

Draft Environmental Impact Statement

for the

South Dakota PrairieWinds Project DOE/EIS #0418

January 2010

Co-lead Agency

U.S. Department of
Agriculture

Rural Utilities Service



Co-lead Agency

U.S. Department of Energy

Western Area Power
Administration



Cooperating Agency

U.S. Department of
The Interior
Fish and Wildlife Service



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COVER SHEET

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COOPERATING AGENCIES: U.S. Department of the Interior (DOI), U.S. Fish and Wildlife Service (USFWS)

TITLE: Draft Environmental Impact Statement for the South Dakota PrairieWinds Project, DOE/EIS-0418

LOCATION: Aurora, Brule, and Jerauld counties; or Tripp County, South Dakota

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ABSTRACT: PrairieWinds, SD1, Incorporated (PrairieWinds) is a wholly owned subsidiary of Basin Electric Power Cooperative (Basin Electric). PrairieWinds proposes to construct, own, operate, and maintain the South Dakota PrairieWinds Project, a 151.5-megawatt (MW) nameplate capacity wind-powered generation facility, including 101 General Electric 1.5-MW wind turbine generators, electrical collector lines, collector substation, transmission line, communications system, and service access roads to access wind turbine sites. Two alternative locations are being evaluated for the proposed project. One alternative is located on about 37,000 acres approximately 15 miles north of White Lake, South Dakota, within Brule, Aurora, and Jerauld counties, South Dakota. For this alternative, the requested interconnection is with Western's electric transmission system at Wessington Springs Substation, located in Jerauld County, South Dakota. The other alternative is located on about 83,000 acres approximately eight miles south of Winner, South Dakota, entirely within Tripp County, South Dakota. For this alternative, the interconnection is with Western's electric transmission system at Winner Substation, located in Tripp County, South Dakota. Western's purpose and need is to respond to Basin Electric's interconnection request under Western's Open Access Transmission Service Tariff and make a decision whether to approve or deny the interconnection request. If the decision is to approve the request, Western's action would include making necessary system modifications to accommodate the interconnection of the proposed project. PrairieWinds has requested financial assistance for the proposed project from RUS. RUS's Federal action is whether to approve or deny financial assistance; accordingly, completing the Environmental Impact Statement is one requirement, along with other technical and financial considerations in processing the PrairieWinds application.

Comments on this Draft Environmental Impact Statement should be sent to Western Area Power Administration at the address below. Comments must be postmarked no later than March 1, 2010.

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Acronym and Abbreviation List

| | |
|-----------------|--|
| ADT | Average daily traffic |
| AMSL | Above mean sea level |
| APE | Area of Potential Effects |
| APLIC | Avian Power Line Interaction Committee |
| APMs | Applicants' Proposed Measures |
| ABPP | Avian and Bat Protection Plan |
| Applicants | Basin Electric Power Cooperative and PrairieWinds SD1, Incorporated |
| AR | Administrative Rule |
| AWEA | American Wind Energy Association |
| BA | Biological Assessment |
| Basin Electric | Basin Electric Power Cooperative |
| BCC | Birds of Conservation Concern |
| BGEPA | Bald and Golden Eagle Protection Act |
| bgs | Below ground surface |
| BIA | Bureau of Indian Affairs |
| BLM | Bureau of Land Management |
| BMPs | Best Management Practices |
| CEQ | Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| CO | Carbon monoxide |
| CO ₂ | Carbon dioxide |
| CR | County Road |
| CRP | Conservation Reserve Program |
| CWA | Clean Water Act |
| dB | Decibel |
| dBA | A-weighted decibel |
| DEIS | Draft Environmental Impact Statement |
| DENR | Department of Environment and Natural Resources |
| DOE | U.S. Department of Energy |
| DR | Department Regulation |
| EIA | Energy Information Administration |
| EIS | Environmental Impact Statement |
| EMF | Electric and magnetic fields |
| EPA | U.S. Environmental Protection Agency |
| ESA | Endangered Species Act |
| FAA | Federal Aviation Administration |
| FEIS | Final Environmental Impact Statement |
| FEMA | Federal Emergency Management Agency |
| FERC | Federal Energy Regulatory Commission |
| FIRM | Flood insurance rate map |
| FPPA | Farmland Protection Policy Act |
| FR | <i>Federal Register</i> |
| FSA | Farm Service Agency |

| | |
|----------------------|---|
| G | Gauss |
| Gal | Gallon |
| GHG | Greenhouse Gas |
| GIS | Geographic Information System |
| GPA | Game Production Areas |
| Hz | Hertz |
| I | Interstate |
| IEC | International Electrotechnical Commission |
| IPCC | Intergovernmental Panel on Climate Change |
| Intertribal COUP | Intertribal Council on Utility Policy |
| K | Soil erodibility factor |
| KOP | Key Observation Point |
| kV | Kilovolt |
| kWh | Kilowatt Hour |
| LCIC | Lewis and Clark Interpretive Center |
| LCTDR | Lewis and Clark Trail Driving Route |
| L _{dn} | Day-night average sound level |
| L _{eq(1-h)} | The sound equivalency over 1 hour |
| L | Liter |
| LGIA | Large Generator Interconnection Agreement |
| LGIP | Large Generator Interconnection Procedures |
| MBTA | Migratory Bird Treaty Act |
| mG | Milligauss |
| MISO | Midwest Independent Transmission System Operator |
| MOA | Memorandum of Agreement |
| mph | Miles per hour |
| μT | Microtesla |
| MW | Megawatt |
| MWh | Megawatt-hours |
| NAAQS | National Ambient Air Quality Standards |
| NAGPRA | Native American Graves Protection and Repatriation Act |
| NEPA | National Environmental Policy Act |
| NHPA | National Historic Preservation Act |
| NHT | Lewis and Clark National Historic Trail |
| NOAA Fisheries | National Oceanic and Atmospheric Administration Fisheries |
| NO ₂ | Nitrogen dioxide |
| NOI | Notice of Intent |
| NPDES | National Pollutant Discharge Elimination System |
| NPS | National Park Service |
| NRCS | Natural Resources Conservation Service |
| NREL | National Renewable Energy Laboratory |
| NRHP | National Register of Historic Places |
| NWI | National Wetlands Inventory |
| O ₃ | Ozone |
| O&M | Operation and maintenance |
| OSHA | Occupational Safety and Health Administration |

| | |
|-------------------|--|
| Pb | Lead |
| PII | Potential Impact Index |
| PM _{2.5} | Particulate matter less than 2.5 microns in diameter |
| PM ₁₀ | Particulate matter less than 10 microns in diameter |
| PPR | Prairie Pothole Region |
| PrairieWinds | PrairieWinds SD1, Incorporated |
| Proposed Project | Proposed South Dakota PrairieWinds Project |
| PSA | Power Supply Analysis |
| RE Act | Rural Electrification Act |
| REOs | Renewable Energy Objectives |
| ROD | Record of Decision |
| ROI | Region of Influence |
| RPS | Renewable Portfolio Standards |
| RSA | Rotor Sweep Area |
| RUS | Rural Utilities Service |
| SCADA | Supervisory control and data acquisition |
| SDAAQS | South Dakota Ambient Air Quality Standards |
| SDCL | South Dakota Codified Laws |
| SDDL | South Dakota Department of Labor |
| SDDOT | South Dakota Department of Transportation |
| SDDPR | South Dakota Division of Parks and Recreation |
| SDGFP | South Dakota Game, Fish and Parks |
| SDGS | South Dakota Geological Survey |
| SDNHP | South Dakota Natural Heritage Program |
| SDOC | South Dakota Office of Climate |
| SDPUC | South Dakota Public Utilities Commission |
| SF ₆ | Sulfur hexafluoride |
| SGIA | Small Generator Interconnection Agreement |
| SGIP | Small Generator Interconnection Procedures |
| SHPO | State Historic Preservation Office |
| sle | Super long extreme |
| SO ₂ | Sulfur dioxide |
| SPCC | Spill Prevention Control and Countermeasures Plan |
| SR | State Route |
| SSURGO | Soil Survey Geographic Database |
| SUP | Special Use Permit |
| SWPPP | Storm Water Pollution Prevention Plan |
| T | Tesla |
| Tariff | Open Access Transmission Tariff |
| TCP | Traditional Cultural Properties |
| TSS | Total suspended solids |
| USACE | U.S. Army Corps of Engineers |
| U.S.C. | U.S. Code |
| USDA | U.S. Department of Agriculture |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |

| | |
|---------|-------------------------------------|
| US | U.S. Highway |
| V/m | Volts per meter |
| WEST | Western EcoSystems Technology, Inc. |
| Western | Western Area Power Administration |
| WMD | Wetland Management District |
| WPA | Waterfowl Production Areas |
| WRAN | Wind Resource Assessment Network |
| WUS | Waters of the U.S. |

Metric Conversions

Metric Prefixes

| Prefix | Symbol | Multiplication Factor |
|--------|--------|-----------------------|
| mega- | M | 1 000 000 = 10^6 |
| kilo- | k | 1 000 = 10^3 |
| deci- | d | 0.1 = 10^{-1} |
| milli- | m | 0.001 = 10^{-3} |
| micro- | μ | 0.000 001 = 10^{-6} |

Conversion Chart

| If You Know | To Convert into Metric, | | If You Know | To Convert into English, | |
|--------------------|---|------------------|------------------|------------------------------------|-------------|
| | Multiply By | To Get | | Multiply By | To Get |
| Length | | | | | |
| inch | 2.54 | centimeter | centimeter | 0.3937 | inch |
| feet | 30.48 | centimeter | centimeter | 0.0328 | feet |
| feet | 0.3048 | meter | meter | 3.281 | feet |
| yard | 0.9144 | meter | meter | 1.0936 | yard |
| mile | 1.60934 | kilometer | kilometer | 0.62414 | mile |
| Area | | | | | |
| acre | 0.40469 | hectare | hectare | 2.471 | acre |
| square mile | 2.58999 | square kilometer | square kilometer | 0.3861 | square mile |
| Volume | | | | | |
| gallon | 3.7854 | liter | liter | 0.26417 | gallon |
| gallon | 0.0039 | cubic meter | cubic meter | 256.14 | gallon |
| cubic yard | 0.76455 | cubic meter | cubic meter | 1.308 | cubic yard |
| Temperature | | | | | |
| Fahrenheit | subtract 32, then multiply by 5/9 | Celsius | Celsius | multiply by 9/5, then add 32 | Fahrenheit |

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1 Introduction

This chapter briefly describes the proposed South Dakota PrairieWinds Project (Proposed Project), the purpose and need for Federal agency action and the project's purpose and objectives, and summarizes the scoping process. This draft environmental impact statement (DEIS) informs decision-makers and the public of the potential environmental impacts that could result from the Proposed Project. The DEIS was prepared under the direction of the U.S. Department of Energy's (DOE) Western Area Power Administration (Western) and the U.S. Department of Agriculture's (USDA) Rural Utilities Service (RUS). Western and RUS are collectively termed the "Agencies." The U.S. Fish and Wildlife Service (USFWS) was a cooperator for the DEIS. The DEIS will be used by the responsible Federal officials to make an informed decision on the proposed Federal actions.

PrairieWinds SD1, Incorporated (PrairieWinds), a subsidiary of Basin Electric Power Cooperative (Basin Electric), has proposed to develop a wind-powered generating facility in south-central South Dakota, either near the Town of Wessington Springs or near the City of Winner. Basin Electric has requested to interconnect the Proposed Project with the transmission system owned and operated by Western. PrairieWinds has requested financing for the Proposed Project from RUS. PrairieWinds and Basin Electric are collectively termed the "Applicants."

Basin Electric's generator interconnection request and PrairieWinds' financing request trigger a National Environmental Policy Act (NEPA) review process of the Proposed Project by Western and RUS, respectively. The Agencies have determined that an environmental impact statement (EIS) is required and are serving as co-lead Federal Agencies for preparation of the document. RUS is the lead Federal agency for consultation with the USFWS under Section 7 of the Endangered Species Act (ESA). The Proposed Project must consider impacts to cultural resources under NEPA. Western is the lead Federal agency for Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations (36 CFR 800), which include the identification, management and treatment of cultural resources, as well as the government-to-government consultation process. The Section 106 and NEPA reviews are conducted with an integrated approach.

Native American tribes and agencies with jurisdiction or special expertise have been invited to be cooperating agencies. The USFWS has accepted to participate as a cooperating agency for the Proposed Project.

Western and RUS are preparing this EIS in compliance with NEPA. The EIS will analyze the impacts of their respective proposed Federal actions and the Proposed Project in accordance with NEPA, as amended, DOE NEPA Implementing Procedures (Title 10 Code of Federal Regulations [CFR] Part 1021), the Council on Environmental Quality (CEQ) regulations for implementing NEPA (Title 40 CFR Parts 1500–1508) and RUS Environmental Policies and Procedures (Title 7 CFR Part 1794).

1.1 PROJECT OVERVIEW AND DESCRIPTION

Figure 1.1 depicts the wind resource potential in South Dakota (NREL 2009). **Figure 1.2** depicts the Proposed Project alternatives. Two alternative sites, Crow Lake and Winner, are under consideration for the wind-powered generation facility. The Crow Lake Alternative would be located on approximately 37,000 acres and is approximately 15 miles north of White Lake, and 17 miles southwest of Wessington Springs, South Dakota, within Brule, Aurora and Jerauld counties. The Winner Alternative would be located on approximately 83,000 acres entirely within Tripp County, and is approximately 8 miles south of Winner, South Dakota. Individual maps of each of the Proposed Project alternatives are included as Crow Lake Alternative in **Figure 1.3** and Winner Alternative in **Figure 1.4**.

The Proposed Project would involve the installation and operation of a 151.5-megawatt (MW) nameplate capacity wind energy facility that would feature 101 wind turbine generators. Ten additional turbine locations were identified and analyzed in this DEIS. These turbines may be utilized as contingent turbine locations for the Proposed Project if specific turbine locations are eliminated as a result of additional resource surveys and engineering siting; or they may be installed within the selected site at a later date, pending future load, transmission availability and renewable production standard requirements. Each turbine would have a hub height of 262 feet and a rotor diameter of 252 feet. The total height of each wind turbine would be 389 feet with a blade in the vertical position. The towers would be constructed of tubular steel, approximately 15 feet in diameter at the base, with internal joint flanges. The color of the towers and rotors would be standard white or off-white. During construction, a work/staging area at each turbine would include the crane pad and rotor assembly area, temporarily disturbing an area of approximately 500 feet by 500 feet; and permanently disturbing a 25-foot radius around each turbine.

Each wind turbine would be connected by a service road for access and a 34.5-kilovolt (kV) underground electrical collection system that would ultimately route the power from each turbine to one central collector substation, where voltage would be increased for interconnection to Western's transmission system. Approximately 30 to 40 miles of new access roads would be built to facilitate construction and maintenance of the turbines. Approximately 25 to 35 miles of existing roads would be used and, where appropriate, improved. The underground collector system trench would be approximately 60 miles long. The communication system would be located within the same trenches. The collector substation and transmission line are further described within each alternative discussion below.

The Crow Lake Alternative would require a new 34.5-kV to 230-kV collector substation as well as a 230-kV transmission line to interconnect to a new 230-kV interconnection point at Western's existing Wessington Springs Substation, in Jerauld County. The Wessington Springs Substation is approximately nine miles from the proposed collector substation. Regardless of route, the transmission line length would be approximately 11 miles. The proposed line would be built using steel single-pole structures. The structures would be between 85 and 95 feet high with a span of about 800 feet.

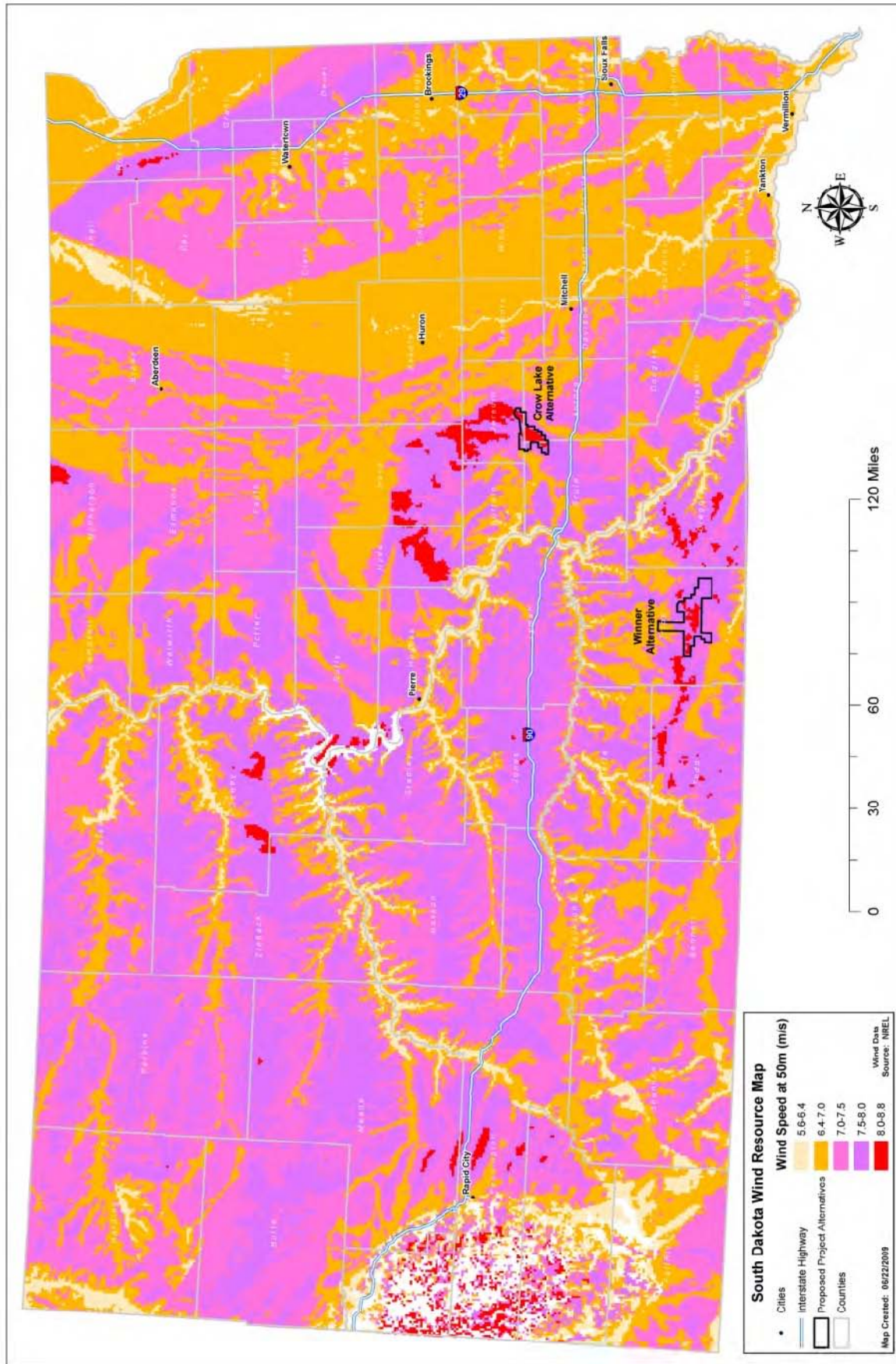


Figure 1.1 South Dakota Wind Resource Map

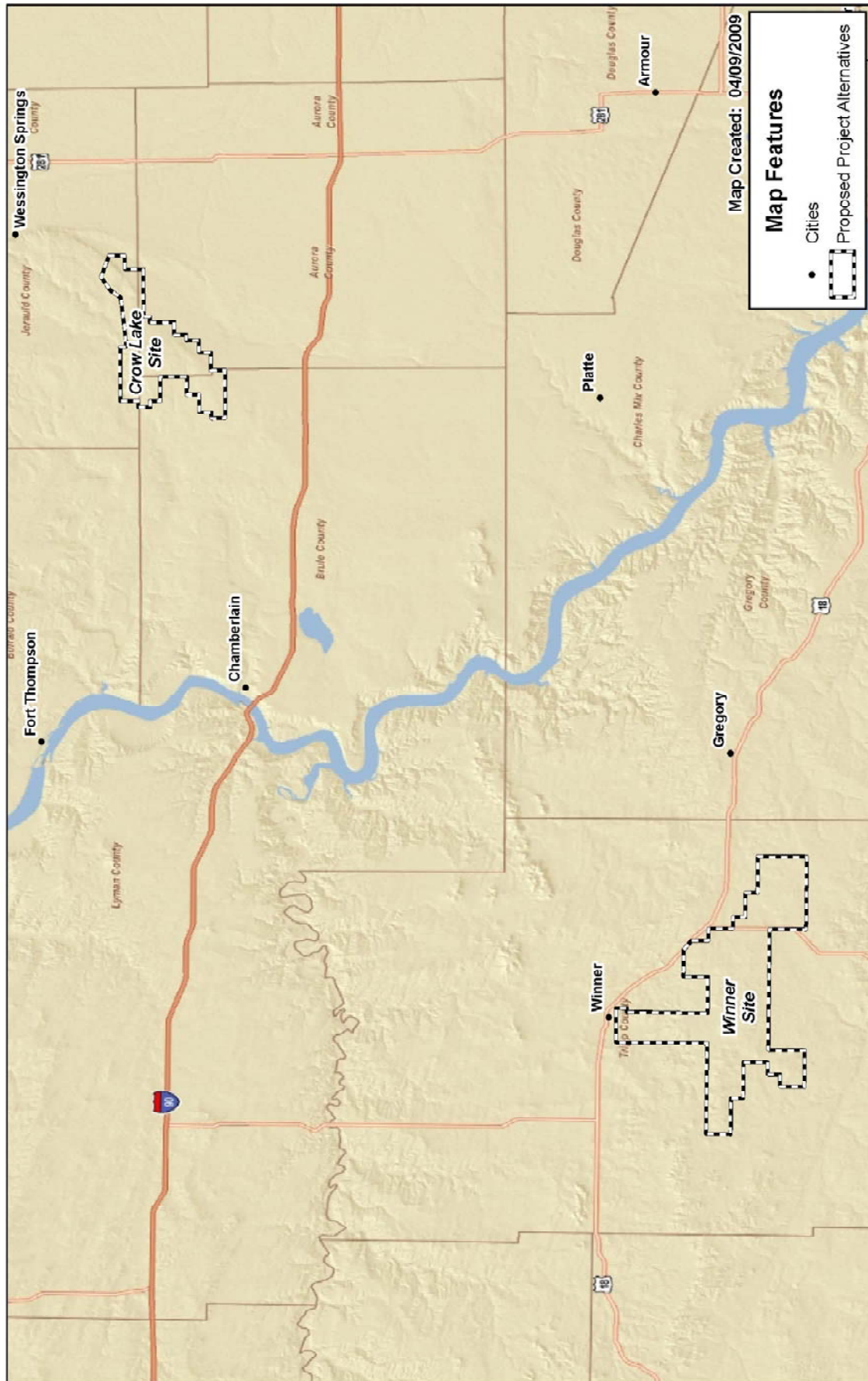













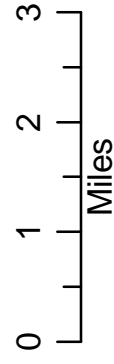
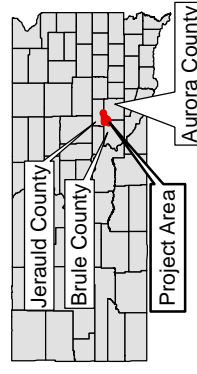
Figure 1.2 Proposed Project Alternatives

Crow Lake

-  Project Boundary
-  Township and Range
-  Western Utility Line
-  Substation
-  O&M Building
-  Internal Road
-  Collector System
-  Turbine

Overhead Transmission Line

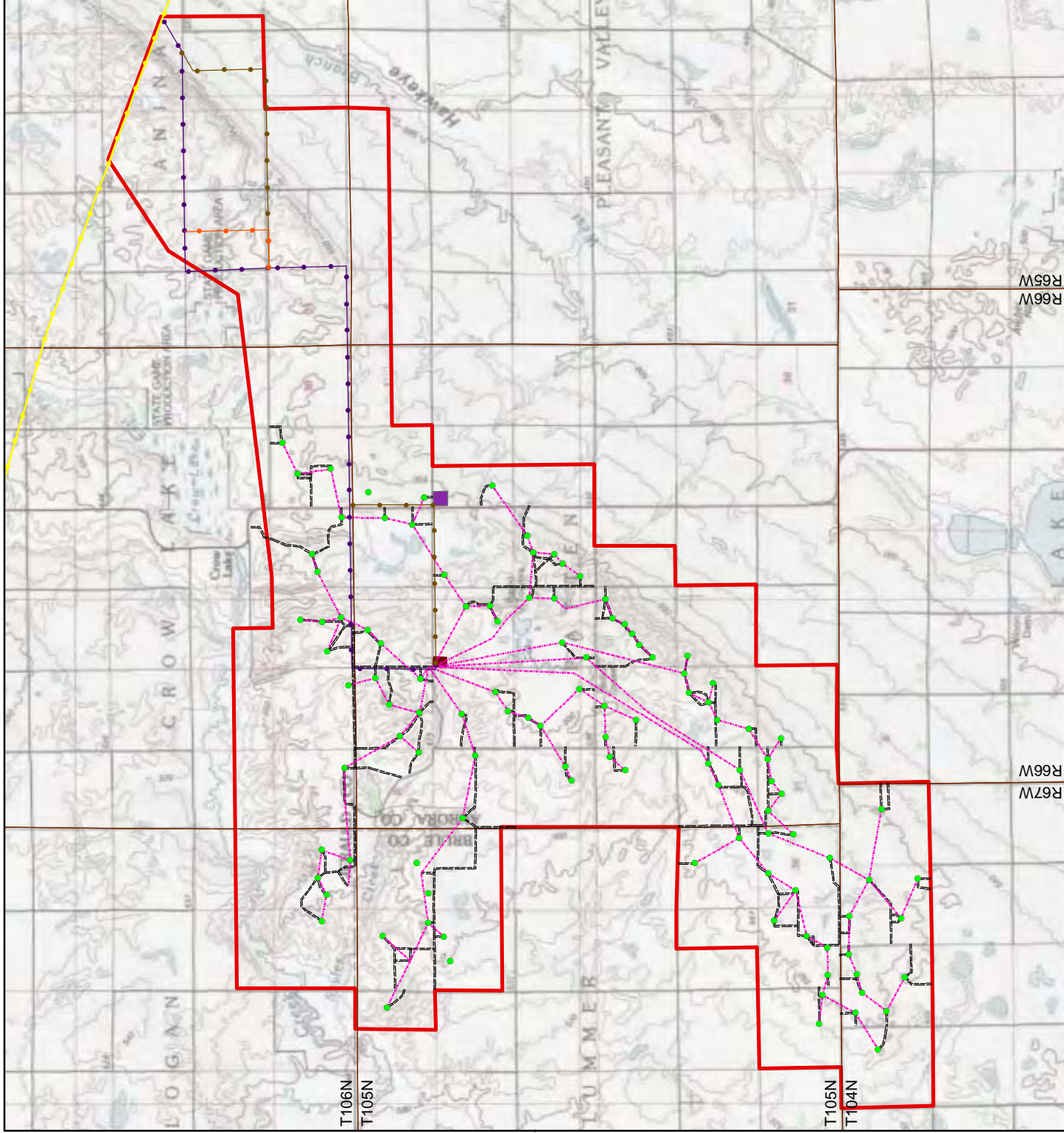
-  Alternative 1
-  Alternative 2
-  Alternative 3



SDPW Project

Figure 1.3

| | | |
|---|----------------|-------------|
| Date: 06.03.09 | Infrastructure | Author: JAG |
| C:\Data\Basin\Maps\EIS\Winem\Crow_Lake_Infrastructure | | |



Due to engineering considerations, the transmission line Alternative 1 location includes area outside of the Crow Lake Alternative boundary; this boundary will be revised to include the transmission line route in the FEIS.

The Winner Alternative would require one new 34.5-kV to 115-kV collector substation as well as a 115-kV transmission line to interconnect to Western's existing 115-kV Winner Substation, in Tripp County. The Winner Substation is approximately nine miles from the proposed collector substation. Depending on route, the proposed transmission line would be approximately 10 to 11 miles long. Other facilities necessary for this site would be similar to those described for the Crow Lake Alternative.

1.2 PURPOSE AND NEED

This section describes the Federal agency actions as well as the purpose and need for the Proposed Project. The Proposed Project is subject to the jurisdiction of the South Dakota Public Utilities Commission (SDPUC), which has regulatory authority for siting wind generation facilities and transmission lines within the State. The Applicants will submit an application for an Energy Conversion Facility Permit to the SDPUC. The SDPUC permit would be needed to authorize the Applicants to construct the Proposed Project under South Dakota rules and regulations.











1.2.1 WESTERN INTERCONNECTION

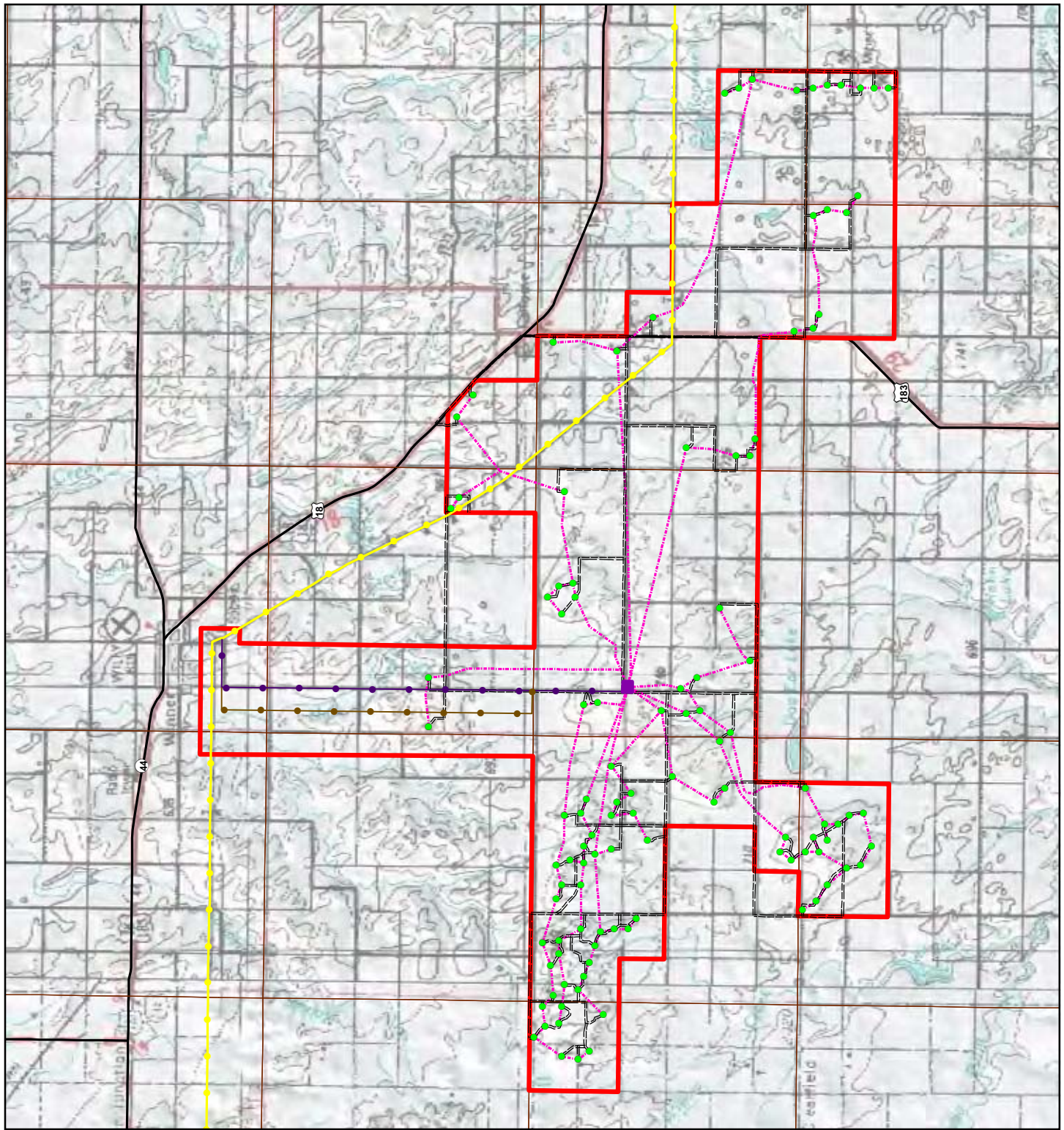
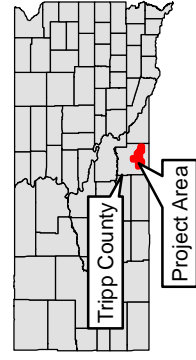
The Applicants propose to interconnect its Proposed Project with either Western's Winner or Wessington Springs Substation. Western's purpose and need is to respond to the interconnection request in accordance with Section 211 of the Federal Power Act and Western's Open Access Transmission Service Tariff (Tariff). Section 211 of the Federal Power Act requires that transmission service be provided upon request, if transmission capacity is available.

Western's Tariff provides open access to its transmission system. If there is available capacity in the transmission system, Western provides transmission services through an interconnection. This interconnection request requires Federal action which triggers NEPA review. When responding to the need for agency action, and subject to its NEPA review, Western is bound by the following:

- Providing Transmission Service - under Western's Tariff, Western offers capacity on its transmission system to deliver electricity when capacity is available. The Tariff complies with the Federal Energy Regulatory Commission's (FERC) Final Orders which are intended to ensure non-discriminatory transmission system access. Western submitted revisions to its non-jurisdictional Tariff in January 2005 as to certain terms and for inclusion of the Large Generator Interconnection Procedures (LGIP) and a Large Generator Interconnection Agreement (LGIA). Final approval for that filing was received from FERC in September 2007. In March 2007, Western submitted another revision for certain terms and to incorporate the Small Generator Interconnection Procedures (SGIP) and a Small Generator Interconnection Agreement (SGIA). In September 2009 Western submitted yet another set of revisions to address FERC Order 890 requirements along with revisions to existing terms.

Winner

-  Project Boundary
 -  Township and Range
 -  Western Utility Line
 -  State/US Highway
 -  Substation and O&M Building
 -  Turbine
 -  Internal Road
 -  Collector System
- ### Overhead Transmission Line
-  Alternative 1
 -  Alternative 2



- Protecting Transmission System Reliability and Service to Existing Customers - Western must ensure that existing reliability and service is not degraded. Western's LGIP provides for transmission and system studies to ensure that system reliability and service to existing customers are not adversely affected by new interconnections. These studies also identify system upgrades or additions necessary to accommodate the proposed Project and ensure that they are in the project scope.

1.2.2 RUS FINANCING

RUS is authorized to make loans and loan guarantees that finance the construction of electric distribution, transmission and generation facilities, including system improvements and replacements required to furnish and improve electric service in rural areas, as well as demand side management, energy conservation programs, and on-grid and off-grid renewable energy systems.

PrairieWinds has requested financial assistance for the Proposed Project from RUS. RUS's proposed Federal action is to decide whether to provide financial assistance; accordingly, completing the NEPA review process is one requirement, along with other technical and financial considerations in processing PrairieWinds' application.

The Rural Electrification Act of 1936, as amended, (7 U.S. Code [U.S.C.] 901 *et seq.*) (RE Act) generally authorizes the Secretary of Agriculture to make rural electrification and telephone loans, including specifying eligible borrowers, preferences, purposes, terms and conditions, security and self-liquidation requirements. The RE Act also authorizes the Secretary of Agriculture to assist borrowers that implement conservation and renewable energy programs.

RUS's agency action involves:

- Provide engineering reviews of the purpose and need, engineering feasibility and cost of the Proposed Project
- Ensure that the Proposed Project meets the borrower's requirements and prudent utility practices
- Evaluate the financial ability of the borrower to repay its potential financial obligation to RUS
- Review and study the alternatives to mitigate and improve transmission reliability issues
- Ensure that adequate transmission service and capacity are available to meet the Proposed Project needs
- Ensure that NEPA and other requirements and RUS Environmental Policies and Procedures are satisfied prior to taking a Federal action

1.2.3 COOPERATING AGENCIES

Two agencies, Wessington Springs Area Development Corporation and USFWS, expressed interest in participating as cooperating agencies. Wessington Springs Area Development Corporation is a non-profit non-governmental organization and will participate as an interested

party, as prescribed in the CEQ Memorandum for the Heads of Federal Agencies (CEQ 2002), and will be engaged in the NEPA process and on distribution lists for review and comment on the NEPA documents. As of May 13, 2009, the USFWS has formally accepted to participate as a cooperating agency. All agencies, regardless of cooperating agency status, will be kept informed of the Proposed Project and receive updates as they become available.

The USFWS is a Federal agency whose primary responsibility is working with others to conserve, protect and enhance fish, wildlife and plants and their habitats for the continuing benefit of the American people. The proposed development sites are located within two USFWS Wetland Management District (WMD) administrative boundaries. The Huron and Lake Andes WMDs are responsible for addressing the potential impacts to USFWS lands within the Proposed Project area.

Additionally, the USFWS works with agencies and other partners to conserve wetlands, migratory birds and Federally-listed threatened/endangered wildlife by administering the Fish and Wildlife Coordination Act, Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712), Bald and Golden Eagle Protection Act of 1940 (BGEPA) (16 U.S.C. 668-668d, 54 Stat. 250), and the ESA (7 U.S.C. 136; 16 U.S.C. 460 *et seq.*).

The leased private land within the proposed wind farm sites could include lands encumbered by perpetual easements administered by the USFWS. These conservation easements are minimally restrictive instruments that grant the USFWS the ability to protect the grassland and wetland habitat on these properties. Easements are acquired as an alternative to fee-title acquisition and are administered as part of the National Wildlife Refuge System to perpetually protect grasslands and wetlands to benefit migratory birds and other wildlife. While easements are particular areas of concern, potential long-term impacts to wildlife and habitat resources can occur on any lands. Thus, the USFWS will be actively involved in the review of the proposed wind turbine sites to identify and offset impacts to USFWS interests and trust resources throughout the project area. When the final location is chosen, and micro-siting of facilities begins, additional coordination will be pursued with the USFWS.

1.2.4 APPLICANTS' PURPOSE AND NEED

PrairieWinds is a wholly-owned subsidiary of Basin Electric. PrairieWinds proposes to construct, own, operate and maintain the Proposed Project.

Project Purpose

Basin Electric is a consumer-owned, regional cooperative headquartered in Bismarck, North Dakota, which services more than 120 member rural electric systems in nine States: Colorado, Iowa, Minnesota, Montana, Nebraska, New Mexico, North Dakota, South Dakota and Wyoming. These member systems, in turn, distribute electricity to more than 2.8 million customers.

Public policy regarding the electric industry has increasingly focused on the carbon intensity of the resources commonly used to generate electricity. As a result, incentives and regulations to

encourage or require the generation of power from renewable resources are being actively considered and/or implemented within the Basin Electric member service areas. At the same time, a number of proposals for national Renewable Portfolio Standards (RPS) are pending in Congress. With members in nine States, Basin Electric recognizes the need for additional renewable energy capacity to service forecasted member load growth demands and to meet State-mandated RPS.

Basin Electric membership passed a resolution at their 2005 annual meeting that established a goal to “obtain renewable or environmentally benign resources equal to 10 percent of the MW capacity needed to meet its member demand by 2010.” This project would provide an opportunity for them to meet that goal.

State Renewable Energy Objectives

Several States within Basin Electric’s service territory, including Colorado, Minnesota, Montana, North Dakota and South Dakota, have adopted Renewable Energy Objectives (REOs) that require renewable generation to meet a certain percentage of retail sales. The REOs adopted in the various States include both mandatory and voluntary goals that range from 10 to 25 percent of energy production to be generated or procured from an eligible energy technology by a specified deadline. Deadlines for compliance range from 2015 to 2025.

The State of South Dakota has a voluntary 10 percent by 2015 REO. An assumption of 1.25 percent by 2008, 2.5 percent by 2009, 3.75 percent by 2010, 5 percent by 2011, 6.25 percent by 2012, 7.5 percent by 2013, 8.75 percent by 2014 and 10 percent by 2015 was used to meet the REO. Basin Electric serves member cooperatives including East River, Grand, Rosebud and Rushmore.

Basin Electric’s Renewable Energy Sources

Basin Electric captures approximately 22 MW of recovered energy generation (heat recovery from pipeline compressors) from four sites. Four additional sites, another 22 MW of electricity, are expected to be available by late 2009. The total wind generation owned by Basin Electric is projected to be 125.2 MW by late 2009; and the wind energy purchased is 131 MW, making the total wind generation (owned and purchased) available to Basin Electric’s members 256.2 MW by late 2009.

Basin Electric would need a total of 272 MW of renewable capacity, which is 10 percent of the 2,721 MW of forecasted member load for the year 2010, to meet its goal. With the addition of 151.5 MW for the Proposed Project, they will be able to meet the REO requirements for those States that currently have such requirements through the year 2016. **Figure 1.5** compares the needed renewable generation to the existing and proposed renewable generation.

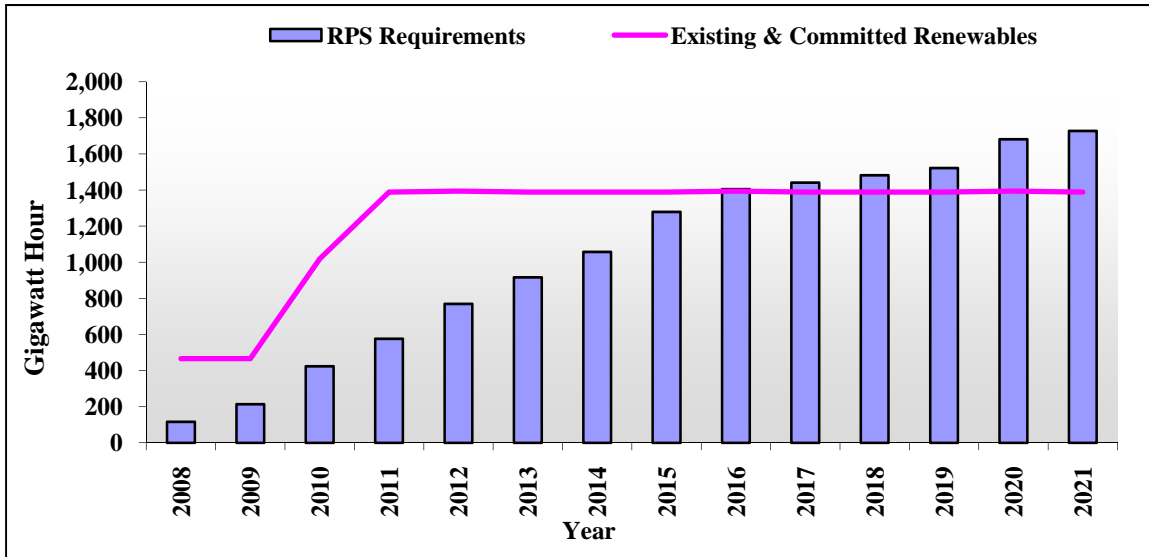


Figure 1.5 RPS Requirements and Existing/Proposed Renewable Energy Sources

Existing Resources

According to its 2007 Power Supply Analysis (PSA), Basin Electric operates a total of 3,518 MW of electric generating capacity and has a total of 136 MW of wind energy resources in the form of owned projects and power purchase agreements; additionally, Basin Electric has 22 MW of recovered energy generation through power purchase agreements. Basin Electric also manages and maintains 2,424 miles of high-voltage transmission lines, 40 switchyards and substations, and 58 microwave installations used for communications and system protection.

Projected Energy Requirements

Between 1999 and 2006, Basin Electric’s system peak demand increased 752 MW, from 1,195 MW to 1,947 MW, which is approximately 107 MW per year. Their system energy sales increased 5.3 million megawatt-hours (MWh), from 6.5 million MWh to 11.8 million MWh, or approximately 760,000 MWh per year. Basin Electric forecasts peak demand on its system to grow by 1,834 MW from 2006 through 2021. This will be a growth of approximately 122 MW per year. The load growth is driven mainly by commercial sector growth, which includes energy related development in the form of coal, oil and gas development. There are also increased loads in the residential sector mainly located on the outskirts of larger cities within the service territory. This is depicted in **Figure 1.6**.

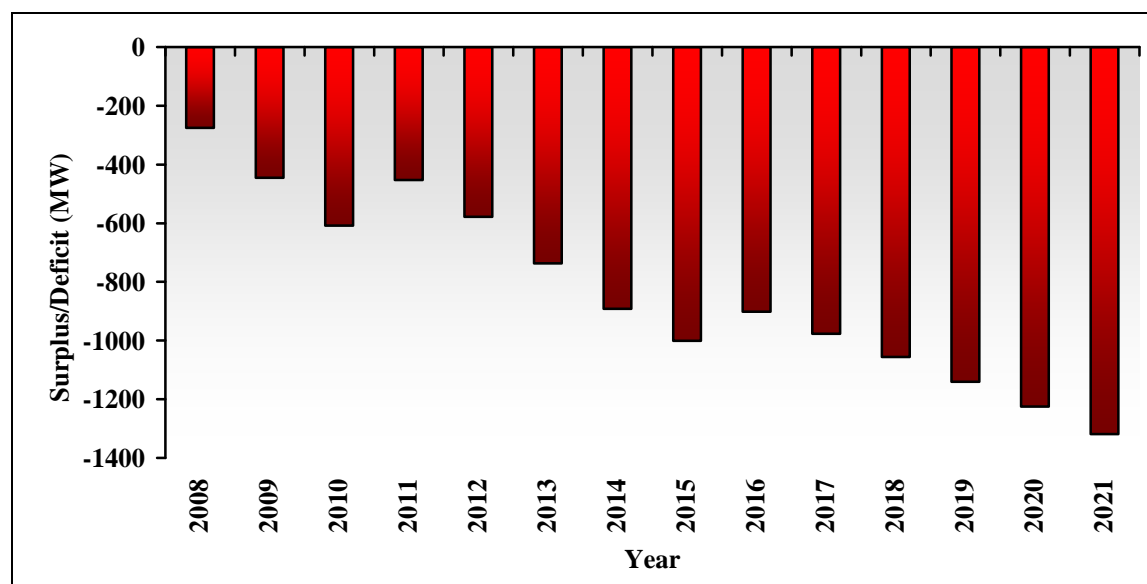


Figure 1.6 Total System Load and Capability

Basin Electric’s total system deficit was anticipated to be 275 MW in 2008 and is forecasted to increase steadily over time. As **Figure 1.6** depicts, the deficit is anticipated to decrease in 2011 from 2010 levels when the new Dry Fork Station in Wyoming is expected to go commercial; the deficit is also anticipated to decline slightly in 2016 when Basin Electric’s long-term power supply obligation ends.

Project Need

The need has been established for additional renewable energy capacity in the PSA to serve forecasted member load growth demands, to meet Basin Electric’s renewable energy goal set forth in 2005, and to meet State mandated RPS. Solar resources in the region are limited. While solar economics are improving, costs are still not competitive with wind. Geothermal and bio-based resources are, in some cases, cost effective but are restricted to limited or distant locations, available only in small quantities, or present other environmental concerns. In contrast, potential wind resources in the Basin Electric member service territory are generally recognized as excellent, and limited mainly by land use and transmission. The proposed wind project was determined to be the best available, least-cost renewable resource option to satisfy future load and RPS requirements.

1.3 REGULATORY FRAMEWORK AND LAND STATUS

The Proposed Project must comply with Federal, State and local laws requiring permits or approvals. **Table 1.1** lists agencies and their respective permit/authorizing responsibilities with respect to the Proposed Project.

