c). Rufa red knot fly very long distances during migration (over 9,000 miles) in the spring and autumn. Their range predominately encompasses coastal areas from south of Tierra del Fuego to as far north as the central Canadian Arctic. Rufa red knot have been documented in most states during migration, including North Dakota. This species depends on suitable habitat, food and weather conditions along its migration route. Rufa red knot feed

predominately on clams, mussels, snails and other invertebrates, consuming even their shells. However, stop over habitats, including wetlands, require the presence of easily-digestible food such as juvenile clams and mussels and horseshoe crab eggs (UFWS 2013d).

4.10.2 Potential Impacts

A significant impact to endangered, threatened, proposed, and candidate species would occur if: 1) the Project resulted in the loss of individuals of a population leading to a jeopardy opinion from the USFWS; or 2) the Project resulted in the loss of individuals leading to the upgrade (e.g., change in listing from threatened to endangered) of the federal listing of the species.

Impacts to wildlife can be short-term (one or two reproductive seasons, generally during the construction period), or long-term (affecting several generations during the life of the Project). Impacts can also be direct (an immediate effect to an individual, population, or its habitat), or indirect (an effect that may occur over time or result from other actions).

The Project would have no impact on pallid sturgeon, as there is no habitat for this fish within the Project Area, and the Project would not impact water quality in the Missouri River or its major tributaries where the pallid sturgeon is known to occur. The Project is highly unlikely to have an impact on the gray wolf or black-footed ferret, due to their scarcity in the region and no recent records of occurrence near the Project Area. Similarly, the Project is unlikely to impact piping plover or interior least tern, as there have been no documented occurrences of either species in or near the Project Area. The Project is also unlikely to impact whooping cranes, as there have been no documented occurrences in or near the Project Area. Reconductoring of the Mandan-Ward transmission line is also unlikely to impact listed species, largely because the transmission lines are already present and reconductoring would not significantly alter their design.

Sunflower plans to largely implement the avoidance and minimization measures and Best Management Practices (BMPs), as of the writing of the project specific BA, listed in the Draft UGP Wind Energy Biological Assessment and Programmatic EIS (see BA Appendix A for draft table as provided by the USFWS in June 2014). It is understood that the final Programmatic EIS and BA may vary slightly from this draft. Many of the avoidance and minimization measures outlined in the Programmatic documents are not applicable to the proposed Project, or were addressed by Sunflower in siting the Project in the current location. For example, the whooping crane measure that describes not siting turbines, transmission lines, access roads, or other project facilities within 5 mi (8 km) of the Platte or Niobrara Rivers, or in some instances species are described in the Programmatic documents that simply do not occur in North Dakota (e.g., Eastern prairie fringed orchid) These specific measures are not discussed or identified further, but applicable measures as they pertain to the Project are included in the BA and in this EA, as follows:

Measures applicable to protection of Whooping Crane

Most of the Conservation Measures listed in the Programmatic BA and EIS relate to siting of a project away from known or occupied nesting habitat, of which none occurs near the Project Area. The applicable measures (in italics) and how they are incorporated for the Project are:

- *Conduct preconstruction evaluations and/or surveys to identify wetlands that provide potentially suitable stopover habitat and areas of occurrence within project boundaries*. A Whooping crane habitat evaluation was completed for the Project.
- *Do not site turbines, transmission lines, access roads, or other project facilities within 1 mi (1.6 km) of wetlands that provide suitable stopover habitat* or within 5 miles of the Platte or Niobrara Rivers in Nebraska. No turbines or other facilities will be built within 1 mile of a wetland that scored 12 or more according to the Watershed Institutes analysis methods and all turbines are greater than 5 miles from the Platte and Niobrara Rivers in Nebraska.
- *Place approved bird flight diverters on the top static wire on any new or upgraded overhead collector, distribution, and transmission lines within 1 mi (1.6 km) of suitable stopover habitat located.* The Proposed Project originally stated that 20 miles of transmission line would be upgraded. Only approximately 4.5 miles will be reconductored.
- *Establish a procedure for preventing whooping crane collisions with turbines during operations by establishing and implementing formal plans for monitoring the project site and surrounding area for whooping cranes during spring and fall migration periods throughout the operational life of the project (or as determined by the local USFWS field office) and shutting down turbines and/or construction activities within 2 mi (3.2 km) of whooping crane sightings*. *Monitoring can be done by existing on-site personnel trained in whooping crane identification. Specific requirements of the monitoring and shutdown plan will be determined during preconstruction evaluations. Sightings of whooping cranes in the vicinity of projects will be reported to the appropriate USFWS field office immediately*. Sunflower will incorporate life of project, or as determined by the local USFWS field office) whooping crane monitoring to be performed by site personnel and turbine curtailment if whooping cranes are within 2 mi (3.2 km) of turbines. Sightings of whooping cranes will be reported immediately to the USFWS.
- *Instruct workers in the identification and reporting of sandhill and whooping cranes, and to avoid disturbance of cranes present near project areas.* Site personnel will be trained in identification and reporting, as necessary, of sandhill and whooping cranes and avoidance procedures.
- *Within the portion of the whooping crane migration corridor that encompasses 95 percent of historic sightings, the acreage of wetlands that are potentially suitable migratory stopover habitat located within a 0.5 mi (0.8 km) radius of turbines maybe mitigated based upon site-specific evaluations.* No turbines or other facilities will be built within 1 mile of a wetland that scored 12 or more according to the Watershed Institutes analysis methods and therefore no mitigation is planned.

Measures applicable to protection of Interior Least Tern

Most of the Conservation Measures listed in the Programmatic BA and EIS relate to siting of a project away from known or occupied nesting habitat, of which none occurs near the Proposed Project. The applicable measures (in italics) and how they are incorporated for the Project are:

- *Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries. The pre-construction surveys and BA analysis include review of potential habitat and recording of any observations. No suitable habitat or areas of occurrence were found within the Proposed Project boundary.*
- *Meteorological towers shall not be located in sensitive habitats or in areas where resources known to be sensitive to human activities (e.g., wetlands, cultural resources, and listed species) are present. Installation of towers shall be scheduled to avoid disruption of wildlife reproductive activities or other important behaviors, and the disturbed area will be minimized.*
- *The use of guy wires on meteorological towers shall be avoided or minimized. Any needed guy wires shall have guys appropriately marked with bird flight diverters.*
- *Report all incidents of mortality or injury from wind facility construction and operation to the appropriate USFWS Ecological Services Field Office and State Wildlife offices. Sunflower will report any mortalities or injuries of least terns to appropriate agencies.*

Measures applicable to protection of Piping Plover

Most of the Conservation Measures listed in the Programmatic BA and EIS relate to siting of a project away from known or occupied nesting habitat, of which none occurs near the Proposed Project. The applicable measures (in italics) and how they are incorporated for the Project are:

- *Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries. The pre-construction surveys and BA analysis include review of potential habitat and recording of any observations. No suitable habitat or areas of occurrence were found within the Proposed Project boundary.*
- *Meteorological towers shall not be located in sensitive habitats or in areas where resources known to be sensitive to human activities (e.g., wetlands, cultural resources, and listed species) are present. Installation of towers shall be scheduled to avoid disruption of wildlife reproductive activities or other important behaviors, and the disturbed area will be minimized.*
- *The use of guy wires on meteorological towers shall be avoided or minimized. Any needed guy wires shall have guys appropriately marked with bird flight diverters.*

- *Mark new overhead power lines within 1 mi (1.6 km) of occupied piping plover habitat with bird flight diverters. No new overhead lines will be constructed for the Proposed Project.*
- *Report all incidents of mortality or injury from wind facility construction and operation to the appropriate USFWS Ecological Services Field Office and State Wildlife offices. Sunflower will report any mortalities or injuries of piping plovers to appropriate agencies.*

Measures applicable to protection of Sprague's Pipit

The conservation measures listed in the Programmatic BA and EIS relate to Sprague's pipit (in italics) and how they are incorporated for the Project are:

- *Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries*. A pre-construction evaluation of habitat (i.e., identification of grassland areas) has been done to help in siting turbines and minimizing impacts to large tracts of grasslands. Construction activities within grasslands greater than 160 ac will be limited outside of the April 15-August 1 time period. If construction is not limited to this time period, surveys will be done ahead of construction to determine occupancy of the action area within grasslands greater than 160 ac.
- *Avoid placement of meteorological towers, turbines, access roads, and transmission lines within 1,000 ft (304.8 m) of occupied native prairie tracts 70 ac (28.3 ha) or larger.* A pre-construction evaluation of habitat (i.e., identification of grassland areas) has been done to help in siting turbines and minimizing impacts to large tracts of grasslands
- *Design layouts to minimize further fragmentation of native prairie habitats that are suitable for Sprague's pipit.* A pre-construction evaluation of habitat (i.e., identification of grassland areas) has been done to help in siting turbines and minimizing impacts to large tracts of grasslands.
- *All new meteorological towers should be self-supporting and not guyed. If guy wires are unavoidable, they should be marked with the approved bird flight diverters.* All permanent met towers will either be self-supporting or marked with effective bird flight diverters.

In addition, the applicable BMPs to be implemented by Sunflower as they relate to Sprague's pipit are:

- Reseed (non-cropland) disturbed areas with a native seed mix and re-vegetate disturbed areas immediately following construction

Measures applicable to protection of the Northern Long-eared Bat

The conservation measures listed in the Programmatic BA and EIS relate to the northern long-eared bat (in italics) and how they are incorporated for the Project are:

- *Conduct preconstruction evaluations and/or surveys to identify suitable foraging, roosting, and commuting habitat within project boundaries and to identify the distance from project boundaries to hibernacula known/presumed used by northern long-eared bats. Disturbance of hibernacula is prohibited throughout the year.* Pre-construction evaluations determined that the proposed Project is 180 miles from the nearest known hibernacula in the Black Hills of South Dakota. Presence-absence surveys in summer 2014 confirmed absence of the species.
- *Avoid all suitable habitat (do not site turbines) in areas within 5 mi (8 km) of hibernacula used by northern long-eared bats or within 0.5 miles (0.8 km) of known or presumed occupied foraging, roosting, and commuting habitat. Habitat evaluations should be coordinated with the local USFWS Ecological Services office prior to or during turbine siting planning.* Pre-construction evaluations determined that the proposed Project is 180 miles from the nearest known hibernacula in the Black Hills of South Dakota. Presence-absence surveys in summer 2014 confirmed absence of the species.
- *Within portions of Nebraska, South Dakota, North Dakota, and Montana in the UGP region, northern long-eared bat collisions with wind turbine blades have not been documented. If preconstruction surveys indicate the absence of suitable habitat or species occurrence, companies need not implement cut-in speeds higher than those set by manufacturers during spring and fall migration periods.*
  Alternatively, if surveys indicate the presence of occupied habitat or species occurrence in the project area, turbine cut-in speeds should be increased to 22.6 ft/sec (6.9 m/sec) or greater from ½ hour before sunset to ½ hour after sunrise during spring and fall migration periods for NLEB (consult with the USFWS for the established migration dates in each state). Use of feathering below the cut-in speed of 22.6 ft/sec (6.9 m/sec) should also be implemented at night during the migration season to eliminate turbine rotation and avoid mortality of migrating NLEB. Increased cut-in speed and feathering can be suspended from ½ hour after sunrise to ½ hour before sunset.

  Presence-absence surveys in summer 2014 confirmed absence of the species. No cut-in speeds higher than those set by the turbine manufacturer are planned.
- *Immediately report observations of northern long-eared bat mortality to the appropriate USFWS office*. Sunflower will immediately report any observations of northern long-eared bat mortality to the USFWS.

In addition, the applicable BMPs to be implemented by Sunflower as they relate to northern long-eared bats are:

- Consider increasing cut-in speeds above the manufacturers set speed between ½ hour before sunset and ½ hour after sunrise to reduce mortality for all bat species. Consult with the appropriate USFWS Ecological Services Field Office on whether a conservation benefit can be attained.
- Restrict use of herbicides for vegetation management near known or assumed NLEB hibernacula to those specifically approved for use in karst (e.g., sinkholes) and water (e.g., streams, ponds, lakes, wetlands).

- Avoid clearing of suitable habitat (spring staging, fall swarming, summer roosting) within a 5-mile (8.0 km) radius of known or assumed NLEB hibernacula. Retain snags, dead/dying trees, and trees with exfoliating (loose) bark ≥3-inch diameter at breast height (dbh) in areas ≤ one mile from water.
- Conduct mortality monitoring in the project area during the spring and fall bird and bat migration seasons for a 3-year period after construction has been completed. Mortality monitoring will help to identify individual turbines that contribute to avian and bat mortality. This information could be used to provide design layout information for future wind development projects and to reduce the potential for future avian and bat mortality.

Measures applicable to protection of Rufa Red Knot

The conservation measures listed in the Programmatic BA and EIS relate to the rufa red knot (in italics) and how they are incorporated for the Project are:

- *Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.* Preconstruction review of potential habitat has been completed for the BA as well as during avian surveys, no potential suitable habitat was identified.

In addition, the applicable BMPs to be implemented by Sunflower as they relate to rufa red knot are:

- The use of guy wires on meteorological towers shall be avoided or minimized. Any needed guy wires shall have guys appropriately marked with approved bird flight diverters.

Measures applicable to protection of Gray Wolf

The conservation measures listed in the Programmatic BA and EIS relate to gray wolf (in italics) and how they are incorporated for the Project are:

- *Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.* No suitable habitat exists within the Project Area to sustain a wolf pack.

- *Do not site turbines, transmission lines, access roads, or other project facilities in habitats occupied by gray wolf.* No occupied wolf habitat is present within the Proposed Project.

Additional site-specific measures to further reduce impacts to protected species may be identified and implemented as appropriate; however, impacts to protected species are not expected to be significant.

4.11 Socioeconomics

Because of the way that socioeconomic data is collected and aggregated, the analysis area for socioeconomics is Morton and Stark counties.

4.11.1 Existing Conditions

The Project is located in Stark and Morton counties, North Dakota, a primarily rural agricultural area located south of U.S. Highway 94 and approximately 55 miles west of Bismarck, ND and 30 miles east of Dickinson, ND.

There are several small cities near the Project Area. The city of Hebron (2010 population 747) is located a few miles north of the Project Area; Richardton (2010 population 529) is located approximately 10 miles to the northwest of the Project; and Taylor (population 148, is located approximately 15 miles to the northwest. The city of Glen Ullin (2010 population 807) is located approximately 9 miles to the southeast. The largest city in the area is Dickinson (2010 population 17,787), located approximately 30 miles to the west of the Project. There is no indication of any new residential construction within the Project Area.

Stark County

In the 2010 US Census the population of Stark County was reported at 24,199, an increase of 6.90 percent from the 2000 Census count of 22,636. In the 2010 US Census the population of Morton County was reported at 27,471, an increase of 8.57 percent from the 2000 Census count of 25,303. The population of North Dakota according to the 2000 Census was 642,200, and grew by 4.73 percent to 672,591 in 2010 (U.S. Census Bureau 2010).

Stark County contains 1,338 square miles of land, with a density of just over 18 persons per square mile; the population density of the census block group in which the Project Area is located (Stark County Tract 9633, Block Group 2) is approximately 1.6 persons per square mile. Approximately 94 percent of the county population is composed of white persons who are not of Hispanic or Latino origin. The median age of Stark County residents is 38.3 years. Approximately 16 percent of the county population is 65 years or older while only 6 percent of the population is under five years of age (US Census Bureau 2010). There are a total of 10,638 housing units in Stark County, of which approximately 7.9 percent are vacant.

According to the 2010 Census, almost a quarter (22.1%) of the workforce in Stark County worked in education, health, and social services. Retail trade accounts for over 13 percent of the jobs in the county. Per capita income in 1999 was $27,347; median household income was $55,196. Approximately 7.4 percent of the population lived below the poverty level, compared to 14.3 percent nationwide.

