SUMMARY

The proposed Edgeley/Kulm Project is a 21-megawatt (MW) wind generation project proposed by Florida Power and Light (FPL) Energy North Dakota Wind LLC (Dakota Wind) and Basin Electric Power Cooperative (Basin). The proposed windfarm would be located in La Moure County, south central North Dakota, near the rural farming communities of Kulm and Edgeley. The proposed windfarm is scheduled to be operational by the end of 2003. Dakota Wind and other project proponents are seeking to develop the proposed Edgeley/Kulm Project to provide utilities and, ultimately, electric energy consumers with electricity from a renewable energy source at the lowest possible cost.

A new 115-kilovolt (kV) transmission line would be built to transmit power generated by the proposed windfarm to an existing U.S. Department of Energy, Western Area Power Administration (Western) substation located near Edgeley. The proposed interconnection would require modifying Western's Edgeley Substation.

Modifying the Edgeley Substation is a Federal proposed action that requires Western to review the substation modification and the proposed windfarm project for compliance with Section 102(2) of the National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. 4332, and Department of Energy NEPA Implementing Procedures (10 CFR Part 1021). Western is the lead Federal agency for preparation of this Environmental Assessment (EA). The U.S. Fish and Wildlife Service (USFWS) is a cooperating agency with Western in preparing the EA.

This document follows regulation issued by the Council on Environmental Quality (CEQ) for implementing procedural provisions of NEPA (40 CFR 1500-1508), and is intended to disclose potential impacts on the quality of the human environment resulting from the proposed project. If potential impacts are determined to be significant, preparation of an Environmental Impact Statement would be required. If impacts are determined to be insignificant, Western would complete a Finding of No Significant Impact (FONSI).

Environmental protection measures that would be included in the design of the proposed project to mitigate potential impacts include:

- FPL Energy's *General Bidding Instructions* to prospective windfarm construction contractors;
- *Best Management Practices* (BMPs) developed by FPL Energy for similar projects;
- Western's *Construction Standard 13, Environmental Quality Protection* document, which provides general guidance for environmental protection during both the construction and operation of the proposed windfarm;
- North Dakota Department of Health permit requirements for storm water runoff control;

- Air quality and erosion mitigation per North Dakota Department of Health requirements; and,

- *Suggested Practices for Raptor Protection on Power Lines* developed by the Edison Electric Institute (EEI).

- In addition, Dakota Wind and its partners have agreed to cooperatively participate with the USFWS and U.S. Geological Survey (USGS) in a *Migratory Bird Baseline Investigation and Monitoring Program* that would be implemented at the time of start-up of the proposed windfarm. Because of the proposed project's location near high populations of nesting and migratory species, these investigation and monitoring efforts would provide baseline data to the wind energy industry, USFWS, and USGS for future planning and regulation of wind energy projects.

Potential impacts analyzed in this EA include those related to the following resources:

- Physical resources including geology and soil, air, and water (surface and groundwater);

- Biological resources including vegetation, wetlands, wildlife, and threatened, endangered, proposed, and sensitive species;

- Social resources including socioeconomics, environmental justice, land use, visual, noise, recreation, cultural, and Native American religious concerns; and,

- Cumulative effects in consideration of past, present, and reasonably foreseeable future activities in the area.

A Draft EA was distributed for comment to cooperating agencies, interested agencies, and interested members of the public during March 2003. Comments received are summarized in Chapter 4, and have been addressed in this EA.

In summary, potential impacts to each resource were evaluated to assess the potential for significant impacts from construction and operation of the proposed project. No significant impacts were found based on the mitigation and commitments contained in this EA. The evaluation considered the implementation of mitigation prescribed by FPL Energy's BMPs and construction contractor requirements, Western's Construction Standard 13, North Dakota Department of Health permit requirements, and adopted guidelines. Of specific importance to eliminating or minimizing impacts to the environment as a result of the proposed project is Dakota Wind's and Basin's siting of project components to avoid such features as residences, wetlands, and cultural sites that occur in the project area.

Finally, an adjacent wind energy development project proposed by Otter Tail Power Company comprises a "reasonably foreseeable future action" in the project area. In the EA, Western evaluated Otter Tail's proposed project as having a cumulative effect on resources in the project area. Consistent with the proposed Edgeley/Kulm Project, the proposed Otter Tail Project is not expected to result in any additional or cumulative impacts to those resources evaluated, if mitigation similar to the proposed Edgeley/Kulm Project is implemented.

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CHAPTER 1
INTRODUCTION

The Florida Power and Light (FPL) Energy North Dakota Wind Energy Center (Edgeley/Kulm Project) is a wind generation project proposed by FPL Energy North Dakota Wind LLC (Dakota Wind) and Basin Electric Power Cooperative (Basin). Annual average daily output expected from the proposed Edgeley/Kulm Project is approximately 21 megawatts (MW). The proposed project is located in La Moure County, south central North Dakota, near the rural farming communities of Kulm and Edgeley (**Figure 1-1**). The facility is scheduled to be operational by the end of 2003. Electricity produced from the facility is estimated to meet the energy demands of approximately 15,000 North and South Dakota households.

Power generated by the proposed Edgeley/Kulm Project would be transmitted via a new 115-kilovolt (kV) transmission line to an existing U.S. Department of Energy (DOE) Western Area Power Administration (Western) substation located near Edgeley, North Dakota. The interconnection would require modification of the Edgeley Substation – a Federal action. As a result, review of the substation modification, transmission line construction, and proposed windfarm by Western is required according to Section 102(2) of the National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. 4332, and Department of Energy NEPA Implementing Procedures (10 CFR 1021). The U.S. Fish and Wildlife Service (USFWS) is a cooperating agency for preparation of this EA.

Dakota Wind and Basin have prepared this Environmental Assessment (DOE/EA-1465) for Western's approval to disclose potential environmental and socioeconomic effects of the proposed Edgeley/Kulm Project.

This document follows regulations issued by the Council on Environmental Quality (CEQ) for implementing procedural provisions of NEPA (40 CFR 1500-1508). This EA is intended to disclose potential impacts on the quality of the human environment resulting from the proposed action and determine if the impacts may be significant and, therefore, would require preparation of an environmental impact statement (EIS). If impacts resulting from the proposed action are determined to not be significant, Western would complete a Finding of No Significant Impact (FONSI).

This document describes the components and environmental consequences of modifying Western's Edgeley Substation, constructing a 115-kV transmission line, and constructing the windfarm and ancillary facilities.

Chapter 1 describes:

- Purpose of and need for the action;
- Roles and involvement of proponents of the proposed action;
- Role of Western – the lead Federal agency;
- Roles and responsibilities of other participating agencies; and,
- Public participation in the EA process.

Chapter 2 provides:

- Description of the proposed action;
- No action alternative; and,
- Environmental protection measures (best management practices) that would be followed during construction of the proposed Edgeley/Kulm Project.

Chapter 3 describes:

- Existing or potentially affected environment in the approximate 35-square mile project area; and
- Potential direct, indirect, and cumulative impacts to the affected environment associated with the proposed action.

Chapter 4 contains a list of persons and agents consulted.

Chapter 5 contains a list of references cited in developing the EA.

PURPOSE OF AND NEED FOR ACTION

Dakota Wind's proposed Edgeley/Kulm Project, the construction and operation of a windfarm, requires a Federal action to be taken by Western – modifications to the existing Edgeley Substation. As a result, *Purpose and Need Statements* for Dakota Wind's and Western's actions are provided.

FPL ENERGY NORTH DAKOTA WIND, LLC

Dakota Wind and other project proponents need to develop the proposed Edgeley/Kulm Project to provide utilities and, ultimately, electric energy consumers with electricity from a renewable source at the lowest possible cost. **Table 1-1** provides a listing of project proponents, including their interests or involvement in the proposed Edgeley/Kulm Project.

DOE, Energy Information Administration (EIA) is forecasting a 1.8 percent annual growth in electricity sales through 2020.

TABLE 1-1
Project Proponents

Participant	Description/Involvement
FPL Energy North Dakota Wind, LLC	Lead Proponent and project developer.
Basin Electric Power Cooperative	Purchaser of power generated by the proposed project. A Preference Customer of Western Area Power Administration (Western).
Central Power Electric Cooperative	A Preference Customer of Western and a Class A member of Basin Electric Power Cooperative. Comprised of six member cooperatives serving nearly 46,000 customers in 25 counties in central and southeastern North Dakota. Central Power would construct the 10 mile 115-kV transmission line to tie the proposed windfarm in with Western's Edgeley Substation.
Dakota Valley Electric	Basin Electric Power Cooperative member in the Edgeley service area.

- **Figure**

- **back**

This growth will require an increase in generating capacity of up to 1,300 new power plants over the next 20 years (EIA 2001).

Deregulation of the electric industry and current energy supply issues have emphasized the need for new and diverse energy sources in the region. Basin's purchase of electricity generated by the proposed Edgeley/Kulm Project would meet a recent shareholder directive to diversify its current generation portfolio that includes coal, hydro, and gas with an economical renewable energy source. The proposed Edgeley/Kulm Project would economically meet that directive by using the wind resource in the Edgeley/Kulm area, combined with nearby access to the transmission system. A two-year research investment into the project by Dakota Wind and the project proponents included:

- Collection of meteorological data necessary to design an optimally efficient wind turbine array in the Edgeley/Kulm area; and,

- Conducting a system impact study to determine the feasibility of bringing approximately 21 MW of electricity (based on an annual daily average) generated by the proposed windfarm on-line through connection to the transmission system.

WESTERN AREA POWER ADMINISTRATION

Basin has applied to interconnect with Western's transmission system at its Edgeley Substation. Western must respond to Basin's request for an interconnection with Western's transmission system. In responding to the need for agency action, Western must abide by the following purposes:

- *Providing Transmission Service.* Western published in the Federal Register on January 6, 1998, its *Notice of Final Open Access Transmission Service Tariff (Tariff)*. Under Western's *Tariff,* Western offers transmission service for the use of available transmission capacity in excess of the capacity Western requires for the delivery of long-term firm capacity and energy to current contractual electrical service customers of the Federal government. Under the Tariff, Western provides firm and non-firm point-to-point transmission service and network integration transmission service to the extent that Western has available transmission capability.

- Addressing an Interconnection Application per Western's General Guidelines for Interconnection. Western's General Guidelines for Interconnection provide a process for addressing applications for inter-connection. The process dictates that Western respond to an application as presented by an applicant. Section 211 of the Federal Power Act requires transmission services be provided upon application if transmission capacity is available.

- *Protect Transmission System Reliability and Service to Existing Customer.* Western's purpose is to ensure that existing reliability and service is not degraded. Western's *General Guidelines for Interconnection* provides for transmission and system

studies to ensure that system reliability and service to existing customers is not adversely affected.

- *Consideration of the Applicant's Objectives*. Since the statement of purpose and need affects the extent to which alternatives are considered reasonable, it is important to understand both the agency's purpose and need and that of the applicant.

AUTHORIZING ACTIONS

Western may approve the proposal only after a determination on whether or not an action is a major Federal action significantly affecting the quality of the human environment, as required by NEPA. Western's decision options include the proposed action as described herein, or the no action alternative.

In addition to Western, other Federal, state, and local agencies have jurisdiction over certain aspects of the proposed action. **Table 1-2** provides a listing of agencies and their respective permit/authorizing responsibilities with respect to the proposed Edgeley/Kulm Project.

PUBLIC SCOPING

To allow an early and open process for determining the scope of issues and concerns related to the proposed action (40 CFR 1501.7), public scoping was provided by Western. Western mailed a scoping letter that included a proposed project summary to local individuals, affected landowners, and businesses, as well as organizations listed on Western's Upper Great Plains Region mailing list.

Western notified Federal and state agencies and affected landowners of its determination to prepare an EA and invited comments in a letter dated January 13, 2003. To date, Western has not received any comments in response to its letter. The Draft EA was distributed for review to the Federal, state, and local agencies that have jurisdiction or permitting authority for the proposed project and affected landowners. Substantive comments received on the Draft EA have been incorporated into this EA and considered in Western's determination on whether or not an environmental impact statement (EIS) is required.

Due to the USFWS' participation and special expertise in the proposed Edgeley/Kulm Project, Western invited the USFWS to be a cooperating agency on the EA. No other agencies have requested to become a cooperating agency.

A summary of public and agency issues concerning the proposed project is contained in **Table 1-3**. This table also provides references to sections of this EA which respond to substantive issues raised. Dakota Wind and Basin identified the issues presented in **Table 1-3** in accordance with DOE requirements (10 CFR part 1021).

TABLE 1-2
Permit/Authorizing Responsibilities

Authorizing Action	Responsible Agency
Interconnection	Western Area Power Administration (Western)
Utility Occupancy Agreement	North Dakota Department of Transportation
Easement Grants and Road Crossing Permits	North Dakota Department of Transportation, Pomona Township Board
Review and Approval of Weed Control Plan	La Moure County, Pomona Township Board
National Environmental Policy Act	Western
National Historic Preservation Act	Western, North Dakota State Historical Preservation Office
Native American Graves Protection and Repatriation Act	Western
American Indian Religious Freedom Act	Western
Construction Storm Water Discharge Permit	North Dakota Department of Health, Division of Water Quality, Storm Water Program
Safety Plan	Occupational Safety & Health Administration
Migratory Bird Treaty Act	US Fish and Wildlife Service (USFWS), Western
Endangered Species Act	USFWS, Western
Air Pollution Control Permit to Construct	North Dakota Department of Health, Division of Air Quality
Tower Lighting	Federal Aeronautical Administration

TABLE 1-3
Scoping Summary

Issue	Response
Social impacts associated with visual/scenery in the area.	Chapter 3 – Affected Environment and Environmental Consequences
Potential disturbance to wetlands from construction activities.	Chapter 2 – Proposed Action, Environmental Protection Measures
Effects to local communities and service sectors from construction and operations-related employment.	Chapter 3 – Affected Environment and Environmental Consequences
Potential for spread of noxious weeds resulting from ground disturbance during construction activities.	Chapter 2 – Proposed Action, Environmental Protection Measures Chapter 3 – Affected Environment and Environmental Consequences
Potential for disruption to farming activities during and post-construction.	Chapter 3 – Affected Environment and Environmental Consequences
Potential effects to wildlife, especially migratory birds, during operation of the wind power facility.	Chapter 2 – Proposed Action, Environmental Protection Measures Chapter 3 – Affected Environment and Environmental Consequences
Avoid potential gravel pit areas when siting turbines.	Chapter 2 – Proposed Action, Environmental Protection Measures Chapter 3 – Affected Environment and Environmental Consequences

CHAPTER 2
DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

INTRODUCTION

The proposed FPL Energy North Dakota Wind Energy Center (Edgeley/Kulm Project) is a direct result of the cooperative effort among Western, Dakota Wind, Basin, and Basin's member cooperatives. Basin and its members would purchase the output of the proposed project, which would be constructed, owned, and operated by Dakota Wind. The proposed project is scheduled to be operational by the end of 2003.