In addition to complying with Federal, State and local laws requiring permits or approvals, the Applicants also coordinated with private land owners for lease agreements. All lands considered for the Proposed Projects are privately owned parcels. This could include lands encumbered by

Table 1.1 Regulatory Compliance, Potential Permits and Approvals for the Construction and Operation of the Proposed Project

| Agency | Type of Approval | Description |
|---|---|---|
| Federal Approvals | | |
| U.S. Environmental Protection Agency (EPA) | Spill Prevention Control and Countermeasures (SPCC) Plan | SPCC Plans are required for non-transportation facilities that have a total above-ground oil storage capacity of 1,320-gallons. |
| Federal Aviation Administration (FAA) | Form 7460-1. Notice of Proposed Construction | Notice and approval are required for structures over 200 feet in height. FAA approval of lighting and marking of turbines is required. |
| U.S. Army Corp of Engineers (USACE) | Section 404 Clean Water Act (CWA) Permit | If wetlands would be impacted, a permit for placement of fill would be required. Further investigation is required to determine USACE jurisdiction within the project area. |
| USFWS | MBTA, Section 7 of ESA, BGEPA | Special status species protection. |
| USFWS | Special Use Permit (SUP), Right-of-Way Permit, Compatibility Analysis of Disturbed Easements | If constructing in wetland or grassland easements, then a permit or analysis is required for temporary disturbance. |
| Western, RUS, State Historic Preservation Office (SHPO) | Section 106 of NHPA | Cultural resources protection. |
| Western, RUS | Native American Graves Protection and Repatriation Act (NAGPRA) | Cultural resources protection. |
| State of South Dakota | | |
| Department of Environment and Natural Resources (DENR) | Section 401, CWA | State requirement for Water Quality Certification. |
| DENR | National Pollutant Discharge Elimination System (NPDES), General Construction Storm Water Water Rights Permit | Required for disturbance of over 1 acre of land. Must prepare a Storm Water Pollution Prevention Plan (SWPPP). |
| South Dakota Game, Fish and Parks (SDGFP) | State Threatened and Endangered Species List | Special status species protection. |
| SDPUC | Energy Facility Site Permit | Required for construction of generation facility. |
| South Dakota Department of Transportation (SDDOT) | Oversize/Overweight Permit | Permit required for hauling construction equipment and materials on State highways. |
| SDDOT | Road Approach/Access Permit | Permits required for construction to of access roads to connect to a State highways. |
| SDDOT | Utility Crossing Permit | Permit required for utility crossings on State highway right-of-way. |
| SDDOT | Aeronautical Hazard Permit | Permit lighting plan determined with FAA coordination. |
| Local Permits | | |
| Brule, Aurora, Jerauld and Tripp Counties | Zoning, conditional use authorization and related building permits | Permits required for project construction. |
| Brule, Aurora, Jerauld and Tripp Counties | Road Approach/Access permits | Permits required for project construction. |
| Brule, Aurora, Jerauld and Tripp Counties | Soil Erosion and Sediment Control Plan | Permits required for project construction. |

perpetual easements administered by the USFWS, which are acquired as an alternative to fee-title acquisition and are administered as part of the National Wildlife Refuge System. The Applicants have entered into up-to 50-year lease agreements for placement of the wind turbine generators and associated infrastructure with private landowners within the Proposed Project areas. The Applicants would negotiate in good faith to enter into a new lease agreement upon commercially reasonable terms and conditions to replace the lease agreement at the end of the 50-year agreement. The decision to renew the leases versus decommissioning the facility would be made at that time based on market conditions. Depending on current wind turbine technology, at the end of the lease period, the wind turbine generators may be updated with more efficient components, thereby, extending the wind turbine generator service life.

1.4 PUBLIC INVOLVEMENT / SCOPING

As part of the NEPA process, public participation is a way to inform the public about activities that involve a Federal action and solicit input regarding the proposed project. Western and RUS utilized input identified through public participation to assist with the development of the scope, content and alternatives analysis for the EIS. By incorporating public participation into the development of the EIS, Western, RUS and USFWS will be able to make a more informed decision on their respective proposed actions.

The CEQ, DOE and RUS NEPA regulations define scoping as an early and open process for determining the scope of issues to be addressed in an EIS and for identifying input related to the proposed project. Western and RUS invited Federal, State, local and tribal governments, the Applicants, and other interested persons and groups to participate in defining the scope of the EIS. The public participation process also satisfies the requirements under Section 106 for government-to-government consultation and invited the tribes to participate in reviews conducted under NEPA and Section 106 of the NHPA.

Western and RUS employed various methods to provide information to the public and solicit input regarding the Proposed Project. Information was included in direct mailings that were sent to over 4,000 potentially interested persons in and near the project area. Venues for participation included two scoping meetings and one interagency meeting. In addition to receiving comments at meetings, the Agencies invited interested individuals to submit written comments via mail, fax, e-mail and/or the project website. Additional future public participation opportunities will include project update mailings, review and comment on the DEIS and at least one public hearing. The information in the following sections summarizes the input that has been received on the Proposed Project through the end of the scoping process. Copies of the notices and meeting materials are included in **Appendix A** of this report.

1.4.1 NOTICE OF INTENT

The “Notice of Intent to Prepare an Environmental Impact Statement and to Conduct Scoping Meetings; Notice of Floodplains and Wetland Involvement” was published in the *Federal Register* (FR) (74 FR 15718) on April 7, 2009. The Notice of Intent (NOI) included information

on the Proposed Project, agency actions, times and locations for the April 28 and April 29, 2009, scoping meetings and contact information for questions pertaining to the Proposed Project.

1.4.2 NEWSPAPER NOTICES

Notices announcing the public scoping meetings were published in *Indian Country Today*, *Mitchell Daily Republic*, *Plankinton South Dakota Mail* and the *Winner Advocate*. *Indian Country Today* is a national, Native American interest publication, while the others are local newspapers. Advertisement publications in each newspaper provided information on the proposed project, scoping meeting information and contact information for questions pertaining to the proposed project. The second notice publication in *Indian Country Today*, *Mitchell Daily Republic* and *Winner Advocate*, provided the same information as the initial announcements.

The scoping meeting notice was published as follows:

- *Indian Country Today* – April 8 and 22, 2009
- *Mitchell Daily Republic* – April 8 and 22, 2009
- *Plankinton South Dakota Mail* – April 23, 2009
- *Winner Advocate* – April 8 and 22, 2009

1.4.3 DIRECT MAILINGS

In addition to the NOI, Western and RUS mailed postcard scoping notices and letters, which included the scoping meeting information, to over 4,000 potentially interested persons. The mailing list included Federal, State and local agencies; elected officials; Native American tribes; members of the public; and addresses within seven miles of the Proposed Project alternatives.

The postcard scoping notice was mailed on April 6, 2009. This postcard mailing provided information on the Proposed Project; details for the April 28 and April 29, 2009 scoping meetings; and contact information for questions pertaining to the Proposed Project and/or the NEPA process.

In addition to the postcard scoping mailings, a letter was sent to more than 15 Native American tribes (tribes, communities and representative councils) on April 13, 2009, providing information on the Proposed Project, EIS scoping meeting details and contact information for questions pertaining to the Proposed Project. The letter also served to initiate government-to-government consultation and invited the tribes to participate in the reviews conducted under NEPA and Section 106 of the NHPA.

1.4.4 SCOPING MEETINGS

Two scoping meetings were hosted by Western and RUS during the public scoping process. The scoping meetings were held using an open-house format to allow for an informal one-on-one exchange of information. Scoping meeting handouts included a copy of the NOI, project fact sheet, scoping process information sheet, comment form and a DOE NEPA brochure. Large-

scale aerial photographs illustrating the Proposed Project alternatives were available to help facilitate identification of issues and alternatives. Additional large-scale poster boards included: a South Dakota wind resource map, an EIS process and timeline graphic, the agencies' Federal Action boards, and turbine and transmission line siting parameters. A station was set up at the meetings with a looping PowerPoint presentation to provide an opportunity for individuals to sit and view Proposed Project information and follow along with a print out of the presentation slides. The same information was available at each meeting. All information presented at the meetings is available on Western's website:

<http://www.wapa.gov/transmission/sdprairiewinds.htm>.

Table 1.2 lists the scoping meeting locations, dates, times and attendance.

Table 1.2 Public Scoping Meetings

| Location | Date | Time | Attendance |
|-----------------|----------------|-------------|-------------------|
| Winner, SD | April 28, 2009 | 4 - 7 p.m. | 88 |
| Plankinton, SD | April 29, 2009 | 4 - 7 p.m. | 81 |
| Total | | | 169 |

1.4.5 INTERAGENCY MEETING

A letter was sent on April 9, 2009, to invite Federal, State and local agencies to participate in an interagency meeting for the EIS. In addition, agencies with jurisdiction or special expertise were requested to be a cooperating agency for the Proposed Project.

On April 28, 2009, Western and RUS hosted an interagency meeting at the Best Western Ramkota Hotel, in Pierre, South Dakota, from 9 a.m. to 11 a.m. Proposed Project-specific information was presented at the meeting. The following list summarizes the agencies represented at the interagency meeting (in alphabetical order):

- Aurora County Weed Supervisor
- Bureau of Indian Affairs (BIA)
- Intertribal Council on Utility Policy (Intertribal COUP)
- Mayor of Wessington Springs, South Dakota
- South Dakota Aeronautics Commission
- South Dakota DENR
- SDGFP
- South Dakota Governor's Office
- SDPUC
- SHPO
- South Dakota State Land Department
- USACE
- USFWS
- Wessington Springs Area Development Corporation

1.5 COMMENT SUMMARY

A summary of the written comments received and issues identified through May 15, 2009, are included in **Table 1.3** (note that similar items have been grouped together). Overall, 16 comment forms were received during the scoping and interagency meetings, 46 comment forms/letters were mailed in, 14 comments were e-mailed to the project e-mail address, and one faxed comment was received.

Table 1.3 Scoping Comment Summary

| Issue | Comment | Treatment / Response |
|-----------------------------|--|---|
| Air quality | Protection of air quality should be addressed. | Comment will be addressed in the EIS. |
| | Dust particulates from construction and on-going project activities are a concern; EIS should include dust control methods. | Comment will be addressed in the EIS. |
| Alternatives | Preference for the proposed Crow Lake Alternative to be approved for the Proposed Project. | Comment noted. |
| | Preference for Crow Lake Alternative to be approved for the Proposed Project; also noted that site may cost less to build due to smaller acreage, and have higher wind potential. | Comment noted. |
| | Map request of the Crow Lake Alternative. | Map was provided. |
| | Summarize criteria and process used to develop Proposed Project alternatives, disclose reasoning used to eliminate alternatives. | Comment will be addressed in the EIS. |
| | Proposed Project alternatives map request. | Map was provided. |
| Aviation safety | Request for all project turbines to be lit at night as mitigation. | Comment will be addressed in the EIS. |
| Biological resources | USFWS formally accepted invitation to participate as a cooperating agency. | Cooperating agency status confirmed. |
| | USFWS provided a list of Federally-protected species that may occur in the project area(s). | Species impact analysis will be provided in the EIS. |
| | USFWS provided wind turbine guidelines and considerations for meteorological towers and power lines with respect to sensitive species. | Comment will be addressed in the EIS. |
| | USFWS provided discussion on wind energy and wildlife. | Comment noted. |
| | USFWS provided information on avian and bat protection plans, including the MBTA, or BGEPA, and information on birds of conservation concern, and U.S. Geological Survey avian research. | Avian and bat impact analysis will be provided in the EIS. |
| | South Dakota Game, Fish, and Parks (SDGFP) supports development of alternative sources of energy. | Comment noted. |
| | SDGFP suggested considering impacts, including mortality, from turbine strikes, habitat alteration, and behavior modification from improperly sited wind power projects. | Avian and bat impact analysis will be provided in the EIS. |
| | SDGFP noted previous correspondence with project representatives and information provided including SDGFP Natural Heritage Program data and information on unique and/or special resources or areas in the Proposed Project areas. | Comment noted; species impact analysis will be provided in the EIS. |
| | Identify endangered species potentially affected by the project. | Endangered species impact analysis to be included in the EIS. |
| | Disclose and evaluate effects of project activities on area ecology, vegetation, and wildlife and habitats. | Comment will be addressed in the EIS. |
| | Identify critical habitat and impacts on species and critical habitat. | Comment will be addressed in the EIS. |
| | Describe how project will meet ESA requirements. | Comment will be addressed in the EIS. |
| | Analyze migration corridors and flyways. | Comment will be addressed in the EIS. |
| | Disclose potential toxic hazards associated with pesticide or herbicide use. | Comment will be addressed in the EIS. |

Table 1.3 Scoping Comment Summary

| Issue | Comment | Treatment / Response |
|--|--|---|
| Cultural resources | Identify potential cultural impacts. | Follow-up discussion with the commenter was conducted by project representatives. Comment will also be addressed in the EIS. |
| Cumulative impacts | EIS should examine cumulative impacts, including direct and indirect effects, including past, present, and reasonably foreseeable future activities. | Comment will be addressed in the EIS. |
| Environmental Justice | Include potential impacts on low income, minority, and/or tribal communities. | Comment will be addressed in the EIS. |
| Greenhouse gases and climate change | The EIS should include an estimate of annual greenhouse gas emissions expected during operations and describe the emissions in terms of carbon dioxide (CO ₂) equivalents in metric tons per year per MW hour produced; then compare to regional or State estimated emissions. | Comment will be addressed in the EIS. |
| NEPA process | Request that the environmental process be expedited. | Comment noted. |
| | National energy policies and national security in general are impacted by excessive oil import. | Comment noted. |
| | Commented that wind and other renewable projects are time sensitive, and should be implemented more quickly. | Comment noted. |
| | Support for wind energy development; noted that USFWS is an impediment to wind development; compliance with the USFWS approval process is a moving target and should be more easily acquired for wind energy projects. | Comment noted. |
| | Request to be added to project mailing list. | Information added to mailing list. |
| Out of scope | Welcomed project representatives to the City of White Lake. | Comment noted. |
| | Provided encouragement for the project to move forward. | Comment noted. |
| | Representative from KWYR requested radio interview. | Follow-up discussion with the commenter was conducted by project representative. |
| | Other developers have prompted individuals to sign land agreements. Commenter requested clarification on right-of-way details and easement compliance, requested information on land agreement expirations and payment guarantees. | Applicant responded to commenter. |
| | Encouraged upgrading transmission lines through the areas to provide power access for other wind farm projects interested in the area. | Comment noted; the project as proposed is to build a wind-powered electric generation facility in central South Dakota, as such this comment is beyond the scope of this EIS. |
| Out of scope | Request for transmission line upgrades in Gregory County to support wind energy development. | Comment noted; the project as proposed is to build a wind-powered electric generation facility in central South Dakota (not within Gregory County), as such this comment is beyond the scope of this EIS. |
| | Interest in supplying services/facilities during construction of the project. | Comment noted; information provided to Applicant. |
| | Volunteered land for wind turbine development. | Comment noted; information provided to Applicant. |

Table 1.3 Scoping Comment Summary

| Issue | Comment | Treatment / Response |
|---|--|--|
| Out of scope <i>(continued)</i> | Supports Proposed Project, and suggests improving local transmission infrastructure. | Comment noted. The project as proposed is to build a wind-powered electric generation facility in central South Dakota; as such this comment is beyond the scope of this EIS. |
| Project description | Request for information on the size, and height of the wind testers, number of testing sites in the study areas, acres of study areas, size and MW of proposed substation. | Much of this information was available in the scoping meeting materials and on the project website. Follow-up discussion with the commenter was conducted by project representatives. Comment will also be addressed in the EIS. |
| | Include construction, design, and operation practices that will be incorporated to protect water quality from erosion. | Comment will be addressed in the EIS. |
| | Inquired about the substation component of the Proposed Project. | Comment noted. Substation information can also be found in the NOI and will be included in the EIS. |
| Scoping | Welcomed the Proposed Project and was pleased with the presentation during the meetings. | Comment noted. |
| | Request project information. | Follow-up e-mail provided project information. |
| | Support for the Proposed Project, and would have preferred a formal presentation during the scoping meeting. | Comment noted; follow-up phone call with the commenter was conducted by project representatives. |
| | Bureau of Land Management (BLM) appreciates the opportunity to review and provide comments on the project, but that the agency does not have expertise or information relevant to the project. | Comment noted. |
| | Appreciated the meeting, found it interesting. | Comment noted. |
| | South Dakota Mail representative requested scoping meeting notice to be included in the local newspaper. | Comment noted and notice was included in <i>South Dakota Mail</i> . |
| | Request information regarding the scoping meetings. | Comment noted, information provided. |
| Section 106 process | Are government agencies participating in Government-to-Government discussions with local Native American Tribes? | Follow-up discussion with the commenter was conducted by project representatives. Comment noted; the lead agencies have initiated the Government-to-Government consultations. |
| | Concern about notification to tribes regarding the scoping meetings. | Tribes were notified of the EIS scoping meetings in a letter dated April 13, 2009; Government-to-Government consultation will continue through the Section 106 process; tribal meetings began in August 2009. |
| | Northern Arapahoe Tribal Consultants offered archaeological services for the Proposed Project EIS analysis and Section 106. | Comment noted. |

Table 1.3 Scoping Comment Summary

| Issue | Comment | Treatment / Response |
|----------------------------------|---|---------------------------------------|
| Visual resources | Provided information on the Lewis and Clark National Historic Trail (NHT); requested that the EIS include analysis of the potential visual resource effects for both the Proposed Project alternatives in regards to the Lewis and Clark NHT. | Comment will be addressed in the EIS. |
| Water resources | Clearly describe water bodies within the analysis area which may be impacted by project activities; analysis of area's geology, topography, soils and stream stability may be necessary. | Comment will be addressed in the EIS. |
| | Provide information on Clean Water Act (CWA) Section 303(d) impaired waters in project area, if any. | Comment will be addressed in the EIS. |
| Wetlands / riparian areas | Identify potential wetlands both jurisdictional and non-jurisdictional, potential impacts, and least damaging practicable alternative for avoiding wetlands. | Comment will be addressed in the EIS. |

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2 Alternatives and Proposed Federal Actions

This chapter describes the Proposed Project and proposed Federal actions, and in addition, the Applicants' site selection and screening methods. These methods were used to determine which alternatives would be carried forward for analysis. This chapter provides detailed descriptions of the Crow Lake and Winner alternatives, Proposed Project facilities, construction, operation, and decommissioning activities. It also describes the No Action Alternative, and provides a summary of impacts by alternative. There were no additional alternatives identified during scoping but eliminated from further analysis as part of this NEPA process.

Proposed Federal Actions

The proposed Federal actions evaluated in this EIS by each of the involved Federal agencies are specific and limited and are based on the purpose and need for agency action as described in Section 1.2. Western and RUS need to make decisions as follows:

Western: Western's proposed action is to approve Basin Electric's interconnection to Western's transmission system at either Wessington Springs Substation or Winner Substation, an action which requires Western to complete modifications to one of these substations to support the interconnection.

RUS: PrairieWinds has requested financial assistance for the Proposed Project from RUS. RUS's Federal action is based on providing financial assistance; completing the EIS is one requirement, along with other technical and financial considerations in processing PrairieWinds' application.

Western System Modifications

Western proposes to modify its transmission system based on a preliminary review of the interconnection request. Western would need to add electrical equipment at the Wessington Springs Substation for the Crow Lake Alternative or Winner Substation for the Winner Alternative. Depending on additional transmission studies and electrical design work, the additional electrical equipment would, at a minimum, include installing new concrete foundations, substation bus work, cable trenches, buried cable grounding grid, and replacing existing equipment and/or conductors to accommodate the interconnection. Pending additional study and approval from Western, the Winner Alternative may require expansion of the Winner Substation for the transmission interconnection. Western would design, own, construct, and operate any additions and modifications at these substations. Because Western is a Federal agency, Western is not ceding any jurisdictional authority over Federal facilities to the State of South Dakota for the interconnection.

At this time, all the transmission system studies have not been completed. Details, requirements, and environmental impacts for other system improvements are unknown at this time, since they would be dictated by the on-going transmission system studies. These studies may identify additional upgrades needed to accommodate the proposed interconnection, including

modifications at other existing Western substations that could include installing new control buildings; new circuit breakers and controls; adding new electrical equipment, which would include installing new concrete foundations for electrical equipment and buildings, substation bus work, cable trenches, buried cable grounding grid, and new surface grounding material; and/or replacing existing equipment and/or conductors with new equipment and/or conductors to accommodate the proposed interconnection.

If any needed transmission system modifications are not identified until after the completion of the Proposed Project EIS, Western and RUS would address the environmental impacts of these modifications in accordance with regulatory requirements.

2.1 APPLICANTS' SITE SELECTION AND SCREENING ANALYSIS

Prior to submitting the interconnection request and financing request, the Applicants conducted a screening process to analyze types of generation and possible alternatives. The *PrairieWinds – SD 1 Alternative Evaluation Analysis and Site Selection Study*, was completed in January of 2009. The following information summarizes the findings of the Applicants' study and how the proposed wind project of 151.5-MW was determined to be the best available, least-cost renewable resource option to satisfy future load and RPS requirements. As described in the study, the Applicants identified six alternative sites for consideration. The study analyzed the six alternatives and conducted a screening process to determine which sites had the ability to meet the purpose and need of the Proposed Project. Screening criteria included technical feasibility, economic viability (able to be implemented), and public issues and concerns.

The screening assessment also included consideration of the ability of alternatives to meet the Applicants' project objectives listed below:

- Meet current incentives/regulations that encourage or require power from renewable or low environmental impact resources
- Conform with proposals in Congress for national RPS
- Meet Basin Electric's need for additional energy capacity to serve forecasted growth demands
- Meet Basin Electric's need for additional renewable energy capacity to meet State-mandated RPS

The Applicant considered other factors in the evaluation of potential project sites, including topography, proximity to the interstate highway system, proximity of nearby population centers, and land parcel sizes. A site with rolling topography, rather than steep, rugged topography was preferred because of less turbulent airflow and ease of construction. Distance to the interstate highway system was also considered, due to the large transportation effort associated with the delivery of project components. A site with low population density, but near a population center, would allow site operation and maintenance staff access to a wider array of housing, schools, and services, thereby aiding in staff recruitment and retention. Finally, a site with larger landowner

parcels would be preferred, since there would be a fewer number of leases and possible landowner conflicts.

To evaluate potential impacts to wildlife, a Potential Impact Index (PII) assessment was performed in general accordance with the USFWS Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines dated May 13, 2003 (2003 USFWS Guidance). The PII represents a “first cut” analysis of the suitability of sites proposed for development. It does so by estimating use of the site by selected wildlife species as an indicator of potential impact. Emphasis of the PII is on initial site evaluation and is intended to provide more objectivity than simple reconnaissance surveys.

Based on the results of the PII, the Reference Site (Lake Andes National Wildlife Refuge) had a total score of 331 compared to a total score of 269 for the Winner Site, 239 for the Crow Lake Site, and 214 for the Fox Ridge Site.

Table 2.1 summarizes the site selection and evaluation criteria for the each of the six sites evaluated as potential Proposed Project alternatives.

Through the alternatives screening process, the Applicants found that Crow Lake and Winner were the most favorable alternatives to meet their purpose and need of the Proposed Project. The Highmore/Ree Heights and Reliance alternatives were considered for elimination from further consideration since the land was leased by other developers. The Wessington Springs Alternative was eliminated from consideration due to proximity to multiple waterfowl production areas. When the Fox Ridge Alternative was investigated, transmission congestion and operating constraints on the regional transmission system were observed. The Applicants’ thus found that the instability of the system created too high of a risk for the Fox Ridge Alternative to be feasible; the Fox Ridge Alternative was eliminated from further consideration. The remaining alternatives (Winner and Crow Lake) appeared favorable for development. **Figure 2-1** depicts the general locations of the Proposed Project alternatives.

2.1.1 CROW LAKE ALTERNATIVE

This area was identified as an excellent wind resource through the National Renewable Energy Laboratory (NREL) wind resource map (NREL 2009), supplemented by existing meteorological data from a site established by the South Dakota State University Wind Resource Assessment Network (WRAN) (WRAN 2008). Wind Logics, a meteorological consultant from Minneapolis, was contracted to develop a 500-meter wind map for the area, with the results indicating an excellent wind resource. Meteorological towers were assembled to measure the wind and correlation of this meteorological tower data with the WRAN site was initiated. In general, subsequent wind measurements for speed and direction are taken at different heights. These measurements confirm the site is a Class IV or better wind resource as defined by the U.S. DOE NREL.

Table 2.1 Site Selection and Evaluation Criteria

| Site | Local Transmission Available | Additional Transmission Line Needed | Sufficient Land Available to Lease | Topography | Proximity to Interstate Highway System | Proximity to Population Center | Parcel Size |
|----------------------|---|-------------------------------------|------------------------------------|------------|--|--------------------------------|-------------|
| Highmore/Ree Heights | Yes (Request Submitted) | 10-12 Miles | Compromised by other developers | + | - | + | + |
| Wessington Springs | Yes | Not investigated | Wildlife Habitat | - | - | - | - |
| Reliance | Yes (Non-firm) | 20+ Miles | Compromised by other developers | - | + | - | + |
| Fox Ridge | Yes (High Risk – weak regional transmission system) | 5-6 Miles | Yes | - | - | - | + |
| Winner | Yes (Request Submitted) | 5-6 Miles | Yes | - | - | + | - |
| Crow Lake | Yes (Request Submitted) | 9-12 Miles | Yes | + | + | + | + |

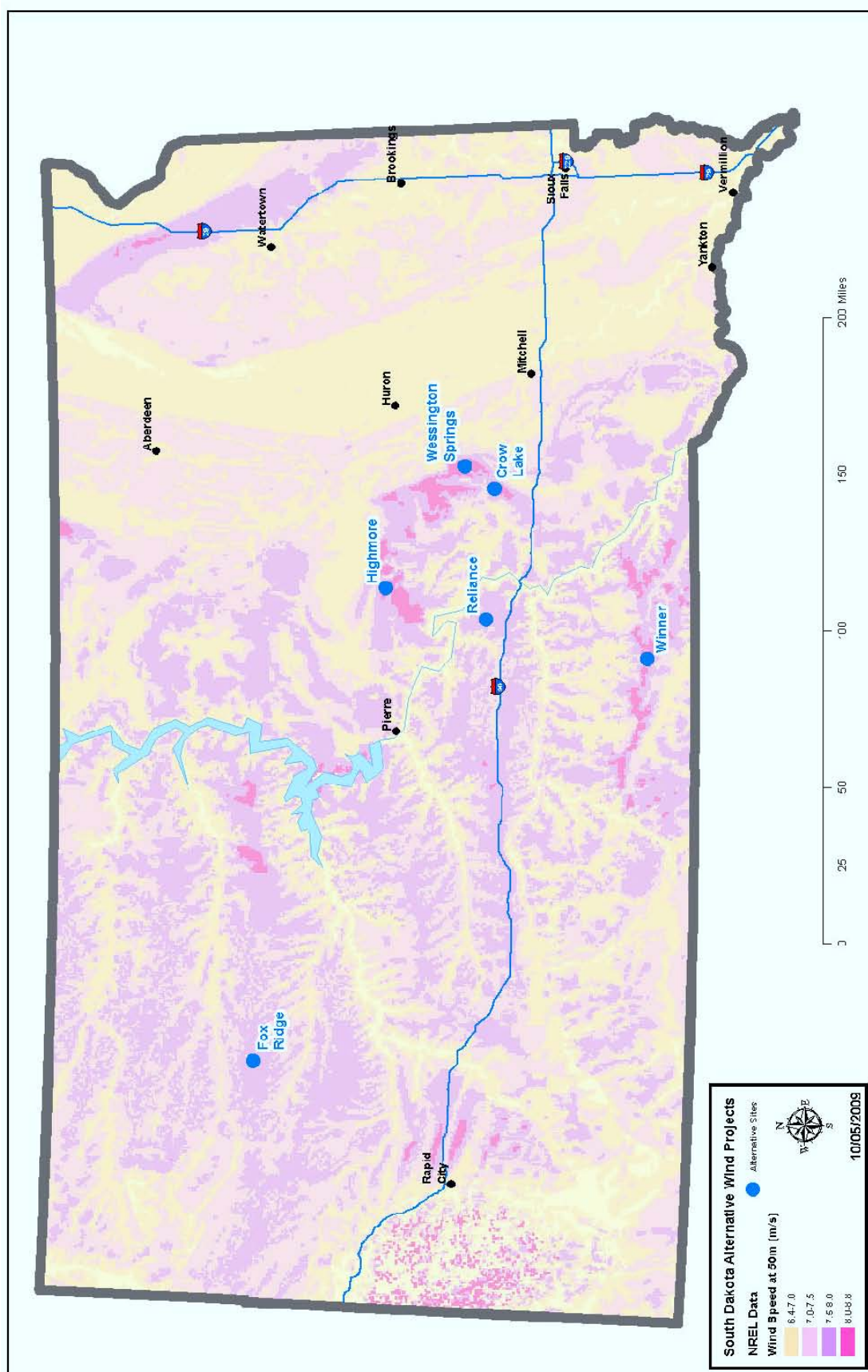


Figure 2.1 Locations of Sites Considered in Screening Assessment

The Applicants conducted environmental studies at the Crow Lake Alternative in late 2007. Various resources such as vegetation, water, wetlands, soils, wildlife, cultural and community issues were assessed to facilitate the evaluation of potential impacts. The Applicants noted that while there are potential issues that need to be addressed, it appears the site is viable for wind energy development. A PII was also done to better assess potential wildlife impacts.

2.1.2 WINNER ALTERNATIVE

This alternative, located in south-central South Dakota near the City of Winner, was identified as an excellent wind resource through the NREL wind resource map (NREL 2009). The Applicants' site reconnaissance also indicated good wind potential, with several ridges oriented somewhat transverse to the expected predominant wind direction. Subsequent wind mapping, using historical wind data provided additional confirmation of preliminary wind assessments, indicating this site has an excellent wind resource. Meteorological towers were installed to measure the wind for speed and direction taken at different heights. This data was correlated to the WRAN site to confirm the wind resource and assist in micro-siting (WRAN 2008).

The Applicants conducted environmental studies at the Winner Alternative in late 2008. Various resources such as vegetation, water, wetlands, soils, wildlife, cultural, and community issues were assessed to facilitate the evaluation of potential impacts. The Applicants noted that while there are potential issues that need to be addressed, it appears the site is also viable for wind energy development. A PII was also done to better assess potential wildlife impacts.

Western and RUS have reviewed the results of the Applicants' screening and siting studies. Based on this review and input received during the EIS scoping process, the Agencies fully analyzed the Crow Lake and Winner alternatives in the EIS.

2.1.3 APPLICANTS' PRELIMINARY SITING PARAMETERS

The following siting parameters were developed by the Applicants and were used in their micro-siting process for Crow Lake and Winner alternatives.

Preliminary siting parameters for turbine locations:

- Wind potential and topography
- Minimum distance of 400 feet from section lines or existing roads
- Minimum distance of 1,000 feet from occupied residences
- Minimum distance of 400 feet from existing transmission line
- Avoidance of wetlands and hydric soils areas
- Site near edges of USFWS grasslands easements to minimize impact
- 1,000 to 2,000-foot minimum distance between turbine locations within the predominant wind direction
- Avoidance of existing microwave paths
- FAA regulations and proximity to airports

- 1,320-foot minimum distance between turbine locations and USFWS Waterfowl Production Areas (WPA)

Preliminary siting parameters for transmission line locations:

- Minimize transmission line length
- Right-of-way requirements and availability of contiguous parcels of land
- Land use considerations (*i.e.*, potential visual impacts, proximity to residences, potential impact to agricultural activities and existing/future land use)
- Environmental resource considerations such as potential impacts to sensitive resources (*i.e.*, cultural resources, wildlife, vegetation and wetlands)
- Jurisdiction and regulatory considerations
- FAA regulations, military, weather and radar installations, and proximity to airports

2.2 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FULL ANALYSIS

Western and RUS reviewed the results of the Applicants' screening and siting studies (as discussed in **Section 2.1**) and concurred with the conclusion to eliminate the Highmore/Ree Heights, Wessington Springs, Reliance and Fox Ridge alternative sites from full analysis in the EIS.

Generally during the scoping process, any additional reasonable generation facility alternatives identified through comments received in response to the scoping process are considered. To be considered reasonable, alternatives would need to meet the Applicants' and Agencies' purpose and need, be technically feasible and economically viable. With publication of the NOI in the *Federal Register* (74 FR 15718) on April 7, 2009, interested parties were invited to participate in the scoping process. Aside from the Proposed Project alternatives (Crow Lake and Winner), no additional alternatives were identified during the scoping process.

For these reasons, only the Crow Lake and Winner alternatives are fully analyzed in this EIS.

2.3 CROW LAKE ALTERNATIVE

2.3.1 PROPOSED PROJECT COMPONENTS

The proposed Crow Lake Alternative would involve the installation and operation of a 151.5-MW nameplate capacity wind energy facility that would feature 101 wind turbine generators. Ten additional turbine locations were identified and analyzed in this DEIS. These turbines may be utilized as contingent turbine locations for the Proposed Project if specific turbine locations are eliminated as a result of additional resource surveys and engineering siting; or they may be installed within the selected site at a later date, pending future load, transmission availability, and renewable production standard requirements. The Crow Lake Alternative is located on

approximately 37,000 acres approximately 15 miles north of the City of White Lake, South Dakota, within Brule, Aurora, and Jerauld counties.

The Proposed Project would be constructed within the boundaries of the site. The areas of disturbance would include the turbine generator foundations, operation and maintenance (O&M) building and fence perimeter, underground communication system and electrical collector lines (within the same trench), collector substation and microwave tower, overhead transmission line, temporary equipment/material storage or lay-down areas, crane walks, and new and/or upgraded service roads to access the facilities, (collectively termed the Proposed Project Components). A map depicting the Crow Lake Alternative is included in **Chapter 1 Figure 1-3**.

Temporary and permanent disturbance acreages for each of the Proposed Project Components are summarized in **Section 2.6** at the end of this chapter. **Table 2.4** provides a comparison of the Crow Lake Alternative and Winner Alternative estimated surface disturbances. The No Action Alternative would not result in any surface disturbances.

Turbines: The Applicants' plan to install 101 General Electric 1.5 super long extreme (sle) model wind turbines for the Proposed Project. Each wind turbine would have a nameplate capacity output of 1.5-MW of power, with a combined nameplate capacity of 151.5 MW. Each wind turbine would have a hub height of 262 feet (80 meters) and a wind turbine rotor diameter of 252 feet (77 meters). The total height of each wind turbine would be 389 feet (118.5 meters) with a blade in the vertical position. The wind turbine tower would be constructed of tubular steel, approximately 15 feet in diameter at the base, with internal flanges. The color of the towers and rotors would be standard white or off-white. **Figure B-1** in **Appendix B** provides a diagram of a General Electric 1.5sle wind turbine for the Proposed Project, and **Figure B-2** in **Appendix B** depicts the main components of a typical wind turbine. During construction, a work/staging area at each wind turbine would include the crane pad and rotor assembly area. This would temporarily disturb an area of approximately 500 feet by 500 feet; and permanently disturb a 25-foot radius around each turbine. The wind turbine foundations would typically be mat foundations or a concentric ring shell foundation. The excavated area for the wind turbine foundations would typically be approximately 70 feet by 70 feet. Pad mounted transformers would be placed next to each wind turbine, with the pedestal 17 feet in diameter, and crushed rock apron extending 10 feet wide around the pedestal. For step-and-touch voltage compliance, an area around each wind turbine and transformer would be covered in gravel four inches deep and ten feet in all directions. See **Figure B-3** in **Appendix B** for a depiction of a typical crane pad layout and **Figure B-4** in **Appendix B** for a depiction of a typical layout for a turbine apron plan.

Collector System: Each wind turbine would be interconnected with underground power and communication cables, called the collector system. The underground collector system would be placed in one trench or multiple parallel trenches within a 15-foot-wide corridor and connect each of the wind turbines to one central collector substation. The estimated trench length, including parallel trenches, is approximately 317,000 feet (60 miles). The communication system would be located within the same trenches. This trench would temporarily disturb the entire 15-

foot-wide corridor; it would not result in any permanent impacts. This system would be used to route the power from each wind turbine to a central collector substation where the electrical voltage would be increased from 34.5-kV to 230-kV. The collector substation would be enclosed in a fence with dimensions of roughly 350 feet by 140 feet, temporarily disturbing 10 acres and permanently disturbing 1.8 acres. **Figure B-5 in Appendix B** shows the proposed Crow Lake Alternative collector substation layout and electrical bus arrangement.

Fiber Optic Communication Lines: The fiber optic communication lines for the Proposed Project would be installed in the same trenches as the underground electrical collector cables and connect each wind turbine to the O&M building and collector substation. There would be a small microwave tower within the substation fence. Using the Integrated Microwave Communication System, the facility would be able to communicate with the operations center.

O&M Building: It is anticipated that a 6,000-square-foot (55 feet by 110 feet) O&M building would be built in the vicinity of the collector substation, temporarily disturbing 20 acres, and permanently disturbing approximately one acre to accommodate personnel parking and the fence. The final location would be determined in consultation with future operations personnel.

Roads: New access roads would be built to facilitate construction and maintenance of the wind turbines. This road network would include approximately 75 miles of new or upgraded roads. These roads would be designed to minimize length and construction impact. The new and upgraded roads would temporarily disturb a corridor up to 40 feet wide to allow movement of wind turbine assembly cranes. Upon completion of construction, the wind turbine access roads would be narrowed to an extent allowing for the routine maintenance of the facility, anticipated to be a permanent 16-foot-wide corridor. Temporary portions of the access roads would be reclaimed.

Existing roads, State and county roads, and section line roads would be improved to aid in servicing the wind turbine sites. Approximately 30 to 40 miles of new wind turbine access roads would be built and 25 to 35 miles of existing roads would be used and where appropriate, improved. Private wind turbine access roads would be built to the towers. The specific wind turbine placement would determine the amount of private roadway needed.

Crane Walks: In some areas of the Proposed Project, it may be more efficient to move the wind-turbine-assembly crane cross-country, from wind turbine to wind turbine, on a route off of roads. These routes are referred to as “crane walks.” Crane walks would be approximately 40-foot wide temporary disturbances that would be reclaimed following construction, similar to other disturbed areas of the Proposed Project Components. The final distance and placement of crane walks would be determined as a result of the final turbine layout.

Lay Down Areas: The temporary staging area would be developed on approximately 40 acres, primarily consisting of cropland to minimize grading (although final locations would need to be determined). The staging area would house the construction office trailers and would provide worker vehicle and equipment parking areas, construction staging for limited project components, and a location for construction safety meetings. To prepare the temporary staging

area, vegetation would be cleared, as needed, and graded. Gravel would be placed to provide a level ground surface and control dust. Excess spoil material and topsoil salvaged from the site would be stockpiled. After construction has been completed, the area would be restored.

Transmission: For the Crow Lake Alternative, a new 230-kV transmission line would be required to deliver the power from the collector substation to a 230-kV interconnection point at Western's Wessington Springs Substation. The Wessington Springs Substation is located approximately nine miles from the collector substation.

The Applicants have identified three alternate transmission line corridors. Due to engineering considerations, the alternative 1 transmission line corridor includes an area outside of the original Crow Lake Alternative boundary; this boundary will reflect the revised transmission line route in the Final Environmental Impact Statement (FEIS). Each of the three transmission line corridors are approximately 11 miles in length. The transmission line would be built using steel single-pole structures. The structures would be about 85 to 95 feet high and span about 800 feet; the right-of-way for the transmission line would be 125 feet wide. Each transmission line structure construction area would have temporary impacts encompassing 100-feet by 125-feet, and there would be a permanent impact of a 20-foot radius around each structure. The transmission line corridor would include a 12-foot wide centerline area to allow for the movement of equipment along the route of the transmission line and include six to eight structures per mile. In addition, pulling sites for each of the alternative transmission line corridor options would include two 125-foot by 300-foot areas for each of the turning locations.

2.3.2 PRE-CONSTRUCTION ACTIVITIES

Based on guidance from Western and RUS in coordination with the Applicants, additional resource surveys and engineering siting would occur that may adjust the currently proposed turbine locations. Pre-construction activities include site-specific surveys and studies, securing landowner agreements, project planning and design, and securing applicable permits. The final layout would depend on the results of these pre-construction activities. Factors which may affect the locations of individual turbines include, but are not limited to, Class III archaeological survey results, biological assessments, a wetland delineation (including jurisdictional Waters of the U.S. [WUS], collectively termed "wetlands") and other resource and engineering considerations. The following list describes the pre-construction activities that have currently been identified.

- A Biological Assessment (BA) will be prepared for consultation with the USFWS in accordance with Section 7 of the ESA. The BA will be prepared and submitted to the USFWS by the Agencies. The results of the BA will be incorporated into the FEIS and the Record of Decision (ROD)
- Avian and bat use surveys are currently being conducted to determine species presence, composition and suitable habitat
- Biological monitoring activities would also be conducted, and coordination with USFWS would occur before and during the geotechnical investigations

- It is anticipated that a wetland delineation would be conducted prior to the start of construction in accordance with USACE standard protocols to identify any wetland potentially affected by the Proposed Project
- To determine what type(s) of concrete foundations would be needed for each wind turbine generator, the Applicants anticipate conducting geotechnical investigations to identify subsurface soil conditions, rock types and strength properties
- Prior to the geotechnical field investigation, a Class III archaeological survey would be conducted in consultation with the South Dakota SHPO
- A Class I cultural resources inventory has been completed. The inventory includes a review of existing cultural resources documentation on file in State repositories, a preliminary architectural history windshield survey within the Proposed Project study area, and a review of 19th century Public Land Survey maps
- On-the-ground Class III field surveys will be conducted along the areas of future ground disturbance including all Proposed Project Components. The results of the Class III survey would be considered in the final engineering of the Proposed Project
- The Proposed Project would be located entirely on privately-owned lands pursuant to lease agreements negotiated between the landowners and the Applicants. These leases would allow construction and operation of wind facilities for a negotiated term
- Additional permits would be obtained and are described in **Chapter 1** in **Table 1.1**

2.3.3 CONSTRUCTION

The Applicants would like to begin construction in mid-2010 and complete construction by the end of 2010. It is anticipated that local workers from the counties would fill the majority of the open construction jobs. Anticipated labor trades required during construction include electricians, crane operators, heavy equipment operators, and other skilled construction laborers. Construction activities would entail the following phases, listed in approximate order of occurrence, although some of the activities would be carried out concurrently:

- Road clearing for access roads for construction and maintenance
- Construction of wind turbine foundations (grading, excavation, reinforcing steel placement, and concrete pouring)
- Grading, trenching, and placement of underground utilities and collector substation (including electric and communication lines)
- Overhead transmission line construction
- Tower assembly, nacelle installation, rotor assembly, rotor installation, and equipment installation including installation of the communication system, supervisory control and data acquisition (SCADA) software and hardware, and telephone or fiber-optic cables
- Final road grading, erosion control and reclamation

Construction activities would be temporary and would involve the use of heavy equipment including bulldozers, graders, trenching machines, concrete trucks, tractor-trailer trucks, and large cranes.

A contractor would be primarily responsible for construction management. The contractor would use the services of local contractors, where possible. Construction management would consist of:

- Securing building, electrical, grading, road, and utility permits
- Performing detailed civil and structural engineering
- Scheduling execution of construction activities
- Completing surveying and geotechnical investigations
- Forecasting project labor requirements and budgeting

The Proposed Project would be constructed under the direct supervision of the on-site construction manager with the assistance of local contractors. The construction consists of the following tasks:

- Site development, including roads
- Foundation excavation
- Installation of concrete foundations
- Electrical and communication system installation
- Tower assembly and machine assembly
- System testing

Throughout the construction phase, ongoing coordination would occur between the Proposed Project development and the construction teams. The on-site construction manager would help coordinate the project, including engaging in ongoing communication with local officials, citizens groups, and landowners.

2.3.4 OPERATION AND MAINTENANCE

Each wind turbine would communicate directly with the SCADA system for the purposes of operation performance monitoring, energy reporting and trouble-shooting. Under normal conditions each wind turbine operates autonomously, making its own control decisions. The Proposed Project would be operated and maintained by the Applicants or a third-party contractor.

The Applicants and the appropriate supplier would control, monitor, operate, and maintain the Proposed Project by means of a SCADA computer software program. In addition to regularly scheduled on-site visits, the wind project could be monitored via computer. The primary functions of the SCADA system are to:

- Monitor status
- Allow for autonomous turbine operation
- Alert operations personnel to conditions requiring resolution
- Provide a user/operator interface for controlling and monitoring wind turbines
- Monitor field communications
- Provide diagnostic capabilities of wind turbine performance for operators and maintenance personnel

- Collect wind turbine, material and labor resource information
- Provide information archive capabilities
- Provide inventory control capabilities; and
- Provide information reporting on a regular basis

There would be a full-time operation and maintenance crew of 10 to 12 people that work in teams of two. If possible, the crews may work in staggered shifts. The two person crews would make trips to the turbines with an average of two turbines per day. With that schedule, the six crews conducting two trips per day would enable 12 trips from the maintenance building to turbines in a typical day.

In general, the heavy equipment and materials needed for site access, site preparation, turbine blade delivery, and foundation construction are typical of heavy construction projects and do not pose unique transportation considerations, except for the delivery of some turbine components as noted below. The movement of equipment and materials to the site during construction would cause a relatively short-term increase in traffic levels on local roadways during the construction period.

Transportation logistics have become a major consideration for wind energy development projects; the trend is toward larger rotors and taller towers and the associated equipment needed to erect them. Depending on the design, some of the turbine components would be extremely long (*e.g.*, blades) or heavy (*e.g.*, the nacelle). The size and weight of these components would dictate the specifications for site access roads for required rights-of-way, turning radii, and fortified bridges. Each turbine would require multiple truck shipments of components, some of which could be oversized or overweight.

Erecting the towers and assembly of the wind turbine generators would require a main crane with a capacity likely to be between 300 and 750 tons, depending on the turbine design, and may require several overweight and/or oversized shipments. In addition, main crane assembly would require a smaller assist crane, and several assist cranes would likely be required for rotor/hub assembly. Cranes would remain on site for the duration of construction activities.

Overweight permits usually are issued with specific dates during which transport is prohibited. These dates are State-specific but tend to eliminate periods during the spring when frozen ground is thawing. Over-dimension permits are likely to have travel time limits in congested areas, limiting movement to non-rush hour periods.

During operations, larger sites may be attended during business hours by a small maintenance crew. Consequently, transportation activities would be limited to a small number of daily trips by pickup trucks, medium-duty vehicles, or personal vehicles. It is possible that large components may be required for equipment replacement in the event of a major mechanical breakdown. Such shipments would be expected to be infrequent.

2.3.5 DECOMMISSIONING AND RESTORATION

The Applicants have a contractual obligation to the landowners to remove the wind facilities, including foundations to a depth of four feet, when the wind easement expires. They also reserve the right to explore alternatives regarding project decommissioning. Retrofitting the turbines and power system with upgrades based on new technology may allow the wind project to produce efficiently for many more years. Based on estimated costs of decommissioning and the salvage value of decommissioned equipment, the salvage value of the wind project may exceed the cost of decommissioning.

With some exceptions, transportation activities during site decommissioning would be similar to those during site development and construction. Heavy equipment and cranes would be required for dismantling turbines and towers, breaking up tower foundations, and regrading the site to the original contours. With the possible exception of a main crane, oversized and/or overweight shipments are not expected during decommissioning activities because the major turbine components can be disassembled, segmented, or reduced in size prior to shipment.

2.3.6 APPLICANTS' AND AGENCIES' INCLUDED BEST MANAGEMENT PRACTICES AND APPLICANTS' PROPOSED MEASURES

The Applicants and Agencies have included Best Management Practices (BMPs) and Applicants' Proposed Measures (APMs), by resource area, and as applicable, for the Proposed Project and proposed Federal actions to minimize impacts associated with construction, operation and decommissioning. The Applicants and Agencies have committed to these included BMPs and APMs prior to the evaluation of environmental impacts. **Table 2.2** summarizes the Applicants' and Agencies' included BMPs, and **Table 2.3** summarizes the APMs. The Applicants would follow standard construction practices, BMPs and APMs during the construction, operation and decommissioning of the Proposed Project Components; these measures may be imposed by State, local or other jurisdictions as the result of approvals for stormwater management, grading permits, building permits, *etc.* or may be the result of efficient and/or responsible construction. Further, Western maintains standard practices for constructing and modifying transmission lines and substations. The BMPs would be followed for any system modifications performed at Western facilities for the proposed Federal action. In addition, Western provides additional requirements for BMPs as part of its contracting requirements. These provisions are outlined in Western's Construction Standard 13 and are applied on a project-specific basis.