Agriculture plays a significant role in the County's land use and economy. In 2007, there were 865 farms in Stark County, comprising approximately 98 percent (837,143 acres) of the land area. In 2007, there were 865 farms in Stark County, comprising approximately 98 percent (837,143 acres) of the land area. According to the 2007 Census of Agriculture (USDA 2007), total market value of agricultural products produced in Stark County was $96,812,000, 65

percent of which was from crops and 34 percent from livestock sales. The primary livestock is cattle and the principal crops include wheat and forage. Sunflowers, corn, and barley are also grown.

Tax revenues in Stark County fund a number of vital community services, including fire protection and law enforcement, emergency management, health and welfare services, and public schools. Tax revenues also fund agricultural extension services, weed management programs, and a roads maintenance department, along with other typical county government services.

Morton County

Morton County contains 1,936 square miles of land, with a density of just over 14 persons per square mile; the population density of the census block group in which the Project Area is located (Morton County Tract 205, Block Group 2) is approximately 2.6 persons per square mile. Approximately 95 percent of the county population is composed of white persons who are not of Hispanic or Latino origin. The median age of Stark County residents is 39.3 years. Approximately 15 percent of the county population is 65 years or older while only 7 percent of the population is under five years of age (US Census Bureau 2008). There are a total of 11,972 housing units in Morton County, of which approximately 8.8 percent are vacant.

According to the 2010 Census, a fifth (20.6%) of the workforce in Morton County worked in education, health, and social services, and another 12.7 percent in agriculture, forestry, fishing and hunting, and mining. Retail trade accounts for 10.2 percent of the jobs in the county. Per capita income in 1999 was $26,678; median household income was $54,269. Approximately 9.3 percent of the population lived below the poverty level, compared to 14.3 percent nationwide.

Agriculture plays a significant role in the County's land use and economy. In 2007, there were 836 farms in Morton County, comprising approximately 94 percent (1,165,098 acres) of the land area. According to the 2007 Census of Agriculture (USDA 2007), total market value of agricultural products produced in Morton County was $117,251,000, 52 percent of which was from crops and 48 percent from livestock sales.

Tax revenues in Morton County fund a number of vital community services, including fire protection and law enforcement, emergency management, health and welfare services, and public schools. Tax revenues also fund agricultural extension services, weed management programs, and a roads maintenance department, along with other typical county government services.

4.11.2 Potential Impacts

Significant direct socioeconomic impacts would occur if the Project resulted in the degradation or commitment of existing goods and services to an extent that would limit the sustainability of existing communities. Potential indirect socioeconomic impacts could result from changes to the appearance of the local landscape, the presence of the Project as a new land use, changes to the work force and tax base, or removal of land from active agricultural use.

Economic Impacts

The Project would have positive economic impacts for the local population, including lease and royalty payments for participating landowners, employment, and property and sales tax revenue. Landowner compensation will be established by individual lease agreements, but are anticipated to total over $800,000 annually. Annual property tax payments to local county governments for the Project are estimated at $500,000. This would ultimately have a positive effect on area schools, law enforcement and fire services, health services, and other civic services that rely on tax revenue. In general, agricultural areas surrounding each turbine can still be farmed. In addition, in an environment of uncertain and often declining agricultural prices and yields, the supplemental income provided to farmers from wind energy leases will provide stability to farm incomes and thus will help assure the continued viability of farming in the Project Area.

The Project would create 8 to 12 full-time permanent jobs and up to 300 peak construction jobs. To the extent that local contractors are used for portions of the construction, total wages and salaries paid to contractors and workers in Morton and Stark counties will contribute to the total personal income of the region. Additional personal income will be generated for residents in the county as well as the state by circulation and recirculation of dollars paid out by Sunflower Wind as business expenditures and state and local taxes. Expenditures made for equipment, energy, fuel, operating supplies and other products and services will benefit businesses in the county.

These anticipated impacts are consistent with the limited amount of published information on other projects. A 2009 case study evaluated the socioeconomic impacts of a wind energy facility constructed in 2007 and 2008 in Cavalier County, northeastern North Dakota (Leistritz and Coon 2009). The study authors felt that the Project Area was typical of Great Plains communities where many similar wind energy projects are being constructed. This study found that the 159-MW project resulted in a peak workforce of 269 workers during construction, 10 permanent jobs, and $1.4 million in ongoing annual expenditures to local businesses and households. This includes payments to landowners totaling $413,000 the first year, annual local property taxes to the County and school district, and direct payments for wages and materials in Cavalier County and adjacent counties. On a per-megawatt basis, the project's economic impacts were $8,900 in local expenditures per year; $2,600 per year in landowner payments; and $2,900 per year in property taxes.

Direct spending by Sunflower will have a multiplier effect as directly spent funds get distributed and re-distributed throughout the economy. The Leistritz and Coon study indicated that for every dollar of direct expenditures, nearly 3 dollars of indirect spending would occur.

At other wind farms, the public has expressed concerns over potential devaluation of property in and adjacent to proposed wind projects. A study published in October 2002, "Economic Impacts of Wind Power in Kittitas County, Final Report," conducted by Dr. Stephen Grover of ECONorthwest of Portland, OR, summarized survey results as follows:

> Views of wind turbines will not negatively impact property values. Based on a nationwide survey conducted of tax assessors in other areas with wind power projects, we found no

evidence supporting the claim that views of wind farms decrease property values (Grover 2002, p.2).

More recently, the Lawrence Berkeley National Laboratory conducted two multi-year studies on the impact of wind power projects on residential property values in the U.S. (Hoen et al 2009, 2013). Both studies included literature review, data collection for residential sales transactions at multiple study areas, visit to each home to measure turbine visibility and quality of scenic vista, use of multiple statistical models. The studies concluded that:

- There was no statistical evidence that homes sold after announcement or construction of wind facilities have reduced property values;
- There was no statistical difference in sales price between homes with a view of wind turbines and homes without such views; and
- There was no statistical difference in sales price between homes within one mile of wind turbines and homes outside of 5 miles or that had been sold prior to facility announcement.

Other Potential Impacts

It is likely that sufficient skilled labor is available in the general area to serve the basic infrastructure and site development needs of the Project. Specialized labor from outside the local area will be required for certain components of wind farm construction.

No effects on permanent housing are anticipated. During construction, out-of-town laborers will likely use lodging facilities in Bismarck or Dickinson. Available socioeconomic data indicates that adequate vacant housing would be available in those cities for the construction workforce. Operation and maintenance of the facility will employ from 10-12 maintenance staff; these are expected to largely be existing residents of the area

Local businesses such as motels, restaurants, bars, gas stations, and grocery stores would likely experience some increase in revenue resulting from new employment of the non-resident portion of Project construction crews. In particular, the consumption of goods, services, and temporary lodging in and near Bismarck, Hebron, Glen Ullin, Dickinson, Richardton, and surrounding cities could be expected to minimally increase due to the presence of these non-native workers. Other local area businesses that may benefit through increased sales would likely include ready-mix concrete and gravel suppliers, hardware and general merchandise stores, welding and machine shops, packaging and postal services, and heavy equipment repair and maintenance services.

This relatively small increase in demand for local goods and services would be minimal due to the small size of the non-local workforce and the short-term nature of the construction phase of the Project. For the same reasons, the effects to infrastructure such as schools, hospitals, housing, and utilities would also be minimal.

4.12 Environmental Justice

4.12.1 Existing Conditions

The goal of environmental justice is to ensure the fair treatment and meaningful involvement of all people with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of potentially adverse human health and environmental effects of a federal agency action, operation, or program. Meaningful involvement means that affected populations have the opportunity to participate in the decision process and their concerns are considered.

Executive Order (E.O.) 12898 was signed by President Clinton in 1994 and orders federal agencies to identify and address "disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States."

The analysis of potential environmental justice issues associated with the Project followed guidelines described in the CEQ's Environmental Justice Guidance under the National Environmental Policy Act (CEQ 1997). The analysis method has three parts: (1) the geographic distribution of low-income and minority populations in the affected area is described; (2) an assessment of whether the impacts of construction and operation of the Project would produce impacts that are high and adverse is conducted; and (3) if impacts are high and adverse, a determination is made as to whether these impacts would disproportionately impact low-income or minority populations.

The description of the geographic distribution of low-income and minority population groups was based on demographic data from the 2010 Census. According to the guidance (CEQ 1997), low-income populations in an affected area should be identified with poverty thresholds from the Census Bureau. The Block Groups in which the Project Area is located were chosen as the environmental justice analysis area, because most of the impacts (e.g., land use, noise, and visual) would be felt there, and because economic data is not available at the block level. The Analysis Area is located in Block Group 2 of Tract 205 in Morton County, and Block Group 2 of Tract 9633 in Stark County. The counties as a whole and the state of North Dakota were selected as comparison areas. The low income population percentages are based on household income as reported in the 2010 Census. The Analysis Area has a low-income household population of 8.66 percent, compared to 8.05 percent for Morton County, 11.54 percent for Stark County, and 12.71 percent for the state as a whole (see Table 12).

"Minority" is defined as individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. The CEQ guidance states that minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. For this analysis, the

number of white alone, not Hispanic individuals in the analysis area was subtracted from the total population for the minority population, since the Census also includes the Native Hawaiian and Pacific Islander, Other, and Two or more races categories. The minority population in 2010 in the Project Area was 3.90 percent, compared to 7.93 percent for Morton County, 6.85 percent for Stark County, and 12.23 percent in the state.

Table 12. Minority and Low-Income Populations, 2010 Census

Location	Total Population	Percent Minority	Percent of Households Below Poverty
Block Group 2, Tract 9633, Stark County	1,275	2.55%	7.84%
Block Group 2, Tract 205, Morton County	3,643	4.88%	9.28%
Stark County	24,199	6.85%	11.54%
Morton County	27,471	7.93%	8.05%
State of North Dakota	672,591	12.23%	12.71%

Source: U.S. Census Bureau, Census 2010, Summary File 1, Table P4 and Summary File 3, Table P87.

The analysis area does not contain either a concentrated minority population or a concentrated low-income population that would indicate an environmental justice concern. The percentage of minority persons in the analysis area is lower than in either Stark or Morton counties as a whole, and lower than the statewide percentage. Similarly, the percentage of low-income households in the analysis area is lower than the percentage in Stark County as a whole and lower than the statewide percentage, and not substantially higher (not greater than 30% higher) than the percentage in Morton County as a whole. Neither the minority nor the low-income household percentages exceed 50% in the analysis area, either of the counties, or the state as a whole.

4.12.2 Potential Impacts

With regard to EO 12898, an impact would be considered significant if a low-income or minority population was disproportionately affected by the Project.

There is no indication that any minority or low-income population is concentrated within or near the Project Area, or that any adverse impact would occur in an area occupied primarily by any minority group. The Project Area block groups do not have a significantly higher percentage of persons below the poverty level compared to the respective counties or the state, and have a lower minority population percentage than the respective counties and the state. The Project impacts do not appear to be high and adverse, and therefore no determination was made regarding whether the low-income and minority populations would be disproportionately affected by the Project. The Project will not have significant adverse environmental justice impacts.

4.13 Land Use/Farmland

4.13.1 Existing Conditions

The land within the Project Area is entirely in private ownership. The Project Area is in agricultural use including crops and livestock grazing, with scattered farmstead residences.

The Project Area is not located within any city limits or any military installation. There are no industrial developments in or near the Project Area, with the exception of Western's Dickinson-Mandan 230 kV transmission line and several communication towers. U.S. Interstate Highway 94 (I-94) runs east-west just north of the northern boundary of the Project Area. The roads within the Project Area include gravel surfaced county roads and two-track farm access roads and trails.

County Land Use Regulation

The Project is subject to land use regulation by Morton and Stark Counties; the Project Area is zoned for Agricultural use under both the Morton County and the Stark County zoning regulations.

Under the Morton County Zoning Regulations (MCZR; March 2013), the construction of a wind energy facility in the Agricultural District requires a Special Use Permit (MCZR Article 5, Section 4.27). The Morton County Zoning Regulations include specific provisions for wind turbines in Appendix I, Wind Energy Facilities, including defined setbacks as follows:

- Each wind turbine is to be set back a distance of at least 1.25 times its total height or 1,320 feet, whichever is greater, from occupied residences, commercial buildings or publicly used structures or facilities, or state and county parks.
- Each wind turbine is to be set back from public Interstate, state, county, or township roads and above-ground communication or electrical lines or railroad right-of-way a distance of not less than 250 feet from the centerline of the existing right-of-way.
- Each wind turbine is to be set back from the perimeter of the facility by a distance not less than one to one and one half (1 to 1 ½) times the rotor diameter; a variance may be granted if the owners/residents of adjoining properties sign a formal and binding agreement with the applicant, expressing support for a variance that may reduce the perimeter setback requirement.

In addition, buildings are to be set back a minimum of 60 feet from the right-of-way line of county roads and state or federal highways (MCZR Article 18).

MCZR Appendix I also includes provisions and requirements for siting of turbines to avoid or minimize impacts to environmental resources, requirements for restoration of temporary disturbance areas, and requirements for removal of facility infrastructure at the time of decommissioning. These requirements would be satisfied through the implementation of impact avoidance and minimization measures and BMPs as identified in the Draft UGP Wind Energy PEIS, as listed below.

Additional administrative permits would be needed for construction of the Project in Morton County, as follows:

- Building permits would be needed, and structures must comply with the North Dakota State Building Code and any future amendments or revisions to that code (MCZR Article 20).
- Construction within a mapped 100-year floodplain would require a floodplain development permit to be issued by the County Building Inspector (MCZR Article 12).
- A Stormwater Management Plan must also be approved by the County Engineer for any building permit or land disturbing activity (MCZR Article 21).

In Stark County, a wind energy facility may be approved through the issuance of a Wind Energy Facility Siting Permit (Stark County Zoning Ordinance [SCZO] Section 6.19.2). The permit would be issued by the Planning and Zoning Commission, following public hearings by both the Planning and Zoning Commission and the County Commissioners. The SCZO, Section 6.19 includes specific provisions for wind energy facilities, including defined setbacks as follows:

- Each wind turbine is to be set back not less than 2,000 feet from occupied dwellings, commercial buildings or publicly-used structures or facilities;
- Each wind turbine is to be set back not less than 200 feet from the centerline of public roads and above-ground communication and electrical lines;
- Each turbine is to be set back a distance of not less than 2.5 times the rotor diameter from the facility perimeter. A variance may be granted if the owners/residents of adjoining properties sign a formal and binding agreement with the applicant, expressing support for a variance that waives or reduces the perimeter setback requirement.
- Buildings must be set back a minimum of 125 feet from the centerline of county roads or from section lines (SCZO Sec 3.7).

Additional administrative permits would be needed for construction of the Project in Stark County.

- Building permits would be needed, and structures must comply with the North Dakota State Building Code, the International Building Code, the International Mechanical Code, and the State Uniform Plumbing Code, and any future amendments or revisions to those codes.
- Construction within a mapped 100-year floodplain would require a permit to be issued by the Code Administrator.

The Stark County Zoning Ordinance, Section 6.19 also includes provisions and requirements for siting of turbines to avoid or minimize impacts to environmental resources, requirements for restoration of temporary disturbance areas, and requirements for removal of facility infrastructure at the time of decommissioning. These requirements would be satisfied through the implementation of impact avoidance and minimization measures and BMPs as identified in the Draft UGP Wind Energy PEIS, as listed above for Morton County.