PROPOSED ACTION

The proposed 21-MW (based on average daily output) Edgeley/Kulm Project is located near the rural communities of Kulm and Edgeley in south-central North Dakota. The legal description of the proposed windfarm is Township 133 North, Range 65 West, Sections 7, 8, 17, 18, 19, 20, and 29 (**Figure 2-1**).

The proposed project would consist of modifying Western's Edgeley Substation; constructing, operating, and maintaining transmission lines and a collection substation; and constructing, operating, and maintaining the windfarm. The following sections describe these three project components.

SUBSTATION MODIFICATION

Location of Western's Edgeley Substation relative to the other project components is shown on **Figure 2-1**. Western would construct modifications to the substation to handle the addition of a line bay from the proposed windfarm. Modifications would include:

- Constructing a main and transfer bus that would include the addition of the 115-kV windfarm line bay, transfer bay, and replacing the existing Jamestown line bay.
- Replacing a two-pole wood transmission line structure with a three-pole structure adjacent to the substation on the existing right-of-way (ROW) for the Jamestown-Edgeley 115-kV transmission line.
- Expanding fences outward on the east and north sides of the property to accommodate the bay additions.

Western's Edgeley Substation occupies a square, 500 feet by 500 feet parcel. Upon approval of the proposed Edgeley/Kulm Project, Western would purchase an additional 130 feet of property extending to the north, and an additional 80 feet of property extending to the east to accommodate substation modifications. An approximate 30-foot wide strip of the northward expansion would be granted to the Dickey Rural Water District for a water line easement. Properties bordering the substation to the north and east are used for agricultural purposes.

TRANSMISSION LINE AND COLLECTOR SUBSTATION

Collection and Transmission System

The proposed Edgeley/Kulm Project collection and transmission system would collect energy generated by the proposed windfarm and transmit it to Western's Edgeley Substation. Central Power Electric Cooperative (Central Power), a

Basin Electric Power Cooperative member, would construct portions of the transmission system.

Dakota Wind – Collection System

Dakota Wind would construct a radial feed collection system from 27 individual wind turbines. Individual collection lines from pad-mounted transformers at the base of the towers would mostly be buried in trenches along wind turbine access roads that are shown on **Figure 2-1**. These would be joined in a common, approximately 2.5-mile long trench along the west edge or beneath the Pomona Township Road. This buried line would connect to the proposed collection substation proposed at the southwest corner of the Pomona Township Road and State Highway 13 intersection. Dakota Wind would purchase approximately 2 to 3 acres required for the collection substation from the respective landowner at fair market value. Trenches (both individual and common) are anticipated to be approximately 2 feet wide, and 4 feet deep. Disturbance associated with all buried collection lines would be limited to a 100-foot construction ROW. All disturbances would be restored following burial of the electrical cables, and above ground utility warning markers would be installed at appropriate intervals. The pad-mounted transformers would be located within 20 feet of the base of each turbine tower. The approximate 5-foot square steel transformer box housing the transformer circuitry would be mounted on an approximate 6-foot square concrete slab. The picture insert on **Figure 2-2** shows a typical pad mounted transformer and its location near the base of the turbine tower.

Central Power – Transmission System

Central Power would construct approximately 10 miles of 115-kV overhead transmission line along State Highway 13 to connect the collector substation to Western's Edgeley Substation. Routing the buried and overhead transmission lines along the Pomona Township Road and State Highway 13 is intended to avoid farms, housing, and sensitive areas such as wetlands. Central Power would provide fair market compensation to landowners for easements within the proposed transmission line ROW.

The transmission line constructed for the proposed project would be in accordance with 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. Overhead transmission line construction along State Highway 13 would occur within a 100-foot construction ROW, with an operational ROW maintained at a 50-foot width. Single wood-pole structures would be installed within the ROW. **Figure 2.3** shows a typical single wood-pole 115-kV transmission structure.

The wood-pole structures for transmission lines have a 100 percent replacement factor in 45 years. However, there are several advantages in using wood poles: they are readily available; they can be installed using simple construction techniques; and, in emergencies, they can be easily modified or replaced to reduce outage time.

New poles are typically buried 10 percent of the pole length plus 2 feet (i.e., an 80-foot pole would be buried 10 feet) and spaced approximately 350 feet apart. Using these spacing standards would require approximately 15 structures per mile. Disturbance at each pole site would likely average 50 feet by 50 feet confined to the 100-foot construction ROW.

Figure 2-1

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Figure 2-2

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figure 2-3

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Construction tasks would include the following:

- *Pre-Construction* -- Includes activities such as environmental, geotechnical, cultural, avian, micro-siting, engineering, design, land procurement, various utility studies, and major procurement.

- *Surveying* -- Initial line-survey work, consisting of survey control, route centerline location, profile surveys, and access surveys.

- *Wood–Pole Structures* -- Vegetation would be removed from a limited area at structure locations. Once any vegetation is removed, holes would be drilled for structures using a truck-mounted auger.

- *Delivery and Assembly* -- The pre-assembled wood-pole structures would be transported to the erection sites on flatbed trucks. The footings of each would be backfilled with drill cuttings and tamped into place to prevent structure movement or settling. Final structure assembly and hardware placement would be completed using man-lift trucks. Guy wires would be screwed into the ground in accordance with standard construction practices.

- *Conductor Installation* -- Following erection of all wood-pole structures, conductor and ground wires would be installed. Conductor would be pulled and tensioned from several locations (approximately every two miles) along the transmission line route. Heavy, truck-mounted winches that also carry reels of conductor and cable would be used for pulling and tensioning work. **Figure 2-4** provides a diagram of basic wire-handling equipment and technique.

- *Restoration* -- Finally, all disturbed areas associated with transmission line construction would be restored to pre-construction condition.

Table 2-1 summarizes transmission line design characteristics specific to the proposed Edgeley/Kulm Project. Electrical conductors provide the medium for flow of electrical energy. The conductor consists of strands of reinforced steel cable encased by aluminum strands. The steel cable provides the tensile strength to support the conductor; the aluminum conducts the electrical current.

Insulators and hardware used on the line would be standard design to provide nearly corona free operation, as well as reduce audible noise and radio and television interference. The typical suspension structure would be configured with three vertical stacks of polymer insulators. One over-head galvanized steel ground wire, approximately 3/8-inch diameter, would be installed on one side of the top of the structure to provide lightning protection.

The proposed collection substation would be located at the southwest corner of the Pomona Township Road and State Highway 13 intersection. The fenced substation facility would occupy an approximate 275 feet by 300 feet area of an approximate 2-acre parcel.

TABLE 2-1
Overhead Transmission Line Design Characteristics
Proposed Edgeley/Kulm Project

Design Element	Characteristic
Line Length (approximate)	10 miles
Width of Construction Right-of-Way (ROW)	100 feet
Width of Operational Right-of-Way (ROW)	50 feet
Thermal Capacity for 115 kV	200 amps
Voltage	115 kV
Circuit Configuration	Vertical Stacked (3)
Conductor Size	T2-266ACSR 26/7
Conductor Type	Twisted Pair (T2)
Electric field at edge of 50' operational ROW	0.2737 kV/meter (3' above ground)
Magnetic field at edge of 50' operational ROW (thermal limit)	7.4 Milligauss (3' above ground @ 40 Mega Volt Ampere (MVA))
Electrostatic short-circuit current limit	7.7 kA for 1 second
Structures: type and number per mile	Transmission Poles - 115 spaced @ 15 per mile
Structure Height	61' above ground level typical
Length of Span	350 feet
Minimum Ground Clearance of Conductor	24 feet @ 212º Fahrenheit
Typical Structure Base Dimensions	30 inch diameter
Land temporarily disturbed per site for conductor reel and pole storage yards	Materials would be stored in an existing storage yard.
Area required for each structure base	3 feet x 3 feet

WINDFARM

The proposed windfarm would be located in portions of Section 7, 8, 17, 18, 19, 20, and 29 in Pomona View Township, La Moure County, North Dakota. A possible array of the 27 proposed wind turbines is shown on **Figure 2-5**. Siting considerations include:

- Anticipated 300-foot radius zone of influence of individual turbines based on turbulence and ice throw;
- Proposed 1,000-foot radius for safety, noise, vibration, and shadow flicker buffer zones for residences; and,
- Wetland boundaries based on the National Wetland Inventory (NWI) and USFWS databases.

Figure 2-6 provides a diagram and photograph of the General Electric (GE) horizontal axis, 3-blade propeller turbines. approximate height of the turbines would be 360 feet from the top of the swept area to the ground surface. The bottom of the swept area above the ground surface would

be approximately 160 feet. These heights would allow the turbines to take advantage of more consistent, less turbulent winds aloft.

The operational footprint of each wind tower approximates 50 feet by 50 feet, equating to approximately 1.5 acres for the proposed windfarm. The wind area under lease for a particular turbine may be up to 30 to 50 acres of land.

Computer systems inside each turbine would perform self-diagnostic tests, and allow a remote operator to set new operating parameters, perform system checks, and ensure turbines are operating at peak performance. Turbines would automatically shut down in sustained winds of 56 miles per hour (mph) or gusts of about 100 mph.

Figure 2-4

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Figure 2-5

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Figure 2-6

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Construction of the wind turbines would be relatively quick in comparison to other types of power plants. Dakota Wind and Basin expect to bring the proposed Edgeley/Kulm Project on-line in a matter of months once easement agreements and construction permits are in place. Although construction impacts would be temporary and short-lived, heavy equipment, including bulldozers, graders, trenching machines, concrete trucks, flatbed trucks, and large cranes, would be required.

Windfarm construction typically occurs in the following sequence:

- *Civil Construction* -- Usually performed about three to six weeks before any other phase of construction begins. Entails surveying, cleaning, grubbing, grading, excavation, and foundation construction. In connection, it would also include civil work on support facilities such as laydown areas (approximately 3 acres), portable ready mix facilities, if applicable, construction office, and employee parking areas (approximately 2-3 acres).

- *Delivery and Access* -- Major wind turbine components including rotor assemblies, towers, power cable, and transformers would be delivered to the windfarm site by flatbed, semi-tractor-trailers. A 350-foot wide construction area would be required alongside the turbine sites for rotor assembly, installation, and underground electrical, road, and access way construction. Access roads constructed from nearby State Highway 13 and Pomona Township Road would be graded and compacted to a total width of 35 feet for large crane travel. Permanent road easement would be reduced to 40 feet, with a permanent access road travel width of approximately 15 feet remaining after construction.

- *Electrical* -- Includes the underground collection system that interconnects into Western's transmission system via the overhead high voltage transmission lines and substation that were previously discussed. This phase typically starts three to four weeks after the civil construction phase.

- *Structural* -- Encompasses wind turbine and tower assembly, and erection onto turbine foundations. This phase would also include installation of all mechanical and electrical systems associated with the turbines. Typically, this phase would occur six to eight weeks following the beginning of civil construction.

- *Testing* -- This phase would start well into the proposed project, usually three to six months after the start of construction, and would typically last two to three months. This phase would include all the testing required to make the windfarm commercially operational. This incremental process would include energizing the interconnect substation, and bringing each turbine on line until commercial operation date would be declared.

- *Restoration and Final Project Completion* -- This final phase in windfarm construction would entail restoration and clean-up of all project disturbances. Erecting necessary

signs, and gates, identifying permanent operations and maintenance facilities on the final walk down, and acceptance of the windfarm would be included in this final task.

A photo series depicting the typical process of erecting a turbine is located in **Appendix A**.

ENVIRONMENTAL PROTECTION MEASURES

Several documents would provide environmental protection guidance to Dakota Wind, Basin, and Central Power. These documents would include FPL Energy General Bidding Instructions, FPL Energy Best Management Practices (BMPs), Western's Construction Standard 13 (Western 2001), North Dakota Department of Health permits, USFWS and USGS agreements, and *Raptor-safe* power line construction practices (EEI 1996). FPL Energy formally agreed to comply with guidelines and requirements outlined in Western's Construction Standard 13 in a letter provided to Western dated March 17, 2003 (Beichel 2003). Summaries and/or applicable parts of each of these documents follow.

FPL Energy General Bidding Instructions

Included in FPL Energy's instructions to prospective contractors bidding on construction of the proposed Edgeley/Kulm Project would be environmental protection requirements. Several noteworthy requirements identify the contractor as responsible for the following:

- *Solid and Sanitary Waste Disposal* -- Contractor shall pick up solid wastes and place in containers that are regularly emptied, dispose of garbage in approved containers that are regularly emptied, and prevent contamination of the proposed project site and other areas when handling and disposing of wastes. Upon completion of the work, Contractor shall leave the work areas clean, and control and dispose of wastes.

- *Petroleum Products* -- Contractor shall conduct fueling and lubrication of equipment and motor vehicles in a manner to protect against spills and evaporation, and shall dispose of unused lubricants and oils.

- *Dust* -- Contractor shall implement dust control at all times in accordance with applicable local and state requirements. Contractor shall keep dust down at all times during construction. Air blowing would be permitted only for cleaning non-particulate debris such as steel reinforcing bars. Contractor shall not permit the shaking of bags of cement, concrete mortar, or plaster.

- *Temporary Construction* -- Contractor shall remove temporary construction facilities (erected by and within Contractor's scope), including access road-entrance-way build ups, access road corner widenings, crane pads, work areas, structures, foundations of temporary structures, and stockpiles of excess or waste materials.

- *Protection of Roads* -- Contractor shall plan and practice measures to minimize the impact to the existing landowner, township, county and state roads. Measures shall include demanding low speed limits for heavy vehicles and equipment traveling on the roads. Any road damage caused by construction activities shall be repaired by Contractor.