Table 2.2 Applicants' and Agencies' Included BMPs

| | |
|---|--|
| <p>Geology and Soils</p> | <p><u>Applicants identified:</u></p> <ul style="list-style-type: none"> The Applicants would use BMPs during construction and operation to protect topsoil and water resources and to minimize soil erosion. Practices may include containing excavated material, applying water, use of silt fences, protecting exposed soil with fabrics (especially near wetlands), stabilizing restored material, and revegetating disturbed areas with native grasses and forbs. Additional geotechnical testing and engineering siting would occur that may adjust the locations of turbines. Engineering design would provide for site specific controls, as needed. |
| <p>Water Resources</p> | <p><u>Applicants identified:</u></p> <ul style="list-style-type: none"> Additional resource surveys and engineering siting would occur that may adjust the locations of turbines. Water resource factors which may affect the locations of individual turbines include, but are not limited to, a wetland delineation (including jurisdictional WUS [collectively termed "wetlands"]), and other resource and engineering considerations. Wetlands would be avoided to the extent practicable during the construction phase. The Applicants would use BMPs during construction, operation, and decommissioning of the site to protect topsoil and water resources and to minimize soil erosion. Practices may include containing excavated material, applying water, use of silt fences and fabrics, protecting exposed soil, stabilizing restored material, and revegetating disturbed areas with native species. <p><u>Western identified:</u></p> <ul style="list-style-type: none"> Watering facilities and other range improvements would be repaired or replaced if they are damaged or destroyed by construction activities to their condition prior to disturbance, as agreed to by the parties involved. |
| <p>Air Quality</p> | <p><u>Applicants identified:</u></p> <ul style="list-style-type: none"> The Applicants would use BMPs during ground disturbing activities and may include applying water, containing excavated material, use of silt fences, protecting exposed soil, stabilizing restored material, and revegetating disturbed areas to minimize short-term air quality effects. Complaints regarding fugitive dust emissions would be addressed in an efficient and effective manner. |
| <p>Threatened and Endangered Species</p> | <p><u>Applicants, RUS and Western identified:</u></p> <ul style="list-style-type: none"> Special status species or other species of particular concern would continue to be considered during post-EIS phases of the Proposed Project's development following management policies set forth by the appropriate land managing agency. This may entail conducting surveys for plant and wildlife species of concern along access and spur roads, staging areas, and construction sites as agreed upon by the land managing agency. In cases where such species are identified, appropriate action would be taken to avoid adverse impacts on the species and its habitat and may include, but is not limited to altering the placement of roads or structures as practical and monitoring construction activities. |
| <p>Vegetation Resources</p> | <p><u>Western identified:</u></p> <ul style="list-style-type: none"> The areal limits of construction activities normally would be predetermined, with activity restricted to and confined within those limits. No paint or permanent discoloring agents would be applied to rocks or vegetation to indicate limits of survey or construction activity. In construction areas where recontouring is not required, vegetation would be left in place wherever possible and original contour would be maintained to avoid excessive root damage and allow for resprouting. |

Table 2.2 Applicants' and Agencies' Included BMPs

| | |
|----------------------------------|---|
| <p>Cultural Resources</p> | <ul style="list-style-type: none"> • Prior to construction, all construction personnel would be instructed on the protection of cultural, paleontological, and ecological resources. To assist in this effort, the construction contract would address (a) Federal, State and tribal laws regarding cultural resources, fossils, plants and wildlife, including collection and removal; and (b) the importance of these resources and the purpose and necessity of protecting them. |
| <p>Land Use</p> | <p><u>Applicants identified:</u></p> <ul style="list-style-type: none"> • The Applicants would work closely with landowners to site access roads to minimize land-use disruptions to the extent possible; for further detail reference the Applicants' Fish and Wildlife Resources APMs in Table 2.3. <p><u>Western identified:</u></p> <ul style="list-style-type: none"> • Fences and gates would be repaired or replaced to their original condition prior to disturbance caused by the proposed Federal action as required by the landowner or the land management agency if they are damaged or destroyed by construction activities. Temporary gates would be installed only with the permission of the landowner or the land managing agency. • In construction areas (e.g., staging yards, spur roads from existing access roads) where ground disturbance is substantial or where recontouring is required, surface restoration would occur as required by the landowner or land management agency. The method of restoration normally would consist of returning disturbed areas back to their natural contour, reseeding (if required), installing cross drains for erosion control, placing water bars in the road, and filling ditches. |

Table 2.2 Applicants' and Agencies' Included BMPs

| | |
|---------------------------------|--|
| <p>Health and Safety</p> | <p><u>Applicants identified:</u> Electric and Magnetic Fields (EMF):</p> <ul style="list-style-type: none"> To reduce the potential for EMF exposure, the Applicants would encourage conservation, encourage distributed generation, continue to monitor EMF research, encourage utilities to work with customers on household EMF issues, and provide public education. <p>Hazardous Material and/or Hazardous Waste:</p> <ul style="list-style-type: none"> All petroleum fluids would be contained within the wind turbines and electrical equipment. Any petroleum wastes generated would be handled and disposed of in accordance with local, State and Federal regulations. Any spills would be immediately reported to construction inspectors so that cleanup activities could be implemented. All spill materials would be labeled and stored at a designated facility for appropriate disposal. <p>Safety and Security:</p> <ul style="list-style-type: none"> The turbines would be placed approximately 400 feet from road right-of-way and 1,000 feet from any occupied residences unless a county or township variance is obtained. These distances are considered to be safe based on developer experience and are consistent with the required local setbacks. They also serve to reduce noise. Security measures would be taken during construction and operation, including temporary and permanent (safety) fencing at the substation(s), warning signs, and locks on equipment and wind power facilities. Also, turbines would sit on solid steel enclosed tubular towers in which all electrical equipment would be located, within the towers except for the pad-mounted transformer. Access to the tower would only be through a solid steel door that would be locked when not in use. <p><u>Western identified:</u></p> <ul style="list-style-type: none"> Hazardous materials would not be drained onto the ground or drainage areas. Totally enclosed containment would be provided for all trash. All construction waste including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials would be removed to a disposal facility authorized to accept such materials. |
|---------------------------------|--|

Source: Applicants' construction details and BMPs received by Tierra EC 2009; Agencies' construction details and BMPs received by Tierra EC 2009

Note: Only resource categories with identified BMPs are included in this table; the Applicants have agreed with and will implement the Agencies' identified BMPs

Table 2.3 APMs

| | |
|---|---|
| <p>Water Resources</p> | <p><u>Applicants identified:</u></p> <ul style="list-style-type: none"> • If impacts to wetlands (including jurisdictional WUS [collectively termed “wetlands”]) are unavoidable, then the Applicants would obtain a section 404 Permit through the USACE. Temporary impacts to jurisdictional wetlands would be restored to their pre-construction condition in coordination with the USACE; permanent impacts would be mitigated according to USACE requirements. Temporary impacts to non-jurisdictional wetlands would also be restored to their pre-construction conditions. • Wetlands within USFWS easements on private property are under USFWS jurisdiction. If wetland impacts in USFWS easements could not be avoided, the Applicants would work with the USFWS to obtain permits for the impact and create/implement required mitigation. |
| <p>Air Quality</p> | <p><u>Applicants and Agencies’ identified:</u></p> <ul style="list-style-type: none"> • Air quality effects caused by dust would be short-term, limited to the time of construction, and would not exceed National Ambient Air Quality Standards (NAAQS) particulate standards. • The construction, operation, and decommissioning of the site would adhere to all requirements of those entities having jurisdiction over air quality matters. Any permits needed for construction activities would be obtained. Open burning of construction trash would not be allowed unless permitted by appropriate authorities. |
| <p>Threatened and Endangered Species</p> | <p><u>Applicants and Agencies’ identified:</u></p> <ul style="list-style-type: none"> • Whooping Crane Monitoring Plan/Sightings: The Proponent will develop a Whooping Crane Monitoring Plan as part of the Section 7 consultation process in coordination with the SDGFP. The plan will include, but will not be limited to, training project personnel in the identification of Whooping Cranes and Sandhill Cranes and USFWS reporting requirements; construction requirements; post-construction survey and reporting requirements; mortality monitoring; and adaptive management practices. |

Table 2.3 APMs

| | |
|---|--|
| <p>Fish and Wildlife Resources</p> <p><u>Applicants identified:</u></p> <ul style="list-style-type: none"> • Prior to surface-disturbing activities during the avian breeding season, a qualified biologist would survey suitable habitat for nesting activity and other evidence of nesting (e.g., mated pairs, territorial defense, birds carrying nest material, transporting food). If active nests are located, or other evidence of nesting is observed, appropriate protection measures, including establishment of buffer areas and constraint periods, would be implemented until the young have fledged and dispersed from the nest area. These measures would be implemented on a site-specific and species-specific basis, in coordination with Western and RUS. • If construction is to occur during the breeding season for raptors, prior to construction activities, raptor breeding surveys would be conducted by a qualified biologist through areas of suitable nesting habitat (grasslands and wooded areas) to identify active nest sites within one half-mile from the Proposed Project area. If applicable, appropriate protection measures, including seasonal constraints and establishment of buffer areas would be implemented at active nest sites until the young have fledged and have dispersed from the nest area. These measures would be implemented on-site-specific and species-specific basis in coordination with Western and RUS. Reports of these activities will be submitted to USFWS and SDGFP. • Habitat impacts to migratory birds, due to both direct (project footprint) and indirect (avoidance effects) will be evaluated and quantified, and appropriate offsetting measures will be developed in coordination with the SDGFP and USFWS. • All temporary meteorological towers associated with the Proposed Project would be removed as soon as construction begins. Any permanent meteorological tower would be freestanding and have no guy wires. • Towers would be lit according to current USFWS guidance regarding reduction of avian mortality associated with turbine tower lights. • Avian and Bat Protection Plan (ABPP): An Avian and Bat Protection Plan will be developed in coordination with the USFWS and SDGFP. It will include, but not be limited to, construction requirements; post-construction avian and bat survey and reporting requirements; avian and bat mortality monitoring; and adaptive management practices | <p>Vegetation Resources</p> <p><u>Applicants identified:</u></p> <ul style="list-style-type: none"> • The Applicant would develop a post-construction noxious weed monitoring program and would conduct surveys according to that program for three years post-construction, with follow-up surveys in problem areas. • Annual post-construction monitoring and treatment would occur as determined through coordination with the SDPUC and Western and RUS. • Grasslands within USFWS easements on private property are under USFWS jurisdiction. If grassland impacts in USFWS easements cannot be avoided, the Applicants would work with USFWS to obtain permits for the impact and create required mitigation. • Temporarily disturbed areas would be reclaimed by replacement of topsoil and seeding. Revegetation would occur as soon as possible to establish vegetative cover and avoid establishment of weeds. Agricultural lands would be returned to their original use. Regionally native seed or seed mix approved by the county and landowners would be used. If native prairie areas are disturbed they would also be reseeded with a native seed mix. • Noxious weeds would be controlled using appropriate weed control measures. • Dust emissions would be minimized during clearing, grading and other construction activities to avoid adversely affecting vegetation. |
|---|--|

Table 2.3 APMs

| | |
|----------------------------------|--|
| <p>Cultural Resources</p> | <p><u>Applicants and Agencies' identified:</u> The following measures would be implemented to address impacts to the area of potential effects (APE):</p> <ul style="list-style-type: none"> • The Applicants would continue to make a reasonable effort to design the project in such a manner as to minimize impacts to National Register of Historic Places (NRHP) listed and eligible properties. <p>The following APMs would also be implemented to address impacts:</p> <ul style="list-style-type: none"> • Tribes that are in the consultation process would be contacted if archaeological resources or other properties of tribal interest are identified during construction. • The appropriate tribal representatives and the State Historical Society would be contacted if a burial site is encountered during construction. • NAGPRA allows tribes to protect American Indian graves and to repatriate human remains. • No surface disturbance would occur within the boundary of any NRHP eligible property prior to completion of the field phase of a data recovery plan that would be reviewed and approved by the South Dakota State Historical Society. • No surface disturbance would occur within the boundary of a site until its NRHP eligibility is determined. If a site is determined to be eligible, no surface disturbance would occur within the boundary of the site prior to completion of the field phase of a data recovery plan that would be reviewed and approved by the South Dakota State Historical Society. • Cultural resources would continue to be considered during post-EIS phases of project development following the development of an MOA in conjunction with preparation of the EIS. This would involve intensive surveys to inventory and evaluate new discoveries (cultural resources not previously identified). In consultation with appropriate land managing agencies, tribal and State Historic Preservation Officers, specific mitigation measures would be developed and implemented to mitigate any identified adverse impacts. These may include project modifications to avoid adverse impacts, monitoring of construction activities, and data recovery studies. American Indian Tribes would be involved in these consultations to determine whether there are effective or practical ways of addressing impacts on traditional cultural places. |
| <p>Transportation</p> | <p><u>Applicants and Agencies' identified:</u> Air Traffic:</p> <ul style="list-style-type: none"> • The Applicants are coordinating with FAA on layout and lighting and would seek design approval from FAA. Wind turbines and meteorological • Structures and/or ground wire would be marked with highly visible devices where required by governmental agencies (e.g., FAA). |
| <p>Noise</p> | <p><u>Applicants and Agencies' identified:</u></p> <ul style="list-style-type: none"> • While there are no Federal noise standards that directly regulate noise from the operation of wind turbines, the EPA guidelines recommend a day-night average sound level (L_{dn}) of 55 dBA in typically quiet outdoor and residential areas. As a design characteristic, and in order to achieve the recommended L_{dn}, wind turbines would be set back at least 1,000 feet from occupied residences. • Noise associated with the short-term construction of the transmission corridor would be abated through engineering design by avoiding placement of a structure adjacent to a residence. • Western would continue to monitor studies performed to determine the effects of audible noise and electrostatic and electric and magnetic fields to ascertain whether these effects are significant. |

Source: Applicants' Proposed Measures received by Tierra EC 2009; additional detail included from the Agencies' construction details and BMPs received by Tierra EC 2009
 Note: Only resource categories with identified measures are included in this table

2.4 WINNER ALTERNATIVE

2.4.1 PROPOSED PROJECT COMPONENTS

The Winner Alternative is located on an approximately 83,000-acre area entirely within Tripp County, approximately eight miles south of the City of Winner, South Dakota. The facilities for the Winner Alternative would be similar to those described for the Crow Lake Alternative (**Section 2.3.1**). However, the difference is that the Winner Alternative would require a 34.5-kV to 115-kV collector substation as well as a 115-kV transmission line to interconnect to Western's existing 115-kV Winner Substation (compared to the 230-kV components described for the Crow Lake Alternative). The Winner Substation is located approximately nine miles from the proposed collector substation. Two alternative transmission line corridors are considered. Depending on the route, the transmission line would be approximately 10 to 11 miles long. The transmission line would be built using steel single-pole structures. The structures would be about 75 to 85 feet high and span about 800 feet. A map depicting the Winner Alternative is included in **Chapter 1** as **Figure 1-4**.

At this time, the Applicants have not prepared a drawing of an electrical bus arrangement for the Winner collector substation. An example layout is depicted in **Figure B-5, Appendix B**.

2.4.2 PRE-CONSTRUCTION ACTIVITIES

The pre-construction activities for the Winner Alternative would be the same as those described for the Crow Lake Alternative. Refer above to **Section 2.3.2** for the additional pre-construction detail.

2.4.3 CONSTRUCTION

The construction aspects for the Winner Alternative would be similar to those described for the Crow Lake Alternative. Refer above to **Section 2.3.3** for the additional details regarding construction.

2.4.4 OPERATION AND MAINTENANCE

The operation and maintenance aspects for the Winner Alternative would be the same as those described for the Crow Lake Alternative. Refer above to **Section 2.3.4** for the additional operation and maintenance detail.

2.4.5 DECOMMISSIONING AND RESTORATION

The decommissioning and restoration aspects for the Winner Alternative would be the same as those described for the Crow Lake Alternative. Refer above to **Section 2.3.6** for decommissioning and restoration detail.

2.4.6 APPLICANTS' AND AGENCIES' INCLUDED BMPs AND APMS

The Applicants' and Agencies' included BMPs and APMS, for the Winner Alternative would be the same as those described for the Crow Lake Alternative. Refer above to **Section 2.3.6** and **Table 2.2** and **Table 2.3** for the additional detail regarding those measures and practices.

2.5 NO ACTION ALTERNATIVE

Under the No Action Alternative, Western would deny the interconnection request (and RUS would not provide financial assistance). For the purpose of impact analysis and comparison in this EIS, it assumed that the Applicants' Proposed Project would not be built and the environmental impacts, both positive and negative, associated with construction and operation would not occur.

2.6 ESTIMATED SURFACE DISTURBANCE AREA

Table 2.4 below describes the anticipated estimated surface disturbance areas associated with the Proposed Project Components for each of the alternatives (note that the No Action Alternative would not result in any surface disturbances). These are conservative estimates based on 101 turbine locations and associated facilities, plus the ten additional turbine locations that may be utilized as contingent turbine locations for the Proposed Project if specific turbine locations are eliminated as a result of additional resource surveys and engineering siting; or they may be installed within the selected site at a later date, pending future load, transmission availability, and renewable production standard requirements. If the Proposed Project is approved and following identification of the preferred project site, the Applicants will determine the exact locations for the 101 turbines and project facility components. Western's action would be limited to previously disturbed areas within its existing substations, unless studies dictate the need to expand the Winner Substation.

2.7 SUMMARY OF IMPACTS BY ALTERNATIVE

Table 2.4 summarizes the quantity of surface disturbance areas for each of the alternatives discussed in the DEIS. **Table S.3** provides a summary of the impacts by resource type, as discussed in **Chapter 4**.

Table 2.4 Estimated Surface Disturbance Areas – Crow Lake and Winner Alternatives

| Disturbance Type | Crow Lake Alternative Temporary (acres) | Crow Lake Alternative Permanent (acres) | Winner Alternative Temporary (acres) | Winner Alternative Permanent (acres) |
|--|---|---|--------------------------------------|--------------------------------------|
| Wind Turbine Generator Assembly Area/Pads | 637 | 4.9 | 637 | 5.0 |
| Crane Walks | 282 | N/A | 530 | N/A |
| Electrical Collections Lines (Underground) | 105 | N/A | 198 | N/A |
| Electrical Transmission Lines (Overhead) | 56* | 0.13 | 42 | 0.12 |
| | 53 | 0.13 | 56 | 0.18 |
| | 55 | 0.13 | NA | NA |
| Access Roads | 255 | 126 | 1,710 | 254 |
| Collection Substation | 10 | 1.8 | 10 | 1.8 |
| O &M Building | 20 | 0.15 | 20 | 0.15 |
| Temporary Lay Down Area | 40 | | 40 | |
| Total Project Impacts (Max Preferred) | 1,405 | 133 | 3,187 | 261 |
| Total Alternative Area (acres within boundary) | 37,000 | | 83,000 | |

Note: Quantified impacts include the 101 turbine locations required for the Proposed Project plus the ten additional turbine locations that may be utilized as contingent turbine locations for the Proposed Project if specific turbine locations are eliminated as a result of additional resource surveys and engineering siting; or they may be installed within the selected site at a later date, pending future load, transmission availability, and renewable production standard requirements. This approach is conservative because it identifies a greater amount of disturbance than what would be required for the Proposed Project.

* Due to engineering considerations, the overhead transmission line location includes area outside of the Crow Lake Alternative boundary; this boundary will be revised to include the transmission line route in the FEIS.

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3 AFFECTED ENVIRONMENT

This chapter describes the baseline condition of the area that could be affected by the Proposed Project. The affected environment, or region of influence (ROI), is the physical area that bounds the environmental, sociological, economic, or cultural feature of interest that could be impacted by construction and operation of the Proposed Project and the proposed Federal actions. The boundaries of the ROI may vary depending on the resource being analyzed. The baseline condition serves as a reference point for the evaluation of impacts presented in **Chapter 4, Environmental Consequences**. For ease of understanding the evaluation of impacts and correlating **Chapters 3 and 4**, the document has been prepared so that a resource described in **Chapter 3, Affected Environment**, has the same section number in **Chapter 4, Environmental Consequences** (e.g., **Section 3.2 Water Resources, Section 4.2 Water Resources**).

The Proposed Project affected environment descriptions are presented for the Crow Lake and Winner alternatives. Instances are noted where the affected environment descriptions for the proposed Federal actions differ from those of the Proposed Project alternatives.

Critical Elements of the Human Environment, as defined and specified in the above-listed statutes and Executive Orders, that could be impacted by the Proposed Project include:

- Geology and soils
- Water resources
- Climate change and air quality
- Biological resources
- Cultural resources
- Land use
- Transportation
- Visual resources
- Noise
- Socioeconomics
- Environmental justice
- Health and safety

Critical elements of the human environment that would not be affected are listed below, followed by the justification for dismissal of these elements from further discussion.

Paleontology – Investigations of publicly available maps and local geology did not identify paleontological resource sites in the Proposed Project area. The glacial till and outwash deposits that comprise the majority of the surface soils in the area are unlikely to contain fossils.

Wild and Scenic Rivers – Review of the U.S. Department of Interior, National Park Service (NPS) website indicates that there are no Federally-designated Wild and Scenic Rivers in South Dakota (NPS 2004).

Wilderness – There are no Federally-designated wilderness areas near the Proposed Project alternatives.

3.1 GEOLOGY AND SOILS

The ROI for geology and soils includes areas of immediate disturbance associated with implementation of the Proposed Project Components and proposed Federal actions. Because existing data on geologic resources is not available for the specific sites, the geology in the vicinity of the alternatives is summarized.

3.1.1 GEOLOGY

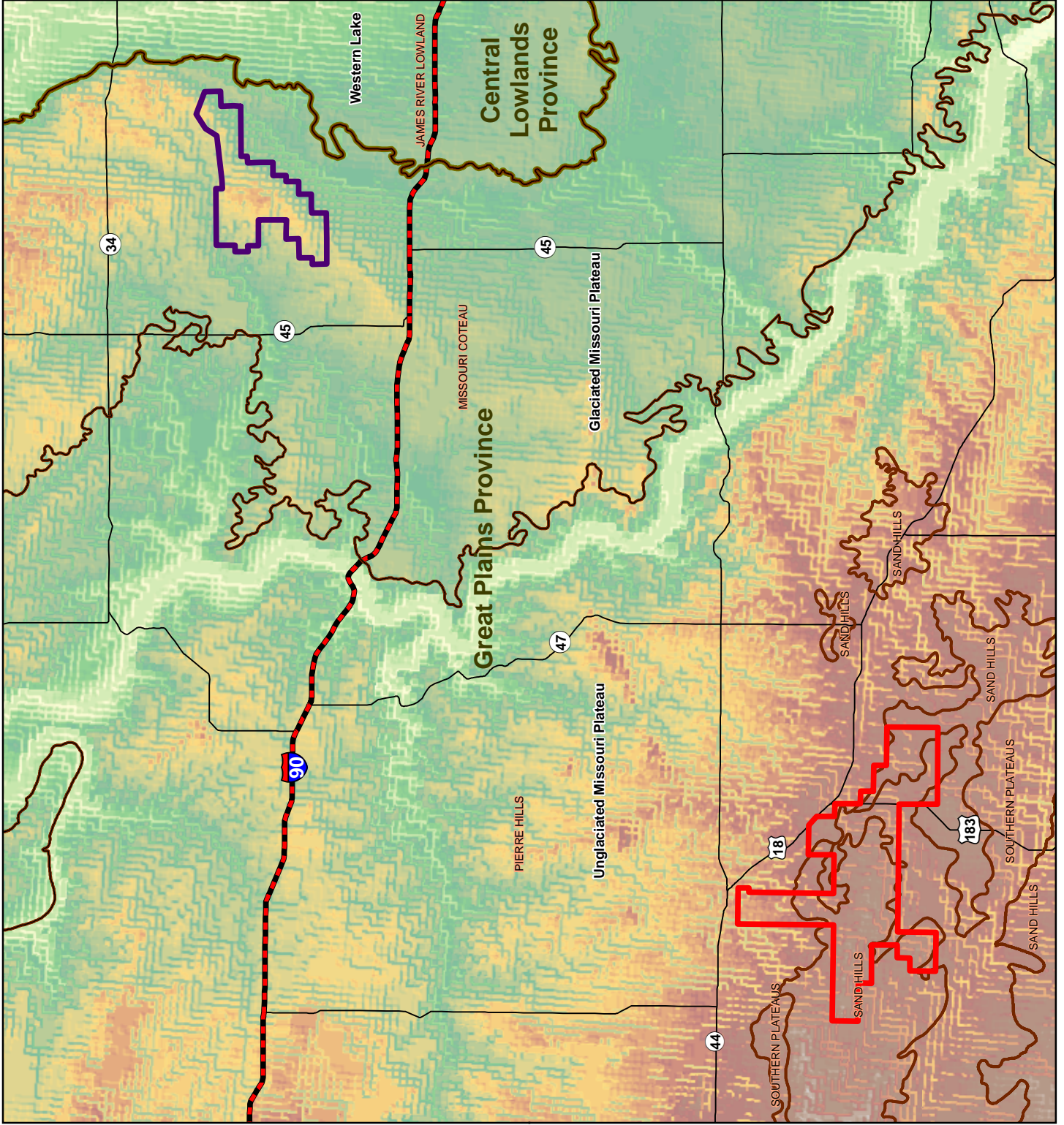
3.1.1.1 Crow Lake Alternative

Information and data for the compilation of this section is from *Bulletin 32 – Geology of Aurora and Jerauld Counties, South Dakota* (Hedges 2001), *Aquifer Materials Map 21 – First Occurrence of Aquifer Materials in Aurora County, South Dakota* (Jensen 2004), *Aquifer Materials Map 21 – First Occurrence of Aquifer Materials in Jerauld County, South Dakota* (Jensen 2005), and *Compilation of Resource Technical Memorandums – Crow Lake Project, Portions of Jerauld, Aurora, and Brule Counties, South Dakota* (Terracon 2009a).









The topography of the Crow Lake Alternative is characterized by gently rolling hills with low to moderate relief. Elevation for the site ranges from approximately 1,500 to 1,900 feet above mean sea level (AMSL). The Crow Lake Alternative is located within the Glaciated Missouri Plateau (also known as the Coteau du Missouri Section) of the Great Plains physiographic province, which is characterized by low hummocky, undulating hills and large undrained areas containing prairie potholes, lakes and sloughs (see **Figure 3.1-1**). Strata for this highland area are characterized by glacial deposits which are underlain by the Upper Cretaceous Pierre Shale and older formations. A northeast-southwest trending axis in the site topography marks a steep escarpment corresponding with a ridge in the bedrock underlying the site. The escarpment rises 300 to 400 feet above the James River Basin east of the site.

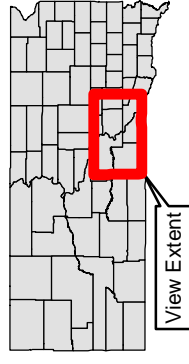
In general, geomorphology of the region consists of physiographic features formed by glacial advancement and retreat during the Pleistocene epoch. Surficial deposits on the site consist of glacial till, moraine deposits and outwash from the Late Wisconsin period of the Quaternary age.

The strata of the region include formations from the Precambrian age, dated to 2.5 billion years ago, to the Holocene epoch. Formations include Precambrian granite and quartzite rocks; Mesozoic shales and sandstones of late Cretaceous age; and Cenozoic nonmarine silts and sandstones of Tertiary age. The Quaternary strata include the Pleistocene nonglacial and glacial sediments, and Holocene sediments (Hedges 2001).



Alternatives

-  Crow Lake
-  Winner
-  Physiographic Province
-  Physiographic Region
-  Physiographic Section
-  State/US Highway
-  I-90
-  Elevation (Meters)
High : 2144
Low : 292



View Extent



SDPW Project

Figure 3.1-1

| | | |
|--|-----------------------|-------------|
| Date: 06.10.09 | Physiographic Regions | Author: JAG |
| C:\Data\Basin\Maps\EIS\Physiographic_Regions | | |

The Pierre Shale of the late Cretaceous age underlies the site and creates the base of the northeast-southeast axis in elevation of the Crow Lake Alternative. The Pierre Shale also occurs as isolated surface outcrops at elevations as high as 1,900 feet AMSL within the site.

Quaternary sediments in the region consist of Pleistocene western-derived nonglacial alluvium, glacial deposits, loess and Holocene alluvium and colluvium. Pleistocene tills comprise the bulk of the Quaternary deposits in the region, although Pleistocene outwash or lake deposits may be substantial. The Quaternary deposits may also include Plio-Pleistocene western-derived fluvial sand and gravel deposits and Holocene alluvium and colluvium. Collectively, these sediments can exceed 500 feet in thickness in the region and comprise the large majority of the surficial sediments (Hedges 2001).

Within the Crow Lake Alternative boundary, the composite thickness of the Upper Wisconsin till may be up to 300 feet. Quaternary sediments occurring at the surface of the site include:

- Undifferentiated glacial outwash – consists of heterogeneous sand and gravel with minor clay and silt. Of glaciofluvial origin, this formation includes outwash plains, kames, kame terraces and other undifferentiated deposits, and is expected to be up to 30 feet thick.
- Stagnation moraine till – includes a compact, silty, clay-rich matrix with sand- to boulder-sized clasts. This glacial, geomorphic feature is characterized by hummocky terrain with abundant sloughs resulting from the stagnation of ice sheets.
- Ground moraine till – also consists of a compact, silty, clay-rich matrix with sand- to boulder-sized clasts. The geomorphic feature is characterized by smooth, rolling terrain formed by glaciers.
- Terrace outwash – occurs at the extreme northwest corner of site represented by heterogeneous clay to gravel of glaciofluvial origin. This formation is expected to be up to 60 feet thick.
- Alluvial deposits are found within the present-day drainage of East Smith Creek.

3.1.1.2 Winner Alternative

Information and data for the compilation of this section is from *Ground Water Supply for City of the Winner, South Dakota* (Barari 1966), *Groundwater Investigation for the City of Colome, South Dakota* (Barari 1969), *Hydrogeologic Assessment of the High Plains Aquifer in Tripp and Gregory Counties, South Dakota* (Filipovic 2004), and *Compilation of Resource Technical Memorandums - Winner Project Site, Tripp County, South Dakota* (Terracon 2009b).

The Winner Alternative lies within the Great Plains physiographic province. The majority of the site is in the Unglaciaded Missouri Plateau Section, which is also described as Tertiary Table Lands or Sand Hills (see **Figure 3.1-1**). The northeastern-most fringe of the site near the City of Colome is also in the Unglaciaded Missouri Plateau Section, but is also described as a part of the Pierre Hills. Areas of the south-central portion of the site are in the Southern Plateaus, which are associated with the High Plains Section of the Great Plains physiographic province.

The vicinity of the Winner Alternative is characterized by rolling plains of relatively low relief, developed on the marine rocks of the Pierre Shale. To the south, elevations rise into butte and mesa topography, typical of the Tertiary tablelands. The stratigraphy of the region includes formations from Precambrian, dated to 2.5 billion years ago, to Quaternary age. Similar to the Crow Lake Alternative, formations include Precambrian granite; Cambrian and Ordovician sands; Paleozoic sediments; Cretaceous age shales and sandstones; Cenozoic nonmarine silts; sandstones of Tertiary age; and Quaternary alluvium and eolian sediments.

3.1.2 SOILS

Geographic Information System (GIS) data depicting soil types within and adjacent to the Proposed Project alternatives were obtained from the Natural Resources Conservation Service (NRCS 2009). Soils within the Proposed Project alternatives were overlain on a GIS map of the Proposed Project Components to identify soils within the affected environment.

3.1.2.1 Crow Lake Alternative

A total of nine soil unit associations are mapped in the Crow Lake Alternative area, as listed in **Table 3.1-1** and depicted in **Figure 3.1-2**. Soils within the Crow Lake Alternative are generally consistent, dominated by silty drift over loamy till. This includes soils of the Mobridge-Java-Highmore, Houdek-Ethan, Ethan-Clarno-Betts and Highmore-Ethan-Eakin soil unit associations, accounting for roughly 93 percent of the area. Along the northeastern most corner of the site, soils of the Dudley-Bon-Beadle soil unit association become more clayey. Other soil units within the area account for less than 1 percent of the area.

The soil erodibility factors (K), representing both susceptibility of soil to erosion and the rate of runoff, for site soils generally range from 0.28 to 0.32. This slight to moderate potential for erosion is typical for silt loam soils. Silty soils can be susceptible to detachment and produce moderate runoff, but the erosion potential is tempered by the loamy, organic content which lowers the susceptibility to detachment and increases infiltration (reducing runoff).

The predominant construction considerations for the site soils are the potential for shrink/swell and slopes in localized areas.

Table 3.1-1 Soils of the Crow Lake Alternative

| Name | Predominant Soils | Flooding Frequency | Representative Slope | K Factor | Percentage of Area |
|------------------------|--|--------------------|----------------------|----------|--------------------|
| Mobridge-Java-Highmore | Silty drift over loamy till and loamy till | None | 4% | 0.32 | 42.9% |
| Houdek-Ethan | Loamy till and silty drift over loamy till | None | 4% | 0.28 | 22.8% |
| Ethan-Clarno-Betts | Loamy till | None | 5% | 0.28 | 15.2% |
| Highmore-Ethan-Eakin | Silty drift over loamy till and loamy till | None | 4% | 0.32 | 7.61% |
| Dudley-Bon-Beadle | Clayey till and loamy till | None | 2% | 0.28 | 6.40% |
| Highmore-Eakin-DeGrey | Silty drift over loamy till and loamy till | None | 1% | 0.32 | 4.48% |
| Ree-Delmont-Canning | Loamy alluvium and loamy alluvium over outwash | None | 2% | 0.28 | 0.44% |
| Talmo-Oahe-Durrstein | Loamy till and outwash | None | 1% | 0.28 | 0.083% |
| Talmo-Enet-Delmont | Clayey till and silty drift | None | 6% | 0.28 | 0.030% |

Source: NRCS 2009

Crow Lake

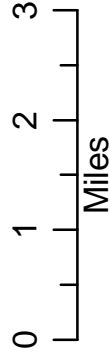
- Project Boundary
- Township and Range
- Section
- Drainage
- Western Utility Line
- Turbine
- Collector System
- Internal Road
- Substation
- O&M Building

Overhead Transmission Line

- Alternative 1
- Alternative 2
- Alternative 3

Soil Unit

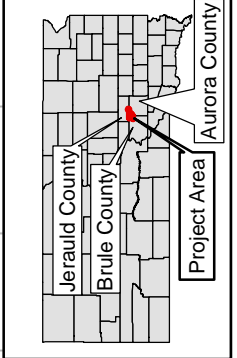
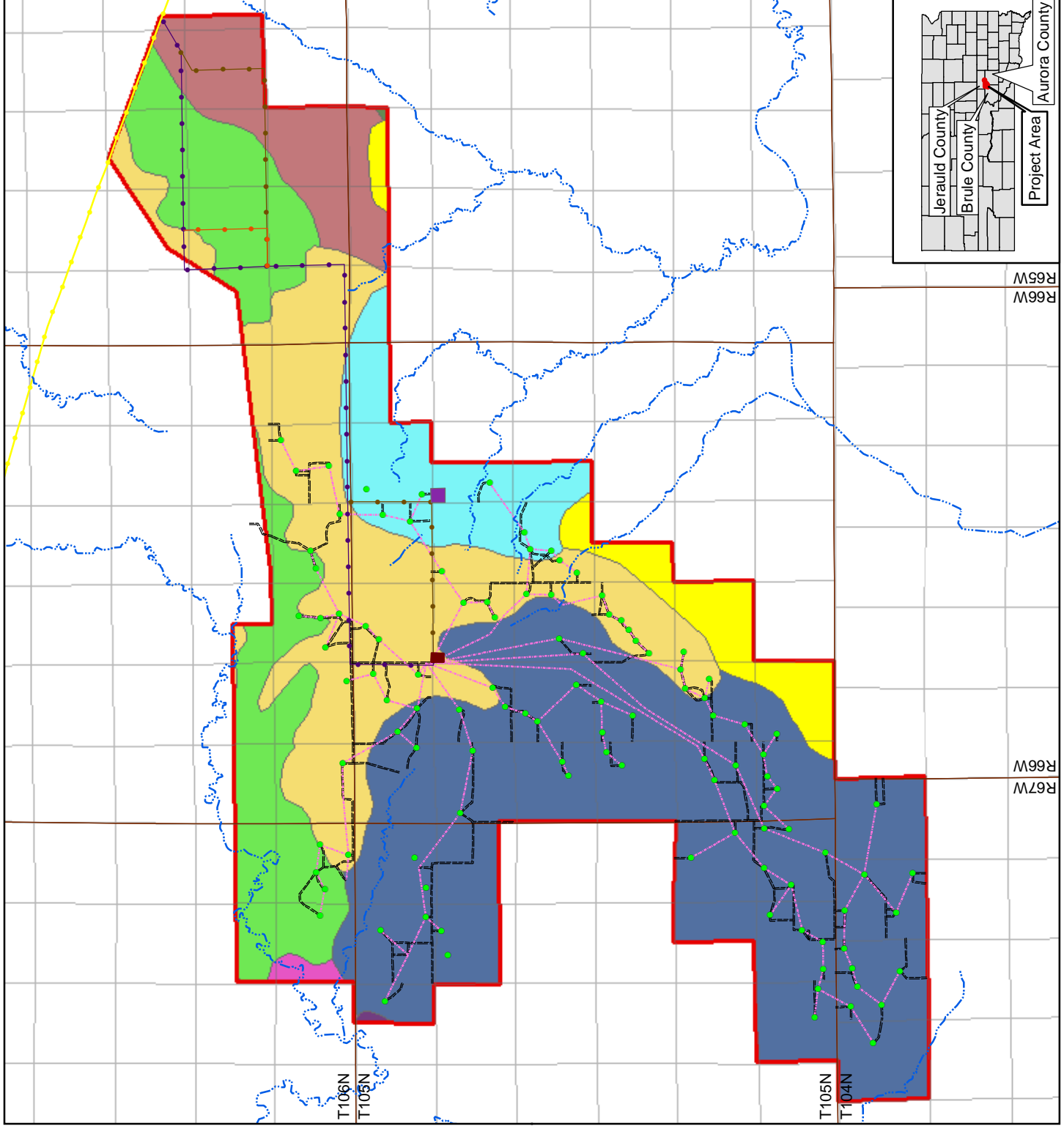
- Dudley-Bon-Beadle
- Ethan-Clarno-Betts
- Highmore-Eakin-DeGrey
- Highmore-Ethan-Eakin
- Houdek-Ethan
- Mobridge-Java-Highmore
- Ree-Delmont-Canning
- Talmo-Enet-Delmont
- Talmo-Oahe-Durrstein



SDPW Project

Figure 3.1-2

Date: 06.03.09 Soils Author: JAG
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Due to engineering considerations, the transmission line Alternative 1 location includes area outside of the Crow Lake Alternative boundary; this boundary will be revised to include the transmission line route in the FEIS.

3.1.2.2 Winner Alternative

A total of five soil unit associations are mapped within the Winner Alternative area, as listed in **Table 3.1-2** and depicted in **Figure 3.1-3**. The eastern half of the site consists of loamy and eolian sands of the Valentine-Tassel-Anselmo soil unit. Moving eastward, loamy and eolian sands dominate, but become more intermixed with sandy alluvium. The northern portion of the site is dominated by the Millboro soil unit, which is more clayey in nature, derived from shale. Along the northern and eastern fringe of the ROI, occurrences of loess associated with the Reliance-Ree-Onita soil unit begin to appear.

The K factors for the site soils range from 0.20 to 0.37, with the higher potential for erosion associated with the more clayey soils of the Millboro (in the north) and Reliance-Ree-Onita (to the northeast) soil units. Sandy soils and alluvium have lower erodibility factors due to low runoff potential and high permeability.

The predominant construction considerations for the site soils are localized slopes and the potential for shrink/swell with the clayey soils of the Millboro and Reliance-Ree-Onita soil units. Characteristics of the site soils relating to the potential for erosion and limitations for construction were obtained from the NRCS database (NRCS 2009).

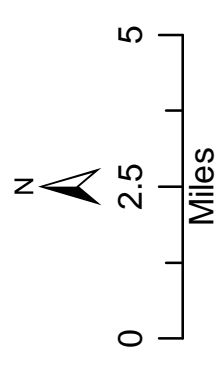
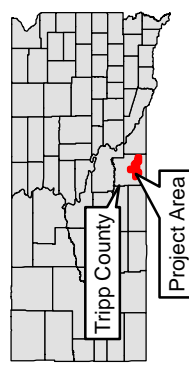
Table 3.1-2 Soils of the Winner Alternative

| Name | Predominant Soils | Flooding Frequency | Representative Slope | K Factor | Percentage of Area |
|----------------------------------|---|--------------------|----------------------|----------|--------------------|
| Valentine-Tassel-Anselmo | Eolian sands and loamy eolian sands | None | 5% | 0.20 | 50% |
| Elsmere-Dunday-Doger-Anselmo | Loamy eolian sands and sandy alluvium | None | 2% | 0.20 | 23% |
| Vetal-Tassel-Manter-Holt-Anselmo | Loamy eolian sands and loamy and sandy alluvium | None | 1% | 0.20 | 12% |
| Millboro | Clayey alluvium derived from shale | None | 4% | 0.37 | 10% |
| Reliance-Ree-Onita | Loess and loamy, clayey and sandy alluvium | None | 1% | 0.28 | 5% |

Source: NRCS 2009

Winner

- Project Boundary
 - Township and Range
 - Sections
 - Drainage
 - Western Utility Line
 - State/US Highway
 - Substation and O&M Building
 - Turbine
 - Internal Road
 - Collector System
- ### Overhead Transmission Line
- Alternative 1
 - Alternative 2
- ### Soil Unit
- Elsmere-Dunday-Doger-Anselmo
 - Millboro
 - Reliance-Ree-Onita
 - Valentine-Tassel-Anselmo
 - Vetal-Tassel-Manter-Holt-Anselmo

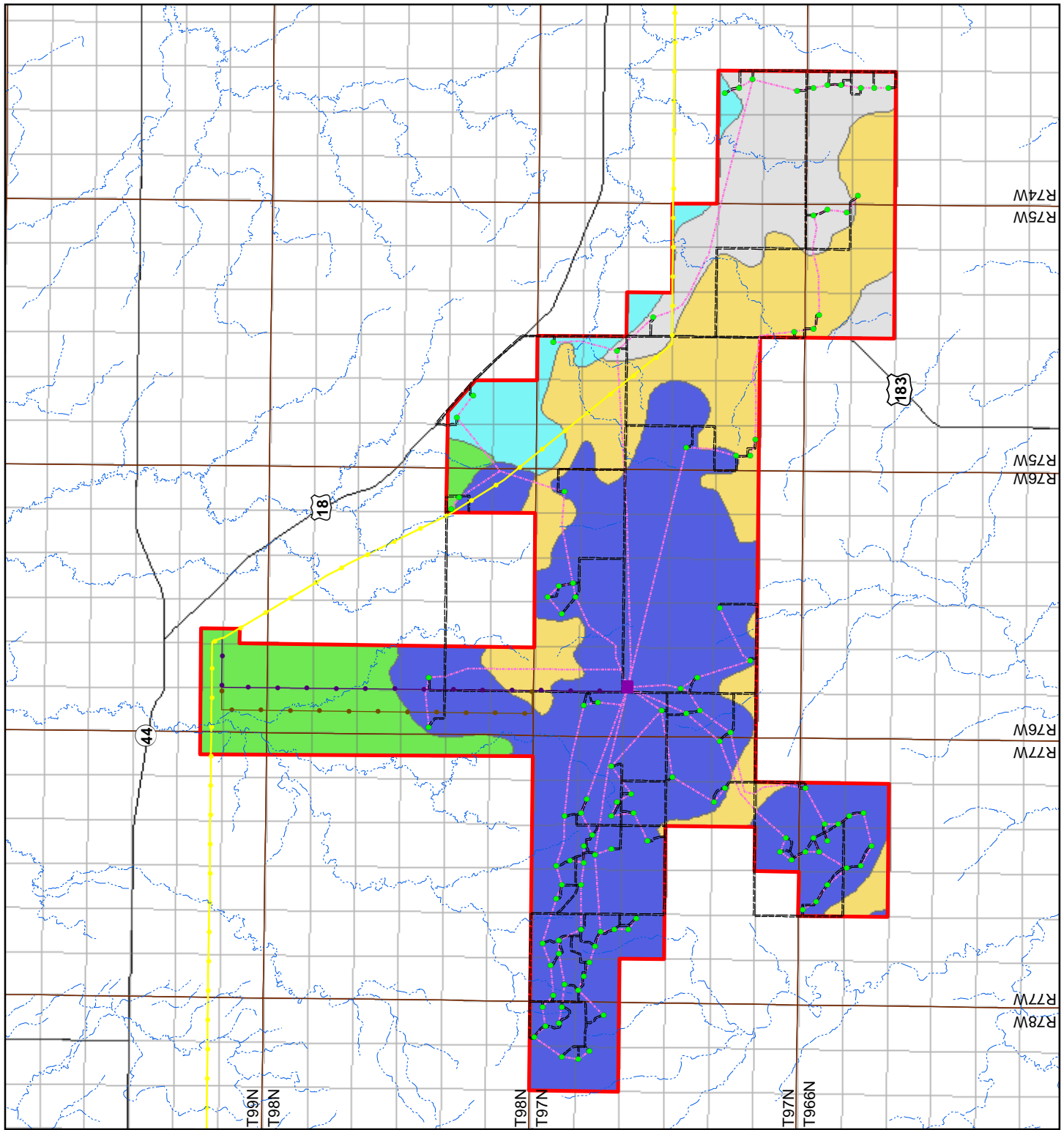


SDPW Project

Figure 3.1-3

Date: 07/29/09 Soils Author: JHR

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3.2 WATER RESOURCES

The ROI for water resources encompasses hydrologic systems that could be impacted by discharges, spills and/or stormwater runoff associated with implementing the Proposed Project and proposed Federal actions.

3.2.1 SURFACE WATER RESOURCES

The Crow Lake and Winner alternatives are within the Missouri River Basin surface water drainage system. This system includes a watershed of approximately 529,350 square miles, including about 9,700 square miles in Canada (USACE 2006). The Missouri River Basin surface water drainage system consists of region, subregion, basin and subbasin drainages in accordance with hydrologic unit maps published by the U.S. Geological Survey (USGS). Six mainstem reservoir system dams line the Missouri River (beginning upstream): Fort Peck, Garrison, Oahe, Big Bend, Fort Randall and Gavins Point.

In the vicinity of the two sites, Fort Randall Dam on the Missouri River forms Lake Francis Case, and accepts drainage from the White River. Below the Fort Randall Dam is Gavins Point Dam, which impounds Lewis & Clark Lake. Ponca Creek and the Niobrara River join the Missouri River downstream of Fort Randall Dam, above Lewis & Clark Lake. The James River flows into the Missouri River downstream of Gavins Point Dam.

The following sections describe the path of surface water flows from within the alternative site boundaries to their confluence with the Missouri River. Impaired waters, listed under Section 303(d) of the CWA, within the flow path to the Missouri River are also discussed. Impaired waters do not meet water quality standards due to pollution or other degradation.







3.2.1.1 Crow Lake Alternative

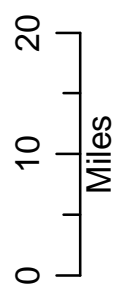
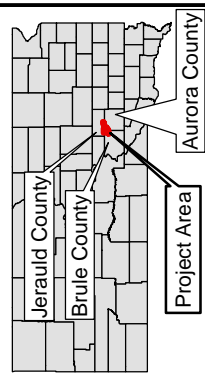
The Crow Lake Alternative is within the prairie pothole region of the northern Great Plains. As described in **Section 3.1**, well-drained, hilly terrain dominates the site along the northern and western side of a noticeable northeast-southwest trending axis in the site topography. The poorly drained prairie pothole areas and water-holding sloughs are along the eastern side of this axis. Intermittent streams are prevalent at the Crow Lake Alternative, and the stream drainages are dendritic, resembling the branching pattern of blood vessels or tree branches. Various intermittent and perennial lakes and ponds associated with prairie potholes and intermittent streams are throughout the site.

As depicted in **Figure 3.2-1**, drainage from the majority of the Crow Lake Alternative flows into the Missouri-White Subregion of the Missouri Region. A portion of the site along the north half of the eastern site boundary drains easterly toward the James Subregion of the Missouri Region.

Within the Missouri-White Subregion, the site falls into the Fort Randall Reservoir Basin and spans two subbasins:

Crow Lake

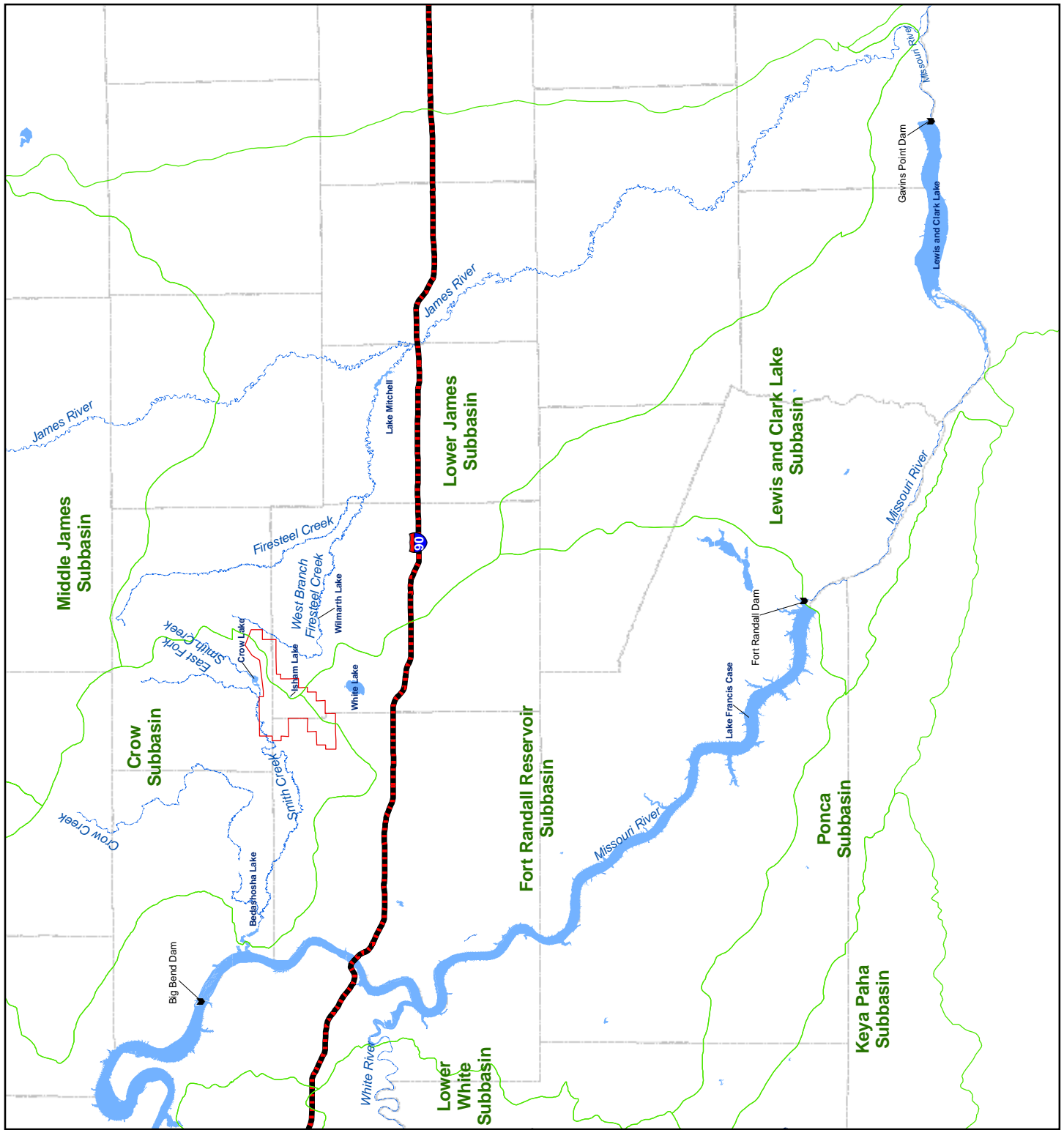
-  Hydrological Subbasin
-  Project Boundary
-  I-90
-  Water Bodies
-  Drainage
-  County Boundary



SDPW Project

Figure 3.2-1

Date: 06.03.09 Hydrology Author: JAG
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- The Crow Subbasin dominates the surface water drainage on the western and northwestern portions of the site
- The Fort Randall Reservoir Subbasin drains the southeastern portion of the site

Within the James Subregion:

- The Lower James Subbasin drains an eastern portion of the site

The Crow Subbasin

The majority of the Crow Lake Alternative lies within the Crow Subbasin. The East Fork of Smith Creek flows westerly into Crow Creek along the northern boundary of the site. Downstream of Crow Lake, East Fork Smith Creek converges into Smith Creek. Sayles Creek also begins within the northwestern portion of the site and flows into Smith Creek just west of the project boundary. Smith Creek continues westerly until the confluence with Crow Creek. Headwaters to these creeks originate within the site boundaries. Crow Creek used to flow into the man-made reservoir which formed Bedashosha Lake. Water was drained from the Bedashosha Lake impoundment, and the spillway and abutment walls were removed between 1995 and 2000. Crow Creek was restored to its natural elevation and currently flows through the lake bed and discharges to the Lake Francis Case portion of the Missouri River, just downstream of the Big Bend Dam (DENR 2009). No impaired waters lie downstream of the Crow Lake Alternative within this subbasin.