State Land Use Regulation

Pursuant to the North Dakota Energy Conversion and Transmission Facility Siting Act (North Dakota Century Code [NDCC] Chapter 49-22), a Certificate of Site Compatibility must be issued by the ND Public Service Commission (PSC) prior to the construction of the Project. Sunflower will apply for the Certificate in a separate filing. Siting criteria are established in the North Dakota Administrative Code (NDAC) Chapter 69-06-08 including exclusion and avoidance areas. Required setback exclusion areas include the following:

- 1.1 times the height of the turbine from interstate or state roadway right-of-way;
- 1.1 times the height of the turbine plus 75 feet from the centerline of county or township roads;
- 1.1 times the height of the turbine from any railroad right-of-way;
- 1.1 times the height of the turbine from any transmission line of 115 kV or higher capacity;
- 1.1 times the height of the turbine from the property line of a nonparticipating landowner, unless a variance is granted; a variance may be granted if the owners/residents of adjoining properties sign a formal and binding agreement with the applicant, expressing support for a variance that may reduce the perimeter setback requirement.

Sunflower will incorporate these setbacks and all of the required exclusion and avoidance areas into the final design.

Easements and Other Protected Lands

Land in North Dakota may be protected through a variety of conservation easements including the following:

USFWS Wetland and Grassland Easements

The USFWS has been purchasing wetland easements in the Prairie Pothole Region since 1989. Easement wetlands are part of the National Wildlife Refuge System. There are no USFWS wetland easements in the Project Area or in Morton or Stark counties (NCED 2013).

Conservation Reserve Program Easements

The USDA-Natural Resource Conservation Service (NRCS) and Farm Service Agency (FSA) administer a number of conservation-based programs for private landowners. The Conservation Reserve Program (CRP) conserves soil and water resources and provides wildlife habitat by removing enrolled tracts from agricultural production, generally for a period of 10 years. The NRCS administers a number of conservation-based programs for private landowners. These tracts cannot be hayed, tilled, seeded, or otherwise disturbed without the authorization of the NRCS. The 2002 Farm Bill amended Section 3832 of the Farm Security and Rural Investment Act to allow the use of CRP land for wind energy generation.

According to the FSA, there are a total of 6,436.2 acres of land in Morton County and 30,946.8 acres of land in Stark County currently enrolled in the CRP; some of these lands may occur in

the Project Area. Sunflower will work with landowners within the Project Area to determine if any lands are enrolled in CRP; should any CRP lands be identified, Sunflower will avoid those areas to the extent practicable during micrositing; if avoidance is not practical, Sunflower will work with the landowner and USDA to determine an appropriate course of action.

USDA Loan Coordination

The USDA offers a variety of loans through its Rural Development program. Land under loans from the USDA requires special coordination with the USDA if non-agricultural project activities are proposed within those parcels; this coordination can include a modified National Environmental Policy Act (NEPA) review. The Project Area may include some lands that have used USDA loans and are therefore subject to USDA review. Sunflower will work with landowners within the Project Area to determine if any lands are under USDA jurisdiction due to loans. Should any loan coordination lands be identified, Sunflower will work with the landowner and USDA to determine appropriate avoidance or minimization measures, if necessary.

Private Land Open to Sportsmen

The NDGFD runs the Private Land Open to Sportsmen (PLOTS) program, under which private lands may be opened to public hunting use. These lands are enrolled in one of three NDGFD programs to enhance fish and wildlife populations for sustained public use, and may also be jointly enrolled in other federal programs such as the Conservation Reserve Program described below. No PLOTS parcels are located within the Project Area. Several PLOTS parcels are located near the southwestern corner of the Project Area (see Figure 2); these PLOTS lands would not be impacted by the Project.

Wildlife Management Areas

Wildlife Management Areas (WMAs) are state-owned lands managed by the NDGFD for wildlife habitat. There are no WMAs in or near the Project Area. The closest is the Storm Creek WMA in Morton County located approximately 18 miles east of the Project Area.

The Heart Butte Reservoir State Game Management Area is not a WMA, but is managed by the NDGFD for fishing and hunting. This game management area is located approximately 16 miles southeast of the Project Area.

Waterfowl Management Districts

Waterfowl Management Districts (WMDs) are lands purchased by the U.S. Bureau of Reclamation (Reclamation) as part of North Dakota's Garrison Diversion Unit. Reclamation developed these areas for wildlife by restoring drained wetlands and planting cropland acres to grassland. The WMDs were transferred to the USFWS to be managed primarily for the production of migratory birds and for public use. The closest WMD is located approximately 21 miles southwest of the Project Area in Hettinger County.

State Trust Lands

There are no state trust lands within the Project Area.

Federal Lands

There are no federally-owned or managed lands within the Project Area.

Tribal Lands

There are no tribally-owned or managed lands within the Project Area.

4.13.2 Potential Impacts

A significant land use impact would occur if: 1) the Project resulted in the uncompensated loss of crop production; or 2) the Project resulted in the foreclosure of future land uses.

Direct Impacts

Direct impacts to land use would include the permanent loss of agricultural production in areas used for turbine foundations, permanent access roads, the Project O&M facility, and the Project substation and interconnection switchyard. These permanent impacts would total up to 45 acres for the Project.

Direct impacts would also include the temporary disturbance associated with temporary construction areas at each turbine, the underground collection system, access road areas used during construction and then reclaimed, and the construction laydown area. These temporary impacts would total up to approximately 251 acres for the Project.

Sunflower will work closely with landowners to locate access roads and other Project components so as to minimize impact on current or future agricultural operations. Temporary impact areas will be restored following completion of construction in consultation with landowners and agencies.

Following completion of the Project, the area would retain its rural and agricultural character. The development of the Project will not result in a significant change in land use or agricultural practices. Agricultural practices would continue unchanged on the vast majority of the Project Area not occupied by Project facilities. The minor economic loss to agricultural operations will be compensated through lease payments from Sunflower.

The development of the Project will not displace any residents or existing or planned industrial facilities. Wind turbines will be sited a minimum of 1,320 feet from occupied residences in Morton County and 2,000 feet from occupied residences in Stark County, in accordance with the requirements of the respective county zoning regulations. Setbacks to roads as established by county and state regulations would be observed. Setbacks to non-participating lands will also be observed, unless Sunflower is able to secure landowner agreements and appropriate waivers or variances.

The Project would not impact any wetland easements or wetlands management districts, PLOTS lands, or wildlife management areas.

If Project facilities are proposed for parcel enrolled in CRP and it is not practical to move such facilities, Sunflower will work with landowners to determine whether the parcel should be removed from the program and if reimbursement is necessary.

During final Project design, Sunflower will observe the exclusion and avoidance areas as established in NDAC Chapter 69-06-08. These will be addressed in detail in the application for a Certificate of Site Compatibility.

Reconductoring of the Mandan-Ward transmission line would have no impacts to land use. This work would occur entirely within the existing transmission right-of-way and would utilize existing access roads and other previously-disturbed areas.

Indirect Impacts

The Project would have no indirect effects on agricultural practices or land uses in the area.

Avoidance, Minimization and Best Management Practices

Sunflower will implement avoidance and minimization measures and BMPs as identified in the Draft UGP Wind Energy PEIS to limit impacts on land use and agricultural practices (see PEIS section 5.1.1), as follows:

- Project developers shall contact appropriate agencies, property owners, tribes, and other stakeholders early in the planning process to identify potentially sensitive land uses and issues, identify pre-Project surveys or data collection needs, and identify rules that govern wind energy development locally, as well as land use concerns specific to the region. Project developers should coordinate closely with the Service and the U.S. Department of Agriculture (USDA) during initial project planning to ensure that wetland and grassland easements are avoided to the extent practicable.
- Consult with the Department of Defense (DOD) during initial project planning to evaluate impacts of a proposed project on military operations in order to identify and address any DOD concerns.
- The Federal Aviation Administration (FAA) required notice of proposed construction shall be made as early as possible to identify any air safety measures that would be required.
- Avoid locating wind energy developments in areas of unique or important recreation, wildlife, or visual resources. When feasible, a wind energy development should be sited on already altered landscapes.
- Available information describing the environmental and sociocultural conditions in the vicinity of the proposed project shall be collected and reviewed as needed to predict potential impacts of the project.
- To plan for efficient use of the land, necessary infrastructure requirements shall be consolidated wherever possible, and current transmission and market access shall be evaluated carefully.
- Projects shall be designed to utilize existing roads and utility corridors to the maximum extent feasible, and to minimize the number and length/size of new roads, lay-down areas, and borrow areas.

- Prior to start of construction, a monitoring plan shall be developed by the project developers so that environmental conditions are monitored during the construction, operation, and decommissioning phases. The monitoring plan shall be submitted to the Service and shall identify the monitoring requirements for important environmental conditions present at the site, establish metrics against which monitoring observations can be measured, identify potential mitigation measures, and establish protocols for incorporating monitoring results and additional mitigation measures into standard operating procedures and BMPs for the project.
- "Good housekeeping" procedures shall be developed to ensure that during operation the site will be kept clean of debris, garbage, fugitive trash, or waste; to prohibit scrap heaps and dumps; and to minimize storage yards.
- An access road siting and management plan shall be prepared incorporating applicable standards regarding road design, construction, and maintenance. Access roads will be designed to minimize total length, avoid wetlands, and avoid and minimize stream and drainage crossings.
- Avoid locating wind energy developments in areas of unique or important recreation, wildlife, or visual resources. When feasible, a wind energy development should be sited on already altered landscapes.
- Consolidate infrastructure wherever possible to maximize efficient use of the land and minimize impacts. Existing transmission and market access should be evaluated and use of existing facilities should be maximized.
- Develop restoration plans to ensure that all temporary use areas are restored.
- Construction debris should be removed from the site.
- Excess concrete (excluding belowground portions of decommissioned turbine foundations intentionally left in place) should not be buried or left in active agricultural areas.
- Vehicles should be washed outside of active agricultural areas to minimize the possibility of the spread of noxious weeds.
- Topsoil should be stripped from any agricultural area used for traffic or vehicle parking—segregating topsoil from excavated rock and subsoil—and replaced during restoration activities.
- Drainage problems caused by construction should be corrected to prevent damage to agricultural fields.
- Following completion of construction and during decommissioning, subsoil should be decompacted (Brower 2005).
- Coordinate closely with the Service or USDA during initial project planning to ensure that wetland and grassland easements are avoided to the extent practicable.

Additional site-specific measures to further reduce impacts to land use may be identified and implemented as appropriate; however, impacts to land use are not expected to be significant.

4.14 Visual Resources

This section evaluates the existing visual setting in the vicinity of the Project and potential Project impacts. The visual study area included areas within and adjacent to the Project Area

from which a person may be able to observe changes to the visual landscape resulting from development of the Project. Scenic quality is determined by evaluating the overall character and diversity of landform, vegetation, color, water, and cultural or manmade features in a landscape. Typically, more complex or diverse landscapes have higher scenic quality than those landscapes with less complex or diverse landscape features.

Visual sensitivity is dependent on viewer attitudes, the types of activities in which people are engaged when viewing the site, and the distance from which the site will be seen. Overall, higher degrees of visual sensitivity are correlated with areas where people live, are engaged in recreational outdoor pursuits, or participate in scenic or pleasure driving.

4.14.1 Existing Conditions

The visual setting of the Project Area consists primarily of agricultural land. The Project Area lies in a rural location with farming, livestock grazing, and related agricultural operations dominating land use. There is an existing 230 kV transmission line crossing the Project Area, and an interstate highway, U.S. Highway 94, a short distance to the north. The visual resources of the area are neither unique to the region nor entirely natural.

Structure and color features in the visual region of influence include those associated with cultivated cropland, pasture, forested shelterbelt, wetlands, and additional human-caused features described above. Colors vary seasonally and include green crop and pasture land during spring and early summer, green to brown crops and pasture during late summer and fall, brown and black associated with fallow farm fields year round, and white and brown associated with late fall and winter periods.

No distinctive landscape features exist in the Project Area that would require specific protection from visual impairment. There are no Federal lands; national parks, monuments or recreation areas; national historic sites, parks or landmarks; national memorials or battlefields; national wild and scenic rivers; national historic trails, national scenic highways, national wildlife refuges, or other designated national scenic resources within 20 miles of the Project Area. There are also no state parks, no county parks, and no locally designated scenic resources in the vicinity of the Project Area. The one State Trust Land parcel located in the Project Area is not known to contain designated scenic resources.

Existing views are primarily of agricultural activity, undeveloped land, existing energy transmission facilities, and vehicles traveling on U.S. Highway 94; State Highway 10, and low-traffic county and private roads. There are currently no other utility-scale wind energy facilities close to the Project Area; the nearest existing wind farm, Bison Wind, is located approximately 15 miles to the northeast in Morton and Oliver counties, ND (OpenEI 2013). Approximately 21 cellular communications, microwave and radio towers are located within 10 miles of the Project Area; six of these are located within the Project Area, and most of the remaining towers are located atop a hill (Custer's Lookout) about 1.5 miles west of the Project Area (see Appendix D, Microwave Beam Path Study).

The principle viewers include local residents living inside the Project Area, residents of the scattered farmsteads near the Project Area, residents of the towns of Hebron, Glen Ullin and Richardton, and travelers on U.S. Highway 94 or on local roads. Six occupied residences have been identified within the Project Area, with another five additional occupied residences located within one mile of the Project Area boundary (see Figure 10). All residences within the Project Area are owned by Project participants. No concerns about visual impacts were raised during the August 2013 Scoping Meeting or in agency and public comments.

4.14.2 Potential Impacts

Direct Impacts

Construction and operation of the Project would introduce visual contrasts, primarily from the presence of the wind turbines and Project substation and interconnection switchyard, and secondarily from the Project access roads. During construction and decommissioning, construction equipment, especially cranes, would introduce temporary impacts during the construction period.

The Project wind turbines would have nighttime lighting in conformance with FAA guidelines. The FAA is expected to require red flashing marker lights on turbines at the perimeter of the Project Area and on select turbines within the Project such that the gap between lights is no greater than 0.5 miles. The FAA may also require white or off-white coloring of the wind turbines for daytime visibility.

Viewer reactions to the Project would be both subjective and site- and time-specific because of the subjective and experiential nature of human visual perception and cognition in the assessment of the magnitude and importance of perceived visual impacts (Hankinson 1999, University of Newcastle 2002; both cited in the Draft UGP Wind Energy PEIS). The perception of visual impacts is highly dependent not only on physical factors that affect what and how the impacts are seen, but also on the number and type of viewers, their sensitivity to the visual environment, their personal preferences and attitudes, and other cultural factors that concern both the viewer and the affected landscape (Benson 2005, BLM 1984, DTI 2005, University of Newcastle 2002, USFS 1995; all cited in the Draft UGP Wind Energy PEIS).

The potential visual impacts of wind energy development are discussed in detail in the Draft UGP Wind Energy PEIS. The Draft PEIS describes key findings and methodologies from a number of visual impact studies, and concludes that “Based on these empirical studies, it is reasonable to expect that within the UGP Region, assuming good visibility, a wind farm with wind turbines approximately 400 feet (122 m) in overall height could be visible from approximately 25 mi (40 km) or farther, and could potentially cause large visual contrasts at distances less than 7–8 mi (11–13 km), and more moderate impacts up to approximately 15 mi (24 km), with smaller visual impacts beyond approximately 15 mi (24 km).”

Impacts on residents are generally greater than those on more transient viewers, such as drivers or workers, in part because residents are likely to view wind energy facilities more frequently and for longer durations. However, a number of studies have shown that residing

close to a wind energy facility does not necessarily negatively affect residents' perception of visual impacts (Krohn and Damborg 1999; Warren et al. 2005, both cited in the Draft UGP Wind Energy PEIS).

In one of the few studies addressing public acceptance of wind power and perceptions of visual impact in the UGP Region, Sowers (2006, cited in the Draft UGP Wind Energy PEIS) noted that a large number of project sites in the region had no significant opposition, which was attributed in part to the region's inhabitants regarding wind turbines as a source of income and as being compatible with their perceptions of wind energy facilities providing a "working" agricultural landscape. Most residents he interviewed indicated that they did not view the visual impacts negatively, viewing wind turbines in some cases as "another piece of farm machinery."