FPL Energy Best Management Practices During Windfarm Construction

FPL Energy developed BMPs for a similar windfarm project in Gray County, Kansas. These include:

- *Disturbance Minimization* -- The proposed windfarm project would be constructed to fit the existing terrain, thereby eliminating land-disturbing cut and fill activities, minimizing disturbance to existing drainage, and reducing soil erosion potential.

- *Sediment Control* -- Potential sediment movement to nearby drainages and wetlands resulting from construction disturbance would be controlled by installing silt fencing on the downhill side of access roads along low areas, and installing gravel entrances at county roads prior to grading activities to prevent vehicle tracking.

- *Fueling and Equipment Maintenance* -- Construction equipment would be fueled and maintained at an equipment maintenance staging area that would be designed to contain spills. Accidental spills would be cleaned up immediately following state regulations.

- *Reclamation/Revegetation* -- Areas disturbed during construction would be graded to blend with the natural terrain, scarified, and seeded with species at landowner request or with regionally native species.

- *Inspection/Maintenance* -- Silt fencing would be inspected within 24 hours of each rain event of 1/2 inch or greater, maintained by removing sediment after a 50 percent loss of capacity, and replaced as necessary.

FPL Energy Best Management Practices During Windfarm Operation

Dakota Wind, Basin, and Central would continue to follow FPL Energy BMPs during operation of the proposed windfarm. These specifically include:

- *Access Road Maintenance* -- Permanent access road gravel surfaces within the proposed windfarm would be maintained to ensure positive drainage and minimize sediment runoff.

- *Noxious Weed Control* -- Areas disturbed during construction would be monitored for infestation by noxious weeds at regular intervals coinciding with routine windfarm maintenance and monitoring activities. La Moure County contracts its noxious weed spraying services to area landowners, or, if not contracted, requests that a courtesy weed control plan is filed with the County Weed Control Officer (Evert 2003).

- *Revegetation Monitoring* -- Re-seeding efforts using native grass seed mixes on areas disturbed during construction that are not being used for crop production would be monitored for success annually (in the spring) for two years following construction. If revegetation efforts are not or only partially successful, appropriate re-seeding measures would be taken.

Western Construction Standard 13 During Windfarm Construction and Operation

Western's *Construction Standard 13, Environmental Quality Protection* document would provide general guidance for environmental protection during both the construction and operation of the proposed Edgeley/Kulm Project (Western 2001). A copy of *Construction Standard 13* is provided in **Appendix B**. Several noteworthy standards provided by Western include the following:

- *Landscape Preservation (Section 13.3)* -- Includes guidance to preserving landscape features, constructing and restoring construction roads, and constructing and restoring construction facilities such as offices and storage yards.

- *Preservation of Cultural Resources (Section 13.4)* -- Provides for treatment and notification of known or discovered cultural sites or artifacts.

- *Noxious Weed Control (Section 13.5)* -- Requires a "clean vehicle policy" while entering and leaving construction areas to prevent transport of noxious weed plants and/or seed.

- *Disposal of Waste Material (Section 13.8)* -- Requires removal and disposal of all waste material generated during construction.

- *Pollutant Spill Prevention, Notification, and Cleanup (Section 13.10)* -- Requires measures to prevent spills of pollutants and respond appropriately if a spill occurs. Includes any solvent, fuel, oil, paint, pesticide, engine coolants, and similar substances.

- *Prevention of Air Pollution (Section 13.13)* -- Ensures that construction activities and equipment operation are undertaken to reduce air pollutant emissions, and that nuisance dust shall be controlled.

North Dakota Department of Health Permits

Beginning March 10, 2003, land disturbance from 1 to 5 acres in size requires a storm water permit issued by the North Dakota Department of Health, Division of Water Quality. The permit, along with the associated notice of termination, requires that disturbed soils are stabilized, vegetative cover restored, temporary erosion control measures removed, and all storm water discharges associated with construction activity have been eliminated.

Discussions with North Dakota Department of Health and Pomona Township Board personnel indicate that FPL Energy Contractor requirements and BMPs, along with Western's *Construction Standard 13*, would satisfy state air quality requirements. However, Department of Health and Township Board personnel did request courtesy notification (Bachman 2003), and have specified control of fugitive dust.

Migratory Bird Baseline Investigation and Monitoring Program

Dakota Wind and its partners have agreed to cooperatively participate with the USFWS and USGS in a *Migratory Bird Baseline Investigation and Monitoring Program*. The study objective is to determine whether wind turbine placement in native prairie affects upland-nesting migratory birds, breeding-bird density and species composition. The baseline investigation has been completed. USGS personnel would implement post construction monitoring at the time of windfarm start-up. In addition, Dakota Wind personnel would periodically conduct carcass searches at the windfarm to document any migratory bird mortality.

Because of the proposed project's location near a high density of wetlands and large populations of nesting and migratory species, these investigation and monitoring efforts would provide baseline data to USFWS and USGS for future planning and regulation of wind energy projects.

Raptor-Safe Power Line Construction Practices:

Central Power would apply *Suggested Practices for Raptor Protection on Power Lines,* developed by The Edison Electric Institute (EEI), Avian Power Line Interaction Committee (APLIC), to the design and construction of overhead transmission line power structures and the collection substation (EEI 1996). Appropriate suggested practices derived from EEI's document are identified and described below.

- Use of alternate positions for overhead groundwire to make available pole tops perching.
- Installation of polyvinyl chloride downwire moulding on groundwire and insulation on insulator bases and bolts.
- Installation of perch guards on horizontal insulators.

PROJECT ALTERNATIVES

NO ACTION ALTERNATIVE

Under the no action alternative, Western would not modify the Edgeley Substation to accommodate power produced by the proposed project. The proposed 10 mile, 115-kV transmission line would not be constructed along State Highway 13 from the proposed collection substation to Western's Edgeley Substation. The 27 wind turbines associated with the proposed Edgeley/Kulm Project would not be constructed.

Disturbance, noise, and impacts related to an influx of construction work associated with the various phases of the proposed Edgeley/Kulm Project would not occur.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

During initial development stages of Dakota Wind's proposed windfarm project, Dakota Wind proposed to site the facility within Basin's transmission area. To minimize disturbance, the windfarm was sited as near an existing transmission substation as possible. These considerations, coupled with readily available wind data and other siting factors (e.g. wetlands avoidance, distance from known floodplains), resulted in siting the proposed windfarm at the proposed location.

Dakota Wind also considered using 660-kilowatt turbines manufactured by Vestas. However, to reduce the total number of turbines to produce the desired amount of electrical energy, Dakota Wind chose to use GE 1.5-MW turbines, thereby reducing the total number of wind turbines for the project by approximately half. This would result in less surface disturbance, a shorter construction schedule, and would reduce potential for waterfowl collisions.

CHAPTER 3
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter presents a description of the existing environment and potential impacts to resources resulting from construction of the proposed FPL Energy North Dakota Wind Energy Center (Edgeley/Kulm Project). The proposed wind generation facility is located near the communities of Kulm and Edgeley in south central North Dakota. A detailed map of the proposed project is provided as **Figure 3-1**. Shown on **Figure 3-1** are the following major project components:

- Western's Edgeley Substation that occupies an approximate 3-acre site and would be expanded for the proposed project;
- A collection substation that would occupy an approximate 2-acre parcel;
- Approximately 13 miles of 100-foot wide construction ROW (maintained at 50-foot wide operational ROW) for buried and overhead transmission lines; and,
- The windfarm with its access roads and ancillary facilities.

The approximate 36 square-mile project area outlined on **Figure 3-2** encompasses the anticipated extent of most environmental resource investigations associated with the proposed project. However, study areas associated with several resources discussed in this chapter are specific and vary from the general project area. These individual study areas are defined in the individual resource discussions, and are based on potential direct and indirect impacts from the proposed action.

Critical Elements of the Human Environment subject to requirements specified in statutes or executive orders that must be considered in an environmental assessment (EA), and could be affected by the proposed action include:

- Geology and Soil;
- Air Resources;
- Water Resources;
- Vegetation;
- Wetlands;
- Wildlife;
- Threatened, Endangered, Proposed, and Candidate Species;
- Socioeconomics;
- Environmental Justice;
- Land Use;
- Visual Resources;
- Noise;
- Safety and Health Issues;
- Recreation;
- Cultural; and

- Native American Religious Concerns.

Preliminary analysis indicated that the proposed action would not affect several other *Critical Elements of the Human Environment*. Justifications for dismissal of these elements from further discussion in this EA, are provided below:

- *Paleontology* -- Inquiry with the North Dakota Geological Survey, Fossil Resource Management Program indicated no documented fossil collection sites in La Moure or Dickey counties.

- *Wild and Scenic Rivers* -- Review of the pertinent U.S. National Park Service web site indicated that there are no Federally designated Wild and Scenic Rivers in North Dakota.

- *Wilderness* -- The nearest Federally designated wilderness area to the proposed Edgeley/Kulm Project is the Chase Lake Wilderness Area, a 4,155 acre isolated alkali lake located approximately 65 air miles to the northwest.

In the following sections, "project area" refers to the land occupied by Western's Edgeley Substation, land occupied by the proposed collection substation and the underground collection lines, land within the 10-mile long transmission line ROW, and land occupied by the proposed windfarm.

An environmental impact is a change in the status of the existing environment as a direct or indirect result of the proposed action or no action alternative. Impacts can be positive (beneficial) or negative (adverse), and permanent or long-lasting (long-term) or temporary (short-term). Short-term impacts are generally associated with the construction phase of the proposed project, while long-term impacts remain for the life of the project and beyond. Measures that would be implemented to reduce, minimize, or eliminate impacts (mitigation measures) are discussed under each resource. Environmental protection measures including BMPs, standard construction practices, regulatory permits, and agreements were presented and discussed in Chapter 2. These would be designed and implemented to avoid, minimize, and/or mitigate potential environmental impacts.

PHYSICAL RESOURCES

GEOLOGY AND SOIL

A regional discussion of geology is necessary for an understanding of the geologic setting and resulting soil types within the project area (**Figure 3-1**). As a result, the discussion of geology encompasses a broad area, whereas the discussion of soil is narrowed to the project area, and further narrowed to actual disturbance when potential impacts to soil as a resource are discussed.

Existing Environment

The physiography of southern and eastern North Dakota has been most recently affected by glaciation. Glaciers have retreated and advanced several times in the past 2 million years. The most recent advance, the Wisconsinan Glaciation (70,000 – 10,000 years ago), terminated at the current location of the Missouri River. Thick layers of unsorted sediments, or glacial till, were deposited by these glaciers and created many of the landscape features of the project area. The Missouri Escarpment traverses the entire state, extending from the northwest corner of the state to the southeast-central boundary, and rises several hundred feet above the adjacent plains. This escarpment forms the boundary between the glaciated drift plains to the north and

Figure 3-1

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Figure 3-2

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east, and the Missouri Coteau. The glaciers were forced up the escarpment and onto the uplands of the Missouri Coteau. Shearing action moved large amounts of rock and sediment from beneath the glacier to on top of the glacier. As the climate warmed, varying depths of sediment overlaying ice caused differential rates of melting and resulted in characteristic "hummocky collapsed glacial topography" with numerous potholes (Bluemle 2000). General topography on the Coteau is undulating to rolling.

The topographical transition between the Missouri Coteau and the Glaciated Plains is at the western edge of the Canadian wind corridor. The higher elevation of the eastern Missouri Coteau increases exposure to wind and, consequently, makes this area of North Dakota highly attractive for wind power generation (Elliot et al., 1986).

According to the North Dakota Geological Survey (Bluemle 2000), North Dakota is located in an area of low earthquake probability. The deep basement formations underlying North Dakota are expected to be geologically stable. There are no known active tectonic features in south-central or southeastern North Dakota.

Soils in the project area are grassland soils (Mollisols) typical of the Missouri Coteau and belong to the Barnes-Svea-Parnell association (Thompson and Sweeney 1971). Soils of the glacial uplands tend to be well drained and medium-textured loams, while poorly drained fine-textured soils are found in the morainic depressions (potholes and wetlands). Soils of the Barnes series dominate the project area with Barnes-Svea loams being most common. The Barnes-Svea loams are medium textured and occur in undulating topography. They are resistant to wind erosion, but are susceptible to water erosion on sloped topography, particularly following cultivation or other surface disturbance.

Parnell silty clay loam (Parnell series), a poorly drained soil, underlies depressions that often retain runoff water from surrounding soils. These most commonly occur as the soil type underlying wetlands within the project area.

There are no known metallic mineral deposits in the project area (Bluemle 1979). While sand and gravel deposits may be available in the vicinity of the Missouri Coteau and Escarpment, deposits tend to be shaley and of poor quality (Bluemle 2000, 1979).

Environmental Consequences – Direct and Indirect

Depletion of an economically valuable mineral deposit could result in a significant impact to geologic resources. However, there are no known metallic mineral deposits in the project area and known gravel and sand deposits are generally of poor quality. Dakota Wind anticipates importing gravel and sand required for project construction (i.e., road construction and structure foundations) and/or locating and developing a new, quality gravel and sand deposit in the project area. As a result, no significant impact to geologic resources would occur.

Potential adverse impacts to soil include increased erosion from runoff due to compaction and loss of vegetation, and possible impacts caused by a fuel spill from construction equipment. An unmitigated loss of highly productive soil could constitute an adverse significant impact. Because of the gentle relief in the project area and deliberate siting of

towers on level terrain, the potential for soil loss due to erosion would be low.

Standard BMPs such as silt fencing, straw bales, and ditch blocks would be used during access road construction and electrical line trenching on sloped ground or at ephemeral drainage crossings within the project area. Implementation of these BMPs would minimize water erosion of upland soil types (Barnes-Svea loams). Access roads would be compacted, and constructed with culverts and gravel top surfaces that would eliminate long-term potential for erosion. Disturbance to Parnell silty clay loam is not anticipated by construction activities, as Dakota Wind and Basin have considered avoidance of wetlands as primary criteria in the siting of wind turbines and ancillary facilities. Soil compaction would be limited to crane pads at each of the wind turbine sites. These pads are anticipated to be approximately 50 feet x 50 feet in size and located on relatively flat ground. Both FPL Energy's *Best Management Practices* (Chapter 2 – *Environmental Protection Measures*), and Western's *Construction Standard 13, Environmental Quality Protection* (**Appendix B**) includes restoration of disturbed areas to pre-construction conditions. Erosional losses to soil resulting from compaction and disturbance would be short-term, only occurring during construction, and would be minimized by implementing BMPs and environmental protection measures.