The Fort Randall Reservoir Subbasin

A small portion of the southeastern corner of the Crow Lake Alternative drains to the southeast in the Fort Randall Reservoir Subbasin. One unnamed stream drains Isham Lake, located within the site, and directs flows toward White Lake. White Lake is in this hydrologic subbasin, but does not have an outflow. No impaired waters lie downstream of the Crow Lake Alternative within this subbasin.

The Lower James Subbasin

The northeastern corner of the Crow Lake Alternative includes unnamed tributaries to the West Branch of Firesteel Creek. A dam was constructed along the West Branch to form Wilmarth Lake in 1936. Outflows exit over the spillway, and flow continues easterly to the convergence with Firesteel Creek. Firesteel Creek continues to flow eastward through Lake Mitchell and then into the James River at Mitchell, South Dakota. The James River flows south-southeast into the Missouri River downstream of the Gavins Point Dam at Yankton, South Dakota, outside of the ROI.

Substantial organic loading from nonpoint sources occur throughout the James River watershed during storm events (DENR 2008). Decay of organic matter contributes to low dissolved oxygen and degraded trophic state index. Agricultural activities such as livestock operations, grazing in riparian zones, lack of riparian vegetation, and row crop production contribute to the amount of

suspended sediments and fecal coliforms in the basin. Wilmarth Lake, Firesteel Creek and segments of the James River are listed as impaired waters under Section 303(d) of the CWA.

3.2.1.2 Winner Alternative

The area is characterized by rolling plains of relatively low relief, giving rise to butte and mesa topography typical of the high plains. The Winner Alternative is located on generally well-drained terrain; intermittent streams are prevalent at the site. The upland portions of the Winner Alternative act as a drainage divide between the Missouri-White and Niobrara Subregions of the Missouri Region hydrologic unit. The northern portion of the site flows north as a part of the White Basin; the southern portion of the site flows south as a part of the Niobrara Basin, as depicted in **Figure 3.2-2**.

Within the White Basin:

- The Lower White Subbasin includes the northern portion of the site

The Niobrara Basin includes flows from the following subbasins:

- The Keya Paha Subbasin dominates the surface water drainage on the southwestern portions of the site
- The Ponca Subbasin drains the southeastern portion of the site

The stream drainages at the Winner Alternative are dendritic. Various intermittent and perennial lakes and ponds associated with artificially dammed intermittent streams are located across the Winner Alternative. The artificial lakes and ponds are primarily used for stock watering.

Lower White Subbasin

The headwaters and tributaries of Mud Creek and Dog Ear Creek begin on the northern portion of the site, flowing northward to their confluence just southwest of Winner, South Dakota. Dog Ear Creek continues northward until its confluence with the White River. Similarly, the headwaters of Sand Creek and Thunder Creek begin on the site. Following their confluence, Thunder Creek continues northward until its confluence with the White River. The White River flows eastward until discharging to the Lake Francis Case portion of the Missouri River, just downstream of Big Bend Dam, outside of the ROI.

A downstream segment of the White River is designated as impaired for elevated concentrations of total suspended solids (TSS) and fecal coliforms. Water quality throughout the White River basin is generally poor and often exceeds numeric standards (DENR 2008). Highly erosive soils from the western Badlands and within the river drainage are considered a major natural source of both suspended and dissolved solids. Rangeland grazing may also contribute to the TSS concentrations. DENR is currently reviewing a study to develop site-specific water quality criteria for the White River to address naturally occurring TSS. The source of fecal coliforms in the Lower White River may include animal feeding operations, crop production and livestock grazing.

Keya Paha Subbasin

The headwaters of an unnamed tributary to the Keya Paha River flow southward from the southern portion of the site, through Rahn Lake and continue southward to its confluence with the Keya Paha River. The Keya Paha River flows generally southeasterly across the South Dakota State line into Nebraska where it drains into the Niobrara River. The Niobrara River flows generally east-southeastward and drains into the Missouri River at Niobrara, Nebraska, downstream of the Fort Randall Dam and above Lewis & Clark Lake, outside of the ROI.

Rahn Lake is impaired for trophic state index due to nutrient enrichment and siltation related to agricultural activities. The Keya Paha River is impacted by fecal coliforms and TSS; sources of fecal coliforms likely include grazing in rangeland, riparian areas and/or along shorelines. TSS is thought to originate from natural sources. The Niobrara River is listed as impaired by the State of Nebraska for *Escherichia coli* (*E. coli*) contamination. Point sources have been identified and include municipal wastewater treatment facilities, fish hatchery/rearing facilities and confined animal feeding operations. Nonpoint sources may also contribute *E. coli*, including failing septic tanks, runoff from livestock pastures, improper or over-application of biosolids (wastewater treatment facility sludge, septage or manure) and urban storm water runoff not regulated by a NPDES permit. Wildlife may also contribute *E. coli* to the river (EPA 2005).

Ponca Subbasin







The eastern portion of the Winner site contains the unnamed headwaters to Ponca Creek, generally draining to the east and northeast. One tributary is dammed to form Roosevelt Lake near the eastern extreme of the site. The spillway from Roosevelt Lake directs flow northward to Ponca Creek. Ponca Creek flows east and southeast across the South Dakota State line into Nebraska, generally paralleling the Keya Paha River. Ponca Creek continues southeastward and drains into the Missouri River just upstream of the confluence of the Niobrara and Missouri rivers, outside of the ROI.

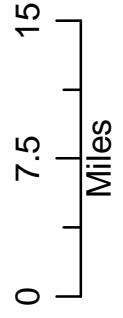
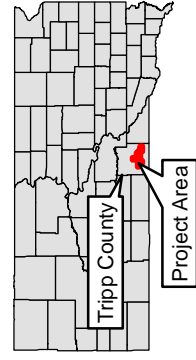
Roosevelt Lake has exhibited high concentrations of mercury, and is listed as impaired. The source of the mercury contamination is unknown. Assessment of the lake is included in the Lewis and Clark Watershed Assessment, which is ongoing by Randall Resource Conservation and Development and DENR. Ponca Creek has reported elevated concentrations of TSS and fecal coliforms, and is also impaired. Agricultural activities such as livestock operations, grazing in riparian zones, lack of riparian vegetation and row crop production likely contribute to the amount of suspended sediments and fecal coliforms in Ponca Creek.

3.2.2 FLOODPLAINS

This DEIS evaluates mapped floodplains within the alternative site boundaries to identify areas that may be subject to flooding.

Winner

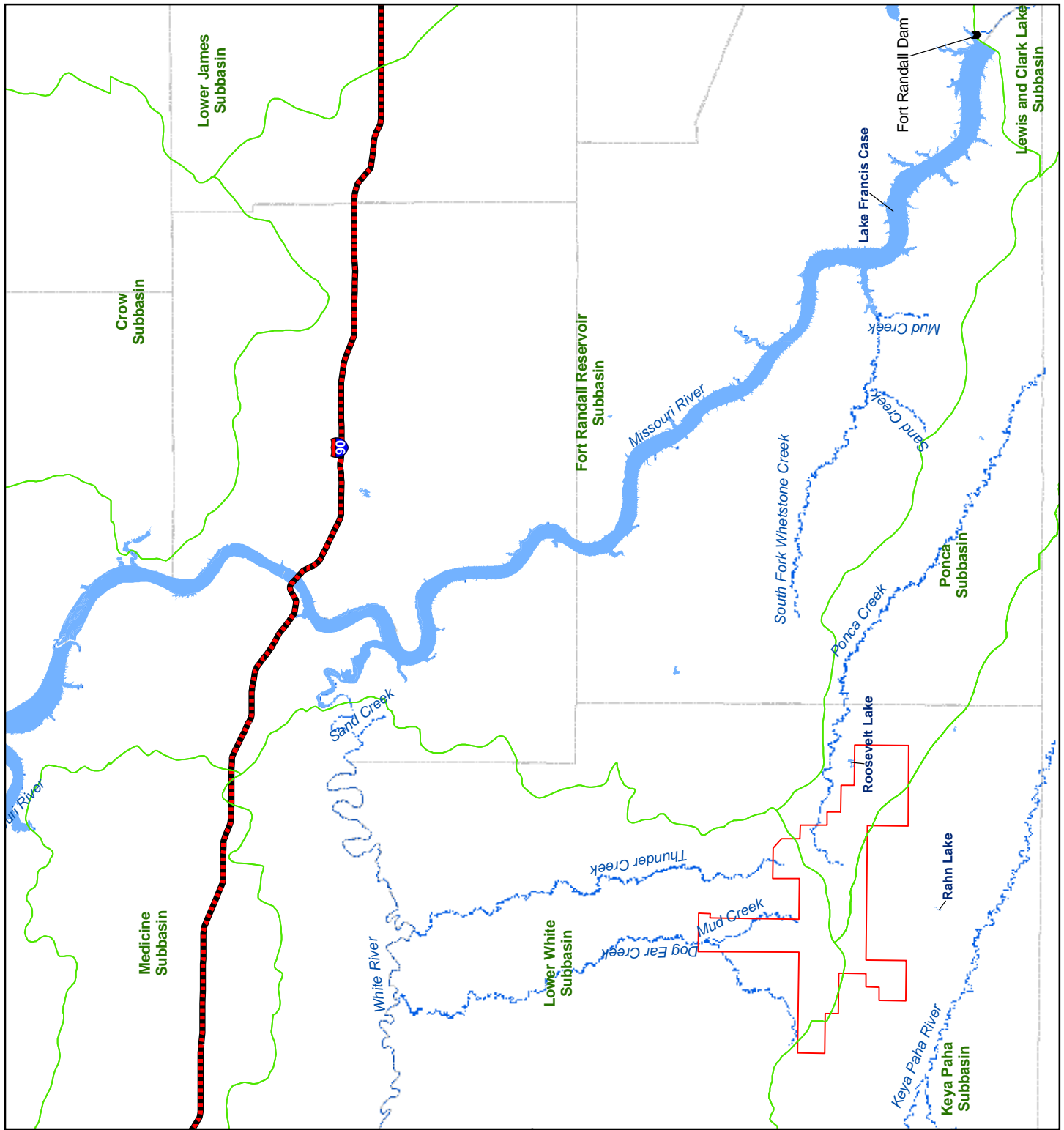
-  Hydrological Subbasin
-  Project Boundary
-  I-90
-  Water Bodies
-  County Boundary
-  Drainage



SDPW Project

Figure 3.2-2

Date: 06.03.09 Hydrology Author: JAG
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3.2.2.1 Crow Lake Alternative

The Federal Emergency Management Agency (FEMA) has not mapped flood hazards in the unincorporated areas of Brule and Jerauld counties; flood insurance rate map (FIRM) panels are not available for review. Aurora County has been mapped and is designated as a flood hazard Zone D on the FIRM panel. A flood hazard Zone D is described as follows:

Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk.

3.2.2.2 Winner Alternative

Floodplains and flood hazards in the unincorporated areas of Tripp County are largely unmapped by FEMA. The cities of Winner and Colome (southeast of Winner) have FIRM panels available. No flood hazard zones are mapped within Winner, and Colome has a strip of land running parallel to U.S. Highway 18 designated as a flood hazard Zone A. Zone A flood hazards are described as follows:

Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.

3.2.3 GROUNDWATER RESOURCES

This DEIS characterizes groundwater resources underlying the alternative site boundaries. Where site specific data is limited, the configuration of the groundwater resources in the region is provided.

3.2.3.1 Crow Lake Alternative

The primary aquifers underlying the Crow Lake Alternative are associated with the regional, Northern Great Plains aquifer system. Small, localized and shallow aquifers within the near-surface shale deposits and glacial sediments can also produce groundwater (Terracon 2009a).

The regional aquifer can be anticipated at depths of approximately 900 to 1,250 feet below ground surface (bgs) and is separated from the near-surface glacial sediments by a confining unit associated with portions of the Pierre Shale formation. The groundwater flow direction in the regional aquifer is generally east-northeast (Terracon 2009a).

Many private wells within the Crow Lake Alternative have been advanced in the shallow, localized sand and gravel aquifers associated with Pleistocene glacial deposits. Water encountered in sands and gravels within 200 feet bgs are classified by the USGS as the Crow Lake local aquifers. Water levels reported for the Crow Lake local aquifers ranged from 1.9 to 100 feet bgs. The Crow Lake local aquifer has approximately 190,000 acre-feet of water in storage in Aurora and Jerauld counties and underlies approximately 50 square miles; the aquifer exhibits a strong correlation between precipitation events and groundwater levels (Terracon

2009a). Locally, the uppermost and highly weathered/fractured beds of the Pierre Shale also can yield groundwater to support domestic uses (Terracon 2009a).

3.2.3.2 Winner Alternative

The Winner Alternative is located within an area of south-central South Dakota where the Northern Great Plains and High Plains regional aquifer systems overlap (Terracon 2009b). Groundwater at the site is primarily obtained from the unconsolidated deposits associated with the High Plains aquifer system. Depths to near-surface groundwater at the Winner site were within 50 feet bgs in the majority of the well records. Well depths generally ranged from 28 to 260 feet bgs, and six wells indicated groundwater levels at or near the ground surface (Terracon 2009b).

The near-surface permeable sediments allow direct infiltration of precipitation, recharge to the aquifer and seepage through the beds of streams over the majority of the site. Recharge is rapid where the surficial material consists of poorly consolidated sand, stream-valley deposits of sand and gravel or highly weathered sediments. Recharge is slower where sandstone or local beds of fine grained sediments are at the ground surface. Near the northeastern boundary of the site, near-surface deposits of the Pierre Shale sediments are not as readily permeable (Terracon 2009b).

3.2.4 WETLANDS AND WATERS OF THE UNITED STATES

The Proposed Project area is within the prairie pothole region, as designated by the USFWS. Wetlands, or prairie potholes, are scattered across the landscape throughout much of eastern and south-central South Dakota. Ranging from small lakes to temporary wetlands, these areas perform several important functions, including:

- flood control
- groundwater recharge
- water quality protection
- plant, aquatic and wildlife habitat production

Under Section 404 of the CWA, the USACE has authority to regulate the discharge of dredged and fill material into WUS. WUS include traditional navigable waters and their non-navigable tributaries that typically flow year-round or have flow at least seasonally (*e.g.*, typically three months).

Wetlands, which are special aquatic sites, can be jurisdictional under Section 404 as a subset of WUS. Wetlands, as defined by the EPA and the USACE in the *Wetland Delineation Manual* (Environmental Laboratory 1987), are “those areas that are inundated or saturated by surface or groundwater at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” The USACE will assert jurisdiction over wetlands adjacent to navigable waters and wetlands that directly abut their non-navigable tributaries.

National Wetlands Inventory (NWI) maps, produced by the USFWS and microfilmed by the USGS, provide a cursory evaluation of potential wetland areas. NWI maps are prepared primarily by stereoscopic analysis of high altitude aerial photographs. Potential wetland areas are noted based on vegetation, visible hydrology and geography. Generally, water bodies visible on the high altitude aerial photographs would be designated by the USFWS as “potential” wetland areas. Additionally, field investigations for site characterization in 2008 and 2009 (see **Section 3.4**) identified wetlands as part of the review of biological resources and land uses.

The USFWS has been acquiring conservation easements in the vicinity of the Proposed Project alternatives to support the preservation of grasslands and wetlands habitat. These conservation easements are further discussed in **Sections 3.4** and **3.6.3**.

3.2.4.1 Crow Lake Alternative

Based on the NWI, two wetland classification types are mapped at various locations across the Crow Lake Alternative, including Freshwater Emergent Wetland and Freshwater Pond. **Figure 3.2-3** depicts the NWI indicated wetland areas. **Table 3.2-1** lists the total number of NWI indicated wetland acres in the Crow Lake Alternative.

Table 3.2-1 Wetland Areas within the Crow Lake Alternative

| Wetland Type | Area (acres) |
|-----------------------------|--------------|
| Freshwater Emergent Wetland | 385 |
| Freshwater Pond | 91 |
| Total | 476 |

Source: NWI

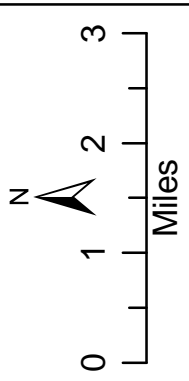
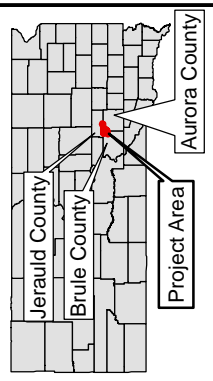
As a secondary measurement of the wetlands anticipated within the Crow Lake Alternative, field investigations in 2008 and 2009 identified a total of 517 acres of prairie potholes, stock ponds, wetlands and wetland fringe, as depicted in **Figure 3.2-3** (Tierra EC 2009). **Section 3.4.3.1** further describes the field-identified wetland areas. WUS have not yet been delineated.

3.2.4.2 Winner Alternative

Four wetland classification types are mapped at various locations across the Winner Alternative, including Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, Freshwater Pond and Lake. **Figure 3.2-4** depicts the NWI indicated wetland areas. **Table 3.2-2** lists the total area of NWI indicated wetland in the site.

Crow Lake

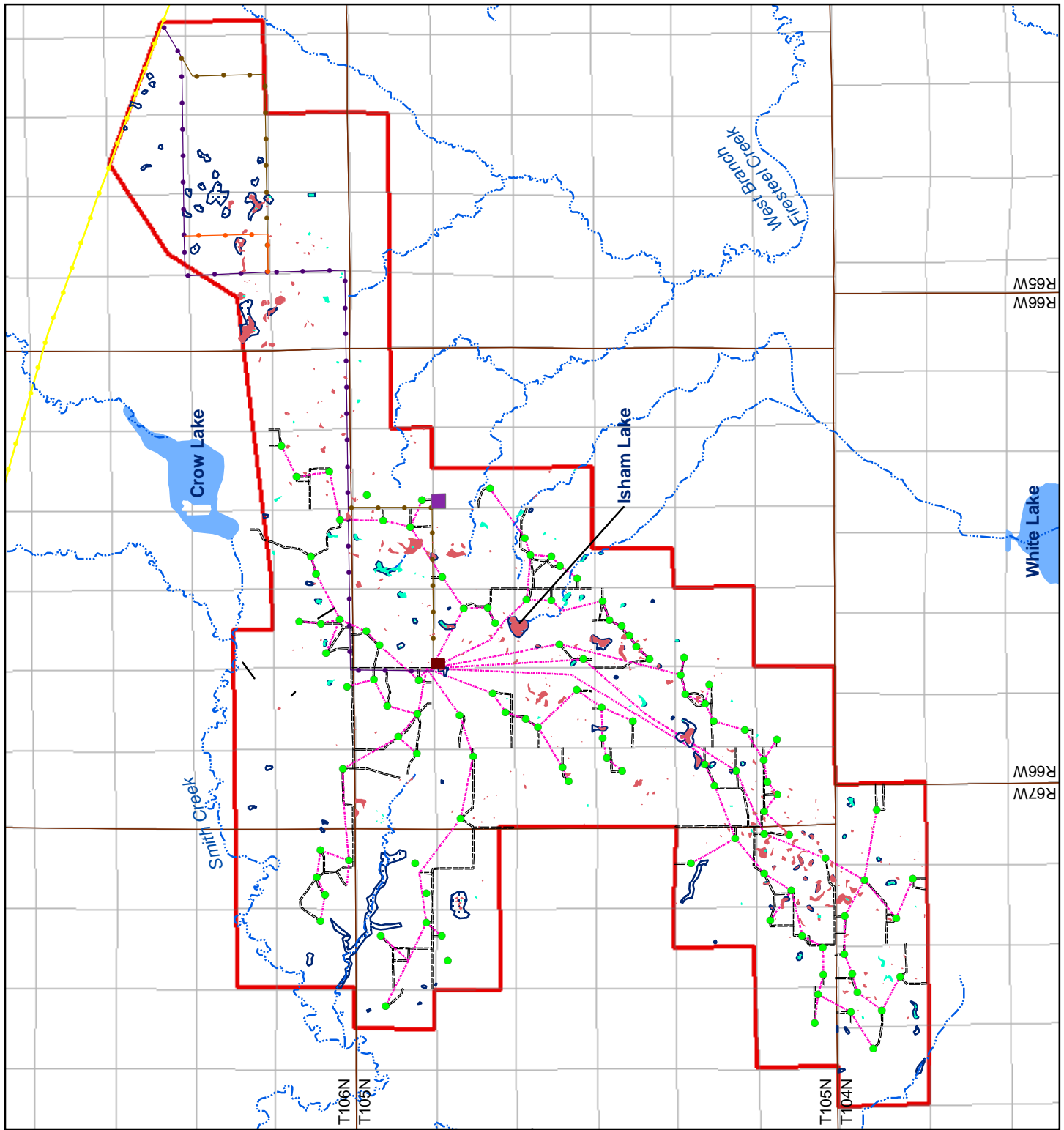
- Project Boundary
- Township and Range
- Section
- Western Utility Line
- Turbine
- Collector System
- Internal Road
- Substation
- O&M Building
- Overhead Transmission Line**
- Alternative 1
- Alternative 2
- Alternative 3
- Water Bodies
- Field Verified Wetland
- Drainage
- National Wetland Inventory**
- Freshwater Emergent Wetland
- Freshwater Pond



SDPW Project

Figure 3.2-3

| | | |
|---|-------|-------------|
| Date: 06.03.09 | Water | Author: JAG |
| C:\Data\Basin\Maps\EIS\Winnet\Crow_Lake_Water | | |



Due to engineering considerations, the transmission line Alternative 1 location includes area outside of the Crow Lake Alternative boundary; this boundary will be revised to include the transmission line route in the FEIS.

Table 3.2-2 Wetland Areas within the Winner Alternative

| Wetland Type | Area (acres) |
|------------------------------------|---------------------|
| Freshwater Emergent Wetland | 1,937 |
| Freshwater Forested/ Shrub Wetland | 155 |
| Freshwater Pond | 98 |
| Lake | 51 |
| Total | 2,240 |

Source: NWI

Similar to the Crow Lake Alternative, field investigations in 2008 and 2009 identified a total of 931 acres of deciduous wetland, forested wetland, lake, stock pond, wetland and wet meadow within the Winner Alternative, as depicted in **Figure 3.2-4** (Tierra EC 2009). **Section 3.4.3.2** further describes the field-identified wetland areas. WUS have not yet been delineated.



















3.3 CLIMATE CHANGE AND AIR QUALITY

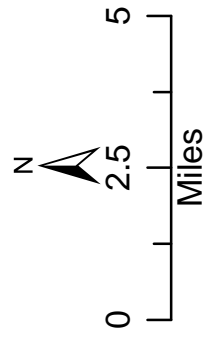
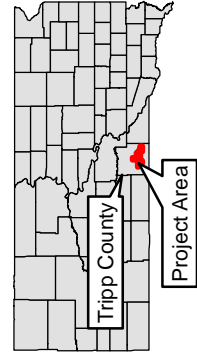
The ROI for climate change and air quality includes areas of immediate disturbance associated with the Proposed Project Components and proposed Federal actions, in association with regional conditions.

3.3.1 REGIONAL CLIMATE AND METEOROLOGY

The Chamberlain Station (Station #024) is the closest weather station to either alternative and it is equidistant to both sites. Between 1971 and 2000, and considering the annual average highs and lows, this station recorded an annual mean high temperature of 79.6 degrees Fahrenheit, an annual mean low temperature of 2.9 degrees Fahrenheit (South Dakota Office of Climate [SDOC] 2009), and an annual mean temperature of 46.7 degrees Fahrenheit. Station #024 receives an average yearly rainfall of 22.35 inches. The annual average surface wind velocity for South Dakota ranges from 10 to 12 miles per hour (mph), as depicted in **Chapter 1, Figure 1-1**.

Winner

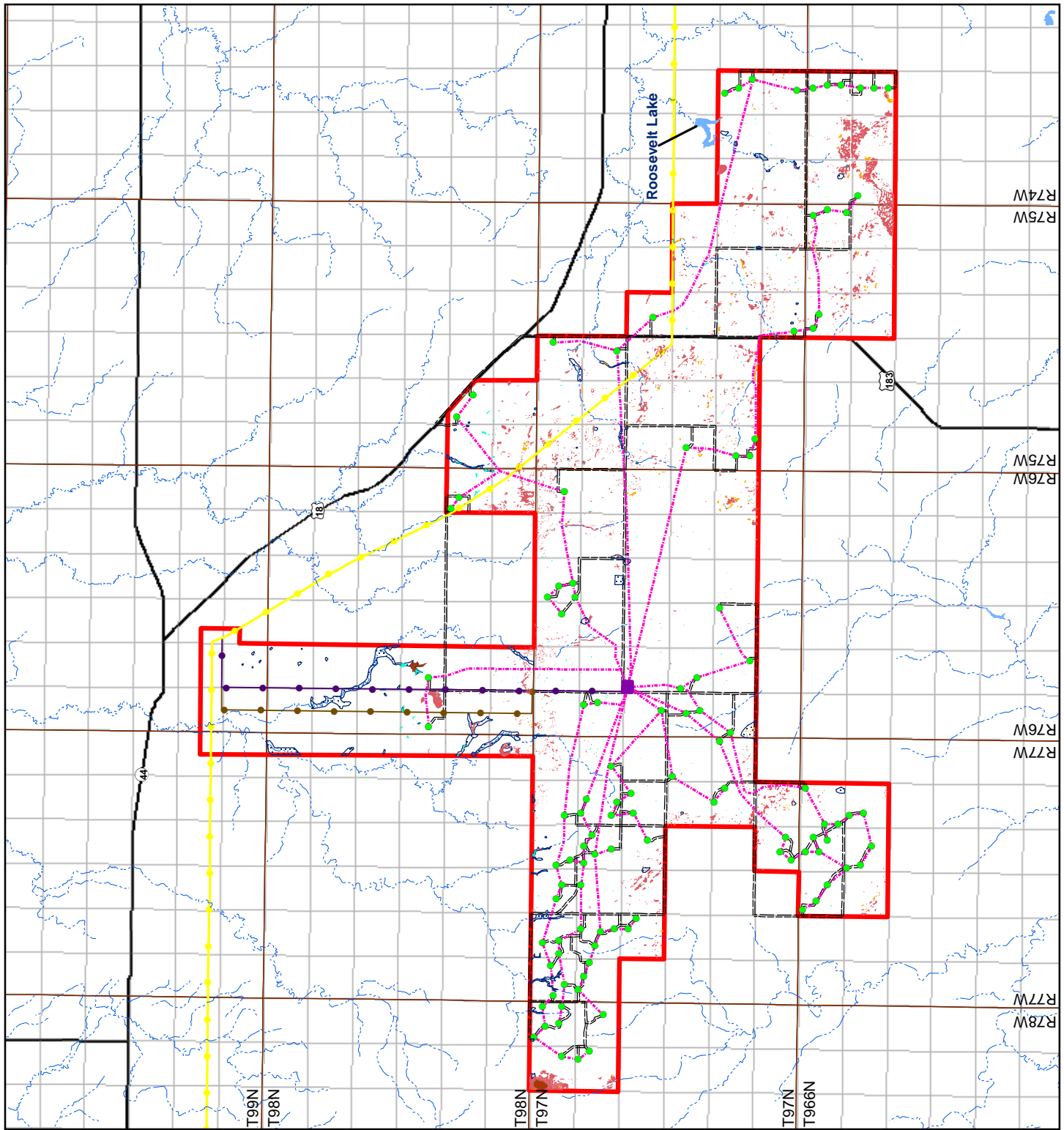
-  Project Boundary
 -  Township and Range
 -  Section
 -  Western Utility Line
 -  State/US Highway
 -  Substation and O&M Building
 -  Turbine
 -  Collector System
 -  Internal Road
- ### Overhead Transmission Line
-  Alternative 1
 -  Alternative 2
 -  Field Verified Wetland
 -  Drainage
 -  Water Bodies
- ### National Wetland Inventory
-  Freshwater Emergent Wetland
 -  Freshwater Forested/Shrub Wetland
 -  Freshwater Pond
 -  Lake



SDPW Project

Figure 3.2-4

| | | |
|---|-------|-------------|
| Date: 06.03.09 | Water | Author: JAG |
| C:\Data\Basin\Maps\ES\Winner\Winner_Water | | |



3.3.2 AIR POLLUTANTS

Air quality in South Dakota is regulated by the DENR Air Quality Program, which is responsible for permitting and enforcement. Federal and State laws seek to reduce air pollution to levels shown by research to protect the majority of individuals and reduce overall impacts to ecosystems. The implementation of these laws begins with setting air quality standards, which describe the existing air environment in the Proposed Project area. The EPA sets NAAQS to regulate the emissions of six air pollutants referred to as “criteria pollutants.” DENR has adopted the NAAQS for the State air quality program. The criteria pollutants include:

- Carbon monoxide (CO)
- Lead (Pb)
- Nitrogen dioxide (NO₂)
- Ozone (O₃)
- Particulate matter less than 10 (PM₁₀) and 2.5 (PM_{2.5}) microns in diameter
- Sulfur dioxide (SO₂)

3.3.3 AMBIENT AIR QUALITY

Both the Crow Lake and Winner alternatives are in attainment for the NAAQS, thus no special mitigation measures are required for new activities.

3.3.4 CLIMATE CHANGE

Carbon dioxide (CO₂) is one of six greenhouse gases (GHGs) that contributes to climate change. CO₂ emissions represent approximately 84 percent of all GHG emissions in the U.S. CO₂ is generated whenever a carbon-based fuel, such as coal, wood, natural gas, or fuel oil is burned. It is the primary GHG emitted from fossil-fired utility boilers, with approximately 41 percent of U.S. carbon emissions (primarily CO₂) coming from power plant sources (Energy Information Administration [EIA] 2009). Other significant sources are automobile and truck exhaust, industrial combustion sources and residential heating sources. Wind-generating stations do not emit CO₂.

Within South Dakota, CO₂ emissions resulting from fossil fuel combustion totaled 13.78 million tons in 2007 (EPA 2009a). Five principal sectors contribute to CO₂ emissions through the combustion of fossil fuels, including commercial, industrial, residential, transportation and electric power. Of these, activities related to the generation of electric power accounted for 2.96 million tons of CO₂ emitted in South Dakota (EPA 2009a).

In addition to CO₂, sulfur hexafluoride (SF₆) is another GHG listed by the Intergovernmental Panel on Climate Change (IPCC). Western’s existing substations in the Proposed Project areas use SF₆, a gaseous dielectric, used in high-voltage circuit breakers, switchgears and other electrical equipment, such as circuit breakers. Since 2000, Western has had an aggressive program to identify and repair leaks throughout the transmission system to reduce SF₆ emissions. Project personnel would monitor the use, storage and replacement of SF₆ to minimize

any releases to the environment. The likelihood for accidental release is low, as SF6 gas is supplied in sealed units and is factory-certified not to leak. The activities associated with Western's proposed Federal action would be done in accordance with Western's environmental protection provisions.

Wind farms and substations do not emit substantial amounts of the other GHGs.

3.4 BIOLOGICAL RESOURCES

3.4.1 REGULATORY FRAMEWORK

3.4.1.1 Federal Statutes

Endangered Species Act

The ESA provides for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The ESA is implemented by two Federal agencies, the USFWS and National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries), which are authorized to list plant and animal species as endangered, threatened or candidates for listing. Section 7 of the ESA imposes an affirmative duty on Federal agencies to ensure that their actions (including permitting) are not likely to jeopardize the continued existence of a listed species or result in the destruction or modification of its habitat.

Migratory Bird Treaty Act

The MBTA makes it illegal for anyone to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird. . . or any part, nest, or egg of any such bird" (16 U.S.C. 703).

Bald and Golden Eagle Protection Act

The BGEPA (16 U.S.C. 668-668c) prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" Bald Eagles, including their parts, nests or eggs. The BGEPA provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The BGEPA defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb."

3.4.1.2 State Statutes

South Dakota Wildlife Diversity Program

The South Dakota Wildlife Diversity Program (South Dakota Codified Laws [SDCL] 34A-2-1, 38-7-1) protects species and habitats that comprise the biological diversity of the State “in a manner that meets the needs and desires of the citizens of the State.” Statutory policies are geared toward the conservation of water and soils to help preserve wildlife. The SDGFP maintains the interagency South Dakota Natural Heritage Program (SDNHP) to track species lists for the State.

South Dakota Endangered Species Law

The South Dakota Endangered Species Law (SDCL Ann. 34A-8-1 *et seq.*) covers animals and plants. Listings are based on scientific, commercial and other data. The law does not require recovery plans, critical habitat designation or agency consultation.

3.4.2 STUDY METHODS

The ROI for biological resources is different for vegetation and wildlife. The ROI for vegetation includes areas of direct disturbance (temporary and permanent) associated with the Proposed Project Components. The ROI for wildlife includes all areas within the boundaries, because the Proposed Project could impact wildlife species in areas that extend beyond the footprint for construction (including temporary and permanent disturbance areas) of the Proposed Project Components. This includes lands adjacent to proposed facilities but within the boundaries that are used by wildlife, such as migration corridors.

Biological data was collected from literature searches; agency personnel and reports from USFWS, SDGFP and the SDNHP; ecological reports and databases (*e.g.*, NatureServe, GAP analysis); and field investigations. Biologists from Western, Tierra EC, Western EcoSystems Technology, Inc. (WEST) and Terracon provided regional and site-specific information for biological resources. USFWS correspondence provided input during the Proposed Project scoping (**Appendix C**). Information for Federally-listed species was requested from the USFWS on October 14, 2009; a response was provided on November 12, 2009 (**Appendix C**).

Field investigations were conducted for site characterization in July, September, October and November 2008, and March through July 2009. WEST conducted grouse lek surveys, breeding bird surveys, migratory bird surveys and bat use surveys during the spring and summer of 2009. WEST continued to conduct avian use surveys (until November 2009) and bat use surveys (through October 2009). WEST provided interim survey reports in August 2009, including data for analysis in this DEIS. In addition to the avian and bat use surveys, a PII study (see **Sections 4.4.3.1 and 4.4.3.2, Wildlife, Birds**) was completed to evaluate potential impacts to biological resources in accordance with the USFWS’s *Interim Guidelines on Assessing Wind Impacts to Wildlife* (USFWS 2003). Where feasible, site development, turbine design and operational recommendations were incorporated into the project design, as described in **Chapter 2**.

3.4.3 VEGETATION COMMUNITIES

3.4.3.1 Crow Lake Alternative

Regional Overview

The Crow Lake Alternative is within the Southern Missouri Coteau subregion of the Northern Glaciated Plains Ecoregion (Bryce *et al.* 1998; Omernik 2005). Bailey *et al.* (1995) describe this area as the Eastern Prairie Ecoregion, Mixedgrass Subregion. This region is characterized by elevation ranges of 1,985 to 2,510 feet AMSL. The area is mesic with average annual precipitation in excess of 20 inches. Mixed grasses dominate the native vegetation. Species of wheatgrass (*Agropyron* spp.), needlegrass (*Stipa* spp.) and grama (*Bouteloua* spp.) are common, while woody vegetation is rare and generally limited to drainages. Cropland is also common and consists primarily of corn, small grains and alfalfa. Most of the area is nearly level to undulating glacial till plains with prairie pothole wetlands and moraines. Steep slopes are prevalent adjacent to the major streams. Wetland basin densities in the Prairie Pothole Region (PPR) are some of the highest in the country with densities as high as 83 wetland basins per square mile. The wetland basin density in the Crow Lake area is nine to 10 basins per square mile, some of the lower basin densities in the PPR (Kempema 2007).

Crow Lake Alternative Description

As detailed in **Table 3.4-1** and **Figure 3.4-1**, the Crow Lake Alternative is composed of rolling hills intermixed with mixed-grass prairie, including rangeland, pastureland and Conservation Reserve Program (CRP)/prairie, cropland, wetlands (including stock ponds), farmsteads and patches of deciduous trees (mostly shelterbelts) (Tierra EC 2009). Elevations range from 1,644 feet AMSL in the bottomlands to 1,985 feet AMSL in the northwest portion of the site.

Table 3.4-1 Vegetation Communities in the Crow Lake Alternative

| Vegetation Type | Acres | Percentage of Area |
|---------------------|--------|--------------------|
| Mixed-grass prairie | 23,007 | 64% |
| Cropland | 11,678 | 33% |
| Wetlands | 517 | 1% |
| Farmstead | 276 | <1% |
| Shelterbelt | 261 | <1% |
| Deciduous forest | 82 | <1% |

Mixed-grass Prairie (including rangeland, pastureland and CRP/prairie)

Mixed-grass prairie accounts for approximately 64 percent (23,007 acres) of the Crow Lake Alternative. Mixed-grass prairie includes rangeland (untilled areas, as well as areas that were tilled at one time but have reverted to grassland), pasture and CRP/prairie. There is very little unbroken sod in the area.

Rangeland (22,222 acres) includes areas of expansive, mostly unimproved land on which native or adapted, introduced plant species are managed for livestock grazing. Some areas contain unbroken sod; however, much of this acreage has been plowed at one time. Dominant herbaceous vegetation includes smooth brome (*Bromus inermis*) and sweet-clover (*Melilotus* spp.), with occasional occurrences of *Carduus* spp., *Artemisia* spp. and various members of the Asteraceae family. In addition to herbaceous plant species, rangeland often contains scattered plains cottonwood (*Populus deltoides*) and various shrub species.

Pasture (692 acres) includes areas where livestock are held in high densities. Herbaceous vegetation is often minimal; where present, the vegetation is often heavily grazed.

CRP/prairie (93 acres) is areas of naturally occurring prairie or planted grasslands where native prairie grasses are dominant. CRP includes areas of cropland that have been removed from crop production for a specific period (usually 10 years) and are planted with cover designed to conserve soil and water. Hay production and livestock grazing are not permitted on CRP land unless specifically allowed during droughts. The Farm Service Agency (FSA) handbook, updated by the USDA in May 2008, expressly forbids the FSA from revealing acreages or locations of CRP; therefore, this information is no longer available so an estimate of CRP lands within the Crow Lake Alternative cannot be made. Based on field observations, the majority of lands in the CRP/prairie category appear to be CRP (previously broken sod), and not naturally occurring prairie (unbroken sod). CRP/prairie is dominated by smooth brome (*Bromus inermis*), prairie beard grass (*Schizachyrium scoparium*), big blue-stem (*Andropogon gerardii*), switch grass (*Panicum virgatum*), Kentucky bluegrass (*Poa pratensis*) and sweet-clover (*Melilotus* spp.).

The USFWS has approximately 1,629 acres of grasslands in five parcels enrolled in the Grassland Easement program within the Crow Lake Alternative (USFWS 2008). Grassland Easements are included in the mixed-grass prairie land use category in **Table 3.4-1. Figure 3.4-2** identifies the locations of the Grassland Easements within the area. Grasslands protected under easements are prevented from being permanently converted to cropland or development. Landowners may use the land within the easement for grazing and haying; however, mowing, haying and grass seed harvesting must be delayed until after July 15th of each year. The program allows one wind turbine with associated facilities per 160 acres enrolled. Locating turbines on Grassland Easements requires coordination with the USFWS.

Cropland

Cropland accounts for approximately 33 percent (11,678 acres) of the Crow Lake Alternative. It includes all open space areas where agricultural products are currently in production. This category was further divided into specific cover type classifications based on the previous year's crop type (*i.e.*, row crop or cover crop). Row crops include plantings such as sorghum or corn; cover crops include alfalfa, winter wheat or hay. Many agricultural lands alternate between row and cover crops. Some areas defined as cropland are also used as rangeland during parts of the year.

Crow Lake

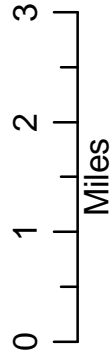
- Project Boundary
- Township and Range
- Section
- Drainage
- Western Utility Line
- Substation
- O&M Building
- Turbine
- Collector System
- Internal Road

Overhead Transmission Line

- Alternative 1
- Alternative 2
- Alternative 3

Habitat

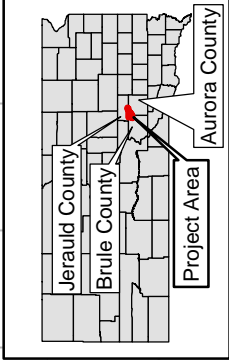
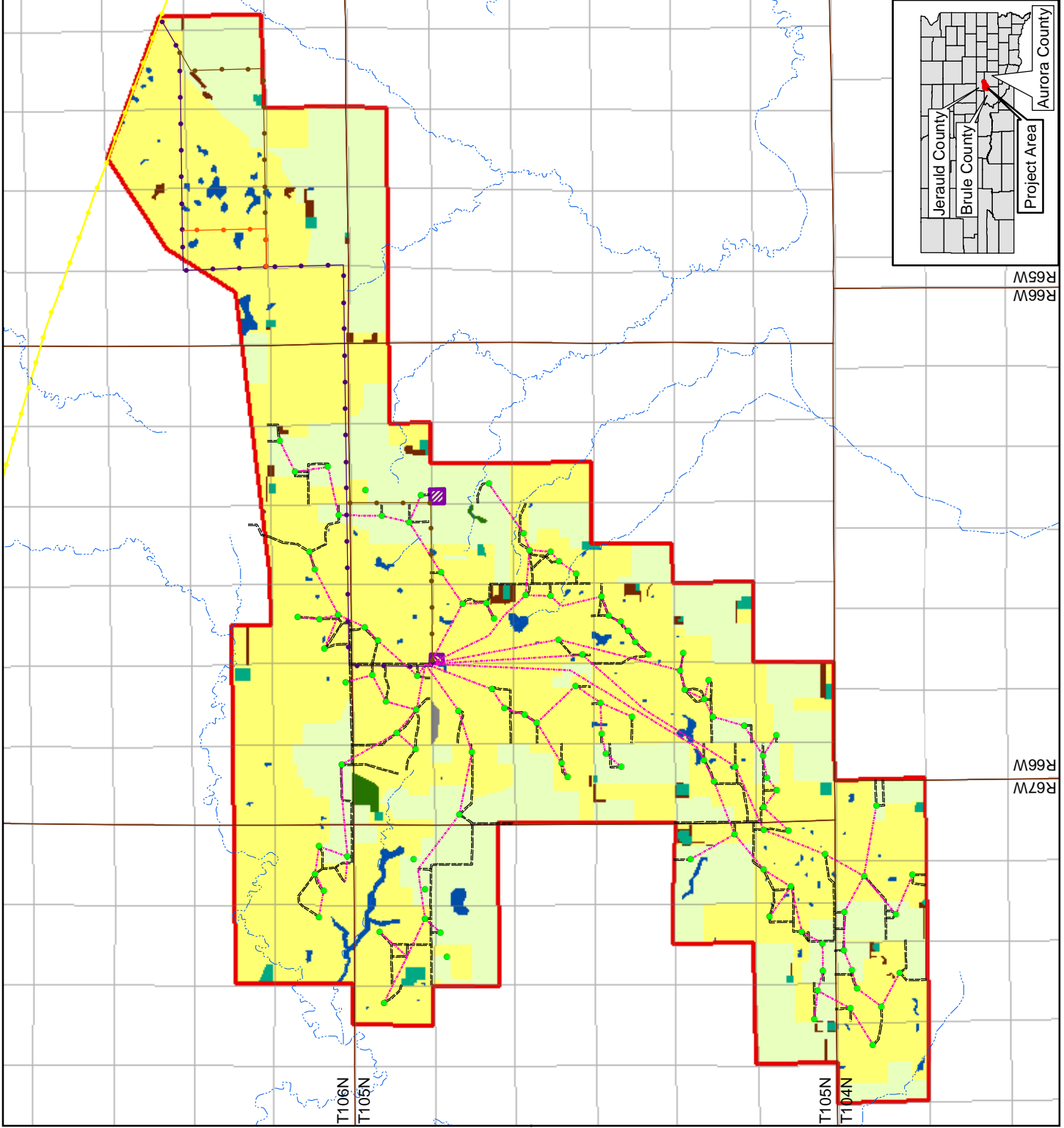
- Cropland
- Deciduous Forest
- Farmstead
- Mine/Quarry
- Mixed-grass Prairie
- Shelterbelt
- Wetland



SDPW Project

Figure 3.4-1

| | | |
|---|---------|-------------|
| Date: 06.03.09 | Habitat | Author: JAG |
| C:\Data\Basin\Maps\EIS\Winem\Crow_Lake_Vegetation | | |



Due to engineering considerations, the transmission line Alternative 1 location includes area outside of the Crow Lake Alternative boundary; this boundary will be revised to include the transmission line route in the FEIS.

Wetlands (including stock ponds)

Wetlands account for slightly over one percent (517 acres) of the Crow Lake Alternative. Prairie potholes describe the naturally occurring depressional wetlands where native and non-native hydrophytic vegetation persists. Dominant vegetation includes prairie cord grass (*Spartina pectinata*), reed canary grass (*Phalaris arundinacea*), narrow-leaved cattail (*Typha angustifolia*) and river bulrush (*Bolboschoenus fluviatilis*).

Stock ponds are areas where ranchers have bermed natural drainage features or seasonal wetlands to create a persistent water supply for livestock. These areas are often heavily grazed and do not generally contain a perimeter of hydrophytic vegetation.

The USFWS has approximately 2,836 acres of wetlands and adjacent uplands in 15 parcels enrolled in the Wetland Easement program within the Crow Lake Alternative (USFWS 2008). Wetland Easement areas are not displayed in **Table 3.4-1**, but are accounted for in both the mixed-grass prairie and wetlands area estimates. They are not displayed as wetland easements because wetland easements include both habitat types and the data do not distinguish these acreages by parcel.

Farmstead, Shelterbelt and Deciduous Forest

Farmsteads account for less than one percent (276 acres) of the Crow Lake Alternative. Farmsteads include developed areas of land with various structures devoted to residential, commercial or industrial practices. These areas are adjacent to pasture or rangeland and are scattered throughout the site.

Shelterbelts account for less than one percent (261 acres) of the Crow Lake Alternative. Shelterbelts are trees or shrubs planted in one or more rows that provide shelter from wind or protect soil from erosion. Shelterbelts are typically found around the edges of fields, pastures and/or farmsteads. Most of the shelterbelts are associated with farmsteads. The most commonly observed tree species within the shelterbelts is eastern red cedar (*Juniperus virginiana*); plains cotton wood (*Populus deltoides*) and wild plum (*Prunus americana*) are also present.

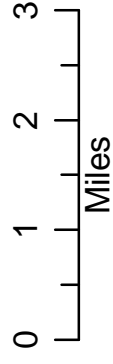
Deciduous forest accounts for less than one percent of the Crow Lake Alternative. These are areas of dense, naturally occurring tree species. In upland areas, plains cottonwoods (*Populus deltoides*) are most abundant, with occurrences of eastern red-cedar (*Juniperus virginiana*), Siberian elm (*Ulmus pumila*), green ash (*Fraxinus pennsylvanica*) and wild plum (*Prunus americana*). Deciduous forest is often located as islands within rangeland.