Overall, the introduction of the Project is not anticipated to be perceived as a negative visual impact by residents in and near the Project Area, most or all of whom are Project participants. For residents outside of the Project Area but within view of the Project, or for travelers, the Project is unlikely to introduce sufficient visual contrast to create significant impacts given the presence of existing wind farms in the area and the general acceptance of wind projects in the surrounding communities.

Reconductoring of the Mandan-Ward transmission line would not create additional visual impacts. This work would utilize the existing transmission support towers and would not require the development of additional structures, access roads, or other disturbance areas. Visual impacts would be limited to the temporary presence of construction equipment.

Shadow Flicker

A wind turbine's moving blades can cast a moving shadow on locations within a certain distance of a turbine. These moving shadows are called shadow flicker, and can be a temporary phenomenon experienced by people at nearby residences or public gathering places. The impact area depends on the time of year and day (which determines the sun's azimuth and altitude angles) and the wind turbine's physical characteristics (height, rotor diameter, blade width, and orientation of the rotor blades). Shadow flicker generally occurs during low angle sunlight conditions, typical during sunrise and sunset.

Shadow flicker intensity for receptor-to-turbine distances beyond 1,500 meters (4,921 feet) is very low and generally considered imperceptible. Shadow flicker intensity for receptor-to-turbine distances between 1,000 and 1,500 meters (between 3,281 and 4,921 feet) is also low and considered barely noticeable. At this distance shadow flicker intensity would only tend to be noticed under conditions that would enhance the intensity difference, such as observing from a dark room with a single window directly facing the turbine casting the shadow.

The British Epilepsy Foundation states that there is no evidence that wind turbines can cause seizures (Epilepsy Action 2008). However, they recommend that wind turbine flicker frequency be limited to 3 Hz. Since the Project's wind turbine blade pass frequency is approximately 0.9 Hz (less than 1 alternation per second), no negative health effects to individuals with photosensitive epilepsy are anticipated.

Shadow flicker impacts are not regulated in applicable state or federal law, and there is no permitting trigger or established threshold of significance with regard to hours per year of anticipated shadow flicker impacts to a receptor from a wind energy project.

In Morton County, turbines must be at least 1,320 feet from occupied residences, and Stark County requires a setback of 2,000 feet from occupied residences. The observance of these setback requirements would minimize potential impacts from shadow flicker. A shadow flicker analysis will be completed for the application to the NDPSC for a Certificate of Site Compatibility; the results of this study will be used in the final micrositing of the turbines.

Avoidance, Minimization and Best Management Practices

Significant impacts to visual resources are not anticipated. The Project Area does not contain any highly distinctive or important landscape features or unique viewsheds. In addition, there are no visual quality standards in place within Stark and Morton counties.

Sunflower will implement measures as identified in the Draft UGP Wind Energy PEIS to reduce visual impacts of the Project, to the extent that they can be reduced (see PEIS section 5.7.1.3), as follows:

Measures Related to Project Design:

- Because the landscape setting observed from national historic sites, national trails, and tribal cultural resources may be a part of the historic context contributing to the historic significance of the site or trail, project siting should avoid locating facilities that would alter the visual setting such as would reduce the historic significance or function.
- Where possible, projects should be sited outside the viewsheds of Key Observation Points (KOPs), highly sensitive viewing locations, and/or areas with limited visual absorption capability and/or high scenic integrity. When wind energy developments and associated facilities must be sited within view of KOPs, they should be sited as far away as possible, since visual impacts generally diminish as viewing distance increases.
- Where possible, developments should be sited in already industrialized and developed landscapes, with due consideration for visual absorption capacity and possible cumulative effects.
- Siting should take advantage of both topography and vegetation (where possible) as screening devices to restrict views of projects from visually sensitive areas.
- The eye is naturally drawn to prominent landscape features (e.g., knobs and waterfalls); thus, projects and their elements should not be sited next to such features, where possible.
- The eye naturally follows strong natural lines in the landscape, and these lines and associated landforms can “focus” views on particular landscape features. For this reason, linear facilities associated with a wind energy project, such as transmission lines and roads, generally should not be sited so that they bisect ridge tops or run down the center of valley bottoms.
- Although wind turbines may sometimes be located on ridgelines, skylining of substations, transmission structures, communication towers, and other structures

associated with wind energy developments should be avoided; that is, they should not be placed on ridgelines, summits, or other locations where they will be silhouetted against the sky from important viewing locations. Siting should avoid skylining by taking advantage of opportunities to use topography as a backdrop for views of facilities and structures. The presence of these structures should be concealed or made less conspicuous by siting and designing them to harmonize with desirable or acceptable characteristics of the surrounding environment.

- Wind turbines should be sited properly to eliminate shadow flicker effects on nearby residences or other highly sensitive viewing locations, or reduce them to the lowest achievable levels, as calculated using appropriate siting software and procedures. Accurately determined shadow flicker estimates should be made available to stakeholders in advance of project approval. If turbine locations are changed during the siting process, shadow flicker effects should be recalculated and made available to potentially affected stakeholders.
- Spatially accurate and realistic photo simulations of wind turbines in the proposed location should be prepared as part of the siting process. Simulations should show views from sensitive visual resource areas; highly sensitive viewing locations, such as residences; and more representative typical viewing locations. Stakeholders should be involved in selecting KOPs for simulations. Where feasible, simulations should portray a range of lighting conditions and sun angles. Simulations should be based on accurate spatial information, particularly elevation data, and must account for screening vegetation and structures. Simulations should show enough of the surrounding landscape to show the project in the appropriate spatial context and should be reproduced at a large enough size to be comfortably viewed from the appropriate specified distance to accurately depict the apparent size of the facility in a real setting.
- As feasible, siting of linear features (ROWs and roads) associated with wind energy developments should follow natural land contours rather than straight lines, particularly up slopes. Fall-line cuts should be avoided. Where it can be accomplished without introducing unacceptable impacts on other resources, following natural contours echoes the lines found in the landscape and often reduces cut-and-fill requirements; straight lines can introduce conspicuous linear contrasts that appear unnatural.
- Siting of facilities, especially linear facilities, should take advantage of natural topographic breaks (i.e., pronounced changes in slope), and siting of facilities on steep side slopes should be avoided. Facilities sited on steep slopes are often more visible (particularly if either the project or viewer is elevated); in addition, they may be more susceptible to soil erosion, which could contribute to negative visual impacts.
- In forested areas or shrublands, where possible, linear facilities should follow the edges of clearings (where they would be less conspicuous) rather than pass through their center.
- Because visual impacts are usually lessened when vegetation and ground disturbances are minimized, where possible, in forested areas or shrublands, siting should take advantage of existing clearings to reduce vegetation clearing and ground disturbance.
- Locations for transmission line and ROW road crossings of other roads, streams, and other linear features within a corridor should be chosen to avoid KOP viewsheds and

other visually sensitive areas and to minimize disturbance to vegetation and landforms. The ROWs should cross linear features (e.g., trails, roads, and rivers) at right angles whenever possible to minimize the viewing area and duration.

- To the extent possible, transmission lines and roads associated with wind energy facilities should be collocated within a corridor to use existing/shared ROWs, existing/shared access and maintenance roads, and other infrastructure in order to reduce visual impacts associated with new construction.

Measures directed at minimizing vegetation and ground disturbance to lessen associated visual impacts:

- Wind turbine siting should be sensitive to and respond to the surrounding landscape in a visually pleasing way. For example, in rolling landscapes, a less rectilinear and rigid configuration of turbines that follows local topography may be appropriate. In flatter agricultural landscapes with rectilinear patterns of road and fields, a more geometric or linear wind turbine configuration may be preferred.
- To the extent possible, given the terrain of a site, wind turbines should be clustered or grouped when placed in large numbers, but a cluttering effect should be avoided by separating otherwise overly long lines of turbines or large arrays, and breaks or open zones should be inserted to create distinct visual units or groups of turbines.
- Project design should provide visual order and unity among clusters of turbines (visual units) to avoid visual disruptions and perceived “disorder, disarray, or clutter.”
- Wind turbines should exhibit visual uniformity in the shape, color, and size of rotor blades, nacelles, and towers.
- Power collection cables or lines on the site should be buried in a manner that minimizes additional surface disturbance (e.g., collocating them with access roads).
- For ancillary buildings and other structures, low-profile structures should be chosen whenever possible to reduce their visibility.
- Where screening topography and vegetation are absent, natural-looking earthwork berms and vegetative or architectural screening should be used to minimize visual impacts associated with ancillary facilities. Vegetative screening can be particularly effective along roadways.
- The siting and design of facilities, structures, roads, and other project elements should match and repeat the form, line, color, and texture of the existing landscape.
- In forested areas and shrublands, openings in vegetation for facilities, structures, roads, etc., should mimic the size, shape, and characteristics of naturally occurring openings to the extent possible.
- Through site design, the number of structures required should be minimized. Activities should be combined and carried out in one structure, or structures should be collocated to share pads, fences, access roads, lighting, etc.
- Structures and roads should be designed and located to minimize and balance cuts and fills. Reducing cut and fill has numerous visual benefits, including fewer fill piles, landforms and vegetation that appear more natural, fewer or reduced color contrasts

with disturbed soils, and reduced visual disturbance from erosion and the establishment of invasive species.

- Facilities, structures, and roads should be located in stable fertile soils to reduce visual contrasts from erosion and to better support rapid and complete regrowth of affected vegetation. Site hydrology should also be carefully considered in siting operations to avoid visual contrasts from erosion. Strip, stockpile, and stabilize topsoil from the site before excavating earth for facility construction.
- The vegetation-clearing design in forested areas should include the feathering of cleared area edges (i.e., the progressive and selective thinning of trees from the edge of the clearing inward) combined with the mixing of tree heights from the edge to create an irregular vegetation outline. These actions would result in a more natural-appearing edge, thereby avoiding the very high linear contrasts associated with straight-edged, clear-cut areas.
- Structures, roads, and other project elements should be set as far back from road, trail, and river crossings as possible, and vegetation should be used to screen views from crossings, where feasible.

Measures Related to Building and Structural Materials:

- The use of monopole structures is recommended. Truss or lattice-style wind turbine structures with lacework or pyramidal or prismatic shapes should be avoided. Monopole structures present a simpler profile, and less complex surface characteristics and reflective/shading properties.
- Subject to FAA or other regulations, color selections for turbines should be made to reduce visual impact and should be applied uniformly to tower, nacelle, and rotor, unless gradient or other patterned color schemes are used.
- Grouped structures should all be painted the same color to reduce visual complexity and color contrast.
- For ancillary structures, materials and surface treatments should repeat and/or blend with the existing form, line, color, and texture of the landscape. If the project will be viewed against an earthen or other non-sky background, appropriately colored materials should be selected for structures, or appropriate stains/coatings should be applied to blend with the project's backdrop.
- The operator should use nonreflective paints and coatings on wind turbines, visible ancillary structures, and other equipment to reduce reflection and glare.
- Turbines, visible ancillary structures, and other equipment should be painted before or immediately after installation.
- For ancillary facilities, multiple-color camouflage technology applications should be considered for projects within sensitive viewsheds and with a visibility distance between 0.25 to 2 mi (0.4 to 3.2 km).
- Electricity transmission projects associated with wind energy facilities should utilize nonspecular conductors and nonreflective coatings on insulators.
- For transmission structures, monopoles may reduce visual impacts more effectively than lattice structures in foreground and middle-ground views, while lattice structures may be

more appropriate for more distant views, where the latticework would “disappear,” allowing background textures to show through.

- Lighting for facilities should not exceed the minimum required for safety and security, and full-cutoff designs that minimize upward light scattering (light pollution) should be selected. If possible, site design should be accomplished to make security lights nonessential. Such lights increase the contrast between a wind energy project and the night sky, especially in rural/remote environments common to UGP Region. Where they are necessary, security lights should be extinguished except when activated by motion detectors (e.g., only around the substation).
- Commercial messages and symbols (such as logos, trademarks) on wind turbines should be avoided and should not appear on sites or ancillary structures of wind energy

Measures Related to Construction:

- Where possible, staging and laydown areas should be sited outside the viewsheds of KOPs and not in visually sensitive areas; they should be sited in swales, around bends, and behind ridges and vegetative screens, where these screening opportunities exist.
- A site restoration plan should be in place prior to construction. Restoration of the construction areas should begin immediately after construction to reduce the likelihood of visual contrasts associated with erosion and invasive weed infestation and to reduce the visibility of affected areas as quickly as possible.
- Disturbed surfaces should be restored to their original contours as closely as possible and revegetated immediately after, or contemporaneously with, construction. Prompt action should be taken to limit erosion and to accelerate restoring the preconstruction color and texture of the landscape.
- Visual impact mitigation objectives and activities should be discussed with equipment operators before construction activities begin.
- Penalty clauses should be used to protect trees and other sensitive visual resources.
- Existing rocks, vegetation, and drainage patterns should be preserved to the maximum extent possible.
- Valuable trees and other scenic elements can be protected by clearing only to the edge of the designed grade manipulation and not beyond through the use of retaining walls, and by protecting tree roots and stems from construction activities. Brush-beating or mowing rather than vegetation removal should be done, where feasible.
- Slash from vegetation removal should be mulched and spread to cover fresh soil disturbances (preferred) or should be buried. Slash piles should not be left in sensitive viewing areas.
- Installation of gravel and pavement should be avoided where possible to reduce color and texture contrasts with the existing landscape.
- For road construction, excess fill should be used to fill uphill-side swales to reduce slope interruption that would appear unnatural and to reduce fill piles.
- The geometry of road ditch design should consider visual objectives; rounded slopes are preferred to V-shaped and U-shaped ditches.

- Road-cut slopes should be rounded, and the cut/fill pitch should be varied to reduce contrasts in form and line; the slope should be varied to preserve specimen trees and nonhazardous rock outcroppings.
- Planting pockets should be left on slopes, where feasible.
- Benches should be provided in rock cuts to accent natural strata.
- Topsoil from cut/fill activities should be segregated and spread on freshly disturbed areas to reduce color contrast and aid rapid revegetation. Topsoil piles should not be left in sensitive viewing areas.
- Excess fill material should not be disposed of downslope in order to avoid creating color contrast with existing vegetation/soils.
- Excess cut/fill materials should be hauled in or out to minimize ground disturbance and impacts from fill piles.
- Soil disturbance should be minimized in areas with highly contrasting subsoil color.
- Natural or previously excavated bedrock landforms should be sculpted and shaped when excavation of these landforms is required. A percentage of backslope, benches, and vertical variations should be integrated into a final landform that repeats the natural shapes, forms, textures, and lines of the surrounding landscape. The earthen landform should be integrated and transitioned into the excavated bedrock landform. Sculpted rock face angles, bench formations, and backslope need to adhere to the natural bedding planes of the natural bedrock geology. Half-case drill traces from pre-split blasting should not remain evident in the final rock face. Where feasible, the color contrast should be removed from the excavated rock faces by color-treating with a rock stain.
- Where feasible, construction on wet soils should be avoided to reduce erosion.
- Communication and other local utility cables should be buried, where feasible.
- Culvert ends should be painted or coated to reduce color contrasts with existing landscape.
- Signage should be minimized; reverse sides of signs and mounts should be painted or coated to reduce color contrasts with the existing landscape.
- The burning of trash should be prohibited during construction; trash should be stored in containers and/or hauled off-site.
- Litter must be controlled and removed regularly during construction.
- Dust abatement measures should be implemented in arid environments to minimize the impacts of vehicular and pedestrian traffic, construction, and wind on exposed surface soils.

Measures Related to Operations and Maintenance:

- Wind facilities and sites should be actively and carefully maintained during operation. Wind energy projects should evidence environmental care, which would also reinforce the expectation and impression of good management for benign or clean power.
- Inoperative or incomplete turbines cause the misperception in viewers that “wind power does not work” or that it is unreliable. Inoperative turbines should be repaired, replaced,

or removed quickly. Nacelle covers and rotor nose cones should always be in place and undamaged.