FPL Energy's construction BMPs specifically address fueling and equipment maintenance. In addition to designated staging areas, fuel spill cleanup and containment kits would be required of construction contractors as standard on-site equipment (FPL Energy 2003).

As a result of mitigations to prevent, minimize, and/or reclaim potential soil erosion, compaction, and spill effects, no unmitigated loss of highly productive soil would result from implementation of the proposed action. Thus, there would be no significant impact to soil resources.

AIR RESOURCES

The region of influence for air resources is limited to the project area (**Figure 3-1**).

Existing Environment

Air in the Edgeley/Kulm Project area is assumed to currently meet the National Ambient Air Quality Standards (NAAQS) based on the lack of development and rural nature of the area. Minimal effects to air quality likely occur from emission sources such as vehicles, trains, and agricultural equipment.

Although relatively high concentrations of total suspended particulates (dust) likely occur in springtime due to the presence of plowed fields and high wind, these are not expected to exceed NAAQS. NAAQS particulate standards adopted by the North Dakota Department of Health, Air Quality Program are 50 micrograms per cubic meter of air expected annual arithmetic mean, and 150 micrograms per cubic meter of air maximum 24-hour average concentration (NDDH 1987).

Environmental Consequences – Direct and Indirect

A significant impact to air resources could result if Federal or state air quality standards would be exceeded during construction and operation of the proposed project, including the unmitigated generation of fugitive dust.

Vehicle movement during construction activities associated with the proposed project is expected to temporarily affect air quality in the project area. Vehicle and construction equipment emissions would

include nitrogen oxides, hydrocarbons, carbon monoxide, and sulfur dioxide from construction and maintenance vehicles. These impacts would be short-term, and are not expected to exceed state and Federal air quality standards.

Fugitive dust caused by vehicle movement during construction would be minimized by watering all access roads and disturbed areas in accordance with FPL Energy's contractor requirements and BMPs, and guidelines provided in Western's *Construction Standard 13* (**Appendix B**). In addition, any complaints that may arise from fugitive dust generation would be dealt with in accordance with North Dakota Department of Health requirements. As a result, any air quality effects caused by dust would be short-term, limited to the time of construction, and would not exceed the aforementioned NAAQS particulate standards. The North Dakota Department of Health, Air Quality Program does not require a permit for the project, but has requested courtesy notification (Bachman 2003), and has specified mitigations to control fugitive dust in its comments on the Draft EA.

The limited duration of construction, along with implementation of BMPs are expected to mitigate air quality effects to levels below Federal and state standards. As a result, no significant impacts to air resources would occur.

WATER RESOURCES

The following discussion of surface water is focused on the project area (**Figure 3-1**), although a broader regional overview, including mention of the Maple River and James River Basin, is necessary for an understanding of the area's hydrology and potential impacts of the proposed Edgeley/Kulm Project. Discussion of groundwater is focused on a region of influence specific to the project area.

Existing Environment

Surface Water

Numerous sediment-lined ponds and marshes are located throughout the project area. These are typical of the collapsed glacial topography found on the previously described (Geology and Soil Section) Missouri Coteau uplands. In summary, during Pleistocene time, continental glaciers flowing over escarpments forced large amounts of rock and sediment upward through shear planes to the surface. Eventually, the climate moderated, the glaciers stopped advancing, and large masses of glacial ice stagnated over the uplands. Irregular melting resulted in the hummocky topography witnessed today. The numerous ponds and marshes within the project area are depicted on **Figure 3-2**.

Surface runoff is toward these undrained or poorly drained depressions that fill up and overflow into lower ones or drain into seasonal tributary streams of the Maple River located approximately 14 miles to the east of the project area. The nearest mapped 100-year floodplain to the project area is along the Maple River and encompasses much of the Edgeley townsite. The Maple eventually enters the Elm River in South Dakota, a tributary of the James River.

The proposed project is located in the James River Basin as defined by the U.S. Geologic Survey (USGS 2002). The James River is located approximately 30 miles east of the project area. The average annual flow of the James River measured at the La Moure, North Dakota gaging station is near 100 cubic feet per second (cfs). Peak flows nearing 1,000 cfs historically occur during June. Low flow historically occurs during December (38 cfs recorded in December 2002).

Groundwater

Shallow groundwater in the vicinity of the proposed Edgeley/Kulm Project occurs in near-surface glacial till (its deposition described above) and/or the underlying Spiritwood aquifer system that is comprised of glaciofluvial materials (Armstrong 1980). Glacial till is typically a non-sorted, non-stratified mixture of clay, silt, sand, gravel, and boulders. Over a large area, the percentages of each type of material in the till may vary considerably.

The glaciofluvial material comprising the Spiritwood aquifer system is generally composed of sand, gravel, and silt that have been sorted and deposited by streams and are similar in composition, and, in this case, undifferentiated from glacial outwash deposits. Anomalies such as channels, isolated deposits of permeable sand and gravel, and impermeable silt and clay result in a complex Spiritwood aquifer system (Armstrong 1980).

Literature available from the USGS document two wells in the project area (Armstrong 1980). These are located in SE¼ Section 23, Township 132 North and Range 66 West, and SE¼ Section 19, Township 132 North and Range 65 West. The Section 23 well was drilled to a depth of 432 feet below ground surface (bgs) where bedrock was encountered. Water was present at approximately 62 feet bgs, and the well was estimated to produce 51 to 250 gallons per minute (gpm). The Section 19 well was drilled to depth of only 55 feet bgs, and encountered groundwater at a depth of approximately 45 feet bgs (no production information was available).

Environmental Consequences – Direct and Indirect

Violation of the terms and conditions of North Dakota Department of Health storm water runoff permit requirements could potentially degrade surface water quality. As a result, a significant impact to water resources could occur.

Anticipated distances to nearby ponds and wetlands from any construction disturbances, combined with implementation of FPL Energy BMPs (Chapter 2) and Western's construction standards (**Appendix B**), would minimize or eliminate potential for increased sediment load and/or a construction equipment fuel spill. Overland flow during storm events is low due to undulating topography and permeable soil underlying the project area. However, per North Dakota State Department of Health requirements, a storm water runoff permit would be obtained prior to construction. No significant impacts to surface water quality or flow from sediment during construction or operation of the proposed project would occur as a result of site conditions, avoidance, securing a permit to discharge storm water runoff, and properly implemented BMPs.

A construction equipment fuel spill occurring in sufficient quantity and given sufficient time could potentially result in a significant impact to groundwater quality. However, based on depth to groundwater (greater than 40 feet), proper fuel handling and storage, and appropriate spill contingencies as specified by FPL BMPs and Western's construction standards, no significant impact to groundwater resources would occur during construction of the proposed project.

BIOLOGICAL RESOURCES

VEGETATION

Evaluation of vegetation resources was limited to the project area (**Figure 3-1**) with consideration of the importance of this resource to wildlife.

Existing Environment

Digital landcover and wetland data were obtained from the USFWS in Bismarck, North Dakota (USFWS 2001a). These data, based on 1992-1996 satellite imagery, were used to derive area estimates of land cover and wetlands within the project area. The project area contains a mosaic of cultivated cropland, grassland, wetland, and forested shelterbelt types (**Figure 3-3, Table 3-1**). Within the project area, cropland accounts for the majority of land area (65 percent). Grasslands and wetlands account for 20 percent and 12 percent of the land cover, respectively.

Cropland

Cropland dominates the project area. In La Moure County, 78 percent of the land area in 1997 was cropland with dryland wheat, (primarily spring wheat) being the most commonly planted grain (AGSS 1997). Other common cultivated crops include sunflower, barley, and corn. Cultivated cropland in La Moure County decreased slightly (13,289 acres) from 1992 to 1997 (AGSS 1997). Specific acreages of different croplands within the project area are not available, and change from year to year.

Some croplands in the project area have been enrolled in the Conservation Reserve Program (CRP). CRP land is removed from crop production for a specific time period (usually 10 years) and is planted with some type of soil and water conserving cover; often introduced grasses or a mixture of grasses and legumes. Unless specifically allowed during droughts, haying and livestock grazing are not permitted on CRP land. Total acreage of CRP land within the project area is unknown. In La Moure County, 68,161 acres (9 percent land area) was enrolled in CRP during 2001 (NRCS 2001).

Hay and Pasture Land

Hay and pasture land are managed for production of livestock forage, often involving fertilization, weed control, reseeding, and renovation. These areas may be composed of introduced grass monocultures or mixtures, mixes of grasses and legumes, small grain hay, or legume monocultures, such as alfalfa or clover. Land cover data indicate that approximately 2 percent of the project area is in alfalfa hayland cover, (USFWS 2001a). Depending upon the local circumstances (e.g. existence of USFWS easements), these lands may or may not be hayed or grazed.

Grassland

Grassland covers 20 percent of the project area and consists of two cover types: native grassland and undisturbed grassland (USFWS 2001a). The native grassland cover type accounts for 18 percent of the project area (USFWS 2001a). According to the USFWS (2001a; C.R. Loesch Pers. Comm.), the native grassland landcover type consists of a “mix of native grasses, forbs, or scattered small shrubs on unbroken prairie.”

This land cover is commonly grazed or hayed annually. Native grassland within the Missouri Coteau is mainly mixed-grass prairie (Kantrud and Kologiski 1982; Küchler 1968). It primarily consists of western wheatgrass, little bluestem, needle-and-thread, and green needlegrass, with prairie cordgrass and northern reedgrass near wetlands (Kantrud and Kologiski 1982; Thompson and Sweeney 1971). Mixed-grass prairie in the Missouri Coteau region includes numerous forbs (e.g., yarrow, pussy toes, fringed sagewort, purple avens, milk vetch, etc.) and shrubs (e.g., prairie wild rose, snowberry) (Kantrud and Kologiski 1982).

TABLE 3-1
Landcover Types (USFWS 2001a) Within the Project Area
Proposed Edgeley/Kulm Project

Land Cover Type	Windfarm (percent)	Project Area (percent)
Native Grassland	10.8	18.2
Undisturbed Grassland	3.4	2.1
Alfalfa Hayland	0.3	1.6
Cropland	77.7	64.6
Forest and Shelterbelt	0.0	0.3
Riparian	0.0	0.4
Urban	0.0	0.9
Temporary Wetland	1.7	1.0
Seasonal Wetland	4.3	3.0
Semipermanent Wetland	1.8	7.7
Lake	0.0	0.2

The undisturbed grassland cover type accounts for 2 percent of the area, and differs from the native grassland in that it is defined as a "predominant mix of cool-season grasses and forbs planted on previously cropped land. This land cover is generally undisturbed but may be hayed or grazed intermittently" (USFWS 2001a; C.R. Loesch Pers. Comm.).

Forest and Shelterbelt

Shelterbelts are planted to reduce wind erosion in cultivated areas, provide wildlife habitat, and to protect farmsteads and livestock areas. A variety of native and non-native shrubs, deciduous trees, and conifers are used for shelterbelt plantings (La Moure County Soil Conservation District 2002). In the project area the forest and shelterbelt cover type accounts for less than 1 percent of the project area.

Riparian

Riparian habitats are disproportionately important to wildlife because they tend to have high plant species richness and diversity, and high vertical habitat diversity. Riparian habitat represents less than 1 percent of the project area and mostly appears as straight lines on the landcover map (**Figure 3-3**). This suggests that the riparian areas are small and may be mostly associated with ditches along roads and other modified land areas.

Rare Plant Populations

A request was submitted to the USFWS (Bismarck, North Dakota) on October 23, 2002, for information on threatened, endangered, and candidate species that may be present in the project area. No rare, threatened, endangered, or candidate plant species were identified. In addition, a request was submitted to the North Dakota Natural Heritage Program (NDNHP) to query their database for any rare species known to occur in the vicinity of the proposed project. NDNHP responded in a letter dated November 7, 2002 (NDNHP 2002), that there were no documented occurrences of rare plants in the project area. The fact that there are no known occurrences of rare plants does not imply that rare plant species are not present.

Figure 3-3

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However, based on NDNHP information and project activities occurring primarily on disturbed ground (see **Table 3-1**), the occurrence of rare plants within areas expected to be disturbed during the proposed project are not anticipated.

Environmental Consequences – Direct and Indirect

An unmitigated loss of native prairie or wetland vegetation, or uncontrolled introduction of noxious weeds could result in a significant impact to vegetation resources.

Temporary and permanent impacts to existing vegetation would result from construction activities. Direct impacts would occur primarily in cropland or hayland and include removing and reducing growth and productivity from construction activities. Short-term indirect impacts associated with removing vegetation include potential localized reduction in cultivation of crops, hay, or grazing capacity at construction sites, and possible introduction of invasive weed species. Permanent disturbance would result from constructing access roads and turbine bases (50 feet by 50 feet). Basal areas of the turbines and access roads would result in a permanent loss of productivity at those sites. Vegetation communities most sensitive to disturbance are native prairie and wetlands. However, turbine locations and access roads were sited to specifically avoid wetland areas.

Temporary impacts (direct and indirect) would be mitigated through revegetation and erosion control practices. New road construction would also include dust control measures to reduce impacts from dust on adjacent vegetation communities. Noxious weeds would be controlled using weed control measures. These mitigation measures were identified in Chapter 2 (Environmental Protection Measures) and are described in Western's construction standards (**Appendix B**).

Mitigation including re-seeding native grasses, wetland avoidance, and compliance with a noxious weed control plan would result in no significant impact to vegetation.

WETLANDS

Wetlands are intrinsically important because they can provide important wildlife habitat, and perform hydrologic (e.g., flood attenuation, surface water, ground water recharge) and water quality (sediment retention, pollution control) functions (Novitzki et al., 1997). Because of the relative importance of wetlands in this region to waterfowl production, the area of study is limited to the project area (**Figure 3-1**), which encompasses substantial waterfowl habitat.

Existing Environment

Wetlands are defined by the U.S. Army Corps of Engineers (USACE) as "Waters of the U.S." and are subject to jurisdiction under Section 404 of the Clean Water Act (1973). Waters of the U.S. include both wetlands and non-wetlands that meet USACE criteria. USACE has determined that a jurisdictional wetland must have a predominance of hydrophytic vegetation, hydric soil, and wetland hydrology.