Invasive and Noxious Plants

In South Dakota, invasive species include declared pests and noxious weeds. These are defined as species which the South Dakota Weed and Pest Control Commission has designated as sufficiently detrimental to the State to warrant enforcement of control measures (Administrative Rule [AR] 12:62:02:01). South Dakota has documented 27 invasive species under this rule.

Crow Lake

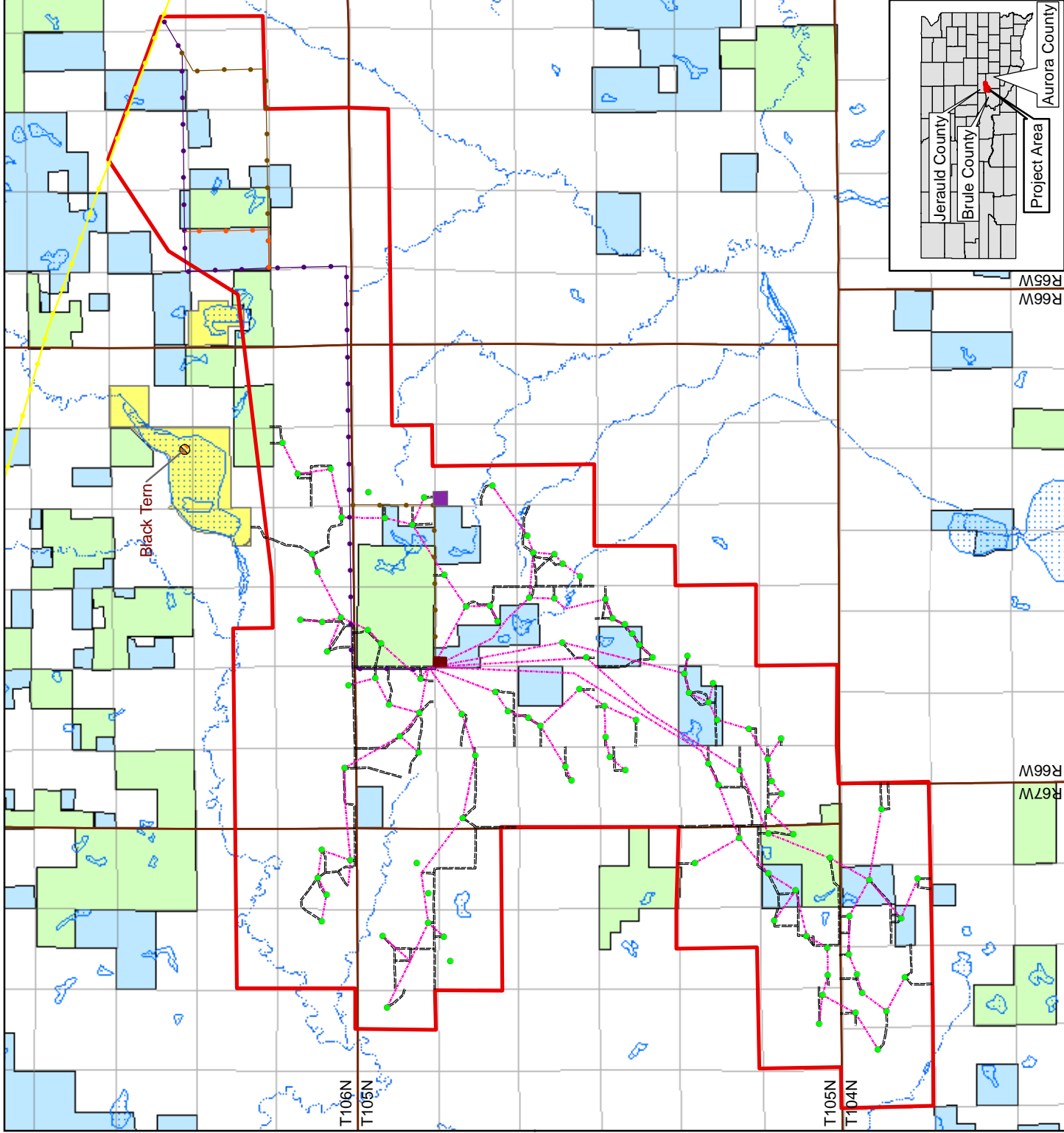
- Project Boundary
- Township and Range
- Section
- Western Utility Line
- Turbine
- Substation
- O&M Building
- Collector System
- Internal Road
- Overhead Transmission Line**
 - Alternative 1
 - Alternative 2
 - Alternative 3
- Natural Heritage Habitat
- Drainage
- Major Water Bodies (EPA)
- Game Production Area
- Waterfowl Production Area
- USFWS Easements**
 - Grassland
 - Wetland



SDPW Project

Figure 3.4-2

| | | |
|---|--------------------|-------------|
| Date: 06.03.09 | Conservation Areas | Author: JAG |
| C:\Data\Basin\Maps\EIS\Winem\Crow_Lake_Infrastructure | | |



Due to engineering considerations, the transmission line Alternative 1 location includes area outside of the Crow Lake Alternative boundary; this boundary will be revised to include the transmission line route in the FEIS.

Table 3.4-2 South Dakota Invasive Plant Species Documented in Jerauld, Aurora or Brule Counties

| Common Name | Scientific Name |
|-----------------------|-----------------------------|
| Absinth wormwood | <i>Artemisia absinthium</i> |
| Hoary cress | <i>Cardaria draba</i> |
| Plumeless thistle | <i>Carduus acanthoides</i> |
| Musk thistle | <i>Carduus nutans</i> |
| Russian knapweed | <i>Centaurea repens</i> |
| Canada thistle | <i>Cirsium arvense</i> |
| Field bindweed | <i>Convolvulus arvensis</i> |
| Leafy spurge | <i>Euphorbia esula</i> |
| Perennial sow thistle | <i>Sonchus arvensis</i> |
| Puncturevine | <i>Tribulus terrestris</i> |
| Common mullein | <i>Verbascum thapsus</i> |

Source: South Dakota Department of Agriculture 2008

Table 3.4-2 presents the 11 invasive species documented in Jerauld, Aurora and Brule counties. The distribution of invasive species in the Crow Lake Alternative is unknown at this time.

Federally-listed Species

No Federally-listed plant species are known to occur within Aurora, Brule or Jerauld counties (USFWS 2009a).

State-Listed Species

No rare, threatened or endangered plant species tracked by the SDNHP are known to occur in the Crow Lake Alternative (SDNHP 2009).

3.4.3.2 Winner Alternative

Regional Overview

The Winner Alternative is in the Great Plains Steppe Ecoregion (Omernik 2005). This ecoregion includes approximately 25 million acres. This ecoregion is characterized by elevations from approximately 1,644 to 1,985 feet AMSL. Topography is gently sloping to rolling with well-drained shale plains. The area is dry mesic to mesic with average annual precipitation between 12 and 23 inches. Mixed grasses dominate the vegetation. The Winner Alternative is in the Keya Paha Tablelands and Ponca Plains subregions (Bryce *et al.* 1998). The Keya Paha Tablelands Subregion (16"-20" annual precipitation) covers the western half of the Winner Alternative. Natural vegetation includes blue grama, sideoats grama, western wheatgrass, little bluestem and needleandthread. The Ponca Plains Subregion covers the eastern half of the Winner Alternative, and is more mesic (20"-22" annual precipitation) than the Keya Paha Tablelands Subregion. Natural vegetation consists of mixed-grass prairie containing little bluestem, prairie sandreed, green needlegrass and needleandthread. Wetland densities are similar to the Crow Lake Alternative and are relatively low.

Winner Alternative Description

The Winner Alternative is predominantly in the mixed-grass prairie zone and is intermixed with mixed-grass prairie (including rangeland, pastureland and CRP/prairie), cropland, wetlands (including herbaceous wetlands, forested wetlands, stock ponds and lakes), deciduous forests, farmsteads and shelterbelts (**Table 3.4-3** and **Figure 3.4-3**). Elevations range from 1,985 feet AMSL in the bottomlands at the northern extent of the Winner Alternative to 2,510 AMSL at the western extent of the area.

Table 3.4-3 Vegetation Communities in the Winner Alternative

| Vegetation Type | Acres | Percentage of Area |
|---------------------|--------|--------------------|
| Mixed-grass prairie | 53,925 | 65% |
| Cropland | 24,450 | 29% |
| Wetlands | 931 | 1% |
| Farmstead | 1,351 | 1.5% |
| Shelterbelt | 1,261 | 1.5% |
| Deciduous forest | 1,464 | 2% |

Mixed-grass Prairie (including rangeland, pastureland and CRP/prairie)

Mixed-grass prairie accounts for approximately 65 percent (53,925 acres) of the Winner Alternative. Mixed-grass prairie includes rangeland, pasture and CRP/prairie. A small percentage of the Winner Alternative is unbroken sod, although there is more than the Crow Lake Alternative.

Rangeland (51,432 acres) defines areas of expansive, mostly unimproved land on which native or adapted introduced plant species are managed for livestock grazing. Some areas contain unbroken sod; however, much of this acreage has been plowed at one time. The most common taxa include smooth brome, sweet-clover, *Carduus* spp., *Artemisia* spp., various members of the Asteraceae family, switch grass (*Panicum virgatum*), prairie beard grass (*Schizachyrium scoparium*), *Muhlenbergia* spp., *Sonchus* spp., hoary verbena (*Verbena stricta*), *Agropyron* spp., *Trifolium* spp. and bull thistle (*Cirsium vulgare*).

Pasture (1,282 acres) defines areas where animals are held in high densities. Herbaceous vegetation is often minimal; where present, the vegetation is often heavily grazed.

CRP/prairie (1,211 acres) defines areas of naturally occurring prairie or planted grasslands where native prairie grasses are dominant. As explained above, the 2008 USDA FSA handbook expressly forbids revealing acreages or locations of CRP; therefore, this information is no longer available so an estimate of CRP lands within the Winner Alternative cannot be made. Based on field observations, the majority of lands in the CRP/prairie category appear to be CRP (previously broken sod), and not naturally occurring prairie (unbroken sod). CRP/prairie is dominated by prairie beard grass with switch grass and yellow Indian grass (*Sorghastrum nutans*) as secondary dominants. Other species include prairie beard grass, goldenrod species

(*Solidago* spp.), evening-primrose (*Oenothera* spp.), *Juncus* spp., hoary verbena (*Verbena stricta*), *Artemisia* spp. and various members of the Asteraceae family.

The USFWS has approximately 220 acres of grasslands in one parcel enrolled in the Grassland Easement program within the Winner Alternative and no Wetland Easements (USFWS 2008). The Grassland Easement is included in the mixed-grass prairie land use category in **Table 3.4-3** and **Figure 3.4-4**.

Cropland

Cropland accounts for approximately 29 percent (24,450 acres) of the Winner Alternative. Cropland classifications are the same as described in **Section 3.4.3.1**.

Wetlands (including deciduous wetland, forested wetland, lake, stock pond, wetland and wet meadow)

Wetlands account for slightly over one percent (931 acres) of the Winner Alternative. A variety of wetland complexes, composed of wet meadow, shrub-carr and deciduous wetland forest communities are located within the site. The deciduous wetland communities are dominated by plains cottonwood; the wet meadow communities are dominated by prairie cord grass, switch grass, river bulrush, reed canary grass, narrow-leaved cattail and *Juncus* spp. The shrub-carr communities are dominated by willow (*Salix* spp.) and olive species (*Elaeagnus* spp.). The forested wetland communities are dominated by cottonwood and willow species (*Salix* spp.). These vegetation communities are often within rangeland.

Stock ponds are areas that are bermed (natural drainage features or seasonal wetlands) to create a persistent water supply for livestock. These areas are often heavily grazed and do not contain a perimeter of hydrophytic vegetation.

Deciduous Forest

Deciduous forest accounts for approximately 2 percent (1,464 acres) of the Winner Alternative. This designation describes areas of dense, naturally occurring tree species. In upland areas, plains cottonwood is most abundant; occurrences of eastern red-cedar, Siberian elm, box elder (*Acer negundo*), green ash and wild plum are also present. This vegetation community is often islands within rangeland.

Farmstead and Shelterbelt

Farmsteads account for approximately 1.5 percent (1,351 acres) of the Winner Alternative and are similar to those described in **Section 3.4.3.1**. Shelterbelts account for approximately 1.5 percent (1,261 acres) of the Winner Alternative. Species composition of the shelterbelts is similar to that seen at Crow Lake.

Winner

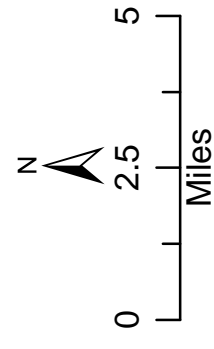
- Project Boundary
- Township and Range
- Section
- Drainage
- Western Utility Line
- State/US Highway
- Collector System
- Internal Road
- Turbine
- Substation and O&M Building

Overhead Transmission Line

- Alternative 1
- Alternative 2

Habitat

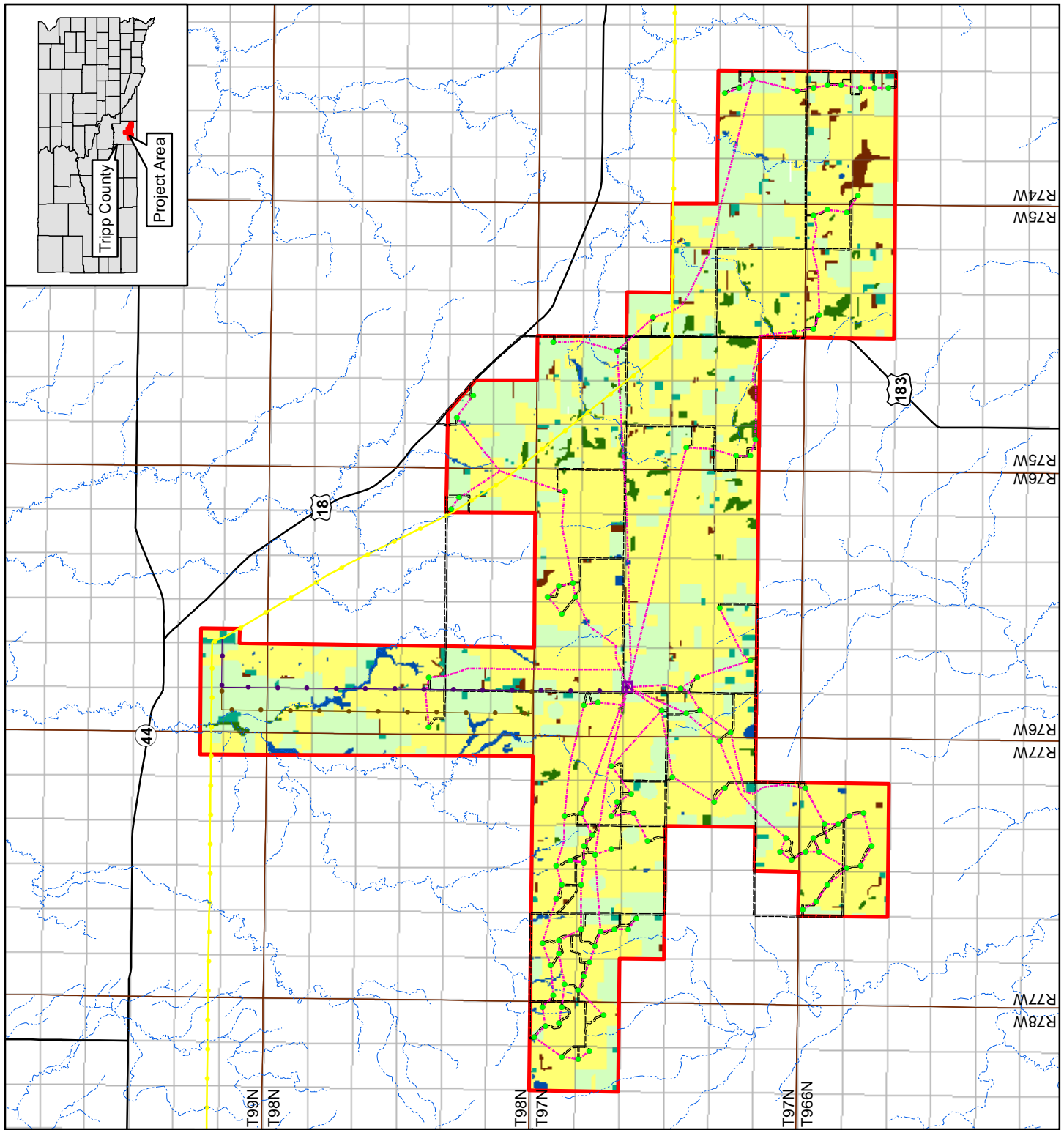
- Cropland
- Deciduous Forest
- Disturbed
- Farmstead
- Mixed-grass Prairie
- Shelterbelt
- Wetland



SDPW Project

Figure 3.4-3

| | | |
|---|---------|-------------|
| Date: 06.10.09 | Habitat | Author: JAG |
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Invasive and Noxious Plants

Table 3.4-4 presents the 12 invasive species documented in Tripp County. The distribution of invasive species in the Winner Alternative is unknown.

Table 3.4-4 South Dakota Invasive Plant Species Documented in Tripp County

| Common Name | Scientific Name |
|-----------------------|----------------------------|
| Hoary cress | <i>Cardaria draba</i> |
| Plumeless thistle | <i>Carduus acanthoides</i> |
| Musk thistle | <i>Carduus nutans</i> |
| Diffuse knapweed | <i>Centaurea diffusa</i> |
| Spotted knapweed | <i>Centaurea maculosa</i> |
| Russian knapweed | <i>Centaurea repens</i> |
| Canada thistle | <i>Cirsium arvense</i> |
| Bull thistle | <i>Cirsium vulgare</i> |
| Leafy spurge | <i>Euphorbia esula</i> |
| Perennial sow thistle | <i>Sonchus arvensis</i> |
| Common mullein | <i>Verbascum thapsus</i> |

Source: South Dakota Department of Agriculture 2008

Federally-listed Species

No Federally-listed plant species are known to occur within Tripp County (USFWS 2009a).

State-Listed Species

No rare, threatened or endangered plant species tracked by the SDNHP are known to occur in the Winner Alternative (SDNHP 2009).

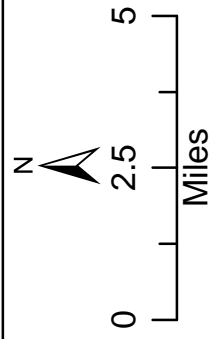
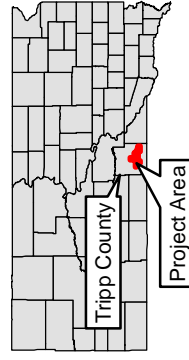
3.4.4 WILDLIFE

The ROI evaluated for wildlife resources encompasses all areas within the boundaries of the Proposed Project alternatives. As the Proposed Project may impact wildlife species in areas that extend beyond the construction footprint of the Proposed Project Components (including temporary and permanent disturbance areas), adjacent lands utilized by wildlife, such as migration corridors, are also included. The ROI for wildlife is greater than the ROI for vegetation because wildlife species move in and out of the Proposed Project alternatives. Extending the ROI ensures that all species are evaluated. The analysis of existing conditions and potential effects from the Proposed Project are based on field studies and the *USFWS PII Score for PrairieWinds SD1* (see **Sections 4.4.3.1 and 4.4.3.2, Wildlife, Birds**) (Terracon 2008b).

This section is based on information contained within Reference (Lake Andes), Crow Lake, Winner, and Fox Ridge Project Sites Central, South Dakota (Terracon 2008b), PrairieWinds SD1, Inc. Project Compilation of Resource Technical Memorandums (Terracon 2009a and 2009b), Wildlife Studies for the PrairieWinds SD1 Crow Lake Wind Resource Area Aurora, Brule, and Jerauld Counties, South Dakota (WEST 2009a), Wildlife Studies for the PrairieWinds SD1 Winner Wind Resource Area Tripp County, South Dakota (WEST 2009b), and Prairie Winds Vegetation Mapping, NRC Project # 009-0044-01, Portions of Jerauld, Aurora, Brule and

Winner

- Project Boundary
 - Township and Range
 - Section
 - State/US Highway
 - Western Utility Line
 - Turbine
 - Substation and O&M Building
 - Collector System
 - Internal Road
- Overhead Transmission Line**
- Alternative 1
 - Alternative 2
- USFWS Grassland Easement**
- Game Production Areas
- Natural Heritage Habitat**
- Species Occurrence
 - American Burying Beetle
 - Drainage
 - Major Water Bodies (EPA)

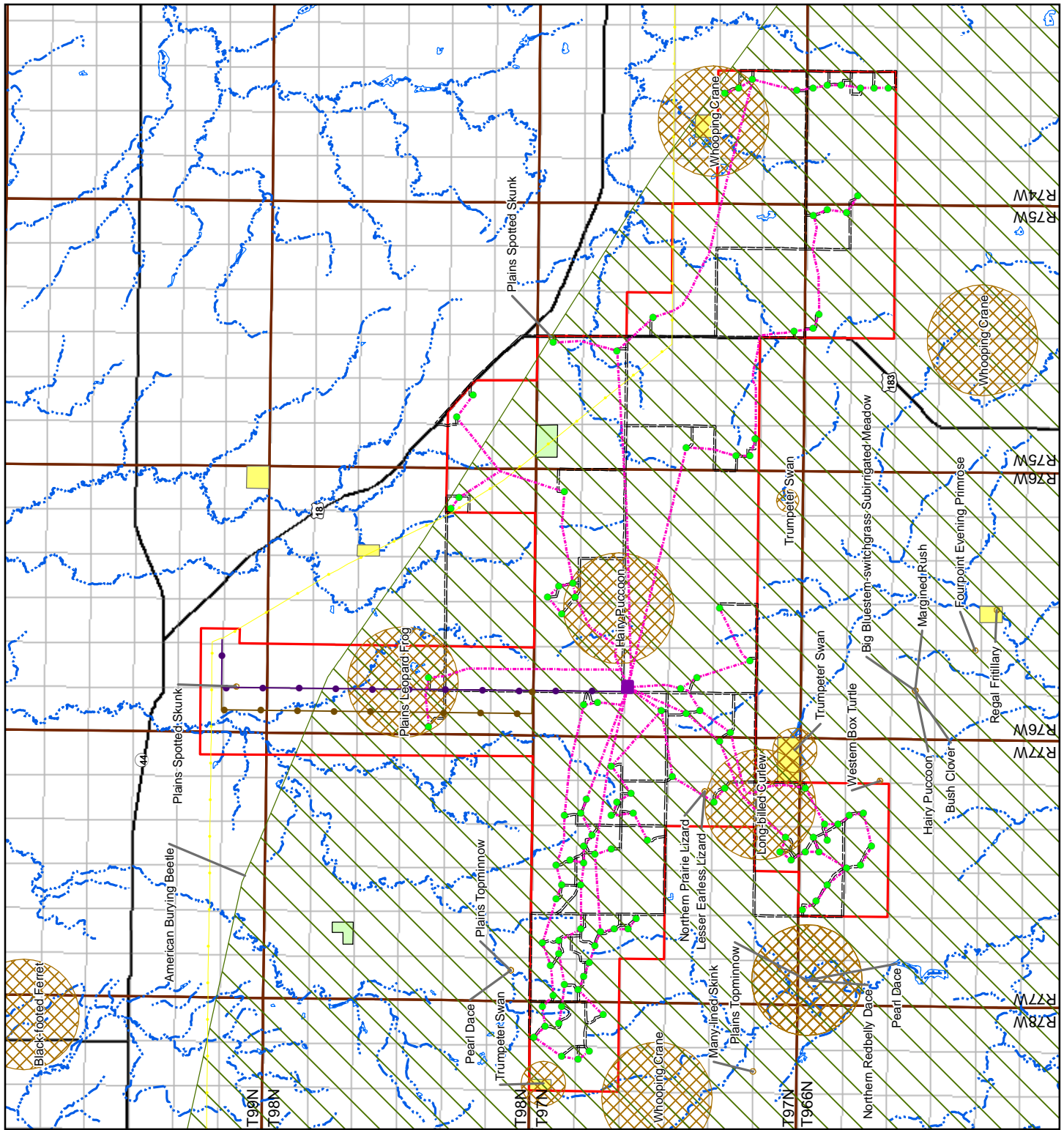


SDPW Project

Figure 3.4-4

| | | |
|----------------|--------------------|-------------|
| Date: 06.10.09 | Conservation Areas | Author: JAG |
|----------------|--------------------|-------------|

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Tripp Counties, South Dakota (Tierra EC 2009). Where additional sources of information have been used to evaluate the potential impacts associated with the Proposed Project, those sources have been cited.

3.4.4.1 Crow Lake Alternative

Terrestrial fauna within the Crow Lake Alternative are characteristic of mixed grasslands within the PPR. Fertile soils and high wetland basin density provide an abundance of forage and habitat cover for species of small mammals, amphibians, reptiles and birds, although wetland density is relatively low at the Crow Lake Alternative when compared to the PPR (Kempema 2007).

Wildlife shares the region with cattle and other livestock. Agricultural practices have reduced the amount and continuity of prairie and wetland habitat. Smaller patches of prairie and wetland are now often intermixed with woody species in tree rows and shelterbelts. A list of wildlife species observed during field surveys in 2008 and 2009 is provided in **Appendix C, Table C-1**. A total of 100 bird species, 12 mammal species and one amphibian were observed.

Hunting is a popular recreational activity in and around the Crow Lake Alternative. Game species pursued most frequently include pheasants and other upland gamebirds, white-tailed deer, fox, coyotes and waterfowl. Review of State and Federal databases indicates that there are no WPAs, State Game Production Areas (GPA) or Walk-in Areas within the Crow Lake Alternative (SDGFP 2009a and 2009b) (**Figure 3.4-2**).

Mammals

Habitat models produced by the South Dakota GAP Analysis Program (Smith *et al.* 2001) were consulted to identify common wildlife species that may occur within the Crow Lake Alternative.

In addition to the species observed, the GAP analysis predicts mammals including fox (*Vulpes vulpes*), bobcat (*Lynx rufus*), opossum (*Didelphidae*), raccoon (*Procyon lotor*) and those listed in **Appendix C, Table C-2**. Small burrowing mammals, such as shrews, voles, mice and gophers, use soft soils for denning and cover. Game species include pronghorn (*Antilocapra americana*), mule deer and white-tailed deer. White-tailed deer are considered common in the area.

Bat species reside in and migrate through the region. Thirteen species of bats are documented in South Dakota, seven of which may occur in the Crow Lake Alternative (SDGFP 2004; SDGFP 2007; Kempema 2007)(**Table 3.4-5**).

Specific information regarding roosting, breeding, foraging and migration is unknown for bats in the Crow Lake Alternative. Areas adjacent to pothole lakes and wetlands are mesic and support cover and foraging habitat for mammal species. Peaks in insect hatches during warm season months provide a good prey base for many mammals. Bat use surveys were performed from May 1 to October 15, 2009. Results were not available at the time of publication of this DEIS but will be included in the FEIS. The surveys are being performed using Anabat, a system to identify and survey bats by detecting and analyzing their echolocation calls.

Table 3.4-5 Bat Species that May Occur within the Crow Lake Alternative

| Common Name | Scientific Name | Type of Residency | Ranking |
|-----------------------------|----------------------------------|-------------------|---|
| Northern myotis | <i>Myotis septentrionalis</i> | Year-round | Apparently secure/rare or local range (G4/S3) |
| Silver-haired bat | <i>Lasionycteris noctivagans</i> | Summer | Secure/apparently secure (G5/S4) |
| Little brown myotis | <i>Myotis lucifugus</i> | Year-round | Secure (G5/S5) |
| Western small-footed myotis | <i>Myotis ciliolabrum</i> | Year-round | Secure (G5/S5) |
| Big brown bat | <i>Eptesicus fuscus</i> | Year-round | Secure (G5/S5) |
| Eastern red bat | <i>Lasiurus borealis</i> | Summer | Secure (G5/S5) |
| Hoary bat | <i>Lasiurus cinereus</i> | Summer | Secure (G5/S5) |

Source: SDGFP 2004, 2007

Ranks: G5/S5 – Demonstrably secure, though it may be quite rare in parts of its range
 G4/S4 – Apparently secure, though it may be quite rare in parts of its range
 S3 – Either very rare and local throughout its range, or found locally

Reptiles and Amphibians

Common reptiles include the common garter snake (*Thamnophis sirtalis*), plains garter snake (*Thamnophis radix*), plains hognose snake (*Heterodon nasicus*), fox snake (*Elaphe vulpine*), the western painted turtle (*Chrysemys picta belli*) and snapping turtle (*Chelydra serpentina*). Amphibians such as the northern leopard frog (*Rana pipiens*), American toad (*bufo americanus*) and tiger salamander (*Ambystoma tigrinum*) are also likely to be present. Habitat for these species includes open agricultural and grasslands, hedgerows and wet lowlands. The density of reptiles and amphibians is considered similar to that of the surrounding areas, as the Crow Lake Alternative does not contain unique habitats.

Birds

Mixed grasslands and the PPR intersect many avian migratory routes and provide breeding grounds for birds. Wetland basins are highly productive and provide birds with ample resources for reproduction. The resulting mosaic of grassland and wetland basins and linear wetland corridors makes the Crow Lake Alternative an important migration route for birds (Kempema 2007). Bird species that were observed in the area during surveys are listed in **Appendix C, Table C-2**.

Bird Survey Results

Intact mixed-grass prairie in the Crow Lake Alternative provides suitable habitat for many resident and migratory bird species. Avian use surveys were conducted in 2009 to estimate temporal and spatial distributions of birds in the area. Migratory bird surveys (fixed point counts) were conducted from mid-March through late-May 2009. Breeding bird surveys (transect surveys) were conducted from early June to early July 2009. Collectively, field surveys recorded 5,002 individual birds. Aerial grouse lek surveys were also conducted.

Preliminary results for migratory bird surveys indicate a total of 60 unique bird species; a total of 2,178 individual birds were recorded (**Appendix C, Table C-2 and Table C-3**). Fifty-eight individual raptors in 56 groups were recorded (2.7 percent of overall bird observations), representing eight species. Northern Harrier and Red-tailed Hawk were the most frequently observed raptor species. Waterfowl were by far the most abundant bird type comprising 48.4 percent of observations. Canada Geese (*Branta canadensis*) and Mallards (*Anas platyrhynchos*) were the most commonly observed waterfowl. Passerines were the second most abundant bird type, accounting for 24.5 percent of overall bird observations, with Red-winged Blackbird (*Agelaius phoeniceus*) and Western Meadowlark (*Sturnella neglecta*) being the most commonly observed passerine species (WEST 2009a).

A total of 2,824 individual bird observations were recorded during breeding bird surveys, representing 59 unique species. Cumulatively, four species (6.8 percent of all species) accounted for 85.4 percent of observations: Brown-headed Cowbird, Western Meadowlark, Grasshopper Sparrow and Red-winged Blackbird, which are species typical of open grassland habitats. Over half of the birds observed during breeding bird surveys were blackbirds and orioles. Woodland and wetland birds were also observed, but were less abundant than grassland species.

Upland game bird species known to occur in the Crow Lake Alternative include Ring-necked Pheasant, Greater Prairie Chicken and Sharp-tailed Grouse. Ring-necked Pheasant habitat includes primarily mixed grasses and cropland. There are few intact native grasslands in the area; these areas provide habitat for Sharp-tailed Grouse and Greater Prairie Chicken. Sharp-tailed Grouse and Greater Prairie Chicken were documented during spring and summer surveys (WEST 2009a; Tierra EC 2009). Five grouse leks were identified during aerial surveys. Four are within the Crow Lake Alternative and one is immediately adjacent to the site. Two of the leks were confirmed to species (one Sharp-tailed Grouse and one Greater Prairie Chicken). The remaining three could not be identified to species (WEST 2009a).

Waterfowl utilize the wetland basins in and adjacent to the Crow Lake Alternative for nesting, foraging and migratory stopover. WPAs are USFWS preserves with quality habitat often used by waterfowl. There are no WPAs within the Crow Lake Alternative; the closest WPA is approximately seven miles to the southeast. Wetlands, streams, ponds and lakes in and near the site provide nesting, foraging and cover habitat for several shorebird species. Two groups of Sandhill Cranes (18 individuals) were observed at the Crow Lake Alternative (WEST 2009a). Sandhill Cranes are often used as a surrogate species for Whooping Cranes because they use similar habitat types. Preliminary results from one year of data collection indicate that the number of individuals observed indicates that habitat suitability for Sandhill Cranes is low; more data collection is needed to confirm this.

Based on the results from other wind resource areas, a ranking of seasonal mean raptor use was developed (WEST 2009a). Raptor use at the Crow Lake Alternative is 0.35 birds per plot per survey. Raptor use at sites around the United States is between 1.65 and 0.1 birds per plot per survey (WEST 2009a). Although habitats in these wind resource areas are not necessarily the

same as those at the Crow Lake Alternative, they provide the best available comparison for raptor use. Based on this analysis, raptor use is relatively low at the Crow Lake Alternative.

The Crow Lake Alternative occurs in the Central Flyway, a major migration corridor through the United States. Avian use surveys conducted in the Crow Lake Alternative indicate that spring and fall migration of songbirds, waterfowl and raptors occurs in the region. There are no topographic features, such as mountain passes or large rivers, which funnel or direct migratory paths to the area or certain portions of the area. Both raptors and songbirds migrate along a broad front throughout the region. Topographic relief in the area is primarily associated with the ridgetop that runs through the site from the southwest portion to the northeast portion. This ridge may provide a source of updrafts that could be used by soaring raptors. Concentrated prey sources, specifically waterfowl, fluctuate seasonally with migrations. Concentrations of waterfowl are expected to be higher in the spring and fall, so raptor populations may increase during those periods. Roosting trees are limited in the area.

Nesting habitat in the Crow Lake Alternative is limited for above ground nesting raptor species and includes scattered trees, tree rows and shelterbelts. No cliffs or rock outcrops were identified during field studies. Ground-nesting raptors likely nest in areas of continuous grassland habitats within the Crow Lake Alternative. Field studies did not reveal raptor nests within the area (WEST 2009a; Tierra EC 2009), although it is likely that raptors nest here.

3.4.4.2 Winner Alternative

Terrestrial fauna within the Winner Alternative are characteristic of mixed grasslands within the mixed-grass prairie zone. Fertile soils provide an abundance of forage and habitat cover for many species of small mammals, amphibians, reptiles and birds. Wetlands provide habitat for many species, although wetland densities are relatively low when compared to the region. Wildlife shares the region with cattle and other livestock. Agricultural practices have reduced the amount and continuity of prairie and wetland habitat. As a result, patches of habitat have become smaller and are often intermixed with woody species in tree rows and shelterbelts. A list of wildlife species observed during field surveys in 2008 and 2009 is provided in **Appendix C, Table C-4**. A total of 98 bird species, 12 mammal species, two reptile species and two amphibian species were observed.

Hunting is a popular recreational activity in and around the Winner Alternative. Game species pursued most frequently include pheasants and other upland gamebirds, white-tailed deer, fox, coyotes and waterfowl. Review of State and Federal databases indicates that there are no Waterfowl Production Areas or Walk-in Areas within the Winner Alternative (SDGFP 2009a and 2009b). The Little Dog Ear Lake GPA is located in the western portion of the site and is approximately 77 acres (**Figure 3.4-4**).

Mammals

Common mammal species residing in the Winner Alternative are similar to those described in **Section 3.4.4.1**.

Bat species reside and migrate through the region. There are 13 species of bats documented in South Dakota, seven of which may occur in the area (SDGFP 2004; SDGFP 2007; Kempema 2007) (**Table 3.4-6**).

Specific information regarding roosting, breeding, foraging and migration is unknown for bats in the Winner Alternative. Areas adjacent to lakes and wetlands are mesic and support cover and foraging habitat for mammal species. Peaks in insect hatches during warm season months provide a good prey base for many mammals. Bat use surveys were performed from May 1 to October 15, 2009. Results were not available at the time of publication of this DEIS but will be included in the FEIS. The surveys are performed using Anabat, a system to identify and survey bats by detecting and analyzing their echolocation calls. The results will be published in the FEIS.

Reptiles and Amphibians

Common reptile and amphibian species residing in the Winner Alternative are similar to those described in **Section 3.4.4.1**. Habitat for these species includes open agricultural and grasslands, hedgerows and wet lowlands. The density of reptiles and amphibians is considered similar to that of the surrounding areas, as the Winner Alternative does not contain unique habitats.

Table 3.4-6 Bat Species that May Occur within the Winner Alternative

| Common Name | Scientific Name | Type of Residency | Ranking |
|-----------------------------|-------------------------------|-------------------|---|
| Northern myotis | <i>Myotis septentrionalis</i> | Year-round | Apparently secure/rare or local range (G4/S3) |
| Silver-haired bat | <i>Lasiurus noctivagans</i> | Summer | Secure/apparently secure (G5/S4) |
| Little brown myotis | <i>Myotis lucifugus</i> | Year-round | Secure (G5/S5) |
| Western small-footed myotis | <i>Myotis ciliolabrum</i> | Year-round | Secure (G5/S5) |
| Big brown bat | <i>Eptesicus fuscus</i> | Year-round | Secure (G5/S5) |
| Eastern red bat | <i>Lasiurus borealis</i> | Summer | Secure (G5/S5) |
| Hoary bat | <i>Lasiurus cinereus</i> | Summer | Secure (G5/S5) |

Source: SDGFP 2004, 2007
Ranks: G5/S5 – Demonstrably secure, though it may be quite rare in parts of its range
G4/S4 – Apparently secure, though it may be quite rare in parts of its range
S3 – Either very rare and local throughout its range, or found locally

Birds

Bird species observed in the Winner Alternative are listed in **Appendix C, Table C-5**.

Bird Survey Results

Intact mixed-grass prairie in the Winner Alternative provides suitable habitat for many resident and migratory bird species. Avian use surveys were conducted in 2009 to estimate temporal and

spatial distributions of birds in the area. Fixed point count migratory bird surveys were conducted from early-April through late-May 2009. Transect surveys for breeding birds were conducted from early-June to early-July 2009. Collectively, field surveys recorded 3,455 individual birds.

Preliminary results for migratory bird surveys indicate a total of 58 unique bird species. A total of 1,223 individual birds were recorded (**Appendix C, Table C-5 and Table C-6**). Thirty individual raptors in 27 separate groups were recorded (2.2 percent of overall bird observations), representing seven species. Northern Harrier was the most frequently observed raptor species. Passerines were the most abundant bird type comprising 45.1 percent of observations, primarily due to high numbers of Red-winged Blackbird and Western Meadowlark. Upland gamebirds were the second most abundant bird type, accounting for 18.8 percent of observations, with primarily Ring-necked Pheasant. Waterbirds were also relatively abundant compared to other birds types with 115 birds observed in eight separate groups. The most abundant waterbird species was Double-crested Cormorant (WEST 2009b).

A total of 2,232 individual bird observations within 1,744 separate groups were recorded during breeding bird surveys, representing 53 unique species. Cumulatively, six species (11.3 percent of all species) composed 67.6 percent of the individual observations: Brown-headed Cowbird, Western Meadowlark, Red-winged Blackbird, Savanna Sparrow, Bobolink and Upland Sandpiper. Blackbirds and orioles were the most abundant passerine subtype, accounting for nearly half of all observations (WEST 2009b).

Upland game bird species are the same as at the Crow Lake Alternative (WEST 2009b; Tierra EC 2009), although habitats for these species are more abundant because the Winner Alternative has larger areas of intact grasslands. Eight grouse leks were located and confirmed. Two of the confirmed leks were verified as Greater Prairie Chicken. The other six leks could not be confirmed to species (WEST 2009b).

There are no WPAs within or near the area. No Sandhill Cranes were observed while conducting surveys at the Winner Alternative (WEST 2009b). Sandhill Cranes are often used as a surrogate species for Whooping Cranes because they use similar habitat types. From one year of data collection, the number of individuals observed indicates that habitat suitability for Sandhill Cranes is low; more data collection is needed to confirm this.

Raptor use at the Winner Alternative was observed around 0.25 birds per plot per survey. Raptor use at different sites around the United States has been observed between 1.65 and 0.1 birds per plot per survey (WEST 2009b). Although habitats in these wind resource areas are not necessarily the same as those at the Winner Alternative, they provide the best available comparison for raptor use. Based on this analysis, raptor use is relatively low.

Nesting habitat in the Winner Alternative is limited for above ground nesting raptor species and includes scattered trees, tree rows and shelterbelts. No cliffs or rock outcrops were identified during field studies. Ground-nesting raptors likely nest in areas of continuous grassland habitats

within the Winner Alternative. Field studies did not reveal raptor nests within the area (WEST 2009b; Tierra EC 2009); although, it is likely that raptors nest here.

3.4.5 SPECIAL STATUS SPECIES

A list of Federally endangered, threatened, proposed and candidate species by county was obtained from the USFWS (USFWS 2009a) for the Crow Lake and Winner alternatives. Lists for State-listed threatened and endangered species, species of greatest conservation need and species of concern were obtained from the SDGFP (SDGFP 2009c). SDGFP identifies 23 species of fish, reptiles, mammals and birds that warrant special protection.

3.4.5.1 Crow Lake Alternative

Table 3.4-7 identifies the Federal and State-listed species that may occur in Aurora, Brule and Jerauld counties, summarizes the habitat associations, lists the status of these species and lists the likelihood of occurrence in the Crow Lake Alternative.

Table 3.4-7 Federal and State-listed Species that May Occur within the Crow Lake Alternative

| Common Name | Scientific Name | Habitat Association | Status ¹ | Potential for Occurrence |
|----------------|---------------------------------|---|---------------------|------------------------------------|
| Whooping Crane | <i>Grus americana</i> | Aquatic/wetland/cropland | E, SE | May occur |
| Topeka shiner | <i>Notropis topeka</i> | Small streams with moderate to high water quality; pool substrate gravel, rubble or sand. | E | None – may occur downstream |
| Piping Plover | <i>Charadrius melodus</i> | Shorelines along small alkaline lakes, large reservoirs or river islands with wide beach. | T, ST | May occur as migrant, but unlikely |
| Bald Eagle | <i>Haliaeetus leucocephalus</i> | Aquatic/wetland | BCC, ST | May occur |

¹T = USFWS Threatened, E = USFWS Endangered, BCC = USFWS Bird of Conservation Concern, ST = State Threatened, SE = State Endangered

Federally-listed Species

A BA addressing potential impacts to Federally-listed species is being prepared. More detailed information (*i.e.*, legal status, species ecology, local distribution) from the BA will be presented in the FEIS. The following summarizes the available information.

Whooping Crane

The Whooping Crane was listed as threatened in 1967 (32 FR 4001) and reclassified as endangered in 1970 (35 FR 8495). Critical habitat was designated in Colorado, Idaho, Kansas, Nebraska, New Mexico, Oklahoma and Texas. A species recovery plan was completed in 2005 and revised in 2007 (Canadian Wildlife Service and USFWS 2007).

The Whooping Crane occurs at three locations in the wild and at nine captive sites (Canadian Wildlife Service and USFWS 2007). The only self-sustaining wild population is the Aransas-Wood Buffalo National Park population, which migrates between summer nesting grounds in Wood Buffalo National Park in Canada and winter habitat in the coastal marshes of Aransas National Wildlife Refuge in Texas. Spring migration begins in late-March to early-April and is completed within two to four weeks (Austin and Richert 2001). In the fall, the Aransas-Wood Buffalo National Park population conducts the return 2,600-mile migration. This migration route approximately follows the Missouri River corridor through the midwestern United States. The corridor is approximately 200 miles wide. While Whooping Cranes use a variety of habitats during migration, they primarily roost in shallow, seasonally and semi-permanently flooded, palustrine wetlands, and forage in sub-irrigated wet meadows and cultivated agricultural lands (Lewis 1995; Austin and Richert 2001; Stehn 2007). Most wetlands used for roosting are small (less than 10 acres) and located within 0.5 miles of a suitable feeding site.

Stopover occurrence during migration is common throughout South Dakota; there were 214 observations of Whooping Cranes in South Dakota between 1943 and 2007. The majority of sightings were in the central portion of the State along the Missouri River corridor (Austin and Richert 2001). Whooping Cranes have not been observed in Jerauld County, although they have been sighted in Brule and Aurora counties.

The Crow Lake Alternative is within the 75 and 80 percentile bands of the approximate 200-mile migration corridor. No Whooping Cranes were observed during the avian use surveys conducted in the Crow Lake Alternative (WEST 2009a). The Crow Lake Alternative contains numerous small wetlands, prairie pothole lakes, mixed grasses and cultivated fields. Crow Lake is the largest body of water in the project vicinity. Nielson North is the closest WPA, and emergent and submergent wetland vegetation is present in the lake at the Nielson North WPA. Wetland habitat represents one percent of the Crow Lake Alternative, some of which is Whooping Crane roosting habitat. The area also contains 33 percent cropland and is dominated by grasslands, both of which could be used as foraging habitat. Although the site is located near the edge of the migration corridor, previous sightings in Aurora and Brule counties suggest that Whooping Cranes may occasionally fly over the area during seasonal migrations. Historical occurrence, location of the site within the migration corridor, and the presence of suitable foraging, roosting and stopover habitat indicate that Whooping Cranes may occur in the Crow Lake Alternative (Stehn 2007).

Piping Plover

The Piping Plover was listed as threatened on December 11, 1985 (50 FR 50726-50734) in its entire range except for the Great Lakes watershed, where it was listed as endangered. The final rule designating critical habitat for the wintering population of the Piping Plover was published in the *Federal Register* on July 10, 2001 (50 CFR 17 36038-36143).

The breeding range of the Northern Great Plains population of the Piping Plover includes wetlands in southeastern Alberta and the midwestern United States, including South Dakota. The

Piping Plover winters primarily on the Gulf of Mexico coast. Critical breeding habitat has been designated in areas of South Dakota.

The Piping Plover is known to nest from mid-April to mid-August on sparsely vegetated sandbars in rivers and on sand piles resulting from sand and gravel mining operations. They are also known to use inland alkali wetlands.

According to the USGS Breeding Birds of South Dakota Database, there have been no documented occurrences of the Piping Plover in Jerauld, Brule and Aurora counties (including the Crow Lake Alternative) to date.

Since Piping Plovers primarily occur along river corridors, they are unlikely to occur in the upland portions of the Crow Lake Alternative. Piping Plovers may migrate through the area during spring and fall migration. However, due to the absence of rivers and reservoirs within or near the Proposed Project, they would be infrequent visitors to the area, mostly in spring and fall.

Topeka Shiner

This species was listed by USFWS in December 1998. Critical habitat was designated on July 27, 2004. There is no designated critical habitat in South Dakota (Shearer 2003).

The Topeka shiner is a small pool dwelling minnow that is found in prairie streams of the lower Missouri River Basin and upper Mississippi River Basin. The range of this fish covers eastern South Dakota, southwest Minnesota, eastern Nebraska, Iowa, northern Kansas and Missouri. In South Dakota, the Topeka shiner has been found in about 40 streams in the James River, Big Sioux River and Vermillion River watersheds. The Topeka shiner currently retains its historic distribution and is locally abundant in South Dakota; however, population trends are unclear.

According to the SDDOT website, the species was observed in the Firesteel Creek and the West Branch Firesteel Creek, approximately 25 miles downstream of the Crow Lake Alternative, as recently as 2006 (SDDOT 2006). The eastern portion of the site (within Aurora County) supports the headwaters of three small tributaries to West Branch Firesteel Creek. Shearer (2003) lists BMPs for crossing streams inhabited by the Topeka shiner.

State-Listed Species

Whooping Crane (State Endangered)

The legal status, species ecology and local distribution of Whooping Cranes are discussed above.

Bald Eagle (State Threatened)

In 1978, the Bald Eagle was designated as a Federally-endangered species throughout most of the lower 48 states (43 FR 6233). The species was subsequently downlisted to threatened and in August 2007, the Bald Eagle was de-listed (USFWS 2007). The Bald Eagle remains protected under the Federal BGEPA and MBTA. The Bald Eagle is also listed as threatened by SDGFP (2007).

Bald Eagle habitat consists of large trees in proximity to water bodies that support fish populations (Groves *et al.* 1997). While fish represent the primary food source, Bald Eagles in the western United States also scavenge for carrion on big game winter range. Principal food items for Bald Eagles in South Dakota include fish, waterfowl, jackrabbits and carrion (Groves *et al.* 1997). Bald Eagles typically nest in tall trees or on cliffs within 0.5 mile of a permanent water body.

In South Dakota, Bald Eagles nest along the Missouri River in the central part of the State and along the James River in the southeast portion of the State. Bald Eagles winter near fish runs, waterfowl concentrations and open water. Impoundments along the Missouri River in South Dakota often support wintering and migrating Bald Eagles. Bald Eagles are generally present in this area between November and March. While there are no known nests or roost sites within the Crow Lake Alternative, the Bald Eagle may occur as a transient within the area during winter months.

State and Federal Species of Concern

Certain species are not protected as threatened, endangered or candidate species, but are identified as species of concern in the *South Dakota Comprehensive Wildlife Conservation Plan* (SDGFP 2006). The plan identifies wildlife species meeting three criteria of conservation concern: 1) Federal or State threatened or endangered listing; 2) South Dakota represents the majority of a species range; and 3) the species depends on a declining or unique habitat in South Dakota. Species in the Eastern Prairie Ecoregion, Mixedgrass Subregion that may occur in the Crow Lake Alternative are listed in **Table 3.4-8**. In addition to those species, South Dakota maintains a list of Level 1 priority bird species (**Table 3.4-8**). Level 1 priority bird species are those with the highest conservation priority due to: 1) high maximum abundance of the species within its range; 2) South Dakota constitutes the core of the species breeding range; and 3) the species is showing population declines in South Dakota or across its range (Bakker 2005). Some Level 1 birds are also species of concern.