- Nacelles and towers should be cleaned regularly (yearly, at minimum) to remove spilled or leaking fluids and the dirt and dust that accumulates, especially in seeping lubricants.
- Facilities and off-site surrounding areas should be kept clean of debris, “fugitive” trash or waste, and graffiti. Scrap heaps and materials dumps should be prohibited and prevented. Materials storage yards, even if thought to be orderly, should be kept to an absolute minimum. Surplus, broken, disused materials and equipment of any size should not be allowed to accumulate.
- Maintenance activities should include dust abatement (in arid environments), litter cleanup, and noxious weed control.
- Road maintenance activities should avoid blading of existing forbs and grasses in ditches and adjacent to roads; however, any invasive or noxious weeds should be controlled as needed.
- Interim restoration should be undertaken during the operating life of the project as soon as possible after disturbances.

Measures Related to Decommissioning:

- All aboveground and near-ground structures should be removed.
- Soil borrow areas, cut-and-fill slopes, berms, waterbars, and other disturbed areas should be contoured to approximate naturally occurring slopes, thereby avoiding form and line contrasts with the existing landscapes. Contouring to rough texture would trap seed and discourage off-road travel, thereby reducing associated visual impacts.
- Cut slopes should be randomly scarified and roughened to reduce texture contrasts with existing landscapes and to aid in revegetation.
- Combining seeding, planting of nursery stock, transplanting of local vegetation within the proposed disturbance areas, and staging of construction should be considered, enabling direct transplanting. Generally, native vegetation should be used for revegetation, establishing a composition consistent with the form, line, color, and texture of the surrounding undisturbed landscape. Seed mixes should be coordinated with local authorities, such as country extension services, weed boards, or land management agencies.
- Gravel and other surface treatments should be removed or buried.
- Rocks, brush, and forest debris should be restored, whenever possible, to approximate preexisting visual conditions.

Additional site-specific measures to further reduce visual impacts may be identified and implemented as appropriate; however, impacts to visual resources are not expected to be significant. The most heavily impacted residents in the area would be Project participants, none of whom have expressed concerns related to visual impacts. Should complaints arise, Sunflower will address them on a case-by-case basis.

4.15 Noise

Noise is generally defined as unwanted or excessive sound. Sound is produced by wind energy facility equipment including the turbines and substation and interconnection switchyard equipment, as well as by the interaction of the wind with the turbine blades.

Perceived noise level, and the potential for resulting disturbance, is a function of both the sound in question and the level of background sound. Background sound levels will vary both spatially and temporally depending on proximity to area sound sources such as agricultural equipment, traffic on nearby roadways or railways, and natural sounds such as birds or vegetation rustling in the wind. Diurnal effects result in sound levels that are typically quieter during the night than during the daytime, except during periods when evening and nighttime insect noise dominates in warmer seasons.

In areas with elevated background sound levels, sound may be obscured through a mechanism referred to as acoustic masking. Seasonal effects such as cricket chirping, certain farming activities, as well as wind-generated ambient noise as airflow interacts with foliage and cropland, contribute to this masking effect. The latter is most prevalent in rural and suburban areas with established tree stands. Wintertime defoliate conditions typically have lower background sound levels due to lower wind masking effects and reduced outdoor activities in colder climates. During colder seasons, people typically exhibit lower sensitivities to outdoor sound levels, particularly in this geographical region of the United States, as windows and doors are typically closed, and limited time is spent outdoors as compared to more temperate climates.

Some land uses are considered more sensitive to intrusive noise than others due to the type of activities typically involved at the receptor location. Sensitive noise receptors normally include residences, schools, libraries, religious institutions, hospitals and nursing homes, daycare centers, and some types of businesses; North Dakota also specifies community buildings as noise sensitive receptors. Noise sensitive receptors in the Project Area are identified on Figure 10.

At the state level, the North Dakota Administrative Code (NDAC) requires that the potential for adverse impacts at noise sensitive receptors be assessed during the site selection process. NDAC 69-06-08-01 Section 4 establishes avoidance areas for wind energy facilities, stating:

> A wind energy conversion facility site must not include a geographic area where, due to operation of the facility, the sound levels within one hundred feet of an inhabited residence or a community building will exceed fifty dBA. The sound level avoidance area criteria may be waived in writing by the owner of the occupied structure or the community building.

The North Dakota standard is the strictest noise limitation applicable to Project operation.

Morton County does not currently have noise standards or ordinances that are applicable to the Project. The Stark County Zoning Ordinance, section 6.7 mandates that, “Sustained noise over eighty (80) decibels (dB) during the day and seventy (70) decibels (dB) at night is prohibited.” It does not specify where these noise limits apply (e.g., at noise-sensitive receptors).

The recommended EPA noise guideline is an Ldn of 55 dBA (Ldn(24-hours), applicable to outdoor locations at noise sensitive receptors where extended periods of time are spent, (e.g., residential yards). This noise level corresponds to a maximum instantaneous equivalent sound level (Leq) of 48.6 dBA. The EPA guideline is essentially echoed by the North Dakota standard.

The National Safety Council (NSC) recommends no more than 85 dBA for 8 hours of exposure as the safe limit for farm operations. Industrial standards of the Occupational Safety and Health Administration (OSHA) regulations would apply to those involved in the construction, operation, and maintenance of the facilities. OSHA permissible noise exposures are shown in Table 13.

Table 13. OSHA Permissible Noise Standards

Duration (number of hours per day)	Sound Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.75	110
0.5	115

4.15.1 Existing Conditions

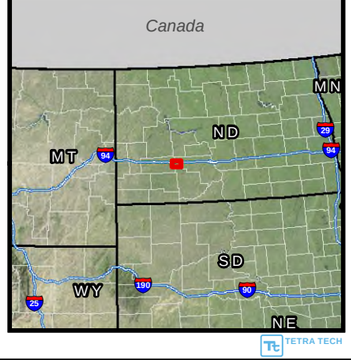
Stark and Morton counties would generally be characterized as a rural agricultural land use area, and existing ambient sound levels are expected to be relatively low, although sound levels may be sporadically elevated in localized areas due to roadway noise or periods of human activity. Principal contributors to the existing acoustic environment likely include motor vehicle traffic, farming equipment, farming activities such as plowing and irrigation, all-terrain vehicles, local roadways, rail movements, periodic aircraft flyovers, and natural sounds such as birds, insects, and leaf or vegetation rustle during elevated wind conditions in areas with established trees or crops. Typical baseline noise levels in the Project Area likely range from approximately 38 average day-night sound levels measured in A-weighted decibels (dBA) to 48 dBA (EPA 1978). Potential noise receptors in the vicinity of the Project Area are limited to scattered rural residences; there are no schools, libraries, places of worship, community buildings, places of business or other types of noise sensitive receptors within or within one mile of the Project Area (Figure 10). Twelve residences have been identified within or within one mile of the Project Area. Of those 12, 7 are occupied, 1 is not occupied, and 3 are undetermined. Figure 10 shows the location of all known occupied residences and residences of unknown occupancy; the one unoccupied residence is not shown on the map, and is not considered a potential noise-sensitive receptor.

Sunflower Wind Project
Environmental Assessment

Figure 10
Noise and Shadow Flicker Sensitive Receptors

Morton and Stark Counties, ND
April 2014

- Project Area
- Project Area 1-mile Buffer
- Preliminary Turbine Array Corridor
- Proposed Interconnection Switchyard
- Proposed Substation
- Approximate Underground Collection System Routing
- Approximate Access Road Routing
- Occupied Residence
- Structure (Occupation Unknown)
- Unoccupied Structure
- School
- County Boundary
- Interstate Highway
- Federal Highway



1:64,000 WGS84 UTM Zone 13N

0 2 4 Miles

TETRA TECH

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4.15.2 Potential Impacts

Noise from wind energy facilities includes primarily mechanical and aerodynamic noise from the wind turbines, and noise emanating from substation and interconnection equipment. Mechanical noise is primarily generated by the gearbox, generator, cooling fans and other moving parts within the wind turbine. Mechanical noise tends to be tonal but also has a broadband component. Aerodynamic noise originates primarily from the flow of air over and past the blades, so it generally relates to the ratio of blade tip speed to wind speed. Aerodynamic noise is characterized by a broadband "swish" sound, and is the dominant noise component for modern wind turbines. Some noise would also be generated from substation and interconnection equipment. The primary noise from substations is a tonal noise emanating from the transformers; this occurs at harmonic frequencies of the transmission frequency (e.g., 120, 240 and 360 Hz tones on a 60-Hz transmission system).

Significant impacts may occur if the Project results in noise levels in exceedance of national, state or local standards, without obtaining a waiver from the owner of the affected noise sensitive receptor.

Construction

The construction of the Project may cause short-term noise impacts. The sound levels resulting from construction activities vary significantly depending on factors such as the type and age of equipment, the specific equipment manufacturer and model, the operations being performed, and the overall condition of the equipment and exhaust system mufflers. The only noise standard applicable to construction is the Stark County standard quoted above. Construction noise is highly unlikely to exceed the 80 dBA daytime limit in this standard given the distance to the nearest residences, and construction noise would not be considered "sustained" noise as specified in that standard. Nevertheless, all reasonable efforts will be made to minimize the impact of noise resulting from construction activities.

Once the Project has been built, no noticeable noise impacts are anticipated from regular maintenance.

Operation

Noise generation data is provided by the manufacturer of each considered turbine type, and is a composite of both mechanical and aerodynamic noise based on empirical measurements. Noise measurements are typically taken at ground level, downwind of a turbine, at a distance equal to the hub height plus ½ rotor diameter.

Table 14 provides manufacturers' noise ratings for each of the five turbines considered for the Project. This table indicates the typical distance at which turbine noise would exceed the North Dakota Noise Standard for Wind Energy of 50 dBA, as well as the typical distance at which turbine noise would fade to background levels. These are based on a single turbine using a simple geometric attenuation model, and may be somewhat different for a turbine array.

Table 14. Noise Characteristics for Considered Wind Turbine Models

	Vestas 2.0 V-110	Vestas 2.0 V-100	GE 1.7-100	GE 1.85-87	Siemens 2.3-108
Maximum Noise Level per Manufacturer (dBA)	107.5	105.0	107.0	106.5	108.0
Distance (feet) from one turbine to Achieve Compliance with ND Noise Standard for Wind Energy (50 dBA)	920	720	930	875	975
Distance (feet) from one turbine to Assumed Background Sound Level (38 dBA)	2,500	2,000	2,600	2,425	2,675

Table 14 indicates that turbines would need to be set back from 720 to 975 feet from noise sensitive receptors in order to avoid exceedances of the state noise standard. At a distance of 2,000 to 2,675 feet from a wind turbine (depending on model), the turbine noise would be indistinguishable from background noise levels.

As the final layout of the Project is designed, Sunflower will observe the setbacks to residences as established by Morton and Stark Counties (see Section 4.12). Wind turbines will be sited a minimum of 1,320 feet from occupied residences in Morton County and 2,000 feet from occupied residences in Stark County, in accordance with the requirements of the respective county zoning regulations.

Table 15 indicates typical noise levels from each of the considered turbine types at the respective Morton and Stark county setback limits. Because noise is additive when there is an array of turbines, Table 16 indicates noise levels where one, two or three turbines would be placed at the setback lines. The noise levels for the three-turbine array are very conservative, as it is highly unlikely that three turbines could be placed within this proximity of a single noise sensitive receptor.

Table 15. Predicted Noise Levels at County Setback Limits

Specification		Vestas 2.0 V-110	Vestas 2.0 V-100	GE 1.7-100	GE 1.85-87	Siemens 2.3-108
Highest Spec. Noise (dBA L_{eq}) at 1320 feet (Morton County Setback Limit)	1 WTG	45	43	46	45	47
	2 WTGs	48	46	49	48	50
	3 WTGs	50	47	50	49	51
Maximum Noise (dBA L_{eq}) at 2000 feet (Stark County Setback Limit)	1 WTG	40	38	41	40	42
	2 WTGs	43	41	44	43	45
	3 WTGs	45	43	46	45	46

This analysis demonstrates that the implementation of standard county setbacks would likely avoid all potential noise exceedances for any of the five turbine models considered. A complete noise analysis will be conducted as part of the final Project layout. If a potential exceedance cannot be avoided through micrositing and application of standard county setbacks, Sunflower will request waivers from the affected landowners or further adjust the Project layout to avoid a potential noise exceedance.

Potential Noise Impacts to Wildlife

Although it is likely that construction of the Project will result in short-term disturbance of wildlife, it will be difficult to assess whether the disturbance comes from the noise of construction activities or the activities themselves (e.g., construction vehicles moving along roads). All such activities will be short-term and limited to the period of construction. Available research regarding the noise impacts of wind farm operations suggests that animals in the area would either habituate to consistent low-frequency noise from the turbines or would alter their behaviors to adapt to the new acoustic environment (e.g., Rabin et al. 2003, Brumm and Slabbekoorn 2005, Wood and Yezerinac 2006).

Reconductoring of the Mandan-Ward transmission line would not create additional noise impacts. Noise disturbance would be limited to the use of equipment to remove the existing conductors and install new wires. This would be short-term and temporary. Once the new conductors are in place, the Mandan-Ward transmission line is likely to operate with a lower noise level than currently exists as the new conductors would likely exhibit less corona activity than the older wires that are likely to be dirtier and more pitted.

Indirect Impacts

The Project would have no indirect noise impacts.

Avoidance, Minimization and Best Management Practices

Sunflower will work to site turbines in the final design stage such that potential noise exceedances would be avoided if possible, and would work with landowners and/or residents to obtain waivers where avoidance is not practical.

Sunflower will implement conservation measures applicable to noise, as identified in the Draft UGP Wind Energy PEIS (see PEIS section 5.5.2), as follows:

Measures applicable throughout multiple phases of a wind energy development project include the following:

- Take advantage of topography and the distance to nearby sensitive receptors when positioning potential sources of noise.
- Establish sufficient setback distances from sensitive receptors wherever feasible. Based on previous experience, noise complaints seldom exist for people living more than 1–1.5 mi (1.6–2.4 km) from a wind farm (Stewart 2006).
- Select equipment with the lowest noise levels available and no prominent discrete tones, when possible.

- Maintain all equipment in good working order in accordance with manufacturer specifications. Suitable mufflers and/or air-inlet silencers should be installed on all internal combustion engines and certain compressor components.
- All vehicles traveling within and around the project area should operate in accordance with posted speed limits.
- Establish a process for documenting, investigating, evaluating, and resolving project-related noise complaints.

Measures applicable during construction of a wind energy project include the following:

- Limit noisy construction activities to the least noise-sensitive times of day (daytime only, between 7 a.m. and 7 p.m.) and weekdays.
- Schedule noisy activities to occur at the same time whenever feasible, since additional sources of noise generally do not greatly increase noise levels at the site boundary. Less-frequent but noisy activities would generally be less annoying than lower-level noises occurring more frequently.
- Locate stationary construction equipment (e.g., compressors or generators) as far as practical from nearby sensitive receptors.
- In the unlikely event that blasting or pile driving would be needed during the construction period, notify nearby residents in advance.

Measures applicable during operation of a wind energy project include:

- If a transformer becomes a noise issue, a new transformer with reduced flux density generating noise levels as much as 10–20 dB lower than National Electrical Manufacturers Association (NEMA) standard values could be installed. Alternatively, barrier walls, partial enclosures, or full enclosures could be adopted to shield or contain the transformer noise, depending on the degree of noise control needed.

The same measures applicable to construction activities are applicable to decommissioning activities.

Additional site-specific measures to reduce noise impacts may be identified and implemented, however noise impacts are not anticipated to be significant for any of the turbine models considered.