The U.S. Supreme Court issued a decision in 2001, in the case of Solid Waste Agency of Northern Cook County vs. USACE, that removed "isolated wetlands" from USACE

jurisdiction. Isolated wetlands are those that have no connection with any tributary system that flows into traditional navigable water or interstate water (i.e., intrastate lakes, streams, prairie potholes). This decision does not alter state or tribal jurisdiction over wetlands, and regulatory authority over isolated wetlands varies from state to state.

The Department of Energy (DOE) is obligated to comply with floodplain and wetlands environmental review requirements as presented in 10 CFR part 1022. This regulation applies to actions implemented under DOE purview that occur in floodplains or wetlands. The Natural Resource Conservation Service (NRCS) oversees the Wetland Reserve Program where landowners sell conservation easements or enter into a cost-share restoration agreement with the U.S. Department of Agriculture (USDA). Any impacts to wetlands could affect farm benefits to landowners. FPL Energy has notified the NRCS La Moure Field Office of the proposed project location and activity.

Within the project area (**Figure 3-2**) approximately 401 acres are designated as a Waterfowl Production Area (WPA) (USFWS 2002b). WPAs are lands owned by USFWS and are part of the National Wildlife Refuge System. These lands protect critical wetlands and grasslands for waterfowl and other wildlife species. WPAs are open for hunting, fishing, and trapping in accordance with Refuge and State regulations (USFWS online).

Wetland resources were evaluated within the project area. There are no mapped 100-year floodplains within the project area. National Wetland Inventory (NWI) digital wetland data were reprocessed by the USFWS Region 6 Habitat and Population Evaluation Team (HAPET) to simplify the wetland classification for computer modeling distribution and density of breeding duck pairs (USFWS 2001b). The resulting five wetland classes include river, lake, semi-permanent, seasonal, and temporary (USFWS 2001b; see **Figure 3-3**). Wetlands account for 12 percent of the project area (**Table 3-1**) and are typical pothole wetlands. Semi-permanent wetlands account for the majority of wetlands in the project area.

USFWS has been purchasing wetland easements in the Prairie Pothole Region since 1958 and grassland easements since 1989 as management tools to protect habitat for waterfowl and other wildlife species (USFWS 2002a). These easements provide perpetual protection of wetlands and grasslands within the boundaries of the easement agreements that have been identified and mapped by USFWS personnel. Within the project area, approximately 3,309 acres of land are protected in wetland easements (**Figure 3-2**). [Note easement boundaries, displayed on **Figure 3-2,** are for illustrative purposes and do not represent legal boundaries; and mapped wetlands do not necessarily represent wetland resources protected by individual easement agreements]

Typical Pothole Wetland in the project area.

Environmental Consequences – Direct and Indirect

Significant impacts to wetland resources could occur by filling (sedimentation) existing wetlands or ephemeral channels or otherwise negatively altering the hydrology, function, or water quality.

Disturbance to wetlands and ephemeral channels resulting from the proposed project would not occur. Wetland areas would be avoided when positioning towers and access roads. All activities would be outside of ephemeral channels and the depression cone of wetlands. While the proposed power line may bisect some ditches and ephemeral channels, there would be no construction activities within those features. To further protect wetlands, sediment and erosion control measures would be implemented as described in FPL Energy BMPs (see Chapter 2) and Western's *Construction Standard 13* (**Appendix B**). Since there would be no activity in wetlands or floodplains, no specific assessments are necessary under 10 CFR part 1022.

As with any construction activity, there is a possibility of spilling fuel, hydraulic fluid, or other hazardous substances. The potential of such events would be minimized using FPL Energy Contractor requirements and BMPs, and Section 13.10 of Western's construction standards (**Appendix B**). Construction equipment would be equipped with spill cleanup kits. Equipment refueling would take place at secure areas, away from wetlands or drainages.

Windfarm access roads could potentially provide new access to wetland areas within the project area. However, access on private land would continue to be controlled by the landowner, and is not likely to differ from previous access across open ground.

Dakota Wind avoided wetlands during siting the windfarm and ancillary facilities. Through avoidance, and proper implementation of BMPs and construction standards, no significant impacts to wetlands would result from construction or operation of the proposed project.

WILDLIFE

Although the evaluation of wildlife resources focused on the project area (**Figure 3-1**), some regional discussion is included. This is necessary because of the greater mobility of wildlife and the relative importance of habitat resources outside of the project area to wildlife, particularly waterfowl.

Existing Environment

Species lists of vertebrates known or likely to occur on or near the project area were developed through literature review and in consultation with agency personnel. Checklists of North Dakota birds (Stewart 1975, Faanes and Stewart 1986), mammals (Grondal, no date), and amphibians and reptiles (Hoberg and Gause 1992) were available online through the USGS Northern Prairie Wildlife Research Center. Also, a baseline study of breeding birds in the general vicinity of the project area (Shaffer and Johnson 2002) provided additional information on bird species occurrence. These sources yielded general distribution information that aided in developing the species lists for the project area. Based on species distributions and known habitat affinities, Western estimates that seven amphibian, seven reptile, 68 bird, and 52 mammal species

may occur in the vicinity of the project area (See Appendix C for listing).

The Missouri Coteau is part of the Prairie Pothole Region in North Dakota. This region is responsible for a substantial portion of North American waterfowl production (U.S. Prairie Pothole Joint Venture 1995). The project area is located within this important region and contains habitat for upland and wetland bird species.

The USFWS HAPET developed computer models to predict nesting pair density and distribution for selected duck species (mallard, northern pintail, blue-winged teal, northern shoveler, and gadwall) (USFWS 2001c, in project file). This effort was designed to assist resource managers in assessing the value of conserving and managing upland nesting cover. Predictions are based on a combination of the potential of individual wetlands to attract breeding duck pairs and the modeled "accessibility" of surrounding landscape to nesting hens. The proposed Edgeley/Kulm Project is in a region with estimated nesting pair densities ranging from 40 to 100 pairs/ square mile (mi^2). Relatively large contiguous areas of potentially high breeding pair density (>100 pairs/ mi^2) lie within 12 miles of the project area.

Environmental Consequences – Direct and Indirect

Significant impacts to wildlife could result from direct or indirect mortality substantial enough to impact populations. Also, mortality to local birds or migratory birds under USFWS jurisdiction that could result in population declines would constitute a significant impact.

Construction activities that remove vegetation and disturb soil may cause direct impacts to individuals of less mobile species (e.g., small mammals, amphibians, reptiles) through direct mortality or displacement and exposure to predators. The cultivated cropland or hayland where most disturbance would occur may not be particularly productive for those species because of low habitat diversity. Permanent habitat loss from constructing access roads and tower bases would be minimal and restricted to localized areas, while other construction disturbances would be temporary. Revegetation of disturbed areas would mitigate the short-term effects. More mobile species (medium to large mammals and birds) would be able to flee disturbed areas.

Disturbance to wildlife from noise, vehicles, and human presence would be localized and of short duration. Small mammals, reptiles, or birds could be killed by vehicles, though most would be able to flee. Nests of ground-nesting birds could be destroyed by vehicle traffic during spring and early summer months when birds are nesting. Vehicles could also disturb nesting activity and habitat during construction activities. However, any losses would not cause a decline in wildlife populations. Thus, these impacts would not be significant.

Construction activities could result in the accumulation of trash and food scraps that may be attractive to scavengers. Scavengers, such as raccoons or ravens, pose a threat to ground-nesting birds or other ground-dwelling wildlife species susceptible to predation. Waste containment measures would be implemented as described in FPL Energy's Contractor requirements, and Western's standard construction practices, Section

13.8 (**Appendix B**). All waste material would be removed from the construction site. Any attraction of scavengers to the construction area would be of short duration and would not affect populations of wildlife in the area.

Windfarm access roads could potentially provide new access to areas within the project area. However, access on private land would continue to be controlled by the landowner, and is not likely to differ from previous access across open ground.

Mortality to birds resulting from collision with turbines at windfarms have been described at other windfarms (Nelson and Curry 1995; Osborn et al. 2000; Johnson et al. 2002), although the degree to which collision mortality is a problem is probably site specific. In Minnesota, Johnson et al. (2002) classified 71 percent of documented avian collision mortalities as migrants and 76 percent of carcasses were passerines. Estimated mortality rates for eight-month periods ranged from 0.98 to 4.4 collisions per turbine (ca. 1.5-6.6 collisions/turbine/ year); with the highest rate being primarily due to a single mortality event, which may have been weather related (Johnson et al. 2002). Avian collisions with turbines may be influenced by such factors as annual migration and local movement patterns, turbine size, and weather.

It is likely that there would be impacts to individual birds as a result of collisions with wind turbines. The potential for avian mortality has been addressed primarily by siting the windfarm project and turbines where birds are less likely to encounter them. Dakota Wind's permitting team participated in meetings with USFWS personnel and local landowners to identify and address a variety of issues including avian mortality. Field visits were conducted with USFWS personnel to document avoidance areas for wetlands and flyway corridors. Staff at USFWS Kulm Wetland Management District assisted with the initial tower siting. As a result of these consultations, the proposed windfarm site is situated in an area with relatively lower density of wetlands and smaller wetlands, compared with areas to the north and west (**Figures 3-2** and **3-3**). Individual turbine towers would be located away from low passes between wetlands where waterfowl are more likely to fly, which would reduce the likelihood of avian collisions.

Dakota Wind would use improved turbine and tower designs (e.g., solid towers rather than lattice towers) to further reduce avian mortality. Strobe lights would be placed on towers, which are less attractive to night-flying birds.

In addition to the specific design measures that would reduce avian mortality, Dakota Wind personnel would conduct periodic searches of the windfarm for carcasses. Searches would be conducted at times coinciding with annual migration, as well as during the nesting season (late spring and summer) to identify impacts to migrant and breeding birds. Local USFWS personnel would be apprised of the findings from the carcass searches. Dakota Wind is collaborating with USFWS and USGS in a study of the effects of wind-power development on grassland breeding birds. This study addresses the issue of the possible avoidance of windfarms by breeding birds, rather than the effects of direct mortality. Baseline data were collected in areas of native prairie habitat where development is likely to occur in the near future (Shaffer and Johnson 2002). These studies would be ongoing and

expanded as wind power development occurs.

The proposed Edgeley/Kulm Project would involve constructing approximately 6 miles of new power line in areas where none currently exist. Potential for line strikes and associated mortality exists; waterfowl, wading birds, and shorebirds may be particularly vulnerable. However, mortality is not expected to increase as a result of the proposed project. In particular, the transmission line portion of the proposed project is not expected to bisect daily movement patterns of these species because the majority of potholes are located outside of the transmission line corridor. Approved marking devices could be placed at about 100-foot intervals and staggered on each overhead ground wire if line strikes are identified as a problem.

Numerous measures would be implemented to minimize impacts to local and migratory bird populations and other wildlife species. These measures include "Raptor-Safe Power Line Construction Practices" (APLIC; EEI 1996), participation with the USGS and USFWS in a monitoring program, avoidance of anticipated flyways during tower siting, and use of tower designs and strobe lights that are shown to reduce collisions. As a result of these measures, significant impacts to wildlife would not be expected.

THREATENED, ENDANGERED, PROPOSED, AND CANDIDATE SPECIES

The area of study for special status species was essentially the same as that for wildlife resources with focus on the project area (**Figure 3-1**).

Existing Environment

A request was submitted on October 23, 2002, to the USFWS Region 6 Office in Bismarck, North Dakota for information on threatened, endangered, and sensitive candidate species that may be present in the project area. The USFWS (2002c) responded that whooping cranes (*Grus americana*) and bald eagles (*Haliaeetus leucocephalus*) may migrate through the project area. However, USFWS staff was not aware of either of these species frequenting the project area. Also, a request was submitted to the NDNHP to query its database for any rare species known to occur in the vicinity of the proposed project. NDNHP staff (2002) responded that there were no known occurrences of rare species within the project area, including critical habitats such as breeding, wintering, or staging areas.

Whooping cranes breed in Wood Buffalo National Park, Northwest Territories, Canada, and winter along the Texas coast. According to USFWS (2002c), whooping cranes migrate through west and central North Dakota counties during fall and spring. Whooping cranes' preferred roosts are on wetlands and stockdams with good visibility (USFWS 2002c).

Bald eagles migrate statewide; however, they tend to follow major river corridors. Also, bald eagles concentrate along the Missouri River during winter and are known to nest within the floodplain forests (USFWS 2002c).

Environmental Consequences – Direct and Indirect

Significant impacts to threatened, endangered, or candidate species could result from direct or indirect mortality of these species resulting from construction activities or operation of the windfarm.

Any such mortality would constitute a taking.

Since neither whooping cranes nor bald eagles are resident in the vicinity of the proposed project, no direct or indirect impacts to these species are expected. It is unlikely that construction activities at the proposed Edgeley/Kulm Project would have any effect upon bald eagles or whooping cranes that might migrate through the project area. It is possible that migrating whooping cranes could use wetlands or uplands in the vicinity of the project area for feeding or roosting. While it is possible that either of these species could collide with turbines during spring or fall migration, such collisions are also unlikely. Migrating bald eagles and whooping cranes tend to fly at altitudes well above the height of wind turbines. Also, since bald eagles tend to migrate along river corridors, they are unlikely to migrate through the project area. Based on the above, Western determined in a March 13, 2003, letter to USFWS that the proposed project may affect, but not likely adversely affect, whooping cranes or bald eagles. USFWS concurred with Western's determination in a letter dated April 1, 2003. Therefore, no significant impact from the proposed project is expected.

SOCIAL RESOURCES

SOCIOECONOMICS

The socioeconomic setting and potential impacts of the proposed project were evaluated on a regional basis that included the counties of Dickey, Logan, McIntosh, and La Moure. State-wide economic data are also discussed to allow comparison.

Existing Environment

The proposed project is located in the southwestern corner of La Moure County near the four-corner intersection of Dickey, Logan, McIntosh, and La Moure counties. This agricultural region had a total 2000 population of 16,156. Population projections by the North Dakota State Data center reflect a downward movement to an estimated 13,869 individuals in this area by 2020. This is consistent with census trends that reflect downward movement among most rural counties and upward growth among counties with larger urban centers (North Dakota State Data Center 2002).

General demographics of the four–county region show a 50.6 percent female and 49.4 percent male distribution of the predominantly (98.6 percent) white population. Approximately 26.5 percent of area residents are older than 65 with a median age of 45.3 years. The region has a high percentage (22.3 percent) of persons (1,547) involved in agriculture compared with 25,914 individuals (8.2 percent) statewide. Median family/household income for the region ($34,518/$28,328) is about 20 percent less than the statewide average of $43,654/$34,604.