The USFWS has also identified species, subspecies and populations of migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA. Birds of Conservation Concern (BCC) (2008) is the most recent effort to carry out this mandate.

Greater Prairie Chicken

Greater Prairie Chicken populations continue to decline, especially in grassland habitat. Greater Prairie Chickens are year-round residents of central South Dakota. Breeding occurs throughout the State; however, Greater Prairie Chicken breeding has not been documented in Jerauld County (Huxoll 2005). Greater Prairie Chickens were observed in the Crow Lake Alternative during 2009 aerial grouse lek surveys (WEST 2009a, Tierra EC 2009). Five grouse leks were found; one was confirmed as Greater Prairie Chicken. Three of the leks could not be identified to species (WEST 2009a).

Table 3.4-8 South Dakota Species of Concern, Level 1 Bird Species and Birds of Conservation Concern Occurring in the Crow Lake Alternative

| Common Name | Scientific Name | Ecosystem | Global Rank | State Rank | BCC | Occurrence |
|----------------------------|-----------------------------------|----------------------------|-------------|------------|-----|------------------------|
| Birds | | | | | | |
| Greater Prairie Chicken | <i>Tympanuchus cupido</i> | Grass/shrub | G4 | S4 | No | Occurs |
| Sharp-tailed Grouse | <i>Tympanuchus phasianellus</i> | Grass/shrub | G4 | S4 | No | Occurs |
| LeConte's Sparrow | <i>Ammodramus leconteii</i> | Riparian/wetland | G4 | S1 | No | May occur ¹ |
| Chestnut-collared Longspur | <i>Calcarius ornatus</i> | Grass/shrub | G5 | S4 | Yes | May occur ¹ |
| American Bittern | <i>Botaurus lentiginosus</i> | Riparian/wetland | G4 | S4 | No | May occur |
| Northern Harrier | <i>Circus cyaneus</i> | Grassland | G5 | S5 | No | Occurs |
| Ferruginous Hawk | <i>Buteo regalis</i> | Grassland | G4 | S4 | No | May occur |
| Swainson's Hawk | <i>Buteo swainsoni</i> | Grassland/woodland | G5 | S4 | Yes | Occurs |
| Upland Sandpiper | <i>Bartramia longicauda</i> | Grassland | G5 | S5 | Yes | Occurs |
| Marbled Godwit | <i>Limosa fedoa</i> | Riparian/wetland/grassland | G5 | S5 | Yes | Occurs |
| Wilson's Phalarope | <i>Phalaropus tricolor</i> | Riparian/wetland/grassland | G5 | S4 | No | May occur |
| Black-crowned Night Heron | <i>Nycticorax nycticorax</i> | Wetland | G5 | S3 | No | Occurs |
| Long-billed Curlew | <i>Numenius americanus</i> | Grassland | G5 | S3 | No | May occur |
| Grasshopper Sparrow | <i>Ammodramus savannarum</i> | Grassland | G5 | S4 | Yes | Occurs |
| Western Meadowlark | <i>Sturnella neglecta</i> | Grassland | G5 | S5 | No | Occurs |
| Lark Bunting | <i>Calamospiza melanocorys</i> | Grassland | G5 | S5 | No | May occur |
| Burrowing Owl | <i>Athene cucularia</i> | Grassland | G4 | S3/S4 | No | May occur |
| Black Tern | <i>Chlidonias niger</i> | Wetland/open water | G4 | S3 | No | Occurs ² |
| Prairie Falcon | <i>Falco mexicanus</i> | Grassland | G5 | S3/S4 | Yes | Occurs |
| Red-headed Woodpecker | <i>Melanerpes erythrocephalus</i> | Open woodland | G5 | S3 | Yes | Occurs |
| McCown's Longspur | <i>Calcarius mccownii</i> | Grassland | G5 | SU/SZ | Yes | Occurs |
| Dickcissel | <i>Spiza americana</i> | Grassland | G5 | S2 | Yes | Occurs |
| Loggerhead Shrike | <i>Lanius ludovicianus</i> | Grassland/woodland | G4 | S4 | Yes | Occurs |
| Invertebrates | | | | | | |
| Regal fritillary | <i>Speyeria idalia</i> | Grass/shrub | G3 | S3 | N/A | May occur |

¹Migratory occurrence is likely

²Known to occur at Crow Lake one mile north of the Crow Lake Alternative (SDNHP 2009)

KEY TO CODES USED IN GLOBAL AND STATE RANKS:

G1 S1 Critically imperiled because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 S2 Imperiled because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3 S3 Either very rare and local throughout its range, or found locally (even abundantly at some of its locations) in a restricted range, or vulnerable to extinction throughout its range because of other factors; in the range of 21 of 100 occurrences.

G4 S4 Apparently secure, though it may be quite rare in parts of its range, especially at the periphery. Cause for long term concern.

G5 S5 Demonstrably secure, though it may be quite rare in parts of its range, especially at the periphery.

SZ No definable occurrences for conservation purposes, usually assigned to migrants.

Bird species may have two State ranks, one for breeding (S#B) and one for nonbreeding seasons (S#N)

BCC – USFWS Birds of Conservation Concern

Sharp-tailed Grouse

Sharp-tailed Grouse populations continue to decline, especially in grassland habitat. Sharp-tailed Grouse are year-round residents in the western portion of South Dakota. Breeding occurs throughout the State distribution and has been documented in northwestern Jerauld County (Huxoll 2005). Sharp-tailed Grouse were observed in the Crow Lake Alternative during 2009 aerial grouse lek surveys (WEST 2009a). Five grouse leks were found; one was confirmed Sharp-tailed Grouse.

Le Conte's Sparrow

Le Conte's Sparrows may be common within its range where suitable habitat is present. Le Conte's Sparrows are migratory residents in central South Dakota and summer residents in the northeastern portion of the State. Breeding has not been documented in Aurora, Brule or Jerauld counties (South Dakota Birds 2009). Le Conte's Sparrows were not observed in the Crow Lake Alternative during 2009 avian use surveys (WEST 2009a).

Chestnut-collared Longspur

Chestnut-collared Longspurs are common within their range where suitable habitat is present. Declining populations are generally local. Chestnut-collared Longspurs are summer residents in South Dakota. Breeding has been documented in northwest Jerauld County (South Dakota Birds 2009). Chestnut-collared Longspurs were observed in the Crow Lake Alternative during 2009 breeding bird surveys (WEST 2009a).

American Bittern

American Bittern populations continue to decline in wetland habitat, especially in the southern portion of its range. American bitterns are summer residents in South Dakota. Breeding has not been documented in Aurora, Brule or Jerauld counties, but has been documented in northeastern South Dakota (South Dakota Birds 2009). American Bitterns were not observed in the Crow Lake Alternative during 2009 breeding bird surveys (WEST 2009a).

Northern Harrier

Northern Harrier populations continue to decline primarily due to loss of wetland habitat and pesticide use within its range. Northern Harriers are summer residents of South Dakota and breed throughout the State. Breeding has not been documented in Aurora, Brule or Jerauld counties although it is probable (South Dakota Birds 2009). Northern Harriers were observed in the Crow Lake Alternative during spring 2009 migratory and breeding bird surveys (WEST 2009a).

Ferruginous Hawk

Ferruginous Hawks are summer residents of South Dakota and breed throughout much of the State. They occur in the northern half of the Eastern Prairie Ecoregion (the northern portion of the Crow Lake Alternative). However, breeding has not been documented in Aurora, Brule or

Jerauld counties (South Dakota Birds 2009). Ferruginous Hawks were not observed in the area during spring 2009 migratory and breeding bird surveys (WEST 2009a).

Swainson's Hawk

Swainson's Hawks are summer residents of South Dakota and breed throughout much of the State. Breeding has been documented in Brule and Aurora counties (South Dakota Birds 2009). Swainson's Hawks were observed in the Crow Lake Alternative during spring 2009 migratory bird surveys (WEST 2009a).

Upland Sandpiper

Upland Sandpiper populations continue to decline primarily due to loss of wetland habitat and pesticide use. Upland Sandpipers are summer residents of South Dakota and breed throughout the State. However, breeding has not been documented in Aurora, Brule or Jerauld counties, although it is probable (South Dakota Birds 2009). Upland Sandpipers were observed in the Crow Lake Alternative during 2009 migratory and breeding bird surveys (WEST 2009a).

Marbled Godwit

Marbled Godwit populations continue to decline from historic levels primarily due to loss of wetland habitat within its range. Marbled Godwits are summer residents of South Dakota and breed throughout the State. Breeding has not been documented in Aurora, Brule or Jerauld counties (South Dakota Birds 2009). Marbled Godwits were observed in the Crow Lake Alternative during 2009 migratory and breeding bird surveys (WEST 2009a).

Wilson's Phalarope

Wilson's Phalarope populations continue to decline in local portions of its range due to loss of wetland habitat. Wilson's Phalaropes are summer residents of South Dakota and breed throughout the State. Breeding has not been documented in Aurora, Brule or Jerauld counties (South Dakota Birds 2009). Wilson's Phalarope was not observed in the Crow Lake Alternative during 2009 avian use surveys (WEST 2009a).

Black-crowned Night Heron

Black-crowned Night Heron threats include wetland loss and degradation, and pesticides that result in indirect adult mortality and direct mortality of eggs and young. Black-crowned Night Herons are summer residents of South Dakota and breed throughout the eastern part of the State. Breeding has been observed in Aurora and Jerauld counties (South Dakota Birds 2009). Black-crowned Night Herons were observed in the Crow Lake Alternative during spring 2009 migratory bird surveys (WEST 2009a).

Long-billed Curlew

Long-billed Curlew threats include habitat loss, degradation and alteration, nest site disturbance, and pesticide/herbicide impacts (SDGFP 2006). Long-billed Curlews are summer residents of South Dakota and breed throughout the western part of the State. Breeding has not been observed east of the Missouri River or in Aurora, Brule and Jerauld counties (South Dakota Birds 2009). Long-billed Curlews were not observed in the Crow Lake Alternative during spring 2009 migratory bird surveys (WEST 2009a).

Grasshopper Sparrow

Grasshopper Sparrow populations continue to decline in local portions of its range due to loss of grassland habitat. Grasshopper Sparrows are summer residents of South Dakota and breed throughout the State. Breeding has not been documented in Aurora, Brule or Jerauld counties, although it is probable (South Dakota Birds 2009). Grasshopper Sparrows were observed in the Crow Lake Alternative during 2009 breeding bird surveys (WEST 2009a).

Western Meadowlark

Western Meadowlark populations are secure, and considered abundant and widespread. Local populations are monitored due to declines in grassland habitat. Western Meadowlarks are summer residents of South Dakota and breed throughout the State. Breeding has not been documented in Jerauld County but has been documented in Aurora and Brule counties (South Dakota Birds 2009). Western Meadowlarks were observed in the Crow Lake Alternative during 2009 breeding and migratory bird surveys (WEST 2009a).

Lark Bunting

Lark Bunting populations are secure, and considered abundant and widespread. Local populations are monitored due to declines in grassland habitat in South Dakota. Lark Buntings are summer residents throughout South Dakota and breed throughout the State. Breeding has not been documented in Aurora, Brule or Jerauld counties, although it is probable (South Dakota Birds 2009). Lark Buntings were not observed in the Crow Lake Alternative during 2009 breeding and migratory bird surveys (WEST 2009a).

Burrowing Owl

Burrowing Owl threats include habitat loss, degradation and alteration, nest depredation, vehicle collisions and illegal shooting (SDGFP 2006). Burrowing Owls are summer residents throughout South Dakota and mostly breed in the western two-thirds of the State. Breeding has not been documented in Aurora, Brule or Jerauld counties, although it is probable in Brule County (South Dakota Birds 2009). Burrowing Owls were not observed in the Crow Lake Alternative during 2009 breeding and migratory bird surveys (WEST 2009a); however, two prairie dog towns were observed along the northwest Crow Lake Alternative boundary. Burrowing Owls have been

shown to prefer active prairie dog towns; it has been suggested that large colonies are needed to maintain Burrowing Owl populations.

Black Tern

Black Terns are summer residents throughout South Dakota and breed throughout the State. Breeding has been documented in Aurora County and is probable in Jerauld County (South Dakota Birds 2009). According to the SDNHP database (2009) and the NRCS (1999), Black Terns occur at Crow Lake approximately one mile north of the Crow Lake Alternative (**Figure 3.4-2**). Black Terns were not observed in the area during 2009 breeding and migratory bird surveys (WEST 2009a).

Prairie Falcon

Prairie Falcons are permanent residents throughout South Dakota; however, some move short distances to the south for the winter. They are known to breed in the western portion of the State; breeding has not been documented in Aurora, Brule or Jerauld counties (South Dakota Birds 2009). Prairie Falcons were observed in the area during 2009 breeding and migratory bird surveys (WEST 2009a).

Red-headed Woodpecker

Red-headed Woodpeckers are permanent residents throughout South Dakota. They are known to breed statewide. Breeding has been documented in Jerauld County, is possible in Aurora County, and is probable in Brule County (South Dakota Birds 2009). Red-headed Woodpeckers were observed in the area during 2009 breeding and migratory bird surveys (WEST 2009a).

McCown's Longspur

McCown's Longspurs are summer residents throughout South Dakota. South Dakota is on the eastern edge of their major breeding grounds (Bakker 2005), and they are rare breeders in western South Dakota (South Dakota Birds 2009). Breeding is not likely in Aurora, Brule or Jerauld counties. McCown's Longspurs were observed in the area during 2009 breeding and migratory bird surveys (WEST 2009a).

Dickcissel

Dickcissels are summer residents throughout South Dakota. Dickcissels preferred large grasslands in the mixed grass region of eastern South Dakota (Bakker 2005). Breeding is confirmed in Aurora and Brule counties, and is possible in Jerauld County (South Dakota Birds 2009). Dickcissels were observed in the area during 2009 breeding and migratory bird surveys (WEST 2009a).

Loggerhead shrike

Loggerhead Shrikes are summer residents throughout South Dakota. They breed statewide. Breeding is confirmed in Aurora County, and is possible in Brule and Jerauld counties (South Dakota Birds 2009). Loggerhead Shrikes were observed in the area during 2009 breeding and migratory bird surveys (WEST 2009a).

Regal Fritillary Butterfly

The regal fritillary butterfly is vulnerable, at moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer) and recent widespread declines. Regal fritillaries are distributed throughout the State and have been documented in all counties except three (Buffalo, Aurora and Miner). Regal fritillaries continue to do well in areas in and around Fort Pierre National Grassland in central South Dakota. Regal fritillaries were last documented in Jerauld County in 1992 (SDNHP 2007). The presence of regal fritillary butterflies in the Crow Lake Alternative is unknown.

3.4.5.2 Winner Alternative

Table 3.4-9 identifies the Federal and State-listed species that may occur in Tripp County, summarizes the habitat associations, lists the status of these species and lists the likelihood of occurrence in the Winner Alternative.

Federally-listed Species

Whooping Crane

Whooping Crane legal status and species ecology was discussed in **Section 3.4.5.1, Federally-listed Species, Whooping Crane**. Whooping Cranes have been observed in Tripp County near the Winner Alternative.

Table 3.4-9 Federal and State-listed Species that May Occur within the Winner Alternative

| Common Name | Scientific Name | Habitat Association | Status ¹ | Potential for Occurrence |
|-------------------------|-------------------------------|--|---------------------|---|
| Whooping Crane | <i>Grus americana</i> | Aquatic/wetland/cropland | E, SE | May occur |
| American burying beetle | <i>Nicrophorus americanus</i> | Large landscapes with abundant carrion and sandy soils | E | Occurs |
| Blacknose shiner | <i>Notropis heterolepis</i> | Aquatic | SE | None – occurs downstream in Keya Paha River |
| Northern redbelly dace | <i>Phoxinus eos</i> | Aquatic | ST | Occurs in Keya Paha Watershed* |
| Pearl dace | <i>Margariscus margarita</i> | Aquatic | ST | Occurs in Keya Paha Watershed* |

¹T = USFWS Threatened, E = USFWS Endangered, XN= Proposed/Experimental Population, ST = State Threatened, SE = State Endangered

*SDNHP data shows known occurrence in or very near the Winner Alternative.

The Winner Alternative is within the 75 percentile sighting band in the 200-mile migration corridor. No Whooping Cranes were observed during the avian use surveys conducted in the Winner Alternative in 2009 (WEST 2009b). The Winner Alternative contains numerous small wetlands, small lakes, mixed grasses and cultivated fields. Dog Ear Lake is the largest body of water in the project vicinity and is within 0.25 mile of the Winner Alternative. Little Dog Ear Lake is smaller, and is within the Winner Alternative. Emergent and submergent wetland vegetation is present in both lakes. There are no WPAs within or near the Winner Alternative. Wetland habitat represents slightly over one percent of the Winner Alternative, some of which is Whooping Crane roosting habitat. The Winner Alternative also contains cropland and is dominated by grasslands, both of which could be used as foraging habitat. Previous sightings in Tripp County suggest that Whooping Cranes may occasionally fly over the Winner Alternative during seasonal migrations. Historical occurrence, location of the Winner Alternative within the 200-mile migration corridor, and the presence of suitable foraging, roosting and stopover habitat indicate that Whooping Cranes may occur in the Winner Alternative (Stehn 2007).

American Burying Beetle

The American burying beetle was listed as an endangered species in 1989 (FR 54:29652-29655). A recovery plan was published in 1991 (USFWS 1991). No critical habitat has been designated for this species.

Considering the broad geographic range formerly occupied by the American burying beetle, it is unlikely that vegetation or soil type were historically limiting. Today, the American burying beetle seems to be largely restricted to areas most undisturbed by human influence.

Carrion availability (appropriate in size as well as numbers) may be more important in determining where beetles occur than the type of vegetation or soil structure. Habitats in Nebraska where these beetles have been recently found consist of grassland prairie, forest edge and scrubland. Specific habitat requirements are unknown.

Adults become active in early summer. These carrion beetles lay their eggs in the carcasses of small animals. The larvae receive parental care while feeding and growing. This is an extremely rare behavior in insects, a condition normally found only in social bees, wasps, ants and termites. The adults continually tend the carcass, removing fungi and covering the carrion ball with an antibacterial secretion. After about a week, the larvae have consumed all but the bones of the carcass, and the adults fly away. Adults live only one season. The young pupate in the nearby soil and emerge as adults about a month later. Beetles overwinter in the adult stage.

Burial of the food resource, which effectively removes it from intense competition by maggots, other carrion-feeding insects and even mammal scavengers, is of principal importance to the beetles and their young (USFWS 2009b).

Populations of American burying beetles have been extirpated from 90 percent of their original range. Known populations occur in South Dakota, Arkansas, Nebraska, Oklahoma and Rhode Island. A few collections have also been made in Kansas. There are perhaps fewer than 1,000

individuals in the only remaining population east of the Mississippi River, and the Oklahoma, Arkansas and South Dakota populations (currently being inventoried) are of uncertain size. South Dakota estimates over 500 square miles of occupied habitat with a high population density. American burying beetles have been documented in South Dakota in numerous locations in Tripp County between 1995 and 2003, including in the Winner Alternative (SDGFP 2009e).

State-Listed Species

Whooping Crane

The legal status and species ecology of Whooping Cranes are discussed in **Section 3.4.5.1, Federally-listed Species, Whooping Crane**. The local distribution of Whooping Cranes is discussed above.

Blacknose Shiner

Blacknose shiner is listed by the State as endangered. The species is an important indicator of high water quality and pristine streams. It is known to occur in southern Tripp County in the Keya Paha watershed (SDGFP 2006).

Northern Redbelly Dace

Northern redbelly dace is listed by the State as threatened. This species is widespread in the northern United States and Canada in boggy lakes, creeks and ponds. It is often found in tea-colored, slightly acidic water. It is found in the Big Sioux, Minnesota, Niobrara and Crow Creek drainages in South Dakota. Northern redbelly dace are known to occur in the Keya Paha watershed within one mile of the Winner Alternative (SDNHP 2009).

Pearl Dace

Pearl dace is listed by the State as threatened. It occurs in southern Tripp County in the Keya Paha watershed (SDGFP 2006) and has been documented within one mile of the Winner Alternative (SDNHP 2009).

State and Federal Species of Concern

State species of concern that may occur in the Winner Alternative are listed in **Table 3.4-10**. In addition to those species, South Dakota maintains a list of Level 1 priority bird species, and the USFWS maintains the BCC list (**Table 3.4-10**).

Table 3.4-10 South Dakota Species of Concern, Level 1 Bird Species and Birds of Conservation Concern Occurring in the Winner Alternative

| Common Name | Scientific Name | Ecosystem | Global Rank | State Rank | BCC | Occurrence |
|----------------------------|--------------------------------------|--------------------------------|-------------|-------------|-----|------------|
| Birds | | | | | | |
| Greater Prairie Chicken | <i>Tympanuchus cupido</i> | Grass/shrub | G4 | S4 | No | Occurs |
| Sharp-tailed Grouse | <i>Tympanuchus phasianellus</i> | Grass/shrub | G4 | S4 | No | Occurs |
| Chestnut-collared Longspur | <i>Calcarius ornatus</i> | Grass/shrub | G5 | S4 | Yes | Occurs |
| American Bittern | <i>Botaurus lentiginosus</i> | Riparian/wetland | G4 | S4 | No | May occur |
| Northern Harrier | <i>Circus cyaneus</i> | Grassland | G5 | S5 | No | Occurs |
| Ferruginous Hawk | <i>Buteo regalis</i> | Grassland | G4 | S4 | Yes | Occurs |
| Swainson's Hawk | <i>Buteo swainsoni</i> | Grassland/woodland | G5 | S4 | No | Occurs |
| Upland Sandpiper | <i>Bartramia longicauda</i> | Grassland | G5 | S5 | Yes | Occurs |
| Marbled Godwit | <i>Limosa fedoa</i> | Riparian/wetland/ grassland | G5 | S5 | Yes | Occurs |
| Wilson's Phalarope | <i>Phalaropus tricolor</i> | Riparian/wetland/ grassland | G5 | S4 | No | Occurs |
| Long-billed Curlew | <i>Numenius americanus</i> | Grassland | G5 | S3 | No | Occurs* |
| Grasshopper Sparrow | <i>Ammodramus savannarum</i> | Grassland | G5 | S4 | Yes | Occurs |
| Western Meadowlark | <i>Sturnella neglecta</i> | Grassland | G5 | S5 | No | Occurs |
| Lark Bunting | <i>Calamospiza melanocorys</i> | Grassland | G5 | S5 | No | May occur |
| Orchard Oriole | <i>Icterus spurious</i> | Grassland/woodland | | | No | Occurs |
| Burrowing Owl | <i>Athene cucularia</i> | Grassland | G4 | S3/S4 | Yes | Occurs |
| Black Tern | <i>Chlidonias niger</i> | Wetland/open water | G4 | S3B/ SZN | No | May occur |
| Trumpeter Swan | <i>Cygnus buccinator</i> | Aquatic/wetland | G4 | S3 | No | May occur* |
| American White Pelican | <i>Pelecanus erythrorhynchos</i> | Aquatic | G3 | S3B/ SZN | No | Occurs* |
| Prairie Falcon | <i>Falco mexicanus</i> | Grassland | G5 | S3/S4 | Yes | Occurs |
| Red-headed Woodpecker | <i>Melanerpes erythrocephalus</i> | Open Woodland | G5 | S3 | Yes | Occurs |
| Loggerhead Shrike | <i>Lanius ludovicianus</i> | Grassland/woodland | G4 | S4 | Yes | Occurs |
| Dickcissel | <i>Spiza americana</i> | Grassland | G5 | S2 | Yes | Occurs |
| Mammals | | | | | | |
| Plains spotted skunk | <i>Spilogale putorius interrupta</i> | Grassland | G5 | S3 | N/A | Occurs* |
| Fish | | | | | | |
| Plains topminnow | <i>Fundulus sciadicus</i> | Aquatic | G4 | S3 | N/A | Occurs* |

Table 3.4-10 South Dakota Species of Concern, Level 1 Bird Species and Birds of Conservation Concern Occurring in the Winner Alternative

| Common Name | Scientific Name | Ecosystem | Global Rank | State Rank | BCC | Occurrence |
|-----------------------|----------------------------|---------------------------|-------------|------------|-----|------------|
| Invertebrates | | | | | | |
| Regal fritillary | <i>Speyeria idalia</i> | Grass/shrub | G3 | S3 | N/A | May occur* |
| Amphibians | | | | | | |
| Plains leopard frog | <i>Rana blairi</i> | Aquatic/wetland/grassland | G5 | S3/S4 | N/A | Occurs* |
| Reptiles | | | | | | |
| Lesser earless lizard | <i>Holbrookia maculata</i> | Riparian/grassland | G5 | S2 | N/A | Occurs* |
| Western box turtle | <i>Terrapene ornate</i> | Aquatic | G5 | S2 | N/A | May occur* |

*SDNHP data shows known occurrence in or very near the Winner Alternative (SDNHP 2009).

KEY TO CODES USED IN GLOBAL AND STATE RANKS:

G1 S1 Critically imperiled because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 S2 Imperiled because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3 S3 Either very rare and local throughout its range, or found locally (even abundantly at some of its locations) in a restricted range, or vulnerable to extinction throughout its range because of other factors; in the range of 21 of 100 occurrences.

G4 S4 Apparently secure, though it may be quite rare in parts of its range, especially at the periphery. Cause for long term concern.

G5 S5 Demonstrably secure, though it may be quite rare in parts of its range, especially at the periphery.

SZ No definable occurrences for conservation purposes, usually assigned to migrants

Bird species may have two state ranks, one for breeding (S#B) and one for nonbreeding seasons (S#N)

BCC – USFWS Birds of Conservation Concern

Greater Prairie Chicken

The legal status and species ecology of Greater Prairie Chicken are discussed in **Section 3.4.5.1, State and Federal Species of Concern, Greater Prairie Chicken.**

Breeding has been documented in Tripp County (Huxoll 2005). Greater Prairie Chickens were observed in the Winner Alternative during spring and summer surveys as well as in 2009 aerial grouse lek surveys (WEST 2009b, Tierra EC 2009). Eight grouse leks were confirmed in the Winner Alternative during the surveys. Two of the leks were confirmed Greater Prairie Chicken. The remaining six could not be identified to species (WEST 2009b); however, three of the leks had Greater Prairie Chicken flying over and are likely associated with this species. Eight additional areas (six in the Winner Alternative and two adjacent to the Winner Alternative) likely support leks based on the presence of large or multiple groups of grouse, but leks were not confirmed.

Sharp-tailed Grouse

The legal status and species ecology of Sharp-tailed Grouse are discussed in **Section 3.4.5.1, State and Federal Species of Concern, Sharp-tailed Grouse.** Breeding has been documented in Tripp County (Huxoll 2005). Sharp-tailed Grouse were observed in the Winner Alternative during 2009 aerial grouse lek surveys (WEST 2009b). Eight grouse leks were confirmed in the Winner Alternative during the surveys. Six could not be identified to species (WEST 2009b); however, it is likely that some of them were Sharp-tailed Grouse. Eight additional areas (six in the Winner Alternative and two adjacent to the Winner Alternative) likely support leks based on

the presence of large or multiple groups of grouse, but leks were not confirmed. Three of these had Sharp-tailed Grouse.

Chestnut-collared Longspur

The legal status and species ecology of Chestnut-collared Longspur are discussed in **Section 3.4.5.1, State and Federal Species of Concern, *Chestnut-collared Longspur***. Chestnut-collared Longspur breeding has been documented in southern Tripp County (South Dakota Birds 2009). Chestnut-collared Longspurs were observed in the Winner Alternative during 2009 breeding bird surveys (WEST 2009b).

American Bittern

The legal status and species ecology of American Bittern are discussed in **Section 3.4.5.1, State and Federal Species of Concern, *American Bittern***. Breeding has not been documented in Tripp County, but it is possible (South Dakota Birds 2009). American Bitterns were not observed in the Winner Alternative during 2009 breeding bird surveys (WEST 2009b).

Northern Harrier

The legal status and species ecology of Northern Harrier are discussed in **Section 3.4.5.1, State and Federal Species of Concern, *Northern Harrier***. Breeding has not been documented in Tripp County although it is possible (South Dakota Birds 2009). Northern Harriers were observed in the Winner Alternative during spring 2009 migratory bird surveys (WEST 2009b).

Ferruginous Hawk

The legal status and species ecology of Ferruginous Hawk are discussed in **Section 3.4.5.1, State and Federal Species of Concern, *Ferruginous Hawk***. Breeding has not been documented in Tripp County, although it is probable (South Dakota Birds 2009). Ferruginous Hawks were observed in the Winner Alternative during spring 2009 avian use surveys (WEST 2009b).

Swainson's Hawk

The legal status and species ecology of Swainson's Hawk are discussed in **Section 3.4.5.1, State and Federal Species of Concern, *Swainson's Hawk***. Breeding has been documented in Tripp County, although it is probable (South Dakota Birds 2009). Swainson's Hawks were observed in the Winner Alternative during spring 2009 migratory bird surveys (WEST 2009b).

Upland Sandpiper

The legal status and species ecology of Upland Sandpiper are discussed in **Section 3.4.5.1, State and Federal Species of Concern, *Upland Sandpiper***. Breeding has not been documented in Tripp County, although it is probable (South Dakota Birds 2009). Upland Sandpipers were observed in the Winner Alternative during 2009 migratory and breeding bird surveys (WEST 2009b).

Marbled Godwit

The legal status and species ecology of Marbled Godwit are discussed in **Section 3.4.5.1, State and Federal Species of Concern, *Marbled Godwit***. Breeding has not been documented in Tripp County (South Dakota Birds 2009). Marbled Godwits were observed in the Winner Alternative during 2009 migratory bird surveys (WEST 2009b).

Wilson's Phalarope

The legal status and species ecology of Wilson's Phalarope are discussed in **Section 3.4.5.1, State and Federal Species of Concern, *Wilson's Phalarope***. Breeding has not been documented in Tripp County, although it is probable (South Dakota Birds 2009). Wilson's Phalarope was observed in the Winner Alternative during 2009 breeding bird surveys (WEST 2009b).

Long-billed Curlew

The legal status and species ecology of Long-billed Curlew are discussed in **Section 3.4.5.1, State and Federal Species of Concern, *Long-billed Curlew***. Breeding has been confirmed in southern Tripp County (South Dakota Birds 2009). Long-billed Curlews were not observed in the Winner Alternative during spring 2009 avian use surveys (WEST 2009b).

Grasshopper Sparrow

The legal status and species ecology of Grasshopper Sparrow are discussed in **Section 3.4.5.1, State and Federal Species of Concern, *Grasshopper Sparrow***. Breeding has not been documented in Tripp County, although it is possible (South Dakota Birds 2009). Grasshopper Sparrows were observed in the Winner Alternative during 2009 breeding bird surveys (WEST 2009b).

Western Meadowlark

The legal status and species ecology of Western Meadowlark are discussed in **Section 3.4.5.1, State and Federal Species of Concern, *Western Meadowlark***. Breeding has been documented in Tripp County (South Dakota Birds 2009). Western Meadowlarks were observed in the Winner Alternative during 2009 breeding and migratory bird surveys (WEST 2009b).

Lark Bunting

The legal status and species ecology of Lark Bunting are discussed in **Section 3.4.5.1, State and Federal Species of Concern, *Lark Bunting***. Breeding has not been documented in Tripp County, although it is probable (South Dakota Birds 2009). Lark Buntings were not observed in the Winner Alternative during 2009 breeding and migratory bird surveys (WEST 2009b).

Orchard Oriole

Orchard Oriole is a common summer resident throughout much of South Dakota. Breeding has not been documented in Tripp, although it is probable (South Dakota Birds 2009). Orchard Orioles were observed in the Winner Alternative during 2009 breeding bird surveys (WEST 2009b).

Burrowing Owl

The legal status and species ecology of Burrowing Owl are discussed in **Section 3.4.5.1, State and Federal Species of Concern, Burrowing Owl**. Breeding has not been documented in Tripp County (South Dakota Birds 2009). Burrowing Owls were observed in the Winner Alternative during 2009 avian use surveys (WEST 2009b). There are two known prairie dog towns in the Winner Alternative that are suitable Burrowing Owl habitat: one in the west portion and one in the southeast portion.

Black Tern

The legal status and species ecology of Black Tern are discussed in **Section 3.4.5.1, State and Federal Species of Concern, Black Tern**. Breeding has been observed in Tripp County (South Dakota Birds 2009). Black Terns were not observed in the Winner Alternative during 2009 breeding and migratory bird surveys (WEST 2009b).

Trumpeter Swan

Trumpeter Swan threats include habitat loss, degradation and alteration resulting in the reduction of shallow areas, reduction in beaver ponds, irregular managed water flows, nest site disturbance, pesticide impacts, lead poisoning and illegal shooting (SDGFP 2006). Trumpeter Swans are summer residents in the western half of South Dakota; very little breeding is known in the State. Breeding has not been confirmed in Tripp County, although it is probable in southern Tripp County (South Dakota Birds 2009). Trumpeter Swans were not observed in the Winner Alternative during 2009 breeding and migratory bird surveys (WEST 2009b); however, they are known to occur at several lakes in and near the Winner Alternative, including Little Dog Ear Lake and Dog Ear Lake (SDNHP 2009).

American White Pelican

American White Pelican threats include habitat loss, degradation and alteration resulting in the reduction of shallow areas, irregular managed water flows, nest site disturbance and pesticide impacts (SDGFP 2009).

American White Pelicans are mostly migratory through South Dakota, although summer residents have been documented in northeastern South Dakota; very little breeding is known in the State (SDGFP 2006). Breeding has been observed but not confirmed in northwestern Tripp County (South Dakota Birds 2009). American White Pelicans were observed in the Winner Alternative during 2009 breeding and migratory bird surveys (WEST 2009b).

Prairie Falcon

The legal status and species ecology of Prairie Falcon are discussed in **Section 3.4.5.1, State and Federal Species of Concern, *Prairie Falcon***. Breeding has not been documented in Tripp County (South Dakota Birds 2009). Prairie Falcons were observed in the Winner Alternative during 2009 breeding bird surveys (WEST 2009b).

Red-headed Woodpecker

The legal status and species ecology of Red-headed Woodpecker are discussed in **Section 3.4.5.1, State and Federal Species of Concern, *Red-headed Woodpecker***. Breeding has been documented in Tripp County (South Dakota Birds 2009). Red-headed Woodpeckers were observed in the Winner Alternative during 2009 breeding bird surveys (WEST 2009b).

Dickcissel

The legal status and species ecology of Dickcissel are discussed in **Section 3.4.5.1, State and Federal Species of Concern, *Dickcissel***. Breeding has been documented in Tripp County (South Dakota Birds 2009). Dickcissels were observed in the Winner Alternative during 2009 breeding bird surveys (WEST 2009b).

Loggerhead Shrike

The legal status and species ecology of Loggerhead Shrike are discussed in **Section 3.4.5.1, State and Federal Species of Concern, *Loggerhead Shrike***. Breeding has not been documented in Tripp County but USGS indicates it is possible (South Dakota Birds 2009). Loggerhead Shrikes were observed in the Winner Alternative during 2009 breeding bird surveys (WEST 2009b).

Plains Spotted Skunk

The plains spotted skunk was formerly common but their populations began declining in the mid-1900s. The decrease may be related to the changes in agriculture that stressed clean farming, thereby leaving little cover for skunks. It also is possible that increased pesticide use in agricultural areas has affected insect abundance, which skunks commonly eat.

Plains spotted skunk is known to occur in the northern portion of the Winner Alternative just south of Winner (SDNHP 2009).

Plains Topminnow

The plains topminnow has a limited range, with eastern South Dakota forming the upper, western edge. The plains topminnow is threatened by any activity causing alteration of its habitat, particularly groundwater withdrawal and drainage of wetlands (SDGFP 2009d).

The plains topminnow has a limited range within the Missouri River drainage, from eastern Wyoming to southwestern Minnesota and northwestern Iowa. The plains topminnow occurs in

the James, Vermillion and Big Sioux river basins in eastern South Dakota. It is most common in the James River basin where it occurs in several tributaries, as well as backwater pools and ponds. It is present west of the Winner Alternative in the Keya Paha watershed (SDNHP 2009).

Plains Leopard Frog

Plains leopard frogs occur in the vicinity of streams, natural and artificial ponds, reservoirs, creek pools, irrigation ditches and other bodies of water in plains grassland, sand hills, stream valleys and canyon bottoms. Plains leopard frogs may disperse far from water during wet, mild weather. Plains leopard frogs are known to occur in the northern portion of the Winner Alternative, approximately 5 miles south of Winner (SDNHP 2009).

Lesser Earless Lizard

Lesser earless lizard threats include habitat loss or degradation due to stabilization of sand dunes and loss of habitat from land conversion by agriculture and urban development (SDGFP 2006). Lesser earless lizards are known to occur in southern Tripp County, including the Winner Alternative (**Figure 3.4-2**) (SDGFP 2006; SDNHP 2009). This lizard prefers sand hills, sandy or gravelly areas along streams, sparsely vegetated or short grass ecosystems, and prairie dog towns (SDGFP 2006).

Western Box Turtle

Western box turtle threats include habitat loss or degradation due to stream channelization and impoundment, water pollution, removal of basking sites (large woody debris) and lack of nesting sites such as sandbars (SDGFP 2006). Western box turtles occur in southern Tripp County, including the Winner Alternative (**Figure 3.4-4**) (SDGFP 2006; SDNHP 2009).

Regal Fritillary Butterfly

The legal status and species ecology of Regal Fritillary are discussed in **Section 3.4.5.1, State and Federal Species of Concern, Regal Fritillary Butterfly**. Regal fritillaries are distributed throughout the State and have been documented in all counties except three (Buffalo, Aurora and Miner). The presence of regal fritillary butterflies in the Winner Alternative is unknown, although there is a documented occurrence five miles south of the Winner Alternative (SDNHP 2009).

3.5 CULTURAL RESOURCES

A cultural resource is an all-encompassing term for an archaeological, historical or Native American resource. They are sites, structures, landscapes and objects of some importance to a culture or community for scientific, traditional, religious or other reasons. They are the materials and built features left from past human activities that are studied to reconstruct past human behavior and actions. Native American resources include but are not limited to Traditional Cultural Properties (TCPs). A TCP is a resource that is eligible for inclusion in the NRHP

because of its association with cultural practices or beliefs of a living community that are rooted in that community's history and are important in maintaining the continuing cultural identity of the community. TCPs are most often associated with Native Americans, but can be associated with any group if they fit the criteria described in the definition of a TCP.

The ROI for cultural resource analysis encompasses locations within the alternatives that would potentially be disturbed by construction and operation of the Proposed Project. Additional prehistoric background information for the Proposed Project alternatives is in **Appendix D**. The Proposed Project must consider impacts to cultural resources under NEPA. Western is the lead Federal agency for Section 106 of the NHPA and its implementing regulations (36 CFR 800), which include the identification, management and treatment of cultural resources, as well as the government-to-government consultation process.

3.5.1 NATIVE AMERICANS OF THE PROPOSED PROJECT AREA, RELIGIOUS CONCERNS

Sioux

The Sioux tribes share a common language, history, social organization and culture (DeMallie 2001a:718). Historically the Sioux were referred to as the Great Sioux Nation. The seven nations that compose the Sioux are Mdewakanton, Wahpeton, Wahpekute, Sisseton, Yankton, Yanktonai and the Teton. The Sioux tribes within the Proposed Project area include the Santee (Eastern Dakota), the Yankton-Yanktonai (Western Dakota) and the Teton (Lakota) (**Figure 3.5-1**). Linguistic reconstruction places the homeland of the proto-western Siouans west of Lake Michigan; Sioux traditions recount an origin near “the northern lakes east of the Mississippi,” and 19th century Santee tradition records that “their fathers left the lakes around the headwaters of the upper Mississippi” and traveled downstream to the Minnesota River region because of the abundance of buffalo there. The archaeological record adds little to the question of Sioux origins because the prehistoric sites in Minnesota are classified as Woodlands tradition, as are the early historic or contact sites (DeMallie 2001a:718-719).

The Santee territory encompassed a transitional ecozone that included both deciduous forest and tall-grass prairie; the Yankton-Yanktonai territory was tall-grass prairie; and the Teton territory was primarily plains. Buffalo was considered the meat staple for the Santee, Yankton-Yanktonai and Teton Sioux tribes; however, as the buffalo began to disappear in the early 19th century, deer, fish and small mammals were also hunted by the Santee and the Yankton-Yanktonai. The Teton also hunted elk, deer, pronghorn, bighorn sheep, carnivores and rabbits. Tool kits varied within each ecozone, as expected; however, all three tribes continued to use the bow and arrow as their primary hunting implement. The Santee also gathered fruits, wild rice, wild beans, tubers, acorns, nuts and maple sap. Both the Santee and the Yankton-Yanktonai also cultivated corn, beans and squash. On the plains, the Teton gathered wild vegetables and fruits, but traded with the Arikara for their corn, squash and melons.

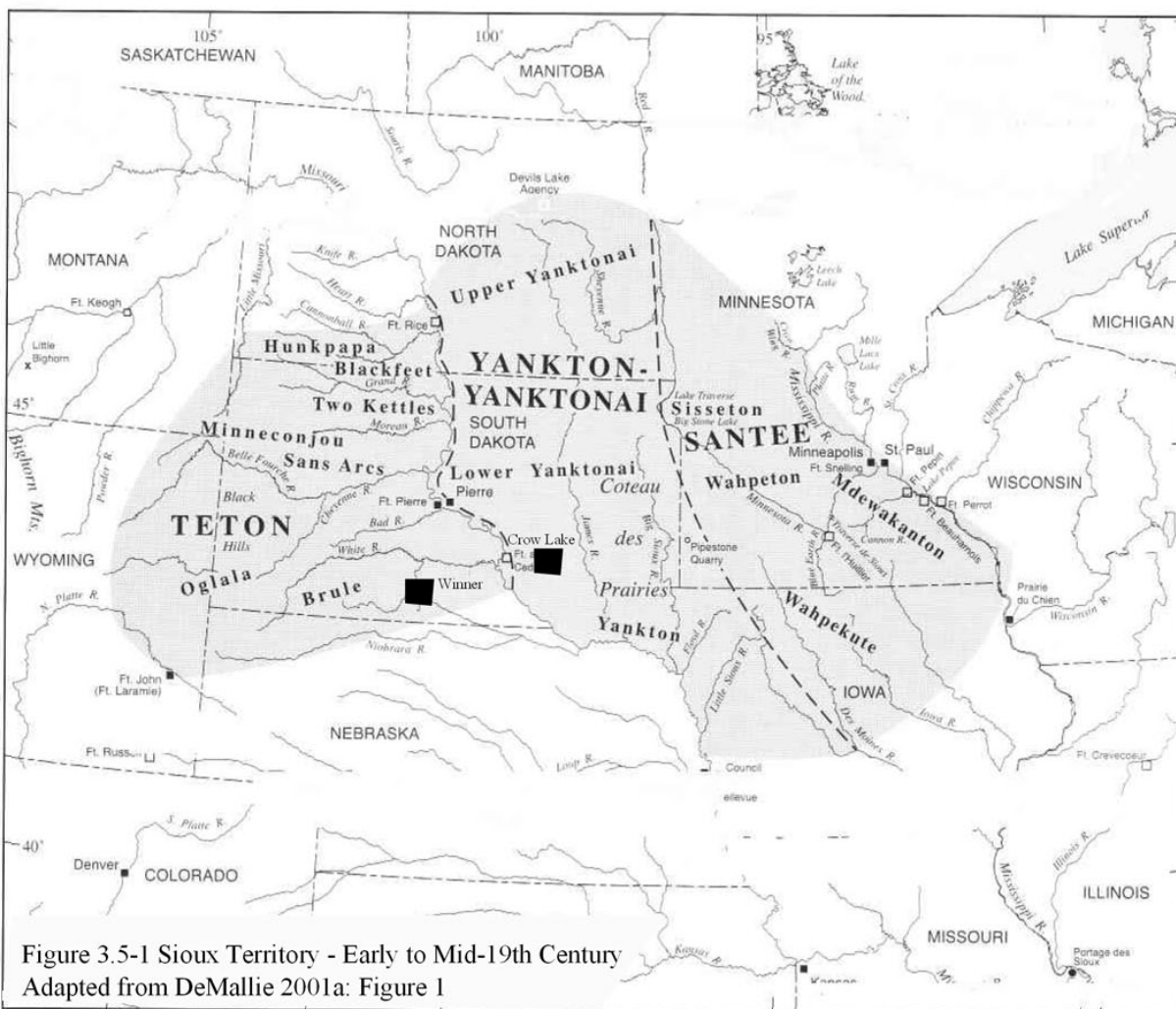


Figure 3.5-1 Sioux Territory – Early to Mid 19th Century

Houses in the forested and prairie areas (Santee and Yankton-Yanktonai) were either bark lodges (Santee) or earthlodges (Yankton-Yanktonai); however, all three tribes used tipis when hunting or living on the Plains.

Hidatsa

The Hidatsa tribe consists of three divisions (Hidatsa proper, Awatixa and Awaxawi). These divisions or village groups were slightly different from each other in culture, and each spoke a distinct dialect. Oral tradition asserts that the Awaxawi and Hidatsa proper came from the east, while Awatixa oral tradition maintains they have always resided on the Missouri River (Stewart 2001:329). Each Hidatsa village consisted of a number of large round earthlodge structures with a strong wooden framework. The earthlodges were generally closely packed together in no particular order. During the communal buffalo hunts (July and August) the people lived in tipis, which were arranged in a camp circle. In the fall people would also form small groups and live in other traditionally established camps where they hunted game and trapped eagles, returning before winter. During the winter the Hidatsa usually split the tribe and established

winter camps several miles away from the summer camp. Subsistence for the Hidatsa consisted of buffalo and other large game, fish, corn, sunflower and wild fruits and vegetables.

Mandan

The Mandan lived in villages on the middle Missouri River and lived a lifestyle that combined horticulture and buffalo hunting. By the early 1700s they had well established fortified villages on both sides of the Missouri River near the mouth of the Heart River, likely due to aggressive pressure from other villages and nomadic tribes from the central Plains (Wood and Irwin 2001:349). The Mandan sphere of influence also included a large area to the west that they used in the fall on annual bison hunts and eagle-trapping expeditions. Mandan village locations were chosen for defense. The villages were built on high terraces overlooking the Missouri River floodplain and their gardens were planted in the floodplains. Their earthlodges were arranged around a plaza, which might be located at the edge of the village or at the center. During the winter, the main village was abandoned and temporary villages were established with smaller earthlodges. Subsistence consisted of bison, deer, antelope, elk, small game, waterfowl, fish, corn, beans, squash and sunflowers.

Arikara

The Arikara are the northernmost member of the Caddoan language family, and are considered a divergent dialect of Pawnee (Parks 2001:365). Devastating smallpox epidemics during the late 18th century forced the Arikara to consolidate into two major villages in the area of the Cheyenne and Missouri Rivers in South Dakota. Over the next century they continued to move north along the Missouri River ending up eventually on the Fort Berthold Reservation in North Dakota in 1862.

Prior to the time of the epidemics the Arikara engaged in large communal buffalo hunts that probably extended westward onto the plains. It is believed that during the historic period the pressures of population loss and warfare caused them to concentrate their subsistence practices on horticulture and trading within the vicinity of their villages. Villages were placed on high terraces overlooking the Missouri River and contained between 30 to several hundred lodges, surrounded by a ditch and earthen embankment (Parks 2001:368).

The Arikara buried their deceased on the prairie beyond the village in mounded graves. These village cemeteries were often one mile in length. The Arikara occasionally placed shrines outside the village on the prairie. During the fall the Arikara left the permanent village and established a smaller, identical village in the bottomlands of the Missouri River for the winter months. The people lived in tepees during the communal buffalo hunts. Subsistence practices consisted of hunting and fishing. Buffalo were the most important game animal; however, other important sources of meat included antelope, deer, elk, smaller prey and fish. Corn was the most important crop, with as many as 11 varieties being grown. Beans, squash, melons, sunflower and tobacco were also grown. Wild plants and fruits were also gathered.

Religious Concerns

The Santee, Yankton-Yanktonai and Teton Sioux tribes, like most Native people, lived their lives with ceremony. Ethnographic accounts of the Sioux tribes suggest that the Proposed Project area may contain sensitive sites where sweatlodge, Sun Dance, vision quests, ritual fasting, life cycle events including surface remains or secondary pit burials, or eagle trapping ceremonies occurred (Albers 2001:768-769; DeMallie 2001b:789-790; DeMallie 2001c:806-808).

Likewise for the Hidatsa, Mandan and Arikara, ceremony was an important part of their lives, especially the “bundles” and associated ceremonies that were an integral part of their tribal and personal identity. The Hidatsa and the Mandan had dance ceremonies similar to the Sun Dance, and the Arikara also had the Sun Dance. All had the eagle-trapping ceremony as well. The Arikara also placed altars outside their villages on the prairie and constructed village cemeteries in the form of mounds also outside the villages (DeMallie 2001b; Parks 2001: 379-383; Stewart 2001:335-337; Wood and Irwin 2001:357-359).