4.16 Transportation

4.16.1 Existing Conditions

Ground Transportation

The analysis area for transportation impacts is the area delineated by roadways adjacent to the Project Area. The Project Area is generally bounded by I-94 on the north side, 43rd Street on the south, 80th Avenue on the west, and 73rd Avenue on the east. Local county roads are spaced throughout the Project Area; these are generally section line roads. However, while section lines in North Dakota are all designated as public right-of-way, not all section line rights-

of-way have been developed as roads, or are owned or maintained by the local counties. County-maintained roads within the Project Area are shown on Figure 3.

State Highway 10 (ND 10)[5] is the only other major road in the vicinity; it runs through Hebron en route between Glen Ullin and Richardton. A Burlington Northern Santa Fe (BNSF) rail line runs roughly adjacent to ND 10.

Most construction equipment and materials would arrive at the Project Area via truck, along I-94. An existing interchange is located south of Hebron at 76th Avenue, approximately at the center of the north side of the Project Area; this interchange and 76th Avenue would serve as the primary route from the highway into the Project Area. Additional I-94 interchanges are located one mile northeast (at ND 10) and three miles west (at 83rd Avenue) of the Project Area, allowing options for specific routing of Project materials if necessary.

According to the North Dakota Department of Transportation (NDDOT)'s 2007 Functional Classification Maps, all roads within the Project Area are considered local roads. 76th Avenue north of I-94 is a County Major Collector, as are ND 10 and 44th Street SW, which runs east-west one mile south of the Project Area between Glen Ullin and 83rd Avenue (this route is also named as County Road 138, and on the NDDOT maps as CMC 3018 in Morton County and CMC 4520 in Stark County). The Morton County Road Map identifies 76th Avenue south of Hebron and County Road 89 as County Highways. In the Morton County Comprehensive Plan, ND 10 and 76th Avenue north of I-94 are identified as Major Collectors, while other roads in the vicinity are minor county roads. Some are shown on the Morton County Road Map as minimum maintenance roads. The Stark County Comprehensive Plan does not provide road classifications; all roads in the Project Area appear to be minor county or private roads. Roads within the Project Area are generally gravel surfaced.

Traffic volume data in the vicinity of the Project are limited. No vehicle count data are available for the county and township roadways in the Project Area. Traffic counts are available for some roads in the vicinity. Available existing traffic volumes on the area's roadways are documented in Table 16.

[5] The status of ND 10 as a state highway, and its correct name, are unclear. On some maps it is identified as a state highway, while on others, including maps from the NDDOT, it is referred to as a county road. Some maps name it as County Road 139; the Morton County Road Map names it as County Highway 139; and the NDDOT 2007 Functional Classification Map names it as County Maintained Collector 3006. For ease of reference in this document, it is referred to as ND 10.

Table 16. Existing Daily Traffic Levels

Roadway Segment	Existing Average Annual Daily Traffic (AADT)/Commercial Truck Traffic
I-94 at Richardton	7320/ 2110
I-94 at Hebron	7595/ 2145
I-94 westbound exit at Hebron	70/ n/a
!-94 westbound on-ramp at Hebron	250/ n/a
I-94 eastbound exit at Hebron	85/ 20
I-94 eastbound on-ramp at Hebron	75/ 25
76th Ave north of I-94	500/ n/a
76th Ave south of I-94	140/ n/a
ND10 at Glen Ullin	575/ 55
ND 10 west of Hebron	190/ 15
83rd Avenue south of I-94	225/ n/a
ND 8 south of Richardton	555/ n/a
50th Street SW at ND 8	25/ n/a

Source: North Dakota DOT Transportation Information Map (NDDOT, 2013).

Additional county and township roads run through the Project Area in addition to those listed in Table 16, but no vehicle count data are available for them. In general, the North Dakota Department of Transportation (NDDOT) indicated that roads with vehicle counts under 100 AADT are rarely counted. According to NDDOT, vehicle counts on routes with no count data are likely lower than those with count data. For purposes of comparison, the functional capacity of a two-lane paved rural road is approximately 5,000 vehicles per day, or Average Annual Daily Traffic (AADT). Paved four-lane highways such as I-94 have a functional capacity of approximately 80,000 vehicles per day. Based on these data, traffic volumes on the roads in and near the Project Area are low and levels of service are high.

Air Transportation

There are two public airports and four private airports within 25 miles of the Project Area (Table 17). Setbacks from public and private airports follow North Dakota Aeronautics Commission and FAA requirements.

Table 17. Public/Private Airports within 25 Miles of the Project Area

Airport Name	Type	Distance from the Project Area (miles)
Chase Airstrip	Private	4.4
Glen Ullin Regional	Public	5.75
Richardton	Public	10.7
Brands	Private	15.0
Fitterer's Strip	Private	16.5
Jurgens Airstrip	Private	17.4

Notice to the FAA allows the agency to evaluate the effect of the proposed construction on air safety and navigable airspace, which begins with a determination of whether the proposed structure represents an obstruction. Thresholds for notice are defined in 14 CFR Subpart B Section 77.9, and are related to construction that would represent an obstruction or would intrude upon protected airspace or approach and takeoff clearance areas around airports. The first threshold for notice is any construction or alteration that would exceed 200 feet above ground level. The second threshold for notice is construction that would exceed the height of an imaginary surface extending upward and outward for a horizontal distance of 20,000 feet (3.8 miles) from a public use airport, a military airport, an airport operated by a federal agency or the Department of Defense, or an airport with an FAA-approved Instrument Approach Procedure (IAP).

The Project meets the first threshold for notice to the FAA and a determination of hazard. The Project is required to submit notice to the FAA due to the overall height of the considered wind turbine models. Although there is one private airstrip, Chase, within 3.8 miles of the Project Area, this airfield is not public, is not operated by the military or other federal agency, and does not have an FAA-approved IAP, so the notification requirement is not triggered by the presence of this airstrip.

Obstructions are defined in 14 CFR 77, Subpart C (Sections 77.13 through 77.23), which defines obstructions based on both absolute height of the proposed object and height in relation to protected airspace, in effect establishing five distinct thresholds. The first threshold is defined in Section 77.17(a)(1) as an object that is greater than a height of 499 feet above ground level at the site of the object. The second threshold is defined in Section 77.17(a)(2) as an object with "a height that is 200 feet AGL, or above the established airport elevation, whichever is higher, within 3 nautical miles [3.45 statute miles] of the established reference point of an airport, excluding heliports, with its longest runway more than 3,200 feet in actual length." As with the notification requirement, "airport" is defined as a public use airport, a military airport, an airport operated by a federal agency or the Department of Defense, or an airport with an FAA-approved Instrument Approach Procedure (IAP). A Determination of No Hazard to Air Navigation will be issued when the aeronautical study concludes that the proposed construction or alteration will exceed an obstruction standard but would not have a substantial aeronautical impact to air navigation. A Determination of No Hazard may include conditional provisions, limitations to minimize potential problems, supplemental notice requirements, or requirements for marking and lighting, as appropriate.

4.16.2 Potential Impacts

Direct Impacts

Ground Transportation

Construction of the Project would increase traffic on local roads to the Project Area, possibly causing temporary impacts to local traffic flow while equipment is hauled to the site. Construction-related vehicles would primarily use I-94, and access the Project Area via the

interchange with 76th Avenue just south of Hebron. The Project EPC contractor would obtain any necessary permits for transporting equipment.

While the number of vehicle trips for workers and equipment has not been modeled, construction traffic is highly unlikely to materially impact local traffic patterns or lower the existing levels of service, given the low volume of existing traffic.

Impacts to existing road infrastructure will mostly be positive. Construction activities associated with the Project would use the existing local roads whenever possible. Where needed, existing local roads will be improved to allow heavy construction cranes and extra-long trucks used to transport turbine blades. These on-site and offsite improvements will remain in place following the completion of construction to assist with access and maintenance of the proposed facilities. Roads damaged during construction will be returned to pre-construction condition or better.

Air Traffic

The installation of wind turbines creates a potential for impacts to air traffic. However, no new transmission lines will be constructed as part of the Project, and the wind turbines and meteorological towers themselves will be visible from a distance. The wind turbines and meteorological towers will have lighting and markings that comply with FAA requirements. Due to minimal air traffic, generally good visibility, and lighting, etc., no impact to air traffic is anticipated.

Because the Project is not located in close proximity to any airport, construction of the Project is expected to result in a Determination of No Hazard to Air Navigation, with the condition that the Project include lighting on selected turbines and utilize white- or off-white-colored turbines and towers to enhance visibility of the Project to pilots. The Project would not affect protected airspace for any airport as defined in the FAA rules.

Reconductoring of the Mandan-Ward transmission line would have no impact to air traffic. This work would utilize the existing transmission support towers and all work would occur within the existing transmission right-of-way. The reconductored transmission lines would be essentially identical to their current configuration.

Indirect Impacts

The Project would not create indirect impacts to transportation.

Avoidance, Minimization and Best Management Practices

Sunflower will observe the setbacks to roadways as established by the State in NDAC 69-06-08 during final micrositing of Project infrastructure. The observance of these setbacks would prevent damage to area roadways or disruptions to local travel in the unlikely event of a catastrophic failure of a wind turbine.

Sunflower will also comply with avoidance and minimization measures and BMPs related to transportation impacts as identified in the Draft UGP Wind Energy PEIS, as follows:

- Existing roads should be used to the extent possible, but only in safe and environmentally sound locations. If new access roads are necessary, they should be designed and constructed to the appropriate standard necessary to accommodate their intended function (e.g., traffic volume and weight of vehicles) and minimize erosion. Access roads that are no longer needed should be recontoured and revegetated.
- A transportation plan should be prepared that identifies measures the developer will implement to comply with State or Federal requirements and to obtain the necessary permits. This will typically address the transport of turbine components, main assembly crane, and other large pieces of equipment. The plan should consider specific object size, weight, origin, destination, and unique handling requirements and should evaluate alternative means of transportation (e.g., rail or barge).
- A traffic management plan should be prepared for the site access roads to ensure that no hazards would result from increased truck traffic and that traffic flow would not be adversely impacted. This plan should identify measures that will be implemented to comply with any State or Federal DOT requirements, such as informational signs, flaggers when equipment may result in blocked throughways, and traffic cones to identify any necessary changes in temporary lane configurations. Signs should be placed along roads to identify speed limits, travel restrictions, and other standard traffic control information. To minimize impacts on local communities, consideration should be given to limiting construction vehicles on public roadways during the morning and late afternoon commute times.
- Project personnel and contractors should be instructed and required to adhere to speed limits commensurate with road types, traffic volumes, vehicle types, and site-specific conditions to ensure safe and efficient traffic flow.
- During construction, operations and maintenance, and decommissioning phases, traffic should be restricted to designated project roads. Use of other unimproved roads should be restricted to emergency situations.

Additional site-specific measures to further reduce impacts to transportation systems may be identified and implemented as appropriate; however impacts to transportation are not anticipated to be significant.

4.17 Human Health and Safety

4.17.1 Existing Conditions

Telecommunication and Radar

Wind turbines can cause loss of detection, false alarms, and corrupt data for primary and weather surveillance radar. This is a concern for air traffic control, the Department of Defense (DOD), Department of Homeland Security (DHS), Federal Aviation Administration (FAA), and for weather radar (i.e., NEXRAD [next generation weather radar]). The potential impacts to radar systems are greatest if wind turbines are placed within 10 nautical miles of a radar unit.

Telecommunications can be impacted by wind turbines if the turbines are placed within the line-of-sight between two communicating towers. Two private land-mobile communication towers

and one microwave transmission tower are located within the Project Area (HDR 2011; see Appendix D). Seventeen registered microwave towers are located on a large hill (Custer Lookout) about 1.5 miles west of the Project Area.

A microwave beam path study was conducted to identify all non-federal microwave telecommunication systems, as well as AM, FM, cellular, and television tower locations (see report in Appendix D). The study identified 15 specific microwave pathways that cross the Project Area; the worst-case Fresnel zones (WCFZ) for each beam path were calculated. Turbines placed within these beam pathways would potentially cause disruptions to microwave communications.

The FAA's online Department of Defense (DoD) Preliminary Screening Tool (DoD Tool) allows developers to gain preliminary insights regarding potential impacts that structures may have on long range radars, military training routes, and special use airspace prior to official filing of an Obstruction Evaluation/Airport Airspace Analysis request with the FAA. This tool does not replace any official processes or procedures that may be required by the FAA.

The Long Range Radar Screening Tool indicates that there would be no impacts to Air Defense and Homeland Security radars, minimal to no impact to Weather Surveillance Radar or Doppler Radar, and no impacts to military airspace. When the notice of proposed construction to the FAA is filed (see Section 4.16), the FAA will conduct an aeronautical study that will include an assessment of potential impacts to radar systems.

Electromagnetic Fields

The term electromagnetic fields (EMF) refers to electric and magnetic fields that are present around any electrical device. Electric fields arise from voltage, or electrical charges, and magnetic fields arise from current, or the flow of electricity through transmission lines, power collection lines, substation transformers, house wiring, and electrical appliances. The intensity of the electric field is related to the voltage of the line, and the intensity of the magnetic field is related to the current flow through the conductors.

The Project would generate EMF at the substation and interconnection switchyard and the underground collection system. All Project facilities would be set back from residences as required by state and county regulation. At these distances Project EMF levels would not be above background levels at the residences. The only exposure would be to maintenance workers, primarily at the substation.

Hazardous Materials / Hazardous Waste

The Project Area is located in a relatively rural area of North Dakota. Potential hazards may exist in rural areas from old gasoline facilities, landfill sites, and private activities. Hazardous wastes from large industrial or commercial activities are not likely.

The Environmental Protection Agency (EPA) Superfund National Priorities List (NPL) database was reviewed to determine the potential for major hazardous material issues within the Project Area. No NPL sites are present within Stark and Morton counties (U.S. EPA CERCLIS 2009;

cited in HDR 2011, see Appendix D). NDDOT maps were also consulted as they often identify known dumps in the area; there are no known dumps in the Project Area. There are no hazardous waste handlers or toxic release inventory sites located within the Project Area or within 5 miles of the Project Area (National Atlas 2009; cited in HDR 2011, see Appendix D).

Potentially hazardous materials associated with the Project include gear box oil, hydraulic fluid, and gear grease for the turbines, and mineral oil used for the transformers.

Vandalism, Sabotage, and Terrorism

Wind farms and associated infrastructure may be the subject of intentional destructive acts ranging from vandalism and theft to sabotage and acts of terrorism intended to disable a project. The most likely risk of damage to the Project would be from casual vandalism and targeted metal theft. Vandalism could take many forms, and would be very difficult to entirely prevent as these acts are often spontaneous and opportunistic in nature rather than premeditated acts. Examples would include damage to tower doors due to attempts to gain access, or damage to Project components from shooting or vehicles. Metal theft is an increasing problem for utilities, as the industry uses large amounts of copper and aluminum. Theft is most likely to involve substation and switchyard equipment that contains salvageable metal (e.g., copper and aluminum) when metal prices are high. Theft of these metals can be extremely hazardous to the thieves because of electrocution risk.

The Project would not constitute an attractive target for sabotage or terrorism, as the facilities would be difficult to damage, and the impact from any successful act would be negligible, both from a practical and political perspective. Western believes, therefore, that the proposed Project would present an unlikely target for an act of terrorism, and would have an extremely low probability of attack.

4.17.2 Potential Impacts

For the purpose of this analysis, a significant impact to public safety and health would occur if: 1) the Project resulted in an increase in personal injuries; 2) the Project resulted in an increase in health risk to area residents; 3) the Project resulted in impacts to public health as a result of increased electric and magnetic fields; or 4) the Project resulted in a violation of federal, state, or local regulations regarding handling, transport, or containment of hazardous materials.

All facilities would be constructed in accordance with the National Electrical Safety Code, U.S. Department of Labor Occupational Safety and Health Standards, and Central's Power System Safety Manual for maximum safety and property protection.