Unemployment in the four-county area is low (1.8 percent) compared with 3 percent statewide (U.S. Census Bureau 2000).

Total market value of agricultural products produced from approximately 2,039 farms (2.29 million acres) in the four-county region exceeds $203.8 million, including $124.2 million in crops and $79.6 million in livestock and poultry (1997 Census of Agriculture, USDA, National Agriculture Statistics Service). La Moure and Dickey counties are primary grain producers while Logan and McIntosh counties favor livestock production.

The two nearest towns to the proposed Edgeley/Kulm Project are Kulm (pop. 514) and Edgeley (pop. 680). Two larger towns Ellendale (pop. 1,798) and Wishek (pop. 1,171) are located 25 miles south, and 28 miles west, respectively. Jamestown (pop. 15,571), a regional service center, is

located about 36 miles north of the project area. Services in the area are limited, with motels and restaurants available in Edgeley, Ellendale, Wishek, and Jamestown. Kulm has three campgrounds and a restaurant. The nearest hospital is located in Wishek.

Environmental Consequences – Direct and Indirect

A long-term effect on the area's infrastructure (e.g., schools, hospitals, housing, utilities) could comprise a significant impact to the socioeconomics of the area.

The North Dakota Department of Commerce has cleared the proposed project in conformance with the North Dakota Federal Program Review System to assure the economic validity of the proposal.

Dakota Wind construction crews would range from 80 to 120 personnel for the proposed Edgeley/Kulm Project. Approximately 30 to 40 percent of the construction crew would involve out-of-area personnel for supervision, technical expertise, and management.

Approximately 60 percent of the work force would be recruited locally. During peak construction the estimated monthly payroll would range from $480,000 to $760,000.

Impacts to social and economic resources are expected to be short-term. Local businesses, such as motels, restaurants, bars, gas stations, and grocery stores, would likely experience some increase in revenue from construction crews associated with the proposed Edgeley/Kulm Project. Social services would not likely be impacted due to the short-term nature of the construction phase of the proposed project. Construction workers would likely be dispersed throughout the towns (Edgeley, Kulm, Ellendale, Wishek, and Jamestown) in the area.

Other local area businesses that would benefit include ready-mix concrete and gravel suppliers, hardware and general merchandise stores, welding and machine shops, packaging and postal services (Federal Express, United Parcel Service, U.S. Postal Service), and heavy equipment repair and maintenance services.

The North Dakota Department of Commerce's review and clearance of the proposed project assures, in part, that no detrimental change to existing goods and services available to the area's populous would result from construction or operation of the proposed Edgeley/Kulm Project. Also, construction activities would be short term. Therefore, no significant impact to the socioeconomics of the area is expected.

ENVIRONMENTAL JUSTICE

Executive Order 12898, (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) was issued by the White House in February 1994. The Executive Order is intended to focus the attention of Federal agencies on the human health and environmental conditions in minority and low-income communities and to ensure that any adverse human health and environmental effect of agency actions that may disproportionately impact minority and low-income population, including Native American Indian Tribes, are identified and addressed. Existing laws such as the National Environmental Policy Act (NEPA) provide the context and opportunity for Federal agencies to identify, address, and consider in decisions any potentially hazardous impacts.

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 potentially affected populations have the opportunity to participate in the decision process and its concerns are considered in the agency's decision.

Existing Environment

The nearest Indian reservation, the Standing Rock Reservation, is located approximately 85 miles to the west of the proposed Edgeley/Kulm Project, and is the closest minority population to the project area. Standing Rock Sioux Tribal members are descendants of the Teton and Yankton Bands of the Lakota/Dakota Nations. The Missouri River forms the eastern boundary of the approximate 2.3 million acre reservation.

Through the processes and activities of early notification, on-site meetings, direct Tribal involvement, and government-to-government consultation, potentially adverse impacts to Tribal interests, primarily sites with cultural value, would be discussed and addressed.

Even though the median family/household income for the region is about 20 percent less than the statewide average, the lower income does not constitute a condition that warrants focus under Executive Order 12898.

Environmental Consequences – Direct and Indirect

With regard to Executive Order 12898, a significant impact could result if a low-income, minority, or subsistence population in the region of the proposed project was disproportionately affected by the proposed project.

Because of the distance of the proposed Edgeley/Kulm Project from the Standing Rock Reservation, no impacts to the economy, environment, or culture of the reservation are anticipated. In addition, Western's interactions with North Dakota Indian tribes is intended to address potentially adverse impacts to Tribal interests outside the reservations. Therefore, discrimination of or disproportionate impacts to low-income, minority, and subsistence populations resulting from of the proposed Edgeley/Kulm Project are not anticipated, and a significant impact would not occur.

LAND USE

The evaluation for land use was focused on the project area (**Figure 3-1**), but includes some discussion that establishes the regional setting of the proposed project.

Existing Environment

The proposed project is located in the Pomona View Township in La Moure County, North Dakota. The project area lies in the southeast corner of North Dakota about 20 miles northwest of Ellendale and approximately 6 miles west – southwest of Edgeley. The area is bounded on the north by North Dakota State Highway 13 and on the west by North Dakota State Highway 56.

Land use features are limited to existing transmission lines, two small towns (Kulm and Edgeley), rural residences, and agriculture. Topography of the area is characterized by subtle undulations with a thick mantle of glacial till. Though the till soil is very fertile, agricultural success is subject to annual climatic fluctuations.

Because of the productive soil and level topography, this region is almost entirely cultivated. Many wetlands are drained, tilled and planted. However, valuable waterfowl habitat remains and is concentrated in state- and Federally-managed waterfowl production areas. The historic grassland was a transitional mix of tallgrass and shortgrass prairie. The prairie grasses have been largely replaced by fields of spring wheat, barley, sunflowers, and alfalfa.

Environmental Consequences – Direct and Indirect

Land use impacts would pertain to physical and operational effects of the proposed project on existing and future land use. In the project area, these impacts are primarily related to agricultural practices. A significant impact could occur from uncompensated loss of crop production or the foreclosure of future land uses.

Western, Dakota Wind, and Central Power would compensate landowners for land, both purchased and leased, that is required for the proposed project. However, construction of 27 wind generation units would affect existing agricultural uses locally and would be both short- and long-term, in duration.

Short-term effects would include:

- Temporary loss of cropland in staging areas;
- Reduced crop yields due to soil compaction; and,
- Increased potential for introduction of invasive weeds.

Long-term impacts would include:

- Loss of cropland under and around structures;
- Reduced crop yield due to soil compaction resulting from farm equipment maneuvering around structures;
- Modified farming operations near and around structures;
- Potential damage to equipment such as harvesters from accidents; and,
- Modified aerial application of herbicides and fertilizers.

Impacts to existing land uses and agricultural practices would be reduced by siting structures in previously disturbed areas, or in areas where agricultural practices have been modified.

Table 3-2 provides a summary of acreage affected by both construction and operation of the proposed project, if

TABLE 3-2
Summary of Acreages Affected by Proposed Edgeley/Kulm Project

Project Component	Construction (acres)	Operation (acres)
Transmission Structures	4.6	.02
Substations	2.0	2.0
Wind Turbines (w/ transformers)	6.0	1.5
Buried Lines and Access Roads	28.0	23.0
Laydown, Parking, Offices	3.0	0.0

implemented. Based on the information provided in **Table 3-2**, approximately one percent of the total approximate 3,000 acres comprising the proposed project area would be affected by operation of the proposed project. As a result, and in consideration of land uses during siting of the windfarm and ancillary facilities, the proposed project would not foreclose future land uses.

FPL Energy's BMPs (discussed in Chapter 2) and Western's *Construction Standard 13* (**Appendix B**) would be implemented to minimize or avoid potential land use impacts from the proposed project. In addition, Western, Dakota Wind, and Basin would provide fair market value compensation to landowners for purchased and leased land. As a result, the proposed project would result in no significant impacts to land use.

VISUAL RESOURCES

The following sections describe the existing visual resources in the general vicinity of the proposed project, followed by a discussion of changes to the existing condition that would result from its construction. For this analysis, the visual region of influence was considered to be the general project area (**Figure 3-1**) as well as those residential areas and roadways along the ROW of the proposed transmission line connecting the windfarm with Western's Edgeley Substation (**Figure 2-1**).

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.

Existing Environment

As described in the *Geology and Soil* section, the general topography on the Missouri Coteau is gently undulating to rolling, with numerous potholes. The topography and character in the project area is primarily flat lying with large areas modified by agricultural activities including ploughing, tillage, and growing small grains, soybeans, and sunflowers. Land use in the area is described in the *Land Use* section. Cultivated fields, occupied and abandoned farmsteads, highways, county roads, and existing transmission lines are prevalent manmade landscape features. Landscape character types include:

- Lowlands that include riparian, wetland, native grassland, and cultivated areas;
- Upland areas where vegetation diversity is limited to dryland farming and pasture; and,
- Areas within lowlands or uplands that have been modified by manmade features (homes, barns, silos).

Structure and color features in the visual region of influence include those associated with wetlands, cultivated cropland, pasture, forested shelterbelt, and additional manmade 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.

Currently, no distinctive landscape features exist in the project area that would require specific protection from visual impairment. There are, however, cultural resources within the regional area of influence that may require special consideration relative to scenic quality, particularly associated with the proposed transmission line connecting the windfarm to Western's Edgeley Substation.

Key Observation Points (KOPs) are viewing locations that represent most sensitive viewers (or the highest incidence of sensitive viewers) of the proposed project.

The proposed windfarm is within ¼ mile of the north-south Pomona Township Road, east-west State Highway 13, and east-west County Road 33. The proposed transmission line would run parallel to east-west State Highway 13 (**Figure 2-1**). Existing rural residences, major transportation routes (State Highway 13, US Highway 281), and dispersed public use areas (Kulm Waterfowl Production Area, township roads) were all considered KOPs within the regional area of influence of the proposed project, including views within ¼ mile (near foreground) of the proposed windfarm and transmission line.

Typical agricultural landscape in project area

Environmental Consequences – Direct and Indirect

Visual resources reflect the aesthetic qualities of the landscape in terms of its public viewing value and sensitivity to change. Significant impacts to visual resources could include those impacts associated with an intrusion by the proposed project on a highly distinctive or important landscape feature (e.g., National Monument), interruption of an unique viewshed from a KOP, or an intrusion on a viewshed from a cultural resource that is registered (or eligible for registration) with the National Register of Historic Places. Wind turbines, transmission lines and structures, and construction of access roads are examples of changes to public viewing that would result from the proposed project. The wind turbines (including swept area) would be approximately 360 feet high, and the proposed transmission line structures would be approximately 65 feet tall. Affected views would include the KOPs (rural residences, businesses, and dispersed viewpoints in the regional area of influence) as discussed above. Because the area contains no highly distinctive or important landscape features, and the proposed transmission line would avoid impacting views from NHRP or eligible cultural resources, the proposed project would not significantly impact visual resources in the regional area of influence of the proposed project.

Typical Post-Construction Windfarm in an agricultural landscape.

NOISE

Evaluation of noise was limited to the project area (**Figure 3-1**).

Existing Environment

The project area is located in a rural, predominantly agricultural area. As a result, sources of background noise to rural residents and occasional visitors to the area include wind, agricultural activity, recreation (primarily hunting), and vehicles traveling Pomona Township Road, County Road 33, and State Highway 13. General noise level data from the U.S. Environmental Protection Agency (USEPA) and the National Transit Institute were used to provide a typical sound level range for rural residential and agricultural crop land uses. 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 (USEPA 1978).

Figure 3-1 shows the locations of occupied residences in the project area. These four residences, shown with a 1,000-foot radius buffer, are located in section 7, 10, 33 and 34 of Township 133 North and Range 65 West. These residences, with the exception of the residence in Section 7, are located at distances greater than one mile from the proposed windfarm.

Environmental Consequences – Direct and Indirect

Exceedance of ambient noise levels at sensitive receptors (e.g., residences) could result in a significant noise impact.

Calculations of audible noise generated from the proposed 27 1.5-MW turbines for the windfarm area were made using *Wind PRO version 2.3.0.125* (Wind Engineers, Inc. 2002) and were based on the international norm "ISO 9613-2 Acoustics – Attenuation of sound during propagation outdoors." (Specific model runs are available upon request).

Variables included in the model runs included turbine noise levels of 105 dBA, wind speed of 8 meters per second (m/s), no tonal noise, no background noise, and a noise limit set to 50 dBA. Model results indicate a noise level range of between 45 and 50 dBA at 1,000 feet distance around the proposed windfarm. Wind turbine siting in section 7 would be conducted with consideration of a 1,000 foot buffer of the occupied residence located in that section.

Based on the expected typical baseline noise levels for the area of between 38 to 48 dBA, and given that at wind speeds used for the calculations (8 m/s), ambient noise levels would likely approach or mask entirely the noise generated from the turbines.

Corona-generated audible noise from transmission lines is generally characterized as a crackling, hissing noise. The noise is most noticeable during wet-conductor conditions such as rain, snow, or fog. Transmission-line audible noise is measured and predicted in dBA. Some typical noise levels are: light automobile traffic at 100 feet, 50 dBA; an operating air conditioning unit at 20 feet, 60 dBA; and freeway traffic or freight train at 50 feet, 70 dBA. This last level represents the point at which a contribution to hearing impairment begins. The average noise-level during wet weather at the edge of the ROW for the proposed transmission line is anticipated to be 46 dBA at 115 kV.

Model runs indicate that noise levels at distances greater than 1,000 feet from the wind turbines would not exceed ambient noise levels. Since proposed wind turbines would be sited to be outside a 1,000 foot radius of the closest residence, no significant noise impacts would result from operation of the proposed project.

SAFETY AND HEALTH ISSUES

Evaluation of safety and health issues was limited to the project area (**Figure 3-1**), and specifically focused on areas in the immediate vicinity of proposed wind turbines, transformers, buried and overhead transmission lines, and substations.

Existing Environment

Agriculture is the predominant land use in the proposed project area. Motor vehicle traffic along Township Road is light with low speed and low volume. Motor vehicle traffic along County Road 33 would be characterized as low volume at moderate speed, and traffic along State Highway 13 would be characterized as moderate volume at high speed (65 miles per hour speed limit).