Archaeologists are able to record the material remains of these sites; however, the religious or cultural significance of these types of sites, if encountered, can only be determined by the tribes.

Federal Responsibilities

Western is the lead Federal agency for the Section 106 process of the NHPA for the Proposed Project. To date, the Agencies have participated in three government- to-government meetings with the tribes on June 24, 2009, August 5, 2009, and September 29, 2009, to discuss the Proposed Project and tribal concerns. Based on the consultation meetings with Native American tribes the following concerns were identified:

- The need for Native American monitors during pedestrian surveys
- The need for a TCP survey that would include tribal elders and other tribal representatives
- The need for cultural sensitivity training for the construction crew
- The potential for historical significance and concerns in the area surrounding the Winner Alternative

Following the government-to-government consultation meetings, a record search was conducted by the Rosebud Sioux Tribe Historic Preservation Office in August 2009 for the Winner Alternative. The results indicated that there was no TCPs recorded in the tribe’s database within the Proposed Project area. However, it is the view of the tribe that this does not preclude the possibility of archaeological sites being present within the Proposed Project area (**Appendix D**).

A TCP study is proposed and will be conducted by consulting tribes prior to construction.

3.5.2 PREVIOUS RESEARCH

The Class I inventory included a review of existing cultural resources documentation on file in State repositories, a preliminary architectural history windshield survey within the Proposed

Project alternatives, and a review of 19th century Public Land Survey maps. The Class I study area included the area within the alternative boundaries as well as a one-mile buffer. The resulting report, *Class I Cultural Resources Inventory for the PrairieWinds SDI Project, Aurora, Brule, Jerauld, and Tripp Counties, South Dakota* (Mitchell 2009), is summarized below.

3.5.2.1 Crow Lake Alternative

Six previous cultural resource surveys have been conducted within the Crow Lake Alternative area (**Figure 3.5-2**). **Table 3.5-1** provides a summary of the six previous cultural resource surveys including author, year and general location of survey.

As a result of the previous surveys, six cultural resource sites were recorded. Site types include stone rings, foundations, farmsteads, a depression and an earthlodge village. Of these sites, one is recommended eligible by SHPO for the NRHP, two are recommended as not eligible and the eligibility of the remaining three sites is undetermined. **Table 3.5-2** provides a summary of the cultural site type, eligibility and general location.

Historic structures identified from previous investigations (**Table 3.5-1**) were also recorded within one mile of the Crow Lake Alternative, and include the Patten Consolidated School, Underwood United Methodist Church, David Grieve Place, H.C. Lyle Farm, Jerry Bennett Farm and the Elwood C. Lyle Wind Powered Mill. **Table 3.5-3** provides a summary of the historic structure type, eligibility and general location.

Table 3.5-1 Crow Lake Alternative Previous Cultural Resource Surveys

| Survey | Author | Year | Location |
|----------|---------------------------|---------|--|
| AAU-0017 | Vaillancourt | 2006 | Within Proposed Project boundary and one-mile buffer |
| AJE-0022 | Vaillancourt | 2008 | Within Proposed Project boundary and one-mile buffer |
| ESD-0263 | Buechler | 2001 | Within Proposed Project boundary and one-mile buffer |
| ESD-0288 | Buechler | 2002 | Within Proposed Project boundary and one-mile buffer |
| ESD-0301 | Buechler | 2003 | Within Proposed Project boundary and one-mile buffer |
| ESD-0068 | Buechler | 1986 | Within Proposed Project boundary and one-mile buffer |
| JExx11 | Petrosky Letter (burials) | No Date | Within one-mile of Proposed Project boundary |
















Table 3.5-2 Crow Lake Alternative Cultural Resource Sites

| Site | Site Type | NRHP Eligibility | Location |
|----------|--------------------|------------------|--|
| 39AU0007 | Foundation | Eligible | Within Proposed Project boundary |
| 39AU0012 | Farmstead | Not eligible | Within Proposed Project boundary |
| 39JE0039 | Stone Circle | Unevaluated | Within Proposed Project boundary |
| 39JE0044 | Foundation | Not eligible | Within Proposed Project boundary |
| 39JE0001 | Earthlodge Village | Unevaluated | Within one-mile of Proposed Project boundary |
| 39JE0037 | Depression | Unevaluated | Within one-mile of Proposed Project boundary |

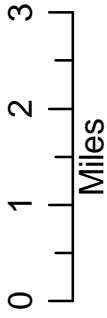
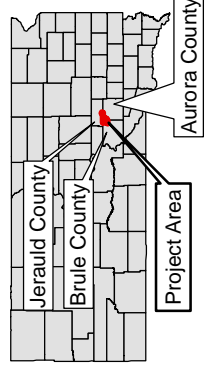
Table 3.5-3 Crow Lake Alternative Historic Structures

| Structure | Type | NRHP Eligibility | Location |
|------------------|-----------------------------------|-------------------------|--|
| AU00000059 | Patten Consolidated School | Eligible | Within Proposed Project boundary and one-mile buffer |
| AU00000060 | Underwood United Methodist Church | Eligible | Within one-mile of Proposed Project boundary |
| JE00000040 | David Grieve Place | Not eligible | Within one-mile of Proposed Project boundary |
| JE01200001 | H. C. Lyle Farm | Not eligible | Within Proposed Project boundary and one-mile buffer |
| JE01200002 | H. C. Lyle Farm | Not eligible | Within Proposed Project boundary and one-mile buffer |
| JE01200003 | H. C. Lyle Farm | Not eligible | Within Proposed Project boundary and one-mile buffer |
| JE01200004 | H. C. Lyle Farm | Not eligible | Within Proposed Project boundary and one-mile buffer |
| JE01300001 | Jerry Bennett Farm | Not eligible | Within one-mile of Proposed Project boundary |
| JE01300002 | Jerry Bennett Farm | Not eligible | Within one-mile of Proposed Project boundary |
| JE01300003 | Jerry Bennett Farm | Not eligible | Within one-mile of Proposed Project boundary |
| JE01300004 | Jerry Bennett Farm | Eligible | Within one-mile of Proposed Project boundary |
| JE01300005 | Jerry Bennett Farm | Not eligible | Within one-mile of Proposed Project boundary |
| JE01300006 | Jerry Bennett Farm | Not eligible | Within one-mile of Proposed Project boundary |
| JE01300007 | Jerry Bennett Farm | Not eligible | Within one-mile of Proposed Project boundary |
| JE01300008 | Jerry Bennett Farm | Not eligible | Within one-mile of Proposed Project boundary |
| JE01300009 | Jerry Bennett Farm | Not eligible | Within one-mile of Proposed Project boundary |
| JE01400001 | Elwood C. Lyle Wind Powered Mill | Eligible | Within one-mile of Proposed Project boundary |
| JE01400002 | Elwood C. Lyle Wind Powered Mill | Not eligible | Within one-mile of Proposed Project boundary |
| JE01500001 | Jerry Bennett Place | Not eligible | Within Proposed Project boundary and one-mile buffer |
| JE01500002 | Jerry Bennett Place | Not eligible | Within Proposed Project boundary and one-mile buffer |
| JE01500003 | Jerry Bennett Place | Not eligible | Within Proposed Project boundary and one-mile buffer |
| JE01500004 | Jerry Bennett Place | Not eligible | Within Proposed Project boundary and one-mile buffer |
| JE01500005 | Jerry Bennett Place | Not eligible | Within Proposed Project boundary and one-mile buffer |

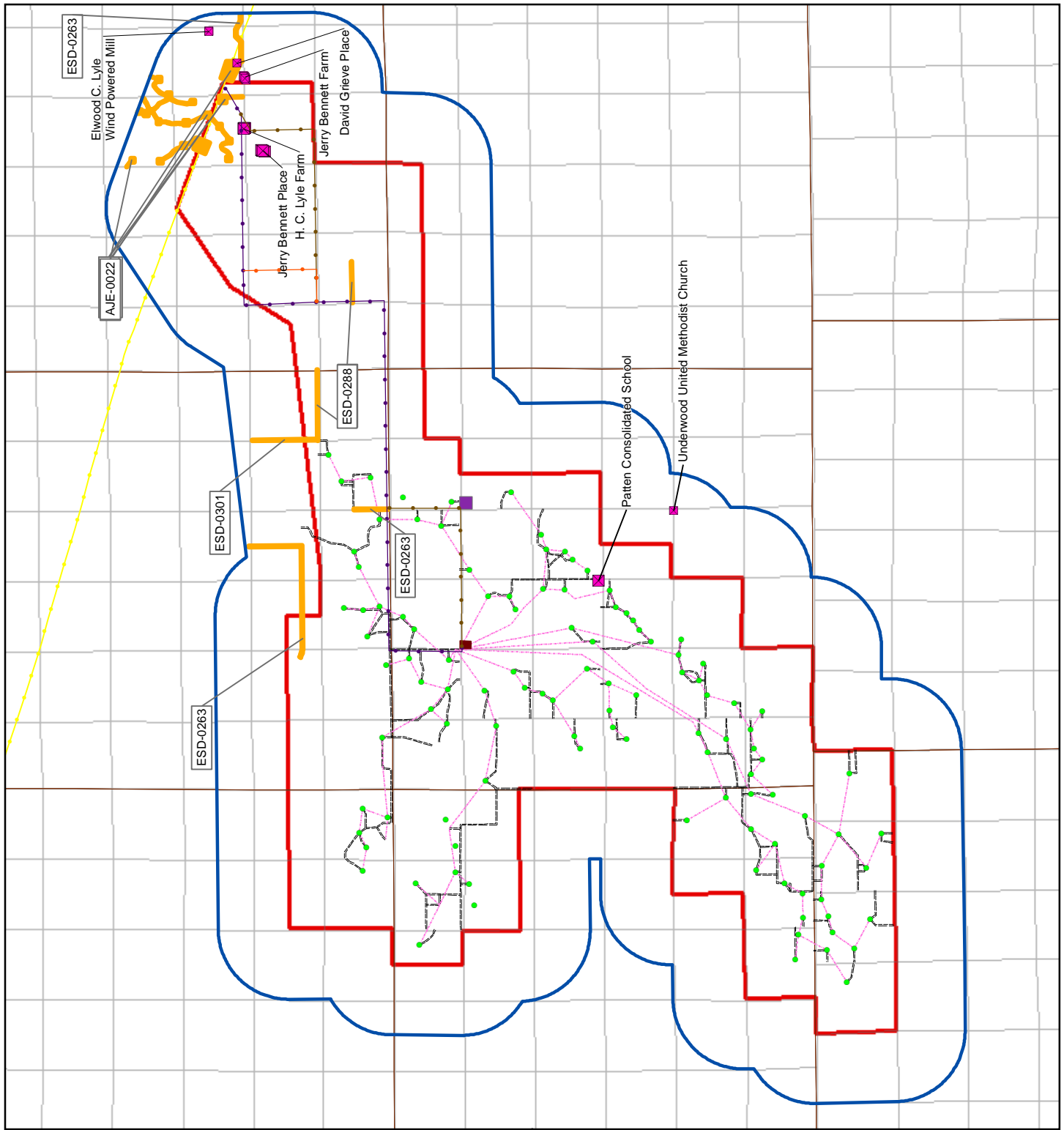
Crow Lake

-  Project Boundary
 -  One Mile Buffer
 -  Township and Range
 -  Section
 -  Historic Structures
 -  Previous Projects
 -  Western Utility Line
 -  Turbine
 -  Collector System
 -  Internal Road
 -  Substation
 -  O&M Building
- ### Overhead Transmission Line
-  Alternative 1
 -  Alternative 2
 -  Alternative 3

CONFIDENTIAL



| | |
|---|----------|
| SDPW Project | |
| Figure 3.5-2 | |
| Date: 06.03.09 | Cultural |
| Author: JAG | |
| C:\Data\Basin\Maps\EIS\Winem\Crow_Lake_Infrastructure | |



Due to engineering considerations, the transmission line Alternative 1 location includes area outside of the Crow Lake Alternative boundary; this boundary will be revised to include the transmission line route in the FEIS.

3.5.2.2 Winner Alternative

Nine previous cultural resource surveys have been conducted within the Winner Alternative area (**Figure 3.5-3**). **Table 3.5-4** provides a summary of the nine previous cultural resource surveys including author, year and general location of survey.

As a result of the previous surveys, 13 sites were recorded. Site types include cairns, farmsteads, isolated finds, a schoolhouse foundation and an artifact scatter. Of these sites, seven are recommended as not eligible, and the eligibility of the remaining six sites is undetermined. **Table 3.5-5** provides a summary of the cultural site type, eligibility and general location.

Table 3.5-4 Winner Alternative Previous Cultural Resource Surveys

| Survey | Author | Year | Location |
|----------|----------|------------------|--|
| ATP-0001 | Haberman | 1982a and 1982b | Within Proposed Project boundary |
| ATP-0005 | Haberman | 1985 | Within Proposed Project boundary |
| ATP-0010 | Haberman | 1982a and 1982b | Within Proposed Project boundary |
| ATP-0012 | Haberman | 1987 | Within Proposed Project boundary |
| ATP-0018 | Chevance | 1991a and 1991 b | Within Proposed Project boundary and one-mile buffer |
| ATP-0030 | Armitage | 2003 | Within Proposed Project boundary and one-mile buffer |
| ATP-0037 | Buechler | 2005 | Within Proposed Project boundary and one-mile buffer |
| WSD-0103 | Chevance | 1991a and 1991 b | Within Proposed Project boundary and one-mile buffer |
| WSD-0118 | Buechler | 1992 | Within Proposed Project boundary and one-mile buffer |

Table 3.5-5 Winner Alternative Cultural Sites

| Site | Site Type | NRHP Eligibility | Location |
|----------|-------------------|------------------|--|
| 39TP0019 | Cairn | Unevaluated | Within Proposed Project boundary |
| 39TP0020 | Cairn | Not eligible | Within Proposed Project boundary |
| 39TP0026 | Farmstead | Unevaluated | Within one-mile of Proposed Project boundary |
| 39TP0027 | School Foundation | Unevaluated | Within Proposed Project boundary |
| 39TP0028 | Farmstead | Not eligible | Within Proposed Project boundary |
| 39TP0034 | Farmstead | Not eligible | Within one-mile of Proposed Project boundary |
| 39TP0035 | Farmstead | Unevaluated | Within Proposed Project boundary |
| 39TP0036 | Farmstead | Unevaluated | Within Proposed Project boundary |
| 39TP0038 | Foundation | Unevaluated | Within Proposed Project boundary |
| 39TP0055 | Farmstead | Not eligible | Within Proposed Project boundary |
| 39TP0056 | Isolated find | Not eligible | Within Proposed Project boundary and one-mile buffer |
| 39TP0057 | Isolated find | Not eligible | Within Proposed Project boundary |
| 39TP0058 | Artifact scatter | Not eligible | Within Proposed Project boundary |

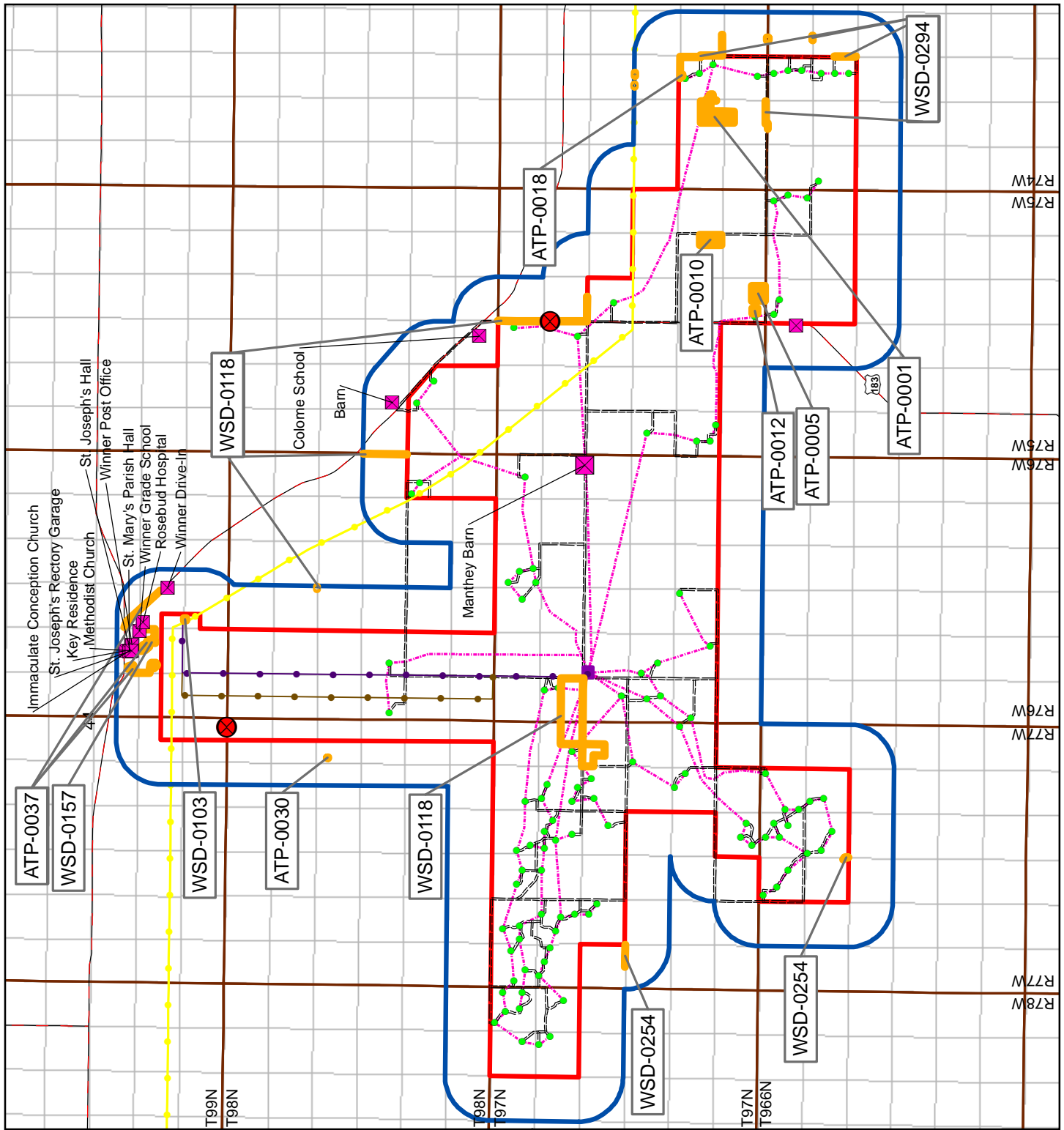
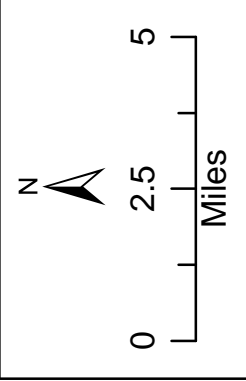
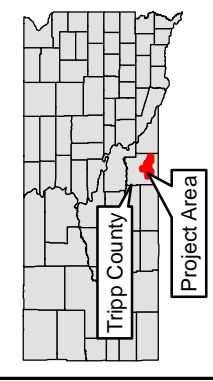
Winner

- Project Boundary
- 1 Mile Buffer
- Township and Range
- Section
- Bridges
- Historic Structures
- Previous Projects
- Western Utility Line
- State/US Highway
- Turbine
- Substation and O&M Building
- Internal Road
- Collector System

Overhead Transmission Line

- Alternative 1
- Alternative 2

CONFIDENTIAL



Historic structures identified from previous investigations were also recorded within one mile of the Winner Alternative, primarily from the Town of Winner. Fourteen structures were located within one mile, and seven are recommended as eligible for the NRHP. **Table 3.5-6** provides a summary of the historic structure type, eligibility and general location.

Also recorded within one mile of the Winner Alternative were two bridges. Both are recommended as not eligible. **Table 3.5-7** provides a summary of the eligibility and general location.

Table 3.5-6 Winner Alternative Historic Structures

| Structure | Type | NRHP Eligibility | Location |
|------------|------------------------------|------------------|--|
| TP00000001 | Key Residence | Eligible | Within one-mile of Proposed Project boundary |
| TP00000002 | Winner Post Office | Eligible | Within one-mile of Proposed Project boundary |
| TP00000006 | Colome School | Not eligible | Within one-mile of Proposed Project boundary |
| TP00000010 | Manthey Barn | Eligible | Within Proposed Project boundary |
| TP00000020 | Barn | Not eligible | Within one-mile of Proposed Project boundary |
| TP00000021 | Barn | Not eligible | Within one-mile of Proposed Project boundary |
| TP00000065 | Winner Drive-In | Eligible | Within one-mile of Proposed Project boundary |
| TP00000066 | Immaculate Conception Church | Eligible | Within one-mile of Proposed Project boundary |
| TP00000067 | St. Joseph's Hall | Not eligible | Within one-mile of Proposed Project boundary |
| TP00000068 | St. Joseph's Rectory Garage | Not eligible | Within one-mile of Proposed Project boundary |
| TP00000069 | St. Mary's Parish Hall | Eligible | Within one-mile of Proposed Project boundary |
| TP00000070 | Methodist Church | Not eligible | Within one-mile of Proposed Project boundary |
| TP00000071 | Winner Grade School | Eligible | Within one-mile of Proposed Project boundary |
| TP00000072 | Rosebud Hospital | Not eligible | Within one-mile of Proposed Project boundary |

Table 3.5-7 Winner Alternative Recorded Bridges

| Bridge | SHPO Number | NRHP Eligibility | Location |
|------------|-------------|------------------|--|
| 62-178-300 | TP00000039 | Not eligible | Within Proposed Project boundary |
| 62-270-372 | TP00000055 | Not eligible | Within Proposed Project boundary and one-mile buffer |

3.6 LAND USE

The ROI for land use includes areas of immediate disturbance associated with the Proposed Project Components and proposed Federal actions. Land uses such as agriculture, designated prime farmland and farmland of statewide importance, rangeland, natural resource conservation areas, residential uses and recreational opportunities were identified within the alternatives.

3.6.1 GENERAL LAND USE

The majority of the region, including both Proposed Project alternatives, is currently used for rangeland and agriculture. Western's Wessington Springs and Winner substations are industrial uses. Reviews of aerial photographs, existing public inventories (*e.g.*, USFWS, NWI, NRCS databases) and field studies were used to identify the land uses within the sites. Tierra EC contacted Aurora, Brule, Jerauld and Tripp county planners and managers to inquire whether existing land use plans for the counties were available (Hirsh 2009b) (Reindle 2009b) (Vissia 2009b) (Westindorf 2009b). Land use plans for Aurora and Brule counties are currently being revised. Jerauld County's Comprehensive Plan was approved in 1998. No land use plan is available for Tripp County.

3.6.1.1 Crow Lake Alternative

Table 3.6-1 and **Figure 3.4-1** (in **Section 3.4**) identify current land uses at the Crow Lake Alternative.

Table 3.6-1 Crow Lake Alternative Current Land Use

| Land Use | Percentage of Area |
|---------------------------------|--------------------|
| Rangeland (mixed-grass prairie) | 64% |
| Agricultural (cropland) | 33% |
| Wetland | 1.4% |
| Farmstead | <1% |
| Shelterbelt | <1% |
| Deciduous forest | <1% |
| Industrial (mine/quarry) | <1% |

Source: Tierra EC 2009

3.6.1.2 Winner Alternative

Table 3.6-2 and **Figure 3.4-3** (in **Section 3.4**) identify current land uses at the Winner Alternative.

Table 3.6-2 Winner Alternative Current Land Use

| Land Use | Percentage of Area |
|---------------------------------|--------------------|
| Rangeland (mixed-grass prairie) | 69% |
| Agricultural (cropland) | 29% |
| Deciduous forest | 1.8% |
| Farmstead | 1.6% |
| Shelterbelt | 1.5% |
| Wetland | 1.1% |
| Disturbed | <1% |

Source: Tierra EC 2009

3.6.2 PRIME FARMLAND AND FARMLAND OF STATEWIDE IMPORTANCE

The Federally-implemented Farmland Protection Policy Act (FPPA) is a set of programs and policies designed to protect farmland from urban sprawl. The FPPA created a system to classify farmland uses with categories that include prime farmland, unique farmland and farmland of statewide or local importance. FPPA requirements govern projects that may irreversibly convert farmland either directly or indirectly to nonagricultural use and are completed under the auspices of a Federal agency process. The FPPA does not authorize the Federal government to affect the property rights of private landowners or regulate the use of private land.

3.6.2.1 Crow Lake Alternative

The NRCS Soil Survey Geographic (SSURGO) Database (NRCS 2009) identifies 912 acres of prime farmland and 20,027 acres of farmland of statewide importance within the Crow Lake Alternative. If the Proposed Project is approved the post-construction facilities at the Crow Lake Alternative would cover less than two acres of prime farmland and less than 100 acres of farmland of statewide importance.

3.6.2.2 Winner Alternative

The SSURGO Database (NRCS 2009) identifies 132 acres of prime farmland and 10,930 acres of farmland of statewide importance within the Winner Alternative. If the Proposed Project is approved the post-construction facilities at the Winner Alternative would cover less than one acre of prime farmland and less than 60 acres of farmland of statewide importance.

3.6.3 CONSERVATION EASEMENTS

Areas within the Proposed Project alternatives include lands that are encumbered by perpetual easements administered by the USFWS for conservation. The USFWS has been purchasing conservation easements in the prairie pothole region since 1958 as an approach to waterfowl habitat management. These conservation easements are minimally restrictive instruments that grant the USFWS the ability to protect the grassland and wetland habitat on the properties where these easements are recorded. Easements are administered as part of the National Wildlife Refuge System, acquired as an alternative to fee-title acquisition and intended to perpetually protect grasslands and wetlands to benefit migratory birds and other wildlife.

3.6.3.1 Crow Lake Alternative

USFWS conservation easements within the Crow Lake Alternative boundary include 2,836 acres of Wetland Easement and 1,629 acres of Grassland Easement. The areas preserved account for 12 percent of the site in total, and are scattered throughout, as depicted in **Figure 3.4-2**. The conservation easements are further discussed in **Section 3.4**.

3.6.3.2 Winner Alternative

USFWS conservation easements within the Winner Alternative boundary include one 220-acre parcel identified as Grassland Easement west of the City of Colome, as depicted in **Figure 3.4-4**. This parcel amounts to 0.26 percent of the area included in the site. The conservation easements are further discussed in **Section 3.4**.

3.6.4 RESIDENTIAL USE

3.6.4.1 Crow Lake Alternative

The Crow Lake Alternative contains a total of 27 residences; each within a farmstead property, and may be occupied permanently, seasonally or for recreational/hunting purposes. The total farmstead acreage constitutes less than one percent of the acreage of the site. No residences are within 1,000 feet of the proposed turbine locations. The closest residence is approximately 1,270 feet away from a proposed turbine. The closest residence to the proposed transmission line right-of-way would be located approximately 1,900 feet away. The nearest residence to the alternative transmission corridor right-of-way is at least 2,800 feet away. The nearest residence to the proposed collector substation would be located approximately 6,700 feet away. The nearest residence to Western's existing Wessington Springs Substation is 1,500 feet away.

3.6.4.2 Winner Alternative

The Winner Alternative contains a total of 127 residences; each included within a farmstead property, and may be occupied permanently, seasonally or for recreational/hunting purposes. The total farmstead acreage constitutes less than 1.6 percent of the acreage of the site. One residence is located within 1,000 feet of a proposed turbine location, at a distance of approximately 800

feet. All other residences are located more than 1,000 feet from proposed turbine locations. The closest residence to a proposed transmission line is 100 feet away from the proposed transmission corridor centerline. The closest residence to an alternative transmission line is 900 feet away from the alternative transmission corridor centerline. The nearest residence to the proposed collector substation would be located approximately 1,400 feet away. The nearest residence to Western's existing Winner Substation is 300 feet away.

3.6.5 RECREATION

Recreational opportunities in the vicinity of each of the Proposed Project alternatives are the same. According to the South Dakota Division of Parks and Recreation (SDDPR) many outdoor recreation activities are available to the public within the State (*i.e.*, fishing, camping, off-highway vehicle use, Lewis and Clark exploration activities); these activities include a wide range of options depending on the time of year and specific interest. Hunting in South Dakota is a popular recreational activity that can be experienced year-round, on nearly five million acres of public land (SDDPR 2009), and is popular within the alternatives.

Pheasant and other upland game hunting, waterfowl hunting, small game, and deer hunting seasons all open in the fall. Late season deer and predator hunting occur during the winter months. In the spring, hunters can participate in turkey and light goose seasons. In the off-season, prairie dog hunting and other varmint hunting are permitted on private land (with permission).

3.7 TRANSPORTATION

The ROI for roads and highways includes existing and proposed roads near the Proposed Project alternatives that would be used for delivery of construction equipment, construction worker access and maintenance access. The ROI for aviation includes airports within 20 miles.

3.7.1 ROADS AND HIGHWAYS

This section includes an evaluation of current road conditions and aviation activities near the Proposed Project alternatives. Information used to develop this section includes regional transportation planning documents from SDDOT. Information pertaining to aviation safety standards was obtained from FAA.

Table 3.7-1 provides a brief inventory of the status and trends of the regional road infrastructure for each of the Proposed Project alternatives.

Table 3.7-1 Regional Roadways

| Roadway | Lane Count / Surface Type | Aurora County | Brule County | Jerauld County | Tripp County |
|------------------------------|---------------------------|---------------|--------------|----------------|--------------|
| Crow Lake Alternative | | | | | |
| Interstate 90 | Four-lane / paved | X | X | | |
| State Route 34 | Two-lane / paved | | | X | |
| State Route 42 | Two-lane / paved | X | | | |
| State Route 45 | Two-lane / paved | | X | | |
| State Route 50 | Two-lane / paved | | X | | |
| State Route 224 | Two-lane / paved | | | X | |
| U.S. Highway 281 | Two-lane / paved | X | | X | |
| County Road 11 | Two-lane / paved | X | | X | |
| Winner Alternative | | | | | |
| State Route 44 | | | | | X |
| State Route 49 | Two-lane / paved | | | | X |
| State Route 53 | | | | | X |
| U.S. Highway 18 | | | | | X |
| U.S. Highway 183 | Two-lane / paved | | | | X |

3.7.1.1 Crow Lake Alternative

County and township (section line) roads characterize the existing roadway infrastructure in and around the Crow Lake Alternative. The site is crossed and accessible by County Road (CR) 11. CR11 is a two-lane paved roadway intersecting Interstate 90 (I-90) to the south, and State Route (SR) 34 to the north. The general alignment of this road is straight and flat. No average daily traffic (ADT) counts are available for CR11. According to the latest available SDDOT 2009 ADT counts, the following list provides the ADT for the major roads that cross or are near the Crow Lake Alternative (**Figure 3.7-1**):

- I-90, south of the Crow Lake Alternative: average of greater than 2,500 ADT
- SR45, west of the Crow Lake Alternative: average of 401 to 1,025 ADT
- SR34, north of the Crow Lake Alternative: average of 401 to 1,025 ADT
- U.S. Highway (US) 281, east of the Crow Lake Alternative: average of 551 to 1,500 ADT

3.7.1.2 Winner Alternative

The Winner Alternative is crossed or accessible via SR44, SR49, SR53, US183 and US18. In addition, I-90 is located to the north of Tripp County, and SR47 is located to the east of Tripp County. The highways are mostly two-lane paved roadways, with general linear alignments, and collectively extend in multiple directions for access to the site (**Figure 3.7-2**).

According to the latest available ADT (SDDOT 2008), the following list provides the ADT for the major roads crossing or near the Winner Alternative:

- SR44, north of the Winner Alternative: of 960 to 1460 ADT
- SR49, northeast of the Winner Alternative: of 401 to 1,025 ADT
- SR53, west of the Winner Alternative: of 0 to 250 ADT

- US183, crossing the Winner Alternative in an north / south direction: of 125.5 to 400 ADT
- US18, northeast of the Winner Alternative: of 1,501 to 2,500 ADT

3.7.2 AVIATION

3.7.2.1 Crow Lake Alternative

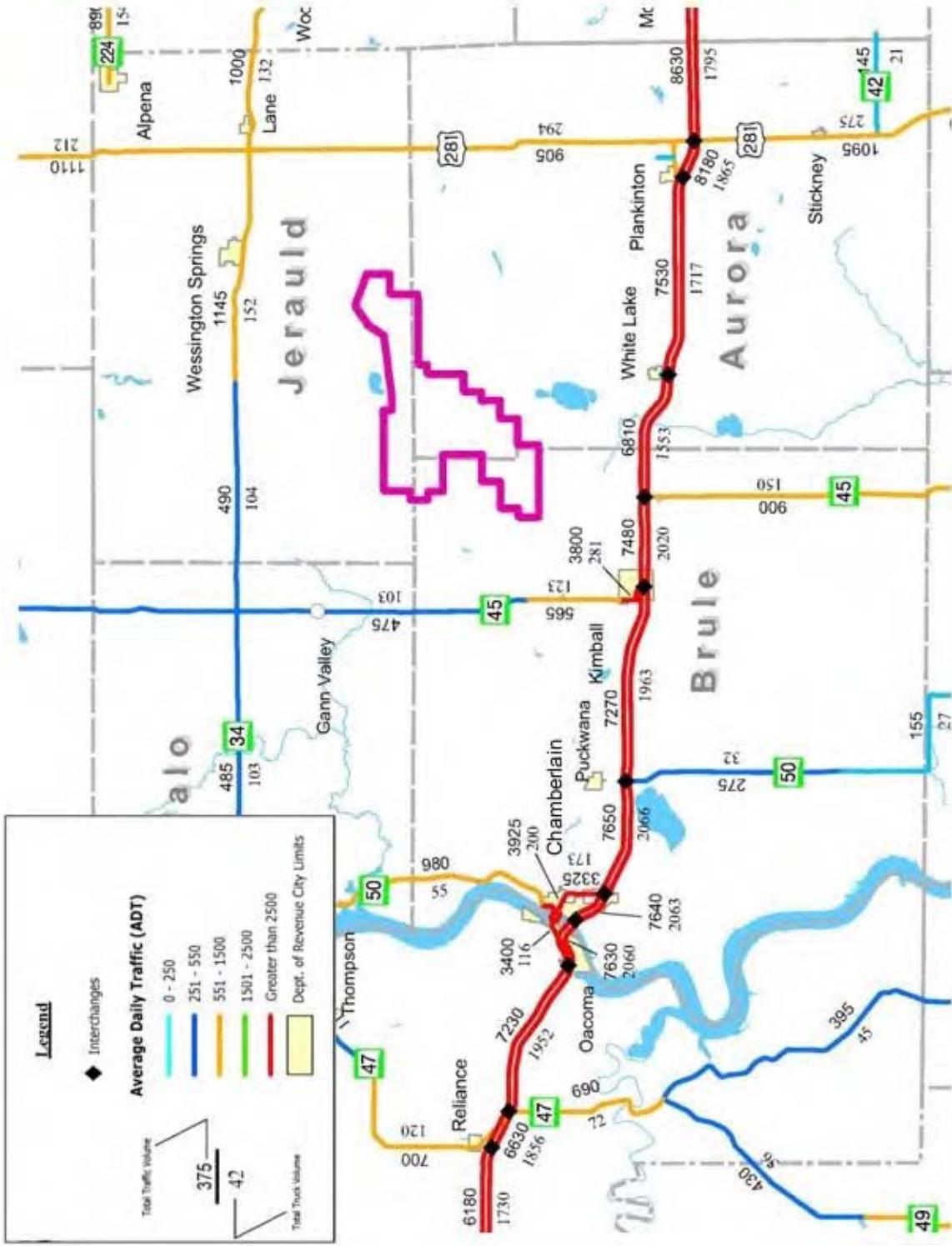
Three airports are within 20 miles of the Crow Lake Alternative. The Wessington Springs Airport and Kimball Municipal Airport are municipal airports serving the local communities, with less than 300 takeoffs/landings per year each (SDDOT Aeronautics 2007). Drake Farm is a farm airfield used for local agricultural purposes (annual reporting of takeoffs/landings was unavailable for this airfield).

- Wessington Springs Airport: Public airport near the Town of Wessington Springs, approximately eight miles from the site
- Kimball Municipal Airport: Public airport near the City of Kimball, approximately seven miles from the site
- Drake Farm: Private airport used primarily for agricultural purposes near the City of White Lake, approximately nine miles from the site

3.7.2.2 Winner Alternative

Two airports and one helipad are within 20 miles of the Winner Alternative. The Winner Regional Airport is used for takeoffs/landings over 20,000 times per year, with nearly half of that being local traffic staying within 20 miles; and the Gregory Municipal Airport is less heavily used at 6,500 takeoffs/landings per year, nearly a third of which is local traffic (SDDOT Aeronautics 2009).

- Winner Regional Airport: Public airport near the City of Winner, approximately two miles from the site
- Gregory Municipal Airport, Flynn Field: Public airport near the City of Gregory, approximately nine miles from the site
- Burke Hospital Helipad: Private Helipad used for hospital emergency rescue services, near the City of Burke, approximately 16 miles from the site



Source: SDDOT 2008

Figure 3.7-1 Crow Lake Alternative Traffic Flow Map



Source: SDDOT 2008

Figure 3.7-2 Winner Alternative Traffic Flow Map

3.8 VISUAL RESOURCES

This section evaluates the existing visual setting in the vicinity of the alternatives. The ROI includes areas within and adjacent to the Proposed Project area from which a person may observe changes to the visual landscape resulting from development of the Proposed Project Components. These areas include residences within the alternative site boundaries, nearby population centers and nearby roadways.

3.8.1 EXISTING VISUAL SETTING

The following aesthetic values were considered when evaluating the visual setting of the existing landscape:

- Form: topographic variation, mountains and valleys
- Line and pattern: roads and transmission lines
- Color and contrast: brightness and diversity
- Texture: vegetation, buildings and disturbed areas

3.8.1.1 Crow Lake Alternative

Topography of the Crow Lake Alternative is characterized by gently rolling hills with low to moderate relief. Elevation ranges from approximately 1,985 to 2,510 feet AMSL. Mixed-grass prairie (including rangeland, pastureland and CRP/prairie) dominates the vegetation. Additional vegetation includes cropland, wetlands (including stock ponds), farmsteads and patches of deciduous trees (mostly shelterbelts) (Tierra EC 2009). Overall, the Crow Lake Alternative is rural in character. The predominant land uses include livestock grazing, farming, sparse farmstead residential development, fencing and a rural road network consisting of paved roads, gravel roads and two-track roads developed primarily on portions of section lines. In addition, the existing Wessington Springs Wind Project, a 51-MW wind energy generating facility, is located adjacent to the northeast edge of the Crow Lake Alternative.

There are 27 farmstead residences located within the boundaries of the Crow Lake Alternative. The Town of Crow Lake is within one mile of the Proposed Project boundary and had a population of 46 at the time of the 2000 census. Kimball, Wessington Springs and White Lake are the only other population centers located within seven to nine miles of the Crow Lake Alternative.

Roadways described in **Section 3.7.3** from which the area may be viewed include I-90, SR45 and SR50 (see **Figure 3.7-1**). A portion of SR50 has been designated as the Native American Scenic Byway. The Native American Scenic Byway extends approximately 357 miles between North Dakota and South Dakota and provides memorial markers, monuments, museums and sacred sites that commemorate the heritage of the Sioux Nation. Portions of I-90 and SR50 are included in the Lewis and Clark Trail Driving Route (LCTDR), which is associated with the Lewis and Clark National Historic Trail (NHT). The Lewis and Clark NHT is administered by NPS. The LCTDR is a network of roads that generally tracks the Lewis and Clark NHT along the Missouri

River and provides vistas as well as historic markers. The Lewis and Clark NHT extends more than 3,700 miles and includes the entire Missouri River from its headwaters in Montana to its confluence with the Mississippi River near St. Louis, Missouri. Under the National Trail System Act and the Organic Act, NPS is charged with preservation of natural scenes and landscapes for enjoyment by future generations.

3.8.1.2 Winner Alternative

The rolling plains of the Winner Alternative include elevation ranges from approximately 1,644 to 1,985 feet AMSL. Mixed-grass prairie (including rangeland, pastureland and CRP/prairie) dominate the vegetation. Additional vegetation includes cropland, wetlands (including herbaceous wetlands, forested wetlands, stock ponds and lakes), deciduous forests, farmsteads and shelterbelts (Tierra EC 2009). Overall, the Winner Alternative is rural in character. The predominant land uses include livestock grazing, farming, sparse farmstead residential development, fencing and a rural road network consisting of paved roads, gravel roads and two-track roads developed primarily on portions of section lines.

There are 127 farmstead residences within the boundaries of the Winner Alternative. The towns of Winner and Colome are within one mile of the project boundary and had a population of 3,137 and 333, respectively, at the time of the 2000 census. Clearfield, Dallas and Gregory are the population centers within three to nine miles of the Winner Alternative.

Roadways described in **Section 3.7.3** from which the area may be viewed include I-90, SR44, SR47 and US18 (see **Figure 3.7-2**). In the vicinity of the Winner Alternative, portions of SR44 and US18 are included in the LCTDR.

3.8.2 KEY OBSERVATION POINTS

Key observation points (KOPs) were selected to depict the general visual setting of each of the alternatives and provide a baseline for developing visual simulations (presented in **Section 4.8**). Based on public input received during the EIS scoping process, local (*i.e.*, residents within and near the alternative site boundaries) sensitivity to visual changes as a result of the Proposed Project is low. Therefore, KOPs were selected for each of the alternatives based on topography and the potential to view the Proposed Project from the LCTDR and associated interpretive center. The foreground (area within three to five miles) and background (area further than three to five miles) are described for each KOP. **Figure 3.8-1** depicts the locations of the KOPs in relation to the alternatives and LCTDR.

3.8.2.1 Crow Lake Alternative

Three KOPs were identified for the Crow Lake Alternative. KOP 1 was identified as one of the areas with the highest elevation along SR50 that could provide a view of the Proposed Project to users of the LCTDR. KOP 1 is approximately 22 miles west of the Crow Lake Alternative and is located near Grosse, South Dakota. This KOP is representative of the Crow Lake Alternative and regional area. **Figure 3.8-2** below represents the existing visual condition from KOP 1; the view is to the east. The foreground includes property fencing, gravel road, mixed grasses, individual trees and agriculture. The background includes the gravel road, mixed grasses and a shelter belt (*i.e.*, trees planted in a row to create a wind and/or snow break). An existing transmission line is visible on the horizon.



Figure 3.8-2 KOP 1 Existing Condition

KOP 2 is the Lewis and Clark Interpretive Center (LCIC), located in the Chamberlain Rest Area on I-90 between exits 263 and 265. The LCIC is approximately 24 miles west of the closest point of the Crow Lake Alternative. KOP 2 depicts the view to the northeast from the LCIC. **Figure 3.8-3** below shows the existing visual condition from KOP 2. The foreground includes mixed grasses, I-90, shrubs, trees, billboards and two buildings. The background includes mixed grasses, shrubs and trees. One building, one communication tower and stadium lights are visible on the horizon.



Figure 3.8-3 KOP 2 Existing Condition

KOP 3 is the view northeast from near the intersection of I-90 and SR50, where the LCTDR is at its closest point (17 miles) to the Crow Lake Alternative. **Figure 3.8-4** below shows the existing condition from KOP 3. The foreground includes I-90 and grasses. The background includes grasses and trees. An existing transmission line is visible on the horizon.

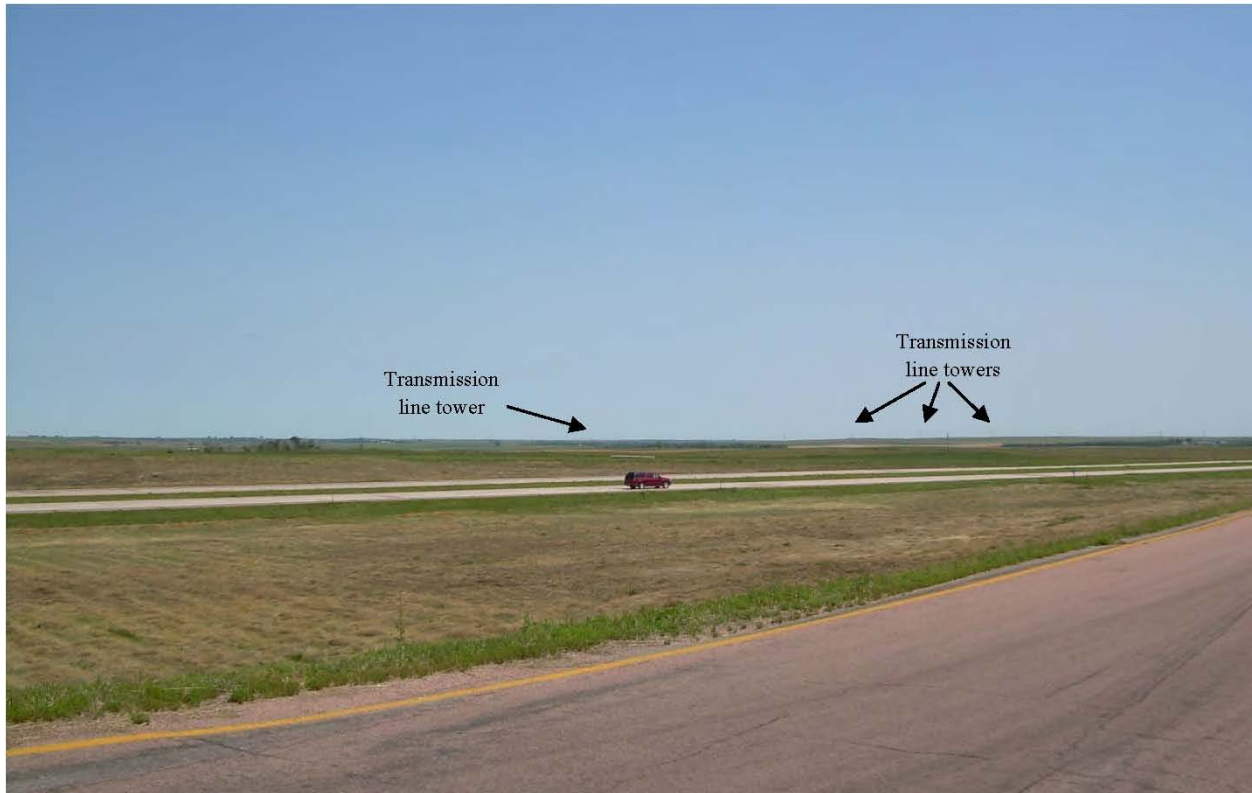


Figure 3.8-4 KOP 3 Existing Condition

3.8.2.2 Winner Alternative

Four KOPs were identified for the Winner Alternative and are representative of the site and surrounding area. KOPs 4 and 5 provide two views from near the intersection of SR44 and SR47. The closest point of the Winner Alternative is approximately 15 miles from KOP 4 and KOP 5. Two views are provided from this location because the location of the site boundary is irregular and the view when facing west is farther from Proposed Project Components when compared with the view when facing southwest. KOP 4 is the view to the west and is farther from Proposed Project Components as compared to KOP 5, which is the view to the southwest.

KOP 4 represents the view to the west. **Figure 3.8-5** below shows the existing condition from KOP 4. The foreground includes SR47, property fencing, mixed grasses, sparse trees and a telephone line. The background includes mixed grasses, agriculture, a shelter belt and sparse buildings.



Figure 3.8-5 KOP 4 Existing Condition

KOP 5 is the view to the southwest. **Figure 3.8-6** below shows the existing condition from KOP 5. The foreground includes SR47, property fencing, hay bales, agriculture, mixed grasses and sparse trees. The background includes mixed grasses, agriculture and hay bales.



Figure 3.8-6 KOP 5 Existing Condition

KOP 6 was identified as one of the areas with the highest elevation along SR47 that could provide a view of the Proposed Project to users of the LCTDR. KOP 6 is approximately 9.6 miles east of the Winner Alternative boundary; the view is to the west. **Figure 3.8-7** below shows the existing condition from KOP 6. The foreground includes SR47, property fencing, agriculture, mixed grasses and sparse shrubs and trees and a stock pond. The background includes mixed grasses, agriculture and farmstead properties.



Figure 3.8-7 KOP 6 Existing Condition

KOP 7 is near the intersection of US18 and SR47, which is located near Gregory, South Dakota. KOP 7 is the nearest point of the LCTDR to the Winner Alternative and is approximately eight miles east of the Winner Alternative boundary. **Figure 3.8-8** below shows the existing condition from KOP 7; the view is to the west. The foreground includes US18, property fencing, agriculture, mixed grasses and sparse trees. The background includes mixed grasses, agriculture and shelter belts. A water tower is visible on the horizon.



Figure 3.8-8 KOP 7 Existing Condition

3.9 NOISE

This section describes the basic measurements used for sound, applicable noise recommendations, and existing sources of noise within the Crow Lake and Winner alternative areas.

3.9.1 FUNDAMENTALS OF SOUND

Noise is defined generally as unpleasant, unexpected or undesired sound that disrupts or interferes with normal human activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to noise is annoyance. An individual's response to noise is influenced by the type of noise, perceived importance of the noise, appropriateness in the setting, time of day, type of activity during which the noise occurs and the sensitivity of the individual.