Telecommunications and Radar

A beam path study was conducted to identify all non-federal microwave telecommunication systems, as well as AM, FM, cellular, and television tower locations (see report in Appendix D). The worst-case Fresnel zones (WCFZ) for each beam path were calculated. The study identified several beam paths crossing the Project Area. These areas will be avoided during micrositing of the Project.

With the switch to digital television in 2009 throughout the United States, the concern of ghost images and flickering that may be caused by wind turbine interference with analog signals are no longer an issue.

The Long Range Radar Screening Tool indicates that there would be no impacts to Air Defense and Homeland Security radars, minimal to no impact to Weather Surveillance Radar or Doppler Radar, and no impacts to military airspace.

Reconductoring of the Mandan-Ward transmission line would have no adverse impact to telecommunications and radar; the improved lines would be essentially identical to the current configurations.

Electromagnetic Fields

While the general consensus is that power-frequency electric fields pose no risk to humans, the question of whether exposure to magnetic fields can cause biological responses or health effects continues to be the subject of research and debate. As discussed above, EMF levels would not be above background levels at any residences. The only exposure would be to maintenance workers, primarily at the substation, and no impacts to health and safety would be created.

Reconductoring of the Mandan-Ward transmission line would not cause adverse EMF impacts. This work would not increase EMF levels above existing levels, and may lower EMF levels depending on the specific conductor design and configuration.

Hazardous Materials / Hazardous Waste

The presence of hazardous materials within the Project Area is unlikely; however, Sunflower will conduct a Phase 1 Environmental Assessment prior to final design to further investigate historic uses of the site and the potential for contamination.

All hazardous materials will be handled in accordance with state and federal regulation. The potential for spills of hazardous materials will be mitigated by the implementation of a Spill Prevention, Control and Countermeasures (SPCC) Plan during construction of the Project. An SPCC Plan would not be necessary during the operational phase of the Project, because the only significant quantities of hazardous materials would be contained within the substation transformers, switches and circuit breakers. These are considered qualified oil-filled operational equipment, and require the establishment of an inspection and monitoring program, as well as a spill contingency plan and the commitment of resources to expeditiously control and remove any discharged oil. Sunflower will implement avoidance and minimization measures and best management practices identified in the Draft UGP Wind Energy PEIS as listed below to prevent potential releases of hazardous materials, and to quickly respond to spills if they occur. These measures will reduce the level of risk for human health impacts to a level of non-significance.

Reconductoring of the Mandan-Ward transmission line would not result in an increased hazard due to hazardous materials. The only hazardous materials that would be involved would be

fuels and hydraulic oils for construction equipment. These would be managed according to the Project SPCC and in accordance with applicable state and federal regulations.

Vandalism, Sabotage, and Terrorism

Standard security measures will be taken during construction and operation, to limit access and deter many potential intruders. Such measures include temporary and permanent fencing at the substation and interconnection switchyard, posting of "High Voltage" warning signs and locks on equipment and wind power facilities. Access will be strictly controlled to all facilities, including turbines, the substation and the interconnection switchyard. Turbines will sit on solid-steel-enclosed tubular towers in which all electrical equipment would be located except for the pad-mounted transformer. Access to the turbines will only be through a solid steel door that will be locked when not in use. Access to the substation and switchyard will also be controlled by key entry. The presence of high voltage would also discourage theft and vandalism.

Landowner and maintenance worker monitoring will also serve to deter acts of theft or vandalism. Resident landowners would be expected to be vigilant concerning unauthorized persons on their property, and the presence of Project personnel on site would add additional observers. The relatively remote location of the Proposed Project would tend to reduce vandalism on the whole, because of the small number of people who would be expected to encounter the turbines or transmission line. However, this same remoteness might encourage a rare act of opportunistic vandalism. Such occurrences would be infrequent and would be vigorously investigated and prosecuted to discourage further acts. Vigorous prosecution of thieves and monitoring of metal recycling operations might deter the theft of equipment. Similarly, the prosecution of vandals who have damaged or destroyed project equipment might discourage vandalism.

The effects of intentional destructive acts could be wide ranging or more localized, depending on the nature and location of the acts and the size of the project, and would be similar to outages caused by natural phenomena such as storms and ice buildup. Since the wind project taps the Western system, destructive acts to the wind project would not have a local or regional effect since auxiliary power would come from other sources than the wind turbines.

Destructive acts could cause environmental effects from damage to the facilities. Two such possible effects would be fire ignition, should conductors be brought down, and oil spills from equipment (e.g., mineral oil in transformers) in the substation, should that equipment be damaged or breached. Fires would be fought in the same manner as those caused by an electrical storm. Any spills would be treated by removing and properly disposing of contaminated soil and replacing it with clean soil. Implementation of the Western Standard Construction Practices and applicable avoidance and minimization measures from the UGP Wind Energy PEIS would be applied to inhibit intentional destructive acts.

These measures will act to reduce the potential for vandalism, sabotage and terrorism-related impacts. Western believes that the Project presents an unlikely target for an act of terrorism, with an extremely low probability of attack. Similarly, the reconductored Mandan-Ward transmission line also represent an unlikely target for an act of terrorism, and the reconductoring

work would not significantly alter the lines' design or purpose such that they would become a more likely target or would be more vulnerable to an attack.

Avoidance, Minimization and Best Management Practices

Sunflower will comply with the avoidance and minimization measures and BMPs identified in the Draft UGP Wind Energy PEIS related to human health and safety, interference with communications and radar systems, hazardous materials management, EMF and sabotage (see PEIS sections 5.12.1.4 and 5.13.4), as follows:

Measures to protect wind energy facility and transmission line workers are applicable during all phases associated with a project.

- All site characterization, construction, operation, and decommissioning activities must be conducted in compliance with applicable Federal and State occupational safety and health standards (e.g., the Occupational Health and Safety Administrations [OSHA's] Occupational Health and Safety Standards, 29 CFR Parts 1910 and 1926, respectively).
- Conduct a safety assessment to describe potential safety issues and the means that would be taken to mitigate them, covering issues such as site access, construction, safe work practices, security, heavy equipment transportation, traffic management, emergency procedures, and fire control.
- Develop a health and safety program to protect workers during site characterization, construction, operation, and decommissioning of a wind energy project. The program should identify all applicable Federal and State occupational safety standards and establish safe work practices addressing all hazards, including requirements for developing the following plans: general injury prevention; personal protective equipment (PPE) requirements and training; respiratory protection; hearing conservation; electrical safety; hazardous materials safety and communication; housekeeping and material handling; confined space entry; hand and portable power tool use; gas-filled equipment use; and rescue response and emergency medical support, including on-site first-aid capability.
- As needed, the health and safety program must address OSHA standard practices for the safe use of explosives and blasting agents (if needed for site development); measures for reducing occupational EMF exposures; the establishment of fire safety evacuation procedures; and required safety performance standards (e.g., electrical system standards and lighting protection standards). The program should include training requirements for applicable tasks for workers and establish procedures for providing required training to all workers. Documentation of training and a mechanism for reporting serious accidents to appropriate agencies should be established.
- Design all electrical systems to meet all applicable safety standards (e.g., the National Electrical Safety Code) and comply with the interconnection requirements of the transmission system operator.
- In the event of an accidental release of hazardous substances to the environment, document the event, including a root cause analysis, a description of appropriate corrective actions taken, and a characterization of the resulting environmental or health

and safety impacts. Documentation of the event should be provided to permitting agencies and other appropriate Federal and State agencies within 30 days, as required.

The following measures for the protection of public health and safety are applicable during all phases associated with a wind energy project:

- Develop a project health and safety program that addresses protection of public health and safety during site characterization, construction, operation, maintenance, and decommissioning activities for a wind energy project. The program should establish a safety zone or setback for wind energy facilities and associated transmission lines from residences and occupied buildings, roads, ROWs, and other public access areas that is sufficient to prevent accidents resulting from various hazards during all phases of development. It should identify requirements for temporary fencing around staging areas, storage yards, and excavations during construction or decommissioning activities. It should also identify measures to be taken during the operations phase to limit public access to facilities (e.g., equipment with access doors should be locked to limit public access, and permanent fencing with slats should be installed around electrical substations).
- Develop a traffic management plan for the site access roads to control hazards that could result from increased truck traffic (most likely during construction or decommissioning), ensuring that traffic flow would not be adversely affected and that specific issues of concern (e.g., the locations of school bus routes and stops) are identified and addressed. This plan should incorporate measures such as informational signs, flaggers (when equipment may result in blocked throughways), and traffic cones to identify any necessary changes in temporary lane configurations. The plan should be developed in coordination with local planning authorities.
- Site and design wind energy facilities to eliminate glint and glare effects on roadway users, nearby residences, commercial areas, or other highly sensitive viewing locations, or reduce it to the lowest achievable levels.
- Use proper signage and/or engineered barriers (e.g., fencing) to limit access to electrically energized equipment and conductors in order to prevent access to electrical hazards by unauthorized individuals or wildlife.
- If operation of the wind energy facility and associated transmission lines and substations could cause potential adverse impacts on nearby residences and occupied buildings as a result of noise, sun reflection, or EMF, incorporate recommendations for addressing these concerns into the project design (e.g., establishing a sufficient setback from transmission lines).
- Site and design the project to comply with FAA regulations, including lighting requirements, and to avoid potential safety issues associated with proximity to airports, military bases or training areas, or landing strips.
- Develop a fire management and protection plan to implement measures to minimize the potential for a human-caused fire and to respond to human- caused or natural-caused fires.

- Project developers shall work with appropriate agencies (e.g., DOE and TSA) to address critical infrastructure and key resource vulnerabilities at wind energy facilities, and to minimize and plan for potential risks from natural events, sabotage, and terrorism.

Sunflower will implement these measures while finalizing the Project layout, and during construction, operation, and decommissioning of the Project. Additional site-specific measures may be identified and implemented as appropriate; however, the Project is not expected to have a significant adverse effect on human health and safety.

4.18 Recreation

4.18.1 Existing Conditions

There are no designated recreation areas, public or private parks and no designated trails in or near the Project Area. The nearest known public recreational resource is the BLM Schnell Recreation Area, located approximately 9 miles northwest of the Project Area.

A major recreational activity in North Dakota is hunting. The NDFGD runs the Private Land Open to Sportsmen (PLOTS) program, under which private lands enrolled in the program may be opened to the public for hunting. No PLOTS are located within the Project Area; several PLOTS parcels are located near the southwestern corner of the Project Area (see Figure 2). These PLOTS lands would not be impacted by the Project.

4.18.2 Potential Impacts

Because there are no designated recreation resources in and near the Project Area, the Project would have no impact to recreation. No conservation measures are proposed.

Reconductoring of the Mandan-Ward transmission line would have no significant adverse impacts to recreation resources. The work would occur entirely within the existing rights-of-way and would utilize existing access roads and other existing infrastructure. If any portion of the right-of-way is used for recreation, access to that area would be temporarily disrupted during construction, but would be allowed to resume once reconductoring is completed.

4.19 Cultural, Historical, and Architectural Resources

Cultural resources include archeological sites, historic standing structures, objects, districts, traditional cultural properties and other properties that illustrate important aspects of prehistory or history or have important and long-standing cultural associations with established communities or social groups. Significant archeological and architectural properties are usually defined by eligibility criteria for listing in the National Register of Historic Places (NRHP), in consultation with the State Historic Preservation Office (SHPO).

4.19.1 Existing Conditions

A search of the State Historical Society of North Dakota's web site and manuscript files was conducted for the Area of Potential Effect (APE), defined as the area in and within 1 mile of the

Project Area. The file search revealed one site, no site leads, and no isolated finds within a one mile radius of the APE; and four manuscripts on file within sections of the APE (see Tables 2 and 3 in Appendix C). A portion of previously recorded site 32MO1379 was located within the APE.

A Class III pedestrian survey was conducted in September 2013 by Beaver Creek Archaeology, Inc. (BCA; see report in Appendix D). During the field inventory, BCA archaeologists identified four previously unrecorded cultural resources and one previously recorded site. Resources included one Native American cultural material scatter (32MO1379), two Native American Isolated Finds (32MOx553 and 32MOx554), and two Historic/Architectural Sites (32MO1415 and 32MO1416). The Native American cultural material scatter site has been recommended unevaluated to the National Register of Historic Places (NRHP) by BCA, and is recommended to be avoided during construction. The two Isolated Finds and Historic/Architectural sites were recommended as not eligible to the NRHP and will not need to be avoided. Further evaluation of the Native American cultural material scatter site in consultation with SHPO may find that this site is not eligible for NRHP listing and does not need to be avoided; however, avoidance will be assumed until such time as SHPO makes such a determination.

BCA also conducted an architectural inventory of structures and buildings around the Project Area to determine the potential for visual impacts to potentially NRHP-eligible architectural sites caused by the Project. During the visual impact inventory, seven architectural locations, with 16 structures, were examined. None of the structures in the APE were recorded as potentially eligible for NRHP listing. The BCA report notes that the survey did not cover all potential impacts of the Project, since the location of some facilities was not known at the time of the surveys. Sunflower will conduct additional surveys prior to construction to characterize any potential new impact areas.

The online NRHP database was searched for registered properties in the APE. No NRHP registered archaeological or historic facility resources are located within the APE.

The absence of listed archaeological and/or historic facility resources does not mean the Project Area is clear of significant resources. It is possible there are both recorded and unrecorded resources in the Project Area that may be significant, but which have been neither evaluated nor had their status determined. Additionally, previously unknown cultural or archaeological resources may be identified during Project construction.

4.19.2 Potential Impacts

A significant impact to cultural resources would occur if a site or archaeological, tribal, or historical value that is listed, or is eligible for listing, in the NRHP could not be avoided or mitigated during siting or construction of the Project.

Possible concerns that should be considered for this project include:

- Unrecorded cultural resources located within the study area;
- Any ground disturbing activity within the study area that has potential to impact known or unknown cultural resources; and

- Visual impacts to recorded or unrecorded cultural resource properties.

No significant impacts to cultural resources are anticipated from the Project. As the layout of the Project is finalized, the location of Project facilities will be adjusted as needed to avoid impacts to cultural resources.

If historic or prehistoric materials are discovered during monitoring of earth-disturbance construction activities, construction would be halted and Western would be notified in order to initiate procedures outlined in 36 CFR Part 800. These procedures would include evaluating the find for eligibility and determining appropriate treatment with the SHPO and the North Dakota Intertribal Reinterment Committee (NDIRC).

An impact to significant architectural resources would occur if a site that is listed, or is eligible for listing, in the NRHP would be affected by the Project. Effects can be either direct, which involves physical harm to a listed or eligible resource, or indirect, which involves a change in the setting, feeling or associations related to a listed or eligible resource. Since no NRHP listed or eligible architectural resources are known to exist in the Project Area, impacts are not expected.

Reconductoring of the Mandan-Ward transmission line would not impact cultural, historical or archaeological resources. That work would utilize existing access roads and other disturbed areas, and would not require the disturbance of additional lands. Reconductoring would not substantially alter the appearance of the existing transmission line, so would not impact the viewshed of listed properties or sites.

Avoidance, Minimization and Best Management Practices

In addition to the measures noted above, Sunflower will implement avoidance and minimization measures and best management practices applicable to historic and cultural resources identified in the Draft UGP Wind Energy PEIS (see PEIS sections 5.8.1.6 and 5.9.1.6), as follows:

The following conservation measures could be implemented to address potential impacts on potential paleontological resources:

- Whether paleontological resources exist in a project area should be determined on the basis of the sedimentary context and soil surveys of the area, a records search of Federal, State, and local inventories for past paleontological finds in the area, review of past paleontological surveys, and/or a paleontological survey.
- Placement of wind energy structures in fossil-rich areas, such as outcrops, should be avoided.
- A paleontological resources management plan should be developed for areas where there is a high potential for paleontological material to be present. Management options may include avoidance, removal of the fossils, or monitoring. If the fossils are to be removed, a mitigation plan should be drafted identifying the strategy for collection of the fossils in the project area. Often it is unrealistic to remove all of the fossils, in which case a sampling strategy can be developed. If an area exhibits a high potential, but no fossils were observed during surveying, monitoring could be required. A qualified paleontologist

should monitor all excavation and earthmoving in the sensitive area. Whether the strategy chosen is excavation or monitoring, a report detailing the results of the efforts should be produced.