Environmental Consequences – Direct and Indirect

A significant impact to safety and health as a result of the proposed project would occur if workers, visitors to the area, or area land users were injured during construction of the proposed project, exhibited health effects from substantial increases in the electric and magnetic fields in the area, or suffered traffic accident fatalities as a result of construction or operation of the proposed Edgeley/Kulm Project.

Worker Safety

Project construction work plans and specifications would be prepared to address worker safety during proposed project construction. The preparation of these documents would include appropriate performance provisions for worker protection as is required under the Occupational Safety and Health Act (OSHA) with emphasis on CFR 1926 – Safety and Health Regulations for Construction. Since development and preparation of these documents would be prepared as part of FPL Energy's Contractor Bid Specifications, no significant worker safety impacts are anticipated.

Electric and Magnetic Fields (EMF)

The proposed transmission line for the project area is a 115-kV line. At maximum thermal capacity of the conductor, approximately 200 amperes would flow in each of three phases. Voltage and current are required to transmit electrical power over the transmission line. A phenomena called Electromagnetic Field (EMF) results from electrically charged particles which may cause effects some distance away from the line. Voltage measured in volts (or kV) is the source of the electric field. Current, measured in amperes, is the source of a magnetic field. Fields drop rapidly as the distance increases from the source. The electrical effects of the 115-kV transmission line would be characterized as "corona effects" and "field effects".

Corona Effects

Effects of corona are audible noise, visible light, radio and television interference, and photochemical oxidants.

Audible noise -- Corona-generated audible noise is generally characterized as a crackling/hissing noise, most noticeable

during wet-weather conditions. There are no design-specific regulations to limit audible noise from transmission lines. Audible noise generated from the proposal 115-kV line would be indistinguishable from background noise.

Visible light -- Corona is visible as a bluish glow under conditions of darkness, and probably only with the aid of telescopic devices. Light would be difficult to detect at the operating voltage of 115 kV.

Radio and television interference -- Corona-generated interference is most likely to affect amplitude modulation (AM) broadcast band reception at transmission line voltages of 345 kV or more; frequently modulation (FM) broadcast band reception is rarely affected. The proposed transmission line would be constructed according to standards that minimize sources of corona, such as surface irregularities and sharp edges on suspension hardware.

Photochemical oxidants -- Corona would ionize the surrounding air and generate ozone and nitrogen oxides. The low levels of oxidants produced would not be measurable either near the line or at ground level.

Field Effects

Field effects are induced current and voltage in conducting objects near the line, spark discharge shocks, steady state current shocks, field perception at ground level, and magnetic field.

Current and voltage -- Voltage induction and the creation of currents in long conducting objects such as fences and pipelines would be possible near the proposed transmission lines. Grounding practices and the availability of mitigation measures would minimize the magnetic induction effects of the line. Non-electric fences such as those made of barbed wire directly attached to steel posts would be adequately grounded and would not collect an electric charge. It is recommended that other types of wire fences be constructed using at least one steel post every 150 to 200 feet to ground the fence.

Spark-discharge shocks -- If the induced voltage is sufficiently high on an ungrounded object, a spark discharge shock would occur as contact is made with the ground. At the operating voltage of 115 kV, and with standard design practices, shock discharge and nuisance shocks would be unlikely.

Steady-state current shocks -- Steady-state currents are those that flow after a person has contacted an ungrounded object, providing a path for the induced current to flow to ground. Design requirements that reduce or eliminate induced current and voltages would help ensure steady-state current shocks will not occur.

Field perception -- When the electric field under a transmission line is sufficiently high, persons standing under or near the line may perceive the raising of hair on an upraised hand. At the operating voltage of 115 kV, any perception of electric fields from the proposed line should not be detected.

Magnetic field -- A 60-hertz (Hz) magnetic field would be created in the space surrounding the proposed transmission line conductor by the flow of current. Magnetic field is expressed in terms of teslas or gauss. The maximum magnetic fields at ground level near the transmission line would be similar to the fields developed from common household appliances. The levels of magnetic fields vary with the amount of current and distance from the source. There are no established limits for magnetic fields.

The possibility of adverse health effects from EMF exposure has increased public concern in recent years about living near high-voltage transmission lines. The available evidence has not established that such fields pose a significant health hazard to exposed humans. However, the same evidence does not prove there is no hazard. Therefore, in light of the present uncertainty, it is Western's and Central Power's policy to design and construct transmission lines that reduce the fields to the maximum extent feasible.

While there is considerable uncertainty about the EMF/health effects issue, the following facts have been established from evaluating the results and trends of EMF-related research:

- Any exposure-related health risks to the exposed individual would be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns have been related to magnetic fields.
- The measures employed for field reduction can affect line safety, reliability, efficiency, and maintainability depending upon the type and extent of such measures.

No Federal regulations have established environmental limits on the strengths of fields from power lines. Some states have set limits on fields from newly constructed lines, not based on factual health data. It has been found that most of Western's lines would meet those standards.

Below are brief summaries of some past and current studies on EMF health studies:

Electric and Magnetic Fields from 60-Hz Powerlines: What do We Know about Possible Health Risks? Morgan (1989) concluded that 60 Hz EMF do not pose a significant risk to agriculture, animals, or ecosystems.

A team of Canadian researchers led by McBride reported in the May, 1999 issue of the American Journal of Epidemiology that if there is a risk (of childhood leukemia from EMF exposure) it is undetectable through epidemiological studies.

A study sponsored by the National Institute of Health (NIH), National Institute of Environmental Health Sciences (NIEHS) was published in June 1999: *Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields*. The report stated that all theories concerning biological effects of EMF "suffer from a lack of detailed, quantitative knowledge," and concluded that laboratory data using a variety of animals such as non-human primates, pigeons, and rodent are inadequate to conclude that exposure to EMF fields alters the rate of patterns of cancer and has not been adequately demonstrated for non-cancer health issues (i.e. birth defects, etc.) (NIEHS). As a precaution regarding human health issues, the report recommends that the electrical field at the edge of a ROW measured one meter above ground not exceed 1 kV/meter, and considered this recommendation conservative.

Dr. Sander Greenland in a 2000 report entitled *A Pooled Analysis of Magnetic Fields, Wire Codes and Childhood Leukemia,* concluded: that exposures to fields less than 3 milligauss (mG) is unlikely to cause leukemia; that there is suggestive evidence of a link between childhood leukemia and exposure to fields higher than 3 mG; that future studies of EMF and childhood leukemia should focus on highly exposed populations.

A paper by Dr. Anders Ahlbom published in the September 2000 issue of British Journal of Cancer stated they did not find any evidence of an increased risk of childhood leukemia at residential magnetic field levels less than 4 mG.

A 2002 report by the Department of Health Services, State of California, *An Evaluation of the Possible Risks from Electric and Magnetic Fields from Power Lines, Internal Wiring, Electrical Occupations and Appliances,* was prepared in response to the California Public Utilities Commission. The three preparing scientists agreed, to one degree or another, that EMF can cause some degree of increased risk of childhood leukemia, adult brain cancer, Lou Gehrig's disease and miscarriage. They strongly believe EMFs do not increase the risk of birth defects or low birth weight. They strongly believe EMFs are not a universal carcinogen. The scientists were not in universal agreement that EMFs are related to other conditions such as heart disease, Alzheimer's disease, suicide and adult leukemia.

Magnetic fields at the edge of ROW (25 feet from centerline) at maximum line capacity are calculated to be 7.4 mG. At a distance of 50 feet from the centerline, the maximum fields would be less than 2 mG. It is unlikely that exposures to the electric and magnetic fields from the proposed line would have adverse effects on biological systems, based on the low levels of magnetic fields from the proposed line and the fact that the proposed line would not be located near occupied residences. Electric fields would be less than 1 kV/m. No significant adverse impact is anticipated.

Underground Collection System

The placement and care of underground power transmission lines comes with inherent risks. Lines may be cut or contacted by others digging in or across the proposed utility corridors. Health and safety consequences of a poorly planned action may result in loss of life or equipment and create an interruption in power supply derived for the project area. It is anticipated that underground utility locations will be appropriately identified with appropriate signage in the project area. Above ground utilities may also require signage with maxim vehicle height designations as appropriate. The National Electric Safety Code (NESC) publishes recommended safety requirements for transmission systems. Recommended clearances within the NESC consider a relative vehicle height of 14 feet. No significant adverse impact is expected.

Safety Issues Related to Increased Traffic during Construction

Motor vehicle traffic near the project area and near planned transmission corridors would increase due to motorists traveling in these areas and the contractors working in the area to establish the new power generation system. Traffic management and control of the local roadways would be considered in the forward planning and implementation of the proposed project. With these measures, the potential for a traffic fatality is low, resulting in no significant impact.

In summary, with consideration during siting of the proposed project (avoidance), and implementation of proper mitigations as required by Western's construction standards, OSHA, and other regulatory agencies, there would be no significant impacts to human safety and health resulting from the proposed project.

RECREATION

Although the following discussion focuses on recreational activities within the project area (**Figure 3-1**), some discussion of

regional recreation (primarily hunting) opportunities are discussed.

Existing Environment

The primary recreational activity in the vicinity of the project area is hunting, for upland birds and waterfowl, deer, and predators. The best waterfowl hunting opportunities are west and north of the project area where more numerous and larger wetlands are found. These areas attract a much greater abundance of waterfowl during the hunting season. Proximity to these wetlands to the west and north and potential impacts to waterfowl, both direct mortality and habitat loss, were considered during the siting of the proposed windfarm.

Environmental Consequences – Direct and Indirect

A significant impact to existing recreational opportunities, primarily waterfowl hunting, could result if hunting opportunities decreased in response to increased hunting pressure or decreases in waterfowl numbers caused by construction and operation of the proposed project. By avoiding larger wetlands to the west and north, the proposed location of the windfarm is intended to minimize potential impacts to nesting and migratory waterfowl populations. In addition, easements established by FPL Energy and its subsidiaries with private landowners for wind energy projects typically do not preclude hunting in the vicinity of the windfarm. Hunter access would be at the landowner's discretion.

Consequently, the proposed windfarm project is not anticipated to affect hunting opportunities, particularly for waterfowl, in the area. Therefore, no significant impact to recreation would occur.

CULTURAL RESOURCES

Cultural resources include archaeological and historical sites, buildings, structures, and objects of historic, scientific, or social value. The primary legislation that mandates Federal management and protection of cultural resources is the National Historic Preservation Act (NHPA) of 1966 (as amended in 1976, 1980, and 1992), specifically Section 106 of the act. Western is responsible for Section 106 consultation with the North Dakota State Historic Preservation Office (SHPO) and the North Dakota Intertribal Reinterment Committee (NDIRC).

Cultural Background

The North Dakota Plan for Historic Preservation divides the state of North Dakota into a series of study units based on geography. The proposed Edgeley/Kulm Project lies within the James River Study Unit that encompasses about 6,588 square miles within the James River watershed.

The cultural background of the region surrounding the project area extends back approximately 12,000 years. A *Prehistoric* and *Protohistoric* summary of the area follows:

- Paleo-Indian Tradition (ca. 9500 – 5500 BC) -- The earliest convincingly documented period of human occupation in North America. Known Paleo-Indian materials in the James River Study Unit consist primarily of surface finds of dateable artifacts such

as projectile points (State Historical Society of North Dakota 1990).

- Plains Archaic Tradition (ca. 550 BC – AD 1700) -- Marked by a shift in overall subsistence strategies, increased diversity, and regionalization of projectile point styles. Cultural materials and sites from this period are quite common within the James River Study Unit (State Historical Society of North Dakota 1990). A site with a probable Archaic projectile point fragment (32LM124) lies within the 3-mile visual buffer of the project area (Scott 1997b).

- Plains Village Tradition (ca. AD 1000 – 1780) -- Marked by a subsistence strategy using both hunting and gathering and small-scale, primarily corn-based agriculture. Several sites of the Plains Village tradition are known near the valley of the James River, a considerable distance to the east of the project area (State Historical Society of North Dakota 1990).

- Equestrian Nomadic Tradition (ca. post-1720) -- Marked by the introduction of horses and goods of European manufacture to indigenous cultural groups. Commonly termed the "protohistoric" period, when native peoples began to come under the influence of European culture without necessarily coming into direct contact with Europeans. Most cultural sites associated within the Equestrian Nomadic tradition found within the James River Study Unit are located well to the east of the project area near the James River (State Historical Society of North Dakota 1990).

Like most other places in the interior of North America, the earliest *historic* activity (marked by direct contact between Native Americans and Europeans) in North Dakota was connected with the fur trade. A partial list of Native American tribes known or suspected to have inhabited the general area in protohistoric or historic times would include: the Nakota (Yankton and Yanktonai or Middle Sioux), Lakota (Teton or Western Sioux), Dakota (Santee, Woodland, or Eastern Sioux), Cheyenne, Hidatsa, Assiniboine, Mandan, Arikara, Plains Ojibwa, and Crow (State Historical Society of North Dakota 1990; Wilkins and Wilkins 1977; Lowie 1963). A historic summary of the area follows:

- The battle of Whitestone Hill on September 3 – 5, 1863, approximately 15 miles south of Kulm, was the last major engagement of the Indian Wars east of the Missouri River (Scott and Kempcke 2000; National Park Service 2003).

- The extension of the St. Paul and Pacific and Northern Pacific railroads into the area during the early 1870s greatly promoted settlement and economic expansion (Riegel 1930).

- The "Dakota Boom" between 1878 and 1885 spurred by rapid growth of the United States (in population, technology, industrialization, and urbanization), and divestiture of land owned by the Northern Pacific Railroad. La Moure County grew in population from only 20 in 1880 to 3,187 by 1890. Dickey County's

population grew from no permanent population in 1880 to 5,573 people by 1890 (Eriksmoen, et al. 1997).

- A second "Dakota Boom" between 1898 and 1915 included the construction of the Milwaukee, St. Paul and Sault Ste. Marie railroad (the "Soo" Line) into the state. The Soo Line courses through the project area (Meyer 2002).

- An economy based on agriculture established itself in North Dakota, including the project area, during the early 1900s. That economy has been greatly subjected to fluctuations in weather and commodity prices. Agricultural booms and busts brought on by World War I, the Great Depression, and World War II resulted in the region's dependence on Federal aid, a situation that has not changed appreciably in subsequent years (Wilkins and Wilkins 1977; Arrington and Reading 1991).