- If an area has a strong potential for containing fossil remains and those remains are exposed on the surface for potential collection, steps should be taken to educate workers and the public on the consequences of unauthorized collection.

The following conservation measures could be implemented to address potential impacts on cultural resources:

- The appropriate Federal agency should consult with federally recognized Native American governments early in the planning process for a wind energy development to identify issues and areas of concern. Consultation is required under the NHPA. Consultation is necessary to establish whether the project is likely to disturb traditional cultural properties, affect access rights to particular locations, disrupt traditional cultural practices, and/or visually impact areas important to the tribe(s).
- The presence of archaeological sites and historic properties in the area of potential effect should be determined on the basis of a records search of recorded sites and properties in the area and/or an archaeological survey. The SHPO is the primary repository for cultural resource information. The National Register of Historic Places could also be consulted at http://www.nps.gov/nr/research/index.htm.
- Archaeological sites and historic properties present in locations that would be affected by project activities should be reviewed to determine whether they meet the criteria of eligibility for listing on the NRHP. Cultural resources listed on or eligible for listing on the NRHP are considered “significant” resources.
- If a development is within the viewshed of a national historic trail eligible for listing on the NRHP, the developer should evaluate the potential visual impacts on the trail associated with the proposed project. If impacts were to occur, mitigation measures such as vegetation or landscape screening could be employed. Other mitigation options are identified in section 5.7.1.3.
- If cultural resources are known to be present at the site, or if areas with a high potential to contain cultural material have been identified, consultation with the SHPO should be undertaken by the appropriate Federal agency (e.g., Western, the Service, USFS, or BLM). In instances where Federal oversight is not appropriate, developers can interact directly with the SHPO. Avoidance of these resources is always the preferred mitigation option. Other mitigation options include archaeological survey, excavation, data recovery, and monitoring (as warranted). If an area exhibits a high potential but no artifacts are observed during an archaeological survey, monitoring by a qualified archaeologist could be required during all excavation and earthmoving in the high-potential area. A report should be prepared documenting these activities. Other steps include the identification and implementation of measures to prevent potential looting/vandalism or erosion impacts, as well as educating workers and the public to make them aware of the consequences of unauthorized collection of artifacts.
- Periodic monitoring of significant cultural resources in the vicinity of development projects may help curtail potential looting/vandalism and erosion impacts. If impacts are

recognized early, additional actions can be taken before the resource is destroyed. Monitoring activities do not require Federal involvement.

- Cultural resources discovered during construction should immediately be brought to the attention of the responsible Federal agency. Work should be immediately halted in the vicinity of the find to avoid further disturbance to the resources while they are being evaluated and appropriate mitigation plans are being developed.
- If human remains are found on a development site, work should cease immediately in the vicinity of the find. The appropriate law enforcement officials and the appropriate Federal agency should be contacted. No material should be removed from the find location. Once it is determined that the remains belong to an archaeological site, the appropriate SHPO should be contacted to determine how the remains should be addressed.
- Significant cultural resources can be affected by soil erosion. See the measures discussed in section 5.2.1.7 for methods that could control soil erosion during a development project. Minimization of soil erosion would protect important resources from damage.

Additional site-specific measures may be identified and implemented to further reduce impacts; however, the Project is not expected to have a significant adverse effect on cultural, archaeological and historic resources.

4.20 Native American Religious Concerns

The Native American Graves Protection and Repatriation Act of 1990 allows tribes to protect American Indian graves and to repatriate human remains. Sunflower must comply with this act if a burial site is encountered during construction, as the Act applies to all developments regardless of the funding source. Any burial site identified, including tribal or pioneer, must be referred to the North Dakota Intertribal Reinterment Committee and the State Historical Society of North Dakota. The North Dakota Indian Affairs Commission was invited to the scoping meeting and to provide comments; no response has been received to date.

4.20.1 Existing Conditions

Existing Native American religious concerns were documented through contact with the tribes listed in Section 5.3 as part of the NEPA process and the NHPA Section 106 consultation process conducted by Western. The Standing Rock Sioux Tribe was the only tribe to respond to Western's interconnection notification letter dated October 8, 2013. Through consultation, they expressed a general concern regarding possible archaeological and cultural sites in the project area. Specific sites or locations were not identified by the Tribe. Consultation under Section 106 was completed with the issuance of a concurrence letter from SHPO on August 29, 2014.

4.20.2 Potential Impacts

Direct Impacts

A significant impact would occur if the Project caused an unmitigated, adverse effect to a traditional cultural property (TCP) or a burial site. In the event that burials or cultural sites with Native American religious values are identified during construction of the Project, work would halt within 200 feet of the site until Native Americans are notified and consulted about conservation measures.

If historic or prehistoric materials are discovered during monitoring of earth-disturbance construction activities, construction would be halted and Western would be notified in order to initiate procedures outlined in 36 CFR Part 800. These procedures would include evaluating the find for eligibility and determining appropriate treatment with the SHPO and the NDIRC.

Avoidance, Minimization and Best Management Practices

In addition to the measures noted above, Sunflower will implement avoidance and minimization measures and best management practices applicable to historic and cultural resources as identified in the Draft UGP Wind Energy PEIS (see PEIS sections 5.8.1.6 and 5.9.1.6) as listed above in Section 4.19; these will also serve to protect Native American religious concerns. Additional site-specific measures may be identified and implemented; however, the Project is not expected to have a significant adverse effect on Native American religious concerns.

4.21 Cumulative Effects

This section presents a discussion of the potential cumulative impacts associated with the Project. Cumulative impacts are defined in the Council of Environmental Quality (CEQ) regulations as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” [40 CFR 1508.7].

This evaluation of potential cumulative impacts from the Project is consistent with the following regulations and guidance:

- CEQ’s Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR Part 1500-1508, 1970 as amended).
- EPA Procedures for Implementing the Requirements of the Council on Environmental Quality on the National Environmental Policy Act (40 CFR Part 6 [2009]).
- Considering Cumulative Effects under the National Environmental Policy Act (CEQ 1997b).
- Consideration of Cumulative Impacts in EPA Review of NEPA Documents, EPA 315-R-99-002 (EPA 1999).
- Guidance on Past and Present Actions (CEQ 2005).

4.21.1 Methods for Identifying Cumulative Effects

Cumulative impacts are identified using the following general approach:

1. Identify appropriate level of analysis for each resource.
2. Identify resources for which no impacts are expected from the Project. These resources will not be considered further for cumulative impacts.
3. Describe current resource conditions and trends.
4. List the potential impact producing factors related to construction and operation of the Project, and their potential direct and indirect impacts to specific resources.
5. Identify the potential impacts of each action that might contribute to cumulative impacts.
6. Identify past, present, and reasonably foreseeable future actions that could affect resources.
7. Analyze the potential cumulative impacts.

In accordance with CEQ guidance (CEQ 1997b), the cumulative impacts analysis focuses on impacts that are "truly meaningful." The level of analysis for each resource is commensurate with the intensity of the impacts identified in Section 4. The spatial and temporal bounds of the cumulative impact analysis vary by resource, and consist of the full extent impacts from both the Project and any of the reasonably foreseeable future actions. For many resources, the potential limit of Project effects is the Project construction footprint. For others the impacts will extend farther.

4.21.2 Past and Present Actions

Past and present actions are not identified individually; rather this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative impacts. Consequently, this cumulative impacts analysis does not attempt to quantify the impacts of past human actions by adding up all prior actions on an action-by-action basis. Current conditions have been impacted by innumerable actions over the last two centuries, and trying to isolate individual actions that continue to have residual impacts would be nearly impossible. The CEQ issued an interpretive memorandum on June 24, 2005, regarding analysis of past actions, which states, "agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions" (CEQ 2005). Past actions are reflected in the baseline information presented in Section 4, which provides context for the cumulative impacts analysis.

4.21.3 Reasonably Foreseeable Future Actions

This section discusses the reasonably foreseeable future actions that have the potential to overlap spatially and temporally with the Project. As described by the CEQ (2005), "It is not practical to analyze how the cumulative effects of an action interact with the universe; the

analysis of environmental effects must focus on the aggregate effects of past, present, and reasonably foreseeable future actions that are truly meaningful."

Identified future actions were reviewed to determine if they should be considered further in the cumulative impacts analysis. Factors considered when identifying other actions to be included in the cumulative impacts analysis included the following:

- Whether the other action is likely or probable (i.e., reasonably foreseeable), rather than merely possible or speculative.
- The timing and location of the other action in relationship to the Project.
- Whether the other action and the Project would affect the same resources.
- The current conditions, trends, and vulnerability of resources affected by the other action.
- The duration and intensity of the impacts of the other action.
- Whether the impacts have been truly meaningful, historically significant, or identified previously as a cumulative impact concern.

A list of reasonably foreseeable actions in the region of the Project (see Table 18) was developed based on a search of projects listed on the PSC online case information, and other publicly available information. The list is limited to three proposed wind energy developments. In this area of North Dakota there are no transmission lines or other energy projects currently proposed, and there is little residential, commercial, or industrial development in the area.

Table 18. Reasonably Foreseeable Actions in the Vicinity of the Project

Project Name	Operator	Proposed Generation Capacity	County	STATE	Approximate Distance from Sunflower Project Area
Clean Energy 1	ALLETE Clean Energy	100 MW	Mercer	ND	6 miles
New Frontier Wind Energy Project	Meadowlark Wind I LLC	102 MW	McHenry	ND	83 miles
Thunder Spirit Wind Project	Wind Works Power Corp	150 MW	Adams	ND	49 miles
Wilton IV	Next Era Energy Resources, LLC	96 MW	Burleigh	ND	60 miles
Oliver III	Next Era Energy Resources, LLC	48 MW	Morton	ND	37 miles
Bison IV	Minnesota Power	210 MW	Oliver and Mercer	ND	14 miles

4.21.4 Potential Cumulative Effects

For cumulative impacts to occur, impacts from the Project would need to overlap in time and space with impacts from one or more of the reasonably foreseeable future actions that were

identified. No cumulative impact would occur for resources where the Project would not have an impact; this would include the following resource areas:

- Environmental Justice
- Recreation

There would also be no cumulative impact where the Project would have an impact to a resource but this impact would not occur in the same time and space as the impact of a reasonably foreseeable action. This would include the following:

- Geology and Soils
- Air Quality
- Climate Change
- Water Resources
- Surface Waters and Wetlands
- Vegetation
- Land Use
- Visual Resources
- Noise
- Transportation
- Health and Safety
- Cultural, Historical and Archaeological Resources

Wind energy development is anticipated to have a positive cumulative impact on several resources, including air quality and socioeconomics.

Resource areas for which the Project may have cumulative impacts are therefore limited to visual resources and some types of wildlife including some listed species. Of the listed species, the Project is unlikely to have impacts to pallid sturgeon, piping plover, black-footed ferrets, and gray wolves due to lack of occurrence in the Project Area. Potential cumulative impacts may occur to whooping cranes and other avian species that migrate through the area due to their widespread occurrence. Cumulative visual impacts may occur due to the proximity of the proposed Clean Energy I wind farm.

The principal resources of concern for cumulative impacts are anticipated to be wildlife (particularly whooping cranes) and visual resources. Each of these is discussed below.

Wildlife

Sunflower believes that the Project can be designed to avoid direct impacts to wetlands, and that an individual permit will not be needed. In addition, Sunflower will implement shut-down protocols during migration periods as may be identified through Section 7 consultation. Consequently, Sunflower expects to have no impacts to whooping cranes or other wetland-dependent bird species, and would thus not contribute to cumulative impacts.

Reconductoring of the Mandan-Ward transmission line would utilize existing access roads and would not create additional wetland impacts.

Further, with the adoption of the UGP Wind Energy PEIS, it is expected that similar measures for wildlife protection would be implemented for most or all future wind energy development in the Upper Great Plains region, including requirements for buffers and/or curtailment during migration season and provision of mitigation if necessary to offset unavoidable or incidental impacts. Consequently, it is anticipated that the total cumulative impacts to whooping cranes and other wildlife from the Project and other reasonably foreseeable actions will be minimal.

Visual Resources

The Project will cause a minor cumulative impact to visual resources in the county in addition to the other reasonably foreseeable actions. The proposed Clean Energy I project would be located sufficiently close that turbines from both facilities could be visible from some areas. While this would represent a change in the visual quality of the area, it is one which is not necessarily viewed as adverse. Rather, many in the region view wind turbines as a source of income and a compatible element to a largely agricultural landscape. Sunflower will implement applicable measures to reduce visual impacts to the extent that they can be reduced, as identified in the Draft UGP Wind Energy PEIS. It is anticipated that future wind energy developments in the region would implement similar measures, helping to limit the cumulative impacts of the Project and other reasonably foreseeable actions in the area. Reconductoring of the Mandan-Ward transmission line would have no discernable visual impact once construction is completed.

5.0 AGENCIES CONTACTED

5.1 Federal Agencies

The following federal agencies were contacted as part of the EA scoping process:

- USACE
- EPA
- USFWS
- USDA (Farm Service Agency and Rural Utilities Service)
- Federal Energy Regulatory Commission (FERC)
- Advisory Council on Historic Preservation
- FEMA
- U.S. Department of Transportation (DOT)
- U.S. Department of Interior, Office of Environmental Policy and Compliance
- U.S Geographic Survey
- Federal Highway Administration (FHWA)
- NRCS
- FAA

5.2 State and Local Agencies

The following state and local agencies have been contacted as part of the EA scoping process:

- ND Department of Agriculture
- NDGFD
- NDDOT
- PSC
- North Dakota SHPO
- State Historical Society of North Dakota
- North Dakota Indian Affairs Commission
- North Dakota State Land Department
- North Dakota Parks and Recreation Department
- Morton County Soil Conservation District
- Central Stark and Western Soil Conservation District
- Office of the Governor
- North Dakota Senate and House of Representatives
- North Dakota Department of Commerce
- Morton County Commission
- Stark County Commission
- Morton County Farm Services Agency
- Stark County Farm Services Agency
- Hebron School District
- Cities of Hebron, Dickinson, Taylor, Richardton and Glen Ullin

5.3 Native American Tribes

Pursuant to the NHPA and the American Indian Religious Freedom Act (AIRFA) of 1978, and in an effort to identify any other significant cultural resources that may be affected by the Project, Western initiated consultation with Native American Tribes that may have a historical interest in the Project area. A letter inviting comments regarding any religious or cultural significance of the Project location was sent out on October 8, 2013, to nine Tribes within the Upper Great Plains Region of Western:

- Cheyenne River Reservation, Montana
- Crow Creek Reservation, South Dakota
- Fort Berthold Reservation (Three Affiliated Tribes), North Dakota
- Fort Peck Indian Reservation, Montana
- Lower Brule Reservation, South Dakota
- Rosebud Indian Reservation, South Dakota
- Santee Sioux Nation, Nebraska
- Sisseton Wahpeton Oyate, North and South Dakota
- Standing Rock Sioux Tribe, North and South Dakota

5.4 Dakota Other Organizations

The following non-governmental organizations have also been contacted as part of the EA scoping process, but no response has yet been received:

- The Nature Conservancy
- Sierra Club
- Dakota Prairie Audubon Society
- Ducks Unlimited
- Pheasants Forever, Inc.

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Appendix A
Scoping Information

Appendix B
Agency Correspondence and Public Comments

Appendix C
Biological Surveys

Appendix D
Other Studies

Appendix E
Biological Assessment