Existing Environment

A search of site files, site lead files, and manuscript files was conducted at the North Dakota State Historic Preservation Office in Bismarck, North Dakota. The cultural records file search revealed the presence of 10 previously recorded sites within a 3-mile visual buffer of the proposed windfarm and transmission line route.

Pedestrian inventory was completed at proposed wind turbine sites (200-foot buffer) and access routes, two adjacent 600 square foot blocks at proposed collector substation sites, a 200-foot corridor around the Edgeley Substation, and a major portion of the proposed transmission line ROW. The pedestrian inventory resulted in the survey of approximately 14,140 linear feet of proposed access routes, and approximately 600 acres at turbine, collector, and substation sites (Meyer 2002).

All of the proposed turbine locations and access routes lie on plowed ground. The majority of the proposed transmission line ROW also lies on ground disturbed by roads and cropland. The pedestrian inventory identified nine cultural sites (seven sites and two isolated finds). Cultural sites identified in the project area through research and field inventory include the following:

- The previously documented (Scott 1998) Soo Line Railroad (32LM127) that intersects portions of access routes to the proposed windfarm site. The site's eligibility for the NRHP has not been evaluated.

- A stone ring feature and adjacent linear feature (G3) near, but not within, a proposed access route corridor leading to three turbine sites. Site G3 should be considered eligible for the National Register of Historic Places (NRHP) under Criterion D. This site lies on one of the few areas of unplowed ground in the vicinity and appears to have good integrity (Meyer 2002).

- The historic Brosz farmstead located along the proposed transmission line. The Brosz place includes a large, well-built and rather unique granary and a

barn of historic age (>50 years old). The barn includes modern alterations and the site as a whole includes intrusive, modern elements that affect its integrity. The Brosz site is recommended as ineligible for the NRHP by the site recorder (Meyer 2003).

- The historic Davis farmstead located along the proposed transmission line. The Davis place is abandoned and dilapidated, and includes modern alterations and nearby modern intrusive elements, all of which affect the site's integrity of setting, materials, workmanship, feeling, and association. The Davis site is recommended as ineligible for the NRHP by the site recorder (Meyer 2002).

- Four sites that consist of sparse scatters of prehistoric and/or historic cultural material within 200 feet of proposed turbine locations. One of the sites (32LM119) was recorded during a past inventory (Haakensan, et al. 1995) and was reevaluated during the current inventory. Because of the scattered nature, impaired integrity from plowed ground, and location, direct and/or indirect impacts to these sites are not expected, nor will these sites be recommended as eligible for the NRHP.

- Two isolated finds consisting of a single Knife River flint flake and a historic or modern stone pile from field clearing. These finds are not eligible for the NRHP.

- The previously recorded "Sunshine Trail," a historic highway, intersects the proposed transmission line route near the town of Edgeley. This site was recommended as ineligible for the NRHP by the original recorders.

- Prehistoric Flegel Mound (32LM3) lies within the 3-mile visual buffer. The site was previously recommended as potentially NRHP eligible (Scott 1997a), but has not been evaluated. Consultation with the NDIRC will continue to ascertain the importance of this site as a Traditional Cultural Property (TCP). The results of this consultation will be reflected in Western's consultation with the North Dakota SHPO.

Environmental Consequences – Direct and Indirect

A significant impact to cultural resources would occur if a site of archaeological, Tribal or historical value that is listed, or eligible for listing, on the NRHP could not be avoided or mitigated during siting or construction of the proposed project. Any mitigation requirements would be developed in consultation with the North Dakota SHPO, and may include treatment of all known sites, those discovered during pre-construction surveys, and those discovered during on-site monitoring of construction activities.

Research and pedestrian surveys completed to date identified several historic sites within the project area that could potentially be affected by construction of the proposed Edgeley/Kulm Project, but are not recommended for NRHP eligibility. These include: the Brosz and Davis farmsteads, four sites of prehistoric and/or historic material scatters, and two isolated finds of historic material. Although ineligible for the NRHP, mitigation measures, primarily avoidance, would be implemented during

the siting and construction of the proposed project.

Not all areas that could potentially be disturbed by proposed project construction have been surveyed. However, pedestrian surveys would be completed for all proposed project areas, and as cultural resources are identified, they would be evaluated for eligibility and effect following regulations 36 CFR part 800, Protection of Historic Properties.

Cultural site G3, a stone ring feature, is recommended for NRHP eligibility and is located on undisturbed ground adjacent to an access route corridor leading to several proposed turbine sites. Direct impact to this site would not occur because the site would be avoided during siting and construction of the proposed project. Indirect impact (e.g., visual) to the integrity of the site will be validated through consultation with the NDIRC and the North Dakota SHPO.

Historic railroads such as the Soo Line are often considered eligible for the NRHP under Criterion A because of association with the development of transportation systems across the country. However, through mitigation (avoidance), direct impact from the proposed project on the railroad would not occur. Indirect effects will be evaluated during consultation.

Although the historic "Sunshine Trail" highway intersects the proposed transmission line route near Edgeley, direct impact would be avoided by appropriate transmission line tower placement, and restriction of line pulling and tensioning equipment. Indirect effects will be evaluated during consultation.

The prehistoric Flegel Mound located within the 3-mile visual buffer of the windfarm would not be directly impacted by the proposed project. Indirect impact (e.g., visual) to the integrity of the site will be validated through consultation with the NDIRC and the North Dakota SHPO.

Cultural sites identified through research and/or pre-construction surveys would be avoided, and, as a result, no significant impact to these sites would occur. If historic or prehistoric materials are discovered during monitoring of earth disturbing 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 North Dakota SHPO and the NDIRC. Possible visual impacts to the integrity of cultural site G3, the Soo Line, the Sunshine Trail, and Flegel Mound would be considered indirect and would be evaluated through consultation. Western will not authorize any ground-disturbing activities until its obligations under NHPA are completed. Thus, no significant impact to cultural resources is expected as a result of construction or operation of the proposed Edgeley/Kulm Project.

NATIVE AMERICAN RELIGIOUS CONCERNS

In addition to NEPA and NHPA, other regulations that pertain to consideration of Native American religious concerns include the American Indian Religious Freedom Act (AIRFA) and the Native American Graves and Repatriation Act (NAGPRA). AIRFA provides that agencies consider the effects of their actions on Native American religious practices. NAGPRA provides that if native human remains, funerary objects, sacred objects, and objects of cultural patrimony are found

on Federal land (i.e., Edgeley Substation), the Federal agency (Western) is responsible for disposition of these remains and objects. This can include tribal consultation to identify potential affiliation and repatriation needs. NHPA, AIRFA, and NAGPRA all mandate consultation with affected native groups.

Existing Environment

Research of cultural resources (discussed in greater detail in the Cultural Resources section of this EA) indicates that Native Americans who inhabited the region throughout prehistoric and historic times typified the culture of the North American Plains Indians. Subsistence was focused on hunting, gathering, and small-scale agriculture. The majority of cultural sites found are concentrated along major river valleys. However, Native American hunting parties likely frequented uplands including the site of the proposed Edgeley/Kulm Project. Past cultural surveys have identified several lithic scatters and a stone ring within the project area, and a burial mound within 3 miles of the project area. Today, much of the project area is under cultivation or used as pasture.

Based on the history of the region and its present-day agricultural disturbance, Western does not anticipate that the proposed project would affect Native American traditional values. In addition, Western has initiated consultation with the NDIRC that represents collective Tribal interests in North Dakota on issues related to sacred sites (State Historical of North Dakota 1990). This consultation would be on-going throughout the duration of proposed project planning and construction.

Environmental Consequences – Direct and Indirect

An unmitigated adverse effect to a TCP or a burial site would constitute a significant adverse impact. To mitigate the potential for significant effects from Western's activities in North Dakota, Western entered into a Memorandum of Agreement (MOA) with the NDIRC during 1996 to insure that provisions of NAGPRA are addressed on lands owned and/or managed by Western. In accordance with the MOA, Western would address any concerns expressed by the NDIRC during the course of consultation and proposed project planning and construction.

Siting and construction of the proposed project also is subject to the following North Dakota laws: *Protection of Human Burial Sites, Human Remains and Burial Goods* (ND Century Code §23-06-27), and *Protection of Prehistoric Sites and Deposits* (ND Century Code §55-03, *et seq.*). As a result, Western would notify the appropriate individuals, agencies and authorities in accordance with these laws in the event that important cultural or historic resources are discovered during inventories or construction associated with the proposed project. Implementation of appropriate mitigations, including avoidance, would follow proper notifications.

Western would adhere to the MOA and require Dakota Wind and Central Power to abide by the North Dakota laws that specify avoidance during project siting. If burials or cultural sites with Native American religious values are identified prior to or during the proposed project construction, Native Americans would be notified and consulted about mitigation measures. Based on the above, no significant impact to Native American religious concerns, sacred sites, or TCPs is expected.

CUMULATIVE EFFECTS

Cumulative effects would result from impacts of the proposed Edgeley/Kulm Project when added to other past, present, and reasonably foreseeable future actions occurring in the region. Significant cumulative impacts would result if impacts from the proposed project, when added to other actions in the region, resulted in one or more significant impacts as defined for each resource area analyzed in this EA.

PAST AND PRESENT

Agriculture practices, vehicle travel along township, county, and state roadways, and any existing electrical transmission lines are the primary activities that have occurred and are occurring in the project area and generally in the region. The primary cumulative effect of the proposed Edgeley/Kulm Project would be to wildlife when added to these past and present activities.

Impacts to wildlife caused by implementing the proposed Edgeley/Kulm Project would primarily be the direct mortality of waterfowl, shorebirds, song birds, and raptors from collisions with wind turbines or transmission lines. This anticipated increase in avian mortality would be additive to existing causes of impacts to wildlife from the aforementioned activities (i.e., human disturbance, vehicle collisions, and transmission line collisions and electrocutions), as well as natural predation, disease, and hunting. Although little data exists regarding windfarm-caused wildlife mortality, Western expects that cumulative effects of the proposed Edgeley/Kulm Project and existing conditions would have little effect on wildlife populations in the area. Therefore, no significant cumulative impacts for wildlife would occur.

REASONABLY FORESEEABLE FUTURE

A reasonably foreseeable future action is the proposed construction of a windfarm immediately south of the proposed Edgeley/Kulm Project that would be jointly developed by FPL Energy and Otter Tail Power Company (Otter Tail). Preliminary plans for the Otter Tail project indicate that FPL Energy would construct and retain ownership of 13 wind turbines that would be connected to Otter Tail's 41.6-kV transmission system near Edgeley (**Figure 3-1**). The Otter Tail project was evaluated from a cumulative standpoint relative to its potential additive impacts in the vicinity of the project area.

Otter Tail would construct and operate a radial feed, 41.6-kV collector system comprised of pad-mounted step-up transformers placed approximately 30 feet from the base of each wind turbine tower. The platform transformers would eliminate the requirement for tie-in to a step-up substation as the voltage is raised directly to the transmission voltage at each wind turbine tower. The remainder of the collector system (individual lines) within the windfarm would be planned to be buried underground.

A 41.6-kV overhead transmission line would be constructed from Otter Tail's windfarm to its existing 41.6-kV transmission system near Edgeley. The route of that line is expected to travel 4 miles directly south along Township Road ROW to the intersection with County Road 33, and then 8 miles west to the windfarm site. All construction would be in accordance with the NESC, and, as with the Edgeley/Kulm Project, would implement raptor-safe practices (e.g. tower designs and live marking devices).

Construction of the Otter Tail project would result in approximately nine acres

of temporary disturbance within the 3,000 acre project area, including turbine bases, access roads, and buried electric lines. Permanent disturbance associated with operation of the Otter Tail project would be approximate 7 acres.

Although statistics are limited, effects of the possible Otter Tail project on avian mortality would likely be similar and additive to those of the proposed Edgeley/Kulm Project. However, as previously stated, the anticipated number of avian fatalities caused by wind turbine structure collisions is not expected to affect individual species populations.

Proposed Otter Tail Project wind turbines would be constructed and operated in a manner consistent with the construction of proposed Edgeley/Kulm Project wind turbines including the implementation of BMP's, contractor requirements, and Western's Construction Standard 13. Similarly, environmental protection measures prescribed for the proposed Edgeley/Kulm Project 115-kV transmission line (e.g., avoidance during transmission structure siting, raptor-safe design measures) would be implemented during the construction of the proposed Otter Tail Project 41.6-kV transmission line.

As a result, avoidance and/or minimization of potential impacts as described for all resources would result in no significant cumulative impacts associated with the reasonably foreseeable future activities in the project area.

CHAPTER 4

AGENCIES/PERSONS CONSULTED

AGENCIES CONTACTED/CONSULTED

FEDERAL AGENCIES

U.S. Fish and Wildlife Service
U.S. Geological Survey
Federal Aviation Administration
Occupational Safety & Health Administration

STATE AND LOCAL AGENCIES

North Dakota State Historic Preservation Office
North Dakota Department of Transportation
North Dakota Department of Health, Division of Water Quality
North Dakota Department of Health, Division of Air Quality
La Moure County, Pomona Township Board

TRIBES

Standing Rock Sioux Tribe
Three Affiliated Tribes
Turtle Mountain Band of Chippewa
Spirit Lake Nation
North Dakota Intertribal Reinterment Committee

SUMMARY OF RESPONSES RECEIVED ON THE DRAFT ENVIRONMENTAL ASSESSMENT

Entity	Comment Date	Comment Summary	EA Response
North Dakota Department of Commerce, Division of Community Services	3-27-03	"Letter of Clearance" In Conformance with the North Dakota Federal Program Review System	Clearance provided by North Dakota Department of Commerce stated in Socioeconomics Section, Chapter 3.
North Dakota Department of Health, Environmental Health Section	3-24-03	Requires mitigations to address potential for fugitive dust, surface water quality impacts, and storm water runoff. Indicates that U.S. Army Corps of Engineers may require 404 Permit for any in-stream work.	Mitigation guidelines summarized in Chapter 2 and Chapter 3
Dennis Anderson, Edgeley Resident	3-03	Request proposed project name be shown as Edgeley/Kulm Project rather than Edgeley Project throughout EA.	Project name changed to Edgeley/Kulm Project throughout EA document.
U.S. Fish and Wildlife Service	4-01	Correct legal description of proposed project, change "waterfowl" to "bird", and revisions to Figures 3-1 and 3-2.	Legal description and waterfowl reference revised in Chapter 2, revisions to Figures 3-1 and 3-2.

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