Intensity of sound is measured in units of decibels (dB) on a logarithmic scale. The A-weighted decibel (dBA) measures sound in a manner similar to the response of the human ear, so that more weight is given to the frequencies that people hear more easily. Typical ranges of common sounds include approximately 60 to 90 dBA for an automobile at a distance of 50 feet, approximately 76 to 89 dBA for a heavy truck at a distance of 50 feet, approximately 80 to 110 dBA for the driver of a motorcycle and approximately 103 to 115 dBA for the operator of a chainsaw (EPA 1979).

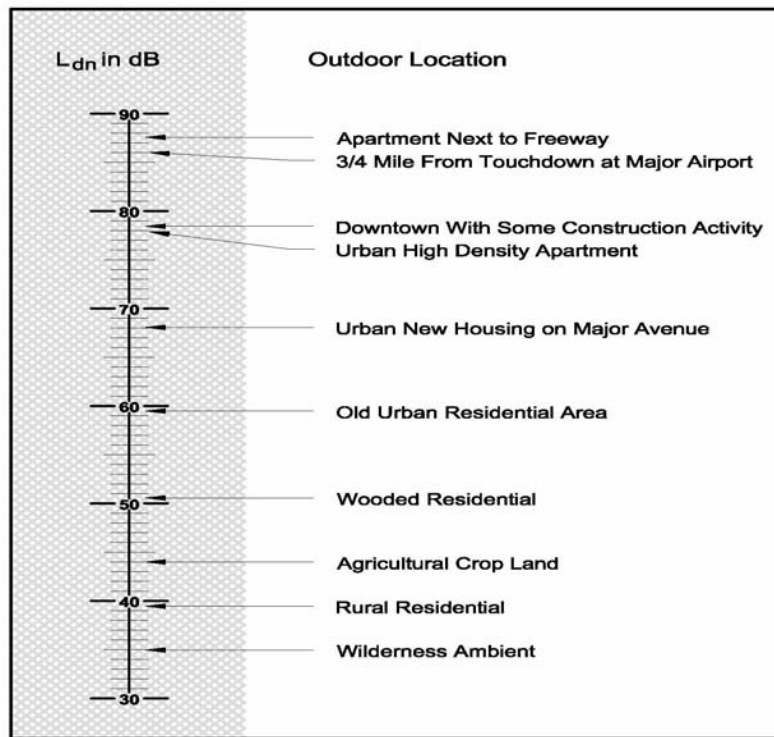
The L_{dn} is the A-weighted average sound level for a 24-hour period. It is calculated by adding a 10 dB "penalty" to sound levels in the night (10 p.m. to 7 a.m.) to compensate for the increased sensitivity to noise during the quieter evening and nighttime hours. Sound levels typical of outdoor areas using the L_{dn} are listed in **Figure 3.9-1**.

3.9.2 APPLICABLE RECOMMENDATIONS

In 1974, the EPA established recommendations to help protect public health and welfare. The EPA identified outdoor L_{dn} levels equal to or less than 55 dBA to prevent activity interference and annoyance (EPA 1974). When annual averages of the daily level are considered over a period of 40 years, the EPA identified average noise levels equal to or less than 70 dBA as the level of environmental noise that will prevent any measurable hearing loss over the course of a lifetime. The EPA-identified levels are recommended guidelines, not regulations. There are no noise codes applicable to wind projects in South Dakota (Reindle 2009c; Steele 2009; Westindorf 2009c).

3.9.3 EXISTING NOISE SOURCES AND SENSITIVE RECEPTORS

Existing sources of noise are similar for both the Crow Lake Alternative and the Winner Alternative; as such, the following discussion applies to both areas.



Source: EPA 1979.

Figure 3.9-1 Typical Sound Levels

The Proposed Project alternatives are located in rural areas, composed primarily of agricultural land use and prairie. The primary sources of noise include agricultural activity (farming equipment), recreation (primarily hunting), wind and vehicles traveling on county roads and low-traffic gravel roads. Based on **Figure 3.9-1**, typical day-night average outdoor noise levels for rural residential and agricultural areas range from 39 dBA to 44 dBA.

Sensitive noise receptors (*e.g.*, residences, schools, hospitals and offices) include sparse residences within the alternatives. The ROI for noise includes residences located within the Proposed Project alternatives and residences adjacent to proposed Federal action areas.

3.9.3.1 Crow Lake Alternative

Twenty-seven residences were identified within the Crow Lake Alternative. The nearest residence to a proposed turbine location would be located approximately 1,270 feet away. The nearest residence to the proposed transmission corridor centerline would be located approximately 1,900 feet away. The nearest residence to the alternative transmission corridor centerline would be located at least 2,800 feet away. The nearest residence to the proposed collector substation would be located approximately 6,700 feet away. The nearest residence to Western's Wessington Springs Substation is 1,500 feet away.

3.9.3.2 Winner Alternative

One-hundred and 27 residences were identified within the Winner Alternative. The nearest residence to a proposed turbine location would be located approximately 800 feet away. The nearest residence to the proposed transmission corridor would be located approximately 100 feet away from the proposed transmission corridor. The nearest residence to the proposed collector substation would be located approximately 1,400 feet away. The nearest residence to Western's Winner Substation is 300 feet away.

3.10 SOCIOECONOMICS

3.10.1 POPULATION TRENDS AND DEMOGRAPHIC CHARACTERISTICS

The socioeconomic analysis for this DEIS evaluated only the counties in which the Proposed Project alternatives are located. While economic effects could occur to additional counties and regions of the U.S., depending on where the specific Proposed Project Components are manufactured, these effects are impossible to determine at this time. For this reason, the ROI for the Crow Lake Alternative is limited to Aurora, Brule and Jerauld counties. The ROI for the Winner Alternative is limited to Tripp County. This section describes the population demographics within the ROI.

Socioeconomic indicators include characteristic demographics, income levels, employment opportunities and quality of life. These are issues that may be affected by construction and operation of the Proposed Project.

The U.S. Census Bureau, South Dakota Department of Labor (SDDL) and other online databases were used to obtain information on population trends and demographics, housing, education, available community services, income data and employment rates.

3.10.1.1 Crow Lake Alternative

Tables 3.10-1 and 3.10-2 below provide a brief inventory of the status and trends of some of the resources that are used as the basis for assessing socioeconomic impacts for the Crow Lake Alternative. Population trends and demographic data were used to set the regional context for the socioeconomic analysis.

The population in the vicinity of the Crow Lake Alternative is small compared to the overall population within South Dakota or the U.S. as a whole.

The nearest population centers to the Proposed Project area are White Lake, approximately 15 miles south with a 2008 population of 378, and Wessington Springs, approximately 17 miles northeast with a 2008 population of 846. These towns have services including hotels, restaurants and public schools; there is a hospital in Wessington Springs. The largest city near the Crow

Table 3.10-1 Crow Lake Alternative Population

| Year | Description | United States | South Dakota | Aurora County | Brule County | Jerauld County |
|------------|----------------------------------|---|--------------|---------------|--------------|----------------|
| Population | | | | | | |
| 2008 | Total population estimates | 304,059,724 | 804,194 | 2,867 | 5,205 | 1,982 |
| 2000 | Total population estimates | 281,421,906 | 755,657 | 3,060 | 5,351 | 2,279 |
| 2008 | Population in two largest cities | Aurora County: Plankinton-569, White Lake- 378 Brule County: Chamberlain –2,264, Kimball – 692 Jerauld County: Wessington Springs – 846, Alpena – 225 | | | | |
| 2000 | Population in two largest cities | Aurora County: Plankinton-601, White Lake- 405 Brule County: Chamberlain – 2338, Kimball – 745 Jerauld Count: Wessington Springs – 1011, Alpena – 265 | | | | |

Source Data: U.S. Census 2008

Table 3.10-2 Crow Lake Alternative Age and Gender Demographics

| Year | Description | South Dakota | Aurora County | Brule County | Jerauld County | Source Data* |
|------|----------------------------|--------------|---------------|--------------|----------------|--------------|
| 2008 | Total population estimates | 804,194 | 2,867 | 5,205 | 1,982 | 1 |
| Age | | | | | | |
| 2006 | Under 5 years | 52,218 | 158 | 307 | 105 | 2 |
| 2006 | 5 to 13 years | 90,502 | 336 | 701 | 162 | 2 |
| 2006 | 14 to 17 years | 45,550 | 254 | 398 | 115 | 2 |
| 2006 | 18 to 24 years | 86,114 | 223 | 464 | 162 | 2 |
| 2006 | 15 to 44 years | 319,559 | 993 | 1,892 | 668 | 2 |
| 2006 | 45 to 64 years | 192,194 | 750 | 1,319 | 627 | 2 |
| 2006 | 65 years and over | 110,530 | 612 | 885 | 553 | 2 |
| Sex | | | | | | |
| 2006 | Male | 385,620 | 1,494 | 2,474 | 1,065 | 2 |
| 2006 | Female | 390,313 | 1,407 | 2,713 | 1,071 | 2 |

*Source Data: 1 = U.S. Census 2008, 2 = U.S. Census 2006

Lake Alternative is Chamberlain, approximately 23 miles away with a 2008 population of 2,264; additional community populations are provided in the table for comparison.

3.10.1.2 Winner Alternative

Tables 3.10-3 and 3.10-4 provide a brief inventory of the status and trends of some of the resources that are used as the basis for assessing the socioeconomic impacts for the Winner Alternative. Population trends and demographic data were used to set the regional context for the socioeconomic analysis.

The population in the vicinity of the Winner Alternative is small compared to the overall population within South Dakota and the U.S. as a whole, with slightly more females than males.

The nearest cities to the Proposed Project area are Winner, directly north approximately 8 miles, with a 2008 population of 2,744; and Colome, approximately 11 miles southeast, with a 2008

population of 291. These cities have services including hotels, restaurants and public schools; there is a hospital in Winner.

Table 3.10-3 Winner Alternative Population

| Year | Description | United States | South Dakota | Tripp County |
|------------|-----------------------------------|--------------------------|--------------|--------------|
| Population | | | | |
| 2008 | Total population estimates | 304,059,724 | 804,194 | 5,681 |
| 2000 | Total population estimates | 281,421,906 | 755,657 | 6,386 |
| 2008 | Population Top Two Largest Cities | Colome-291, Winner-2,744 | | |
| 2000 | Population Top Two Largest Cities | Colome-340, Winner-3,137 | | |

Source Data: U.S. Census 2008

Table 3.10-4 Winner Alternative Age and Gender Demographics

| Year | Description | South Dakota | Tripp County |
|------|----------------------------|--------------|--------------|
| 2008 | Total population estimates | 804,194 | 5,681 |
| Age | | | |
| 2006 | Under 5 years | 52,218 | 318 |
| 2006 | 5 to 13 years | 90,502 | 718 |
| 2006 | 14 to 17 years | 45,550 | 393 |
| 2006 | 18 to 24 years | 86,114 | 530 |
| 2006 | 15 to 44 years | 319,559 | 2,092 |
| 2006 | 45 to 64 years | 192,194 | 1,587 |
| 2006 | 65 years and over | 110,530 | 1,247 |
| Sex | | | |
| 2006 | Male | 385,620 | 2,964 |
| 2006 | Female | 390,313 | 3,101 |

Source Data: U.S. Census 2006

3.10.2 ECONOMIC RESOURCES

3.10.2.1 Crow Lake Alternative

Tables 3.10-5 and 3.10-6 provide a brief inventory of the economic resources within the Crow Lake Alternative. The median income for households in South Dakota increased between 2000 and 2005, as well as for each of the counties to be crossed by the Proposed Project. This increase ranged from 8 percent in Jerauld County to 21 percent in Aurora County.

The economy of Aurora, Brule and Jerauld counties is comprised of multiple sectors and industries. A significant portion of jobs (15.8 percent to 24 percent) come from agriculture, forestry, fishing and hunting industries. In 2007, the unemployment rate in Aurora County, at 4.3 percent, was the highest of the three counties.

Table 3.10-5 Crow Lake Alternative Income

| Year | Description | South Dakota | Aurora County | Brule County | Jerauld County | Source Data |
|-------------|---|---------------------|----------------------|---------------------|-----------------------|--------------------|
| 2000 | Total population estimates | 755,657 | 3,060 | 5,351 | 2,279 | 1 |
| 2000 | Median income in 1999 (dollars) for households | 35,282 | 29,783 | 32,370 | 30,690 | 4 |
| 2005 | Median income in 2005 (dollars) for households | 40,096 | 35,953 | 35,412 | 33,152 | 4 |
| 2000 | Median income in 1999 (dollars) for families | 43,237 | 37,227 | 37,361 | 36,076 | 4 |
| 2000 | Per Capita Income (dollars) | 17,562 | 13,887 | 14,874 | 16,856 | 4 |
| 2000 | Median earnings in 1999 of full-time, year-round male workers (dollars) | 29,677 | 25,786 | 26,698 | 24,583 | 4 |
| 2000 | Median earnings in 1999 of full-time, year-round female workers (dollars) | 21,520 | 21,250 | 20,094 | 17,500 | 4 |

*Source Data: 1 = U.S. Census 2008, 4 = U.S. Census 2009

Table 3.10-6 Crow Lake Alternative Labor Force, Unemployment and Education

| Year | Description | South Dakota | Aurora County | Brule County | Jerauld County | Source Data* |
|---|--|--------------|---------------|--------------|----------------|--------------|
| 2000 | Total Population | 754,844 | 3,058 | 5,364 | 2,295 | 4 |
| Labor Force | | | | | | |
| 2000 | Population 16 years old and over, male and female combined labor force | N/A | 1,474 | 2,694 | 1,183 | 4 |
| 2009 | Population 16 years old and over, male and female combined Labor force | N/A | 1,540 | 2,890 | 1,570 | 4 |
| 2009 | Number of actually employed | N/A | 1,475 | 2,790 | 1,530 | 4 |
| Unemployment | | | | | | |
| 2000 | Population 16 years old and over, male and female combined unemployed | N/A | 27 | 183 | 29 | 4 |
| 2009 | Population 16 years old and over, male and female combined unemployed | N/A | 65 | 100 | 40 | 4 |
| 2007 | South Dakota Annual Average Unemployment Rates | N/A | 3.1% | 2.8% | 2.7% | 3 |
| % Distribution by Occupation | | | | | | |
| 2000 | Management, professional and related occupations | 32.6 | 39.7 | 40.5 | 35.4 | 4 |
| 2000 | Service Occupations | 15.6 | 17.2 | 18.2 | 15.0 | 4 |
| 2000 | Sales and Office Occupations | 26.5 | 17.7 | 22.0 | 19.8 | 4 |
| 2000 | Farming, fishing and forestry occupations | 1.9 | 4.0 | 2.8 | 4.8 | 4 |
| 2000 | Construction, extraction and maintenance occupations | 9.1 | 7.7 | 9.0 | 10.0 | 4 |
| 2000 | Production, transportation and material moving occupations | 14.2 | 13.7 | 7.4 | 15.0 | 4 |
| 2000 | % in Agriculture, forestry, fishing and hunting Industries | 7.7 | 24% | 15.8% | 22.6 | 4 |
| 2000 | % in Manufacturing Industry | 11.1 | 6.1% | 2.9% | 9.7 | 4 |
| 2000 | % Government Workers (local, State or Federal) | 15.3 | 15.1% | 14.2 % | 10.2 | 4 |
| Education (Persons 25 and older) | | | | | | |
| 2000 | High School graduate or higher (%) | 84.6 | 79.5 | 81.1 | 79.6 | 4 |
| 2000 | Bachelor's Degree or higher (%) | 21.5 | 12.7 | 20.6 | 12.3 | 4 |

*Source Data: 3 = SDDL 2009, 4 = U.S. Census 2009

3.10.2.2 Winner Alternative

Tables 3.10-7 and 3.10-8 provide a brief inventory of the economic resources within Tripp County. The median income for households in Tripp County increased by 14 percent between 2000 and 2005. The economy of Tripp County consists of multiple sectors and industries. A significant portion of jobs (23.3 percent) come from agriculture, forestry, fishing and hunting industries. In 2007, the unemployment rate in Tripp County was 3.6 percent.

Table 3.10-7 Winner Alternative Income

| Year | Description | South Dakota | Tripp County | Source Data* |
|------|---|--------------|--------------|--------------|
| 2000 | Total population estimates | 755,657 | 6,386 | 1 |
| 2000 | Median income in 1999 (dollars) for households | 35,383 | 28,333 | 4 |
| 2005 | Median income in 2005 (dollars) for households | 40,096 | 32,334 | 4 |
| 2000 | Median income in 1999 (dollars) for families | 43,237 | 36,219 | 4 |
| 2000 | Per Capita Income (dollars) | 17,562 | 13,776 | 4 |
| 2000 | Median earnings in 1999 of full-time, year-round male workers (dollars) | 29,677 | 22,588 | 4 |
| 2000 | Median earnings in 1999 of full-time, year-round female workers (dollars) | 21,520 | 18,070 | 2 |

*Source Data: 1 = U.S. Census 2008, 2 = U.S. Census 2006, 4 = U.S. Census 2009

Table 3.10-8 Winner Alternative Labor Force, Unemployment and Education

| Year | Description | South Dakota | Tripp County | Source Data* |
|---|--|--------------|--------------|--------------|
| 2000 | Total Population | 754,844 | 6,430 | 4 |
| Labor Force / Unemployment | | | | |
| 2000 | Population 16 years old and over, male and female combined labor force | N/A | 4,861 | 4 |
| 2009 | Population 16 years old and over, male and female combined Labor force | N/A | 2,995 | 4 |
| 2009 | Number of actually employed | N/A | 2,890 | 4 |
| Unemployment | | | | |
| 2000 | Population 16 years old and over, male and female combined unemployed | N/A | 133 | 4 |
| 2007 | South Dakota Annual Average Unemployment Rates | N/A | 3.1% | 3 |
| Employment Industry | | | | |
| 2000 | Management, professional and related occupations | 32.6 | 39.5 | 4 |
| 2000 | Service Occupations | 15.6 | 14.1 | 4 |
| 2000 | Sales and Office Occupations | 26.5 | 22.5 | 4 |
| 2000 | Farming, fishing and forestry occupations | 1.9 | 5.7 | 4 |
| 2000 | Construction, extraction and maintenance occupations | 9.1 | 8.9 | 4 |
| 2000 | Production, transportation and material moving occupations | 14.2 | 9.3 | 4 |
| 2000 | % in Agriculture, forestry, fishing and hunting Industries | 7.7 | 23.3 | 4 |
| 2000 | % in Manufacturing Industry | 11.1 | 1.1 | 4 |
| 2000 | % Government Workers (local, State or Federal) | 15.3 | 14.8 | 4 |
| Education (Persons 25 and older) | | | | |
| 2000 | High School graduate or higher (%) | 84.6 | 80.2 | 4 |
| 2000 | Bachelor's Degree or higher (percent) | 21.5 | 13.5 | 4 |

*Source Data: 1 = U.S. Census 2008, 3 = SDDL 2009, 4 = U.S. Census 2009

3.11 ENVIRONMENTAL JUSTICE

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, states that “each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations.”

This section identifies existing minority populations, low-income populations and tribal communities, defined as follows:







Minority: Individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic.

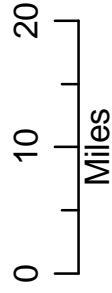
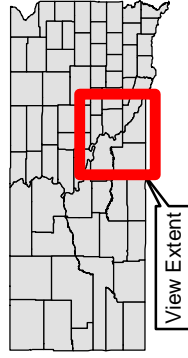
Minority population: Minority populations are either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. In identifying minority communities, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a geographically dispersed/transient set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect. The selection of the appropriate unit of geographic analysis may be a governing body’s jurisdiction, a neighborhood, census tract or other similar unit that is to be chosen so as to not artificially dilute or inflate the affected minority population. A minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds.

Low-income population: Low-income populations in an affected area are populations with the annual statistical poverty thresholds from the Bureau of the Census’ Current Population Reports on Income and Poverty. In identifying low-income populations, agencies may use the same criteria used to define a community for minority populations.

The ROI for environmental justice was identified based on census tracts. When first delineated, census tracts were designed to be homogeneous with respect to population characteristics, economic status and living conditions. Census tracts are relatively permanent statistical subdivisions of a county; usually have between 2,500 and 8,000 persons; and are intended to be maintained over a long time so that statistical comparisons can be made from census to census (Census Bureau 2009). The ROI for the Crow Lake Alternative includes the following census tracts: 9731, 9736 and 9746. The ROI for the Winner Alternative includes the following census tracts: 9716 and 9717. Data from the U.S. Census Bureau (U.S. Census 2000a and 200b) was obtained for the identified census tracts to characterize the minority and low income population occupying the ROI near the Proposed Project alternatives, depicted in **Figure 3.11-1**.

Alternatives

-  Crow Lake
-  Winner
-  State/US Highway
-  I-90
-  County Boundary
-  Census Tract

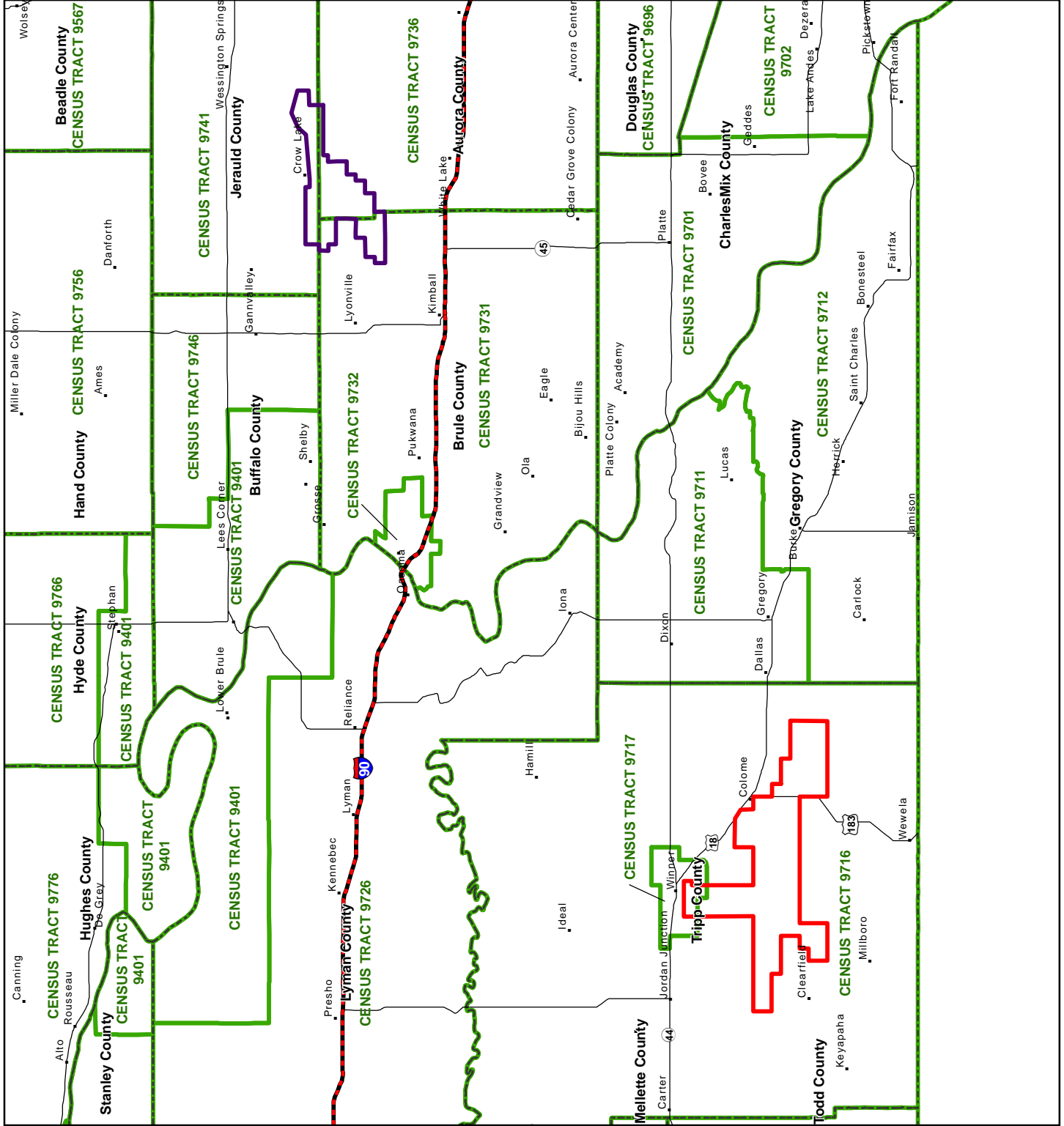


SDPW Project

Figure 3.11-1

Date: 09.02.09 Census Tracts Author: JAG

C:\Data\Basin\Maps\EIS\Census



3.11.1 MINORITY AND LOW-INCOME POPULATIONS

3.11.1.1 Crow Lake Alternative

Generally, the composition of race in South Dakota is predominantly White, less than 10 percent American Indian and Alaskan Native, and a very small percentage of other races. Within the three counties being considered, nearly all the population is white, with near equal gender representations in the predominantly agricultural region. **Tables 3.10-1, 3.10-2 and 3.10-3** in the prior section show the population and individual and demographics including age and sex for South Dakota, Aurora, Brule and Jerauld counties. As identified in **Table 3.11-1**, approximately 99 percent of the population is White within the area of the Crow Lake Alternative. Although there is not a large American Indian population within the area, there are several tribes with historic ties to the area. The Crow Lake Alternative is located approximately 12.5 miles east of the Crow Creek Reservation.

Table 3.11-2 depicts the poverty levels recorded in the census tracts encompassing the Crow Lake Alternative area. Overall for South Dakota, 13.2 percent of the individuals for whom the poverty status is determined are considered below poverty levels. The percentages of poverty levels in the census tracts crossing the site are lower in Aurora County (associated with census tract 9736), and slightly higher in Brule and Jerauld counties (associated with census tracts 9731 and 9741, respectively).

Table 3.11-1 Crow Lake Alternative Race Demographics

| Race | South Dakota | | Census Tract 9736 Aurora County | | Census Tract 9731 Brule County | | Census Tract 9741 Jerauld County | |
|--|--------------|---------|------------------------------------|---------|-----------------------------------|---------|-------------------------------------|---------|
| | Population | Percent | Population | Percent | Population | Percent | Population | Percent |
| White | 669,404 | 88.7% | 2,926 | 95.7% | 2,591 | 99.6% | 2,272 | 99.0% |
| Black or African American | 4,685 | 0.6% | 9 | 0.3% | 0 | 0% | 0 | 0% |
| American Indian and Alaskan Native | 62,283 | 8.3% | 59 | 1.9% | 32 | 1.2% | 13 | 0.6% |
| Asian | 4,378 | 0.6% | 3 | 0.1% | 17 | 0.6% | 3 | 0.1% |
| Native Hawaiian and Other Pacific Islander | 261 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |
| Some other race | 3,677 | 0.5% | 44 | 1.4% | 0 | 0% | 0 | 0% |
| Two or more races | 10,156 | 1.3% | 17 | 0.6% | 10 | 0.4% | 7 | 0.3% |

Source: U.S. Census 2009

Table 3.11-2 Crow Lake Alternative Poverty Levels

| | South Dakota | Census Tract 9736 Aurora County | Census Tract 9731 Brule County | Census Tract 9741 Jerauld County |
|---|--------------|------------------------------------|-----------------------------------|-------------------------------------|
| All individuals for whom poverty status is determined | 727,425 | 2,858 | 2,650 | 2,250 |
| Number below poverty level | 95,900 | 327 | 416 | 464 |
| Percent below poverty level | 13.2% | 11.4% | 15.7% | 20.6% |

Source Data: U.S. Census 2000b

3.11.1.2 Winner Alternative

In general, the Proposed Project area is located in a predominantly White, predominantly agricultural region. **Tables 3.10-4, 3.10-5 and 3.10-6** in the prior section show the population and individual and demographics including age, sex and race for South Dakota and Tripp County. As identified in **Table 3.11-3**, approximately 84 percent of the population is White and approximately 15 percent of the population is American Indian and Alaskan Native within the area of the Winner Alternative. The Winner Alternative is located 8.6 miles east of the Rosebud Reservation.

Table 3.11-4 depicts the poverty levels recorded in the census tracts encompassing the Winner Alternative area. Overall for South Dakota, 13.2 percent of the individuals for whom the poverty status is determined are considered below poverty levels, comparatively, the percentages of poverty levels in the census tracts crossing the site are higher.

3.12 HUMAN HEALTH AND SAFETY

Existing conditions related to air quality, water quality and noise are discussed in their respective resource sections in this chapter. Aviation is discussed in the transportation section. The following information presents the baseline for which impacts to human health and safety were analyzed. The Proposed Project alternatives are located in rural, agricultural areas with low population densities. The predominant activities are farm and range related. Access to private land is restricted by landowners. Public safety is provided by local law enforcement or emergency response agencies. Fire services for the Proposed Project areas are provided by county volunteer fire departments.

While potentially hazardous materials may be associated with areas used for agricultural activities (petroleum products used in farm equipment, pesticides, herbicides and isolated dump sites), a site inspection found nothing to indicate that there were pre-existing hazardous or environmental conditions in areas proposed for development (Terracon 2009a and 2009b).

Table 3.11-3 Winner Alternative Race Demographics

| Race | South Dakota | | Census Tract 9716 Tripp County | | Census Tract 9717 Tripp County | |
|--|--------------|---------|-----------------------------------|---------|-----------------------------------|---------|
| | Population | Percent | Population | Percent | Population | Percent |
| White | 669,404 | 88.7% | 2,492 | 92.6% | 3,133 | 83.8% |
| Black or African American | 4,685 | 0.6% | 0 | 0% | 2 | 0.1% |
| American Indian and Alaskan Native | 62,283 | 8.3% | 165 | 6.1% | 555 | 14.8% |
| Asian | 4,378 | 0.6% | 2 | 0.1% | 2 | 0.1% |
| Native Hawaiian and Other Pacific Islander | 261 | 0% | 0 | 0% | 0 | 0% |
| Some other race | 3,677 | 0.5% | 2 | 0.1% | 3 | 0.1% |
| Two or more races | 10,156 | 1.3% | 30 | 1.1% | 44 | 1.2% |

Source: U.S. Census 2009

Table 3.11-4 Winner Alternative Poverty Levels

| | South Dakota | Census Tract 9716 | Census Tract 9717 |
|---|--------------|-------------------|-------------------|
| All individuals for whom poverty status is determined | 727,425 | 2,670 | 3,624 |
| Number below poverty level | 95,900 | 553 | 701 |
| Percent below poverty level | 13.2% | 20.7% | 19.3% |

Source Data: U.S. Census 2000b

4 Environmental Consequences

This chapter identifies the potential environmental consequences of implementing the Proposed Project and the proposed Federal actions (Western's proposed action is to consider whether to allow an interconnection request; RUS's proposed action is to consider whether to provide financial assistance). The EIS addresses the requirements of applicable laws and regulations including the requirements of NEPA, Section 102(2), the CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500-1508), DOE NEPA Implementing Procedures (10 CFR Part 1021), RUS Environmental Policies and Procedures (7 CFR Part 1794), and the following statutes and Executive Orders:

- Agriculture Department Regulation (DR) 5600-2, Environmental Justice
- Agriculture DR 9500-3, Land Use Policy
- Agriculture DR 9500-4, Fish and Wildlife Policy
- Bald and Golden Eagle Protection Act
- USDA, Departmental Policy for the Enhancement, Protection and Management of the Cultural Environment
- Archeological Resources Protection Act
- Clean Air Act
- Clean Water Act
- Endangered Species Act
- Farmland Protection Policy Act
- Migratory Bird Treaty Act
- National Historic Preservation Act
- Native American Graves Protection and Repatriation Act
- Noxious Weed Act
- Presidential Executive Order 11988 (Floodplain Management)
- Presidential Executive Order 11990 (Wetlands Management)
- Presidential Executive Order 12088 (Federal Compliance With Pollution Control)
- Presidential Executive Order 12898 (Environmental Justice)
- Presidential Executive Order 13007 (Indian Sacred Sites)
- Presidential Executive Order 13112 (Invasive Weed Species)
- Presidential Executive Order 13186 (Environmental Stewardship / Transportation / Infrastructure)
- Presidential Executive Order 13045 (Protection of Children from Environmental Health Risks and Safety Risks)
- Safe Drinking Water Act
- Wild and Scenic Rivers Act

As described in **Chapter 3**, the affected environment or ROI is the physical area that bounds the environmental, sociological, economic, or cultural feature of interest that could be impacted by

implementing the Proposed Project and the proposed Federal actions. The boundaries of the ROI may vary depending on the resource being analyzed.

Direct and indirect impacts for each of the alternatives are identified for each resource component. Direct effects are “caused by the action and occur at the same time and place.” Indirect effects are “caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems” (40 CFR 1508.8).

Construction, operation and decommissioning of the Proposed Project and Western’s system modifications at its existing substation were analyzed to determine potential impacts for each alternative. As identified in **Chapter 2**, the “Proposed Project Components” include:

- Wind Turbine Generators and Foundations
- O&M Building
- Underground Communication System and Electrical Collector Lines
- Collector Substation and Microwave Tower
- Overhead Transmission Line
- Temporary Equipment/Material Storage or Lay-down Areas
- Crane Walks
- New and/or Upgraded Service Roads to Access the Facilities

The significance criteria used for determining potential impacts for each environmental and socioeconomic resource were developed based on scientific information, statute, or in response to public concern. Criteria were only developed for potential impacts identified as issues during the EIS scoping process. For issues not identified during the EIS scoping process, potential impacts are addressed as described in the impact assessment sections for each resource.

“Thresholds of significance” were used to determine the level of environmental impact for issues identified during the EIS scoping process. These thresholds of significance establish benchmarks for increasing levels of effects, the highest of which is significant impact. Significance can be viewed in two ways: 1) the effect is environmentally significant; and/or 2) the effect has policy significance. Thresholds of significance were determined by evaluating the expected impacts against the significance criteria for each of the alternatives.

The Applicants and Agencies have included BMPs and APMs for the Proposed Project and proposed Federal actions to minimize impacts associated with construction; these practices are described in **Chapter 2**, **Table 2.2** and **Table 2.3**, by resource area, as applicable. The Applicants and Agencies have committed to these included BMPs and APMs prior to the evaluation of environmental impacts. If impacts are determined to be less than significant after application of the included BMPs and APMs, then no additional mitigation is proposed. However, for significant impacts that would remain after these BMPs and APMs are applied,

additional mitigation (resulting from additional analyses or public/agency review and comment) would be included in the FEIS.

The impact analysis was conducted by evaluating potential impacts with BMPs and APMs in place, then weighing any residual impacts against the significance criteria and identifying additional mitigation measures, if necessary. The following thresholds of significance used for this analysis are listed in order of increasing level of impact:

- No Impact
- Less than Significant Impact
- Potentially Significant Impact with Proposed Mitigation

4.1 GEOLOGY AND SOILS

4.1.1 METHODS

The ROI for geology and soils includes areas of immediate disturbance associated with development of the Proposed Project Components and proposed Federal actions. As presented in **Section 3.1**, geologic data has been obtained from the South Dakota Geological Survey (SDGS). Reports prepared for local exploration and expansion of community water supplies provided additional information. Geologic units and physiographic provinces have been cross-checked against GIS data and maps obtained from the USGS and EPA (USGS 2009). Soil characteristics have been obtained from the NRCS database (NRCS 2009). Data obtained from the combination of these sources have been overlain on a GIS map of the Proposed Project Components in order to assess impacts.

4.1.2 SIGNIFICANCE CRITERIA

The principal measure of effect on soil resources is the amount and location of soils disturbed during construction and occupied during operations.

A significant impact to geology and soils would occur if:

- The Proposed Project and/or the proposed Federal actions would result in erosion, causing long-term impacts to other resources (*e.g.*, water quality)

4.1.3 IMPACT ASSESSMENT

For both alternatives, staging and construction activities would require sand and gravel resources. Sand and gravel resources are not available within the site boundaries, but are located in the vicinity. South Dakota's annual production of sand and gravel is approximately 8,000,000 tons per year (Peterson Hammond 1992). For the Proposed Project, each turbine base would use approximately 320 cubic yards of concrete, encompassing approximately 33,000 cubic yards total, and would require approximately 46,200 tons of sand and gravel. This amount is less than half of one percent of the sand and gravel annually generated within South Dakota. There could

also be potential for additional gravel to be used for road improvements. Use of these resources for the construction activities would not deplete the availability and supply of sand and gravel.

4.1.3.1 Crow Lake Alternative

Development of the Crow Lake Alternative would result in approximately 1,405 acres of temporary disturbance and approximately 133 acres of permanent impacts to soils. These potential impact estimates would be applicable regardless of which transmission line option would be selected.

Soils in the Proposed Project area are considered by NRCS to have a slight to moderate risk of erosion. During construction, existing vegetation would be removed in the areas associated with the Proposed Project Components, potentially increasing the risk of erosion. Once vegetation is removed in the vicinity of the construction areas, soils would be excavated to achieve necessary grades and put into stockpiles. Excavations would likely encounter the Quaternary sediments consisting of nonglacial alluvium, glacial deposits, loess, and colluvium, and near-surface or surface outcrops of Pierre Shale. Included BMPs and APMs (as listed in **Chapter 2, Table 2.2** and **Table 2.3**) and a SWPPP would be implemented for the construction, operation and decommissioning activities for the Proposed Project Components.

Further, geotechnical investigations would identify the stability of the soils and underlying geology to assist with turbine placement, design of foundations and specification of drainage controls. Grading would be designed to manage runoff and achieve long-term stabilization of restored temporary disturbance areas and areas with permanent installations. Foundation designs would consider compaction requirements for backfill, depth to the saturated zone, slope erosion potential and similar factors.

For the aforementioned reasons, implementing the Proposed Project would result in minimal erosion and would not cause long-term impacts to geology, soils, or water resources (see **Section 4.2**); thus, the impacts would be less than significant.

If the Proposed Project is approved, development of the Western system modifications at the Wessington Springs Substation would result in less than significant impacts to geologic and soil resources since work would be short-term in duration and confined to a previously disturbed and graded area. Development of the Western system modifications at the Wessington Springs Substation would employ the included BMPs and APMs (**Chapter 2, Tables 2.2** and **2.3**), and would adhere to a SWPPP.

4.1.3.2 Winner Alternative

Development of the Winner Alternative would result in approximately 3,188 acres of temporary disturbance and approximately 261 acres of permanent impacts to soils. In general, the impacts associated with the Winner Alternative would be similar to those identified for the Crow Lake Alternative.

Soils in the Proposed Project area are considered by NRCS to have a slight risk of erosion. As described for the Crow Lake Alternative, included BMPs and APMs (as listed in **Chapter 2, Table 2.2** and **Table 2.3**) and a SWPPP would be implemented. Geotechnical investigations would identify the stability of the soils and underlying geology to assist with turbine placement, design of foundations and specification of drainage controls. Development of the Proposed Project would result in less than significant impacts to geology, soils or water resources (see **Section 4.2**).

With the included BMPs and APMs (**Chapter 2, Tables 2.2** and **2.3**), and adherence to a SWPPP, Western's system modifications proposed for the Winner Substation would result in less than significant impacts, similar to the Wessington Springs Substation proposed for the Crow Lake Alternative.

4.1.3.3 No Action Alternative

Under the No Action Alternative, Western would not approve an interconnection request with the Applicants and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the Proposed Project would not be built and that the environmental impacts associated with construction and operation of the Proposed Project would not occur. There would be no geology and soils impacts associated with the No Action Alternative.

4.2 WATER RESOURCES

4.2.1 METHODS

The ROI for water resources encompasses those hydrologic systems that could be impacted by discharges, spills and/or stormwater runoff associated with implementing the Proposed Project and proposed Federal actions. The water resources assessment includes consideration of the compilations of technical memorandums for both alternatives (Terracon 2009a and 2009b). Surface water flows, impaired waters, floodplains, groundwater resources and wetlands data have been cross-checked against data and reports from the DENR, USGS and GIS maps from the EPA, USFWS and USGS. Potential impacts have been identified based on the available resource information, consideration of the elements for evaluation, and in relation to the impact analysis area.

4.2.2 SIGNIFICANCE CRITERIA

A significant impact to water resources would occur if:

- The normal flow of a water body or normal drainage patterns and runoff would be substantially altered; or if the Proposed Project Components would be placed within a 100-year flood hazard area that would impede or redirect flood flows

- The quantity and quality of discharges within waters or watercourses would be modified by in-stream construction or accidental contamination to the extent that water use by established users is measurably reduced, or the water quality of already impaired waters is further degraded
- An activity would cause an increase in susceptibility to on-site or off-site flooding due to altered surface drainage patterns or stream channel morphology, per Presidential Executive Order 11988 Floodplain Management
- Surface drainage patterns or stream channel morphology would be altered to the extent that vegetation communities and habitats dependant on current hydrologic conditions are degraded
- An activity would cause a loss or degradation of wetlands (including WUS) in violation of the terms and conditions of a USACE permit

4.2.3 IMPACT ASSESSMENT

Wetlands (including jurisdictional WUS, collectively termed “wetlands”) have not been delineated for the Proposed Project alternatives. Based on guidance from the agencies in coordination with the Applicants, additional resource surveys and engineering siting would occur that may adjust the locations of turbines indicated herein. Water resource factors which may affect the locations of individual turbines include, but are not limited to, a wetland delineation and other resource and engineering considerations. Under the included BMPs and APMs, further coordination would occur between the Applicants and the USACE to avoid and minimize potential impacts to wetlands. As necessary, the Applicants would obtain the necessary permit(s) under Section 404 of the CWA prior to construction; permits may not be acquired before the completion of the EIS. Potential permanent impacts to wetlands would be less than significant, in accordance with USACE requirements for each of the alternatives.

4.2.3.1 Crow Lake Alternative

The majority of both temporary and permanent disturbances would be on land currently used for rangeland and agriculture and on soils with low representative slopes. However, the excavation and exposure of soil during construction of the Proposed Project Components could cause sediment runoff during rain events. Alteration of flow patterns is not anticipated and would be avoided wherever possible. Potential impacts in these areas that result from construction, operation and decommissioning activities would be minimized through implementing and adhering to regulations and permits governing storm water pollution prevention and sediment control, such as a General Construction Storm Water Permit, SWPPP, 404 permit, and FEMA and county regulations. The SWPPP would outline BMPs for construction, operation and decommissioning of the site to protect water resources (including downstream impaired waters) and adjacent wetlands and minimize the potential for soil erosion and sediment transport. Implementation of the included BMPs and APMs (as listed in **Chapter 2, Table 2.2 and Table 2.3**) and permits would ensure that potential impacts to surface water flows, drainage patterns,

quantity and quality are less than significant during construction, operation and decommissioning activities.

On-site or off-site flooding would not result from construction, operation or decommissioning of the Proposed Project. Flood hazard zones have not been identified in the Crow Lake Alternative; as needed, the final engineering design would evaluate site conditions and the BMPs and APMs would be implemented to address potential flooding. Thus, development of the Proposed Project would result in less than significant impacts to floodplains.

Additionally, excavations for foundation installations may have the potential to encounter shallow groundwater resources. If shallow groundwater is encountered during construction or decommissioning, the Applicants would obtain a Dewatering Permit from DENR. Water extraction during potential dewatering operations would be conducted in a manner to protect water quality, and would be of minimal volume. Potential effects on groundwater would be isolated and small-scale, resulting in short-term, localized water table depressions that would not remain following construction or decommissioning. Thus, development of the Proposed Project would result in less than significant impacts to water supplies.

Development of the Crow Lake Alternative would result in approximately 4 acres of temporary impact and zero acres of permanent impacts to field-identified wetlands. These potential impact estimates would be applicable regardless of which transmission line option would be selected. Wetlands within USFWS easements on private property are under USFWS jurisdiction. As included in the BMPs and APMs, the Applicants would site the Proposed Project Components to avoid wetlands and if wetlands cannot be avoided, the Applicants would work with the USFWS and/or USACE to obtain permits and minimize impacts to wetlands. Therefore, impacts to wetlands would be less than significant.

If the Proposed Project is approved, development of the Western system modifications at the Wessington Springs Substation would not result in any impacts to water resources since drainage from the site is controlled by the site's SWPPP. Based on construction of the existing substation, groundwater is not expected to be encountered during foundation excavation activities. If groundwater is encountered, Western would address this in accordance with BMPs, APMs (**Chapter 2, Tables 2.2 and 2.3**), and other regulatory requirements.

4.2.3.2 Winner Alternative

The impacts associated with the Winner Alternative would be similar to those for the Crow Lake Alternative. However, development of the Winner Alternative would result in approximately 16 acres of temporary impact and approximately 1.8 acres of permanent impacts to field-identified wetlands. These potential impact estimates would be applicable regardless of the transmission line option selected. Wetlands within USFWS easements on private property are under USFWS jurisdiction. Potential impacts to wetlands would be avoided. If wetlands would be impacted, the Applicants' would work with the USFWS and USACE to obtain permits and minimize unavoidable impacts; therefore, impacts to wetlands would be less than significant.

If the Proposed Project is approved, Western's system modifications at Winner Substation would result in impacts similar to the Wessington Springs Substation. Development of the Western system modifications would employ the included BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**).

4.2.3.3 No Action Alternative

Under the No Action Alternative, Western would not approve an interconnection request with the Applicants and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the Proposed Project would not be built and that the environmental impacts associated with construction and operation of the Proposed Project would not occur. There would be no water resource impacts associated with the No Action Alternative.

4.3 CLIMATE CHANGE AND AIR QUALITY

4.3.1 METHODS

The ROI for climate change and air quality includes areas of immediate disturbance associated with the Proposed Project and the proposed Federal actions, in association with the regional conditions. This analysis evaluates environmental impacts to air resources as a result of the construction, operation and decommissioning of the Proposed Project and the proposed Federal actions. DENR data have been researched to verify current State regulations regarding the guideline levels for criteria pollutants. In addition, South Dakota's Ambient Air Quality Standards (SDAAQS) have been identified under the SDCL, Chapter 34A-1. This public policy of the State serves to achieve and maintain reasonable levels of air quality as well as support local and regional air pollution control programs. Climate data has been obtained from the Chamberlain, South Dakota weather station. GHG and climate change information has been obtained from the interactive Green Power Equivalency Calculator available from the EPA for purposes of broader analysis and climate change analysis (EPA 2009a), see **Chapter 5 Section 5.4.1** for additional discussion).

4.3.2 SIGNIFICANCE CRITERIA

A significant impact to air quality would occur if:

- An activity would result in violation to any local, State, or Federal air quality standard due to increased fugitive dust emissions

4.3.3 IMPACT ASSESSMENT

4.3.3.1 Crow Lake Alternative

The Crow Lake Alternative is not in a non-attainment area for any criteria pollutant under any applicable air quality standard. Fugitive dust emissions from the Proposed Project would be within standards set forth by DENR and NAAQS. Increased fugitive dust emissions would be

temporary and minor during construction or decommissioning of the Proposed Project Components, and would not exceed SDAAQS particulate standards.

Further, operation of the Proposed Project would offset emission sources when compared to similarly-sized electric generating facilities using carbon-based fuel sources. Wind-generating stations do not emit CO₂ (which is a GHG that contributes to climate change); it is estimated that the Proposed Project would avoid 726,600 metric tons of CO₂ emissions per year (EPA 2009b) compared to the average emissions of fossil fueled generating stations employed in South Dakota. This amount avoided is equal to the annual carbon dioxide emissions of approximately 130,000 average passenger cars (EPA 2009b). The greatest advantage of wind power is electricity generation without air emissions, including CO₂. Some emissions would be generated from construction and maintenance activities, primarily from vehicle exhaust.

Impacts would be restricted to short periods during construction or decommissioning at small, individual sites. Included BMPs and APMs (as listed in **Chapter 2, Table 2.2 and Table 2.3**) would be employed during ground disturbing activities. Therefore, development of the Proposed Project would not result in a violation to any local, State, or Federal air quality standard and therefore would result in less than significant impacts.

Western's Wessington Springs Substation currently has SF₆ gas-filled circuit breakers, and Western would install additional SF₆ breakers to interconnect the Proposed Project. During operation of the new substation additions, authorized Western personnel would conduct periodic inspections and service equipment as needed. Properly trained maintenance personnel would monitor and manage the use, storage and replacement of SF₆ to minimize any releases to the environment. SF₆ gas used in substation circuit breakers is contained in sealed units that are factory-certified not to leak. During inspections, equipment would be monitored for detection of leaks, and repairs would be made as appropriate. If the Proposed Project is approved, Western's system modifications at Wessington Springs Substation would incorporate BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**); therefore, impacts to air quality from fugitive dust would be less than significant.

4.3.3.2 Winner Alternative

Impacts of the Winner Alternative would be similar to those identified for the Crow Lake Alternative; therefore, impacts to air quality would be less than significant.

SF₆ breakers would be installed at the Winner Substation to accommodate the interconnection, and the same practices proposed for Wessington Springs would be employed at Winner Substation. If the Proposed Project is approved, Western's system modifications at Winner Substation would incorporate BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**); therefore, impacts to air quality from fugitive dust would be less than significant.

4.3.3.3 No Action Alternative

Under the No Action Alternative, Western would not approve an interconnection request with the Applicants and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the Proposed Project would not be built and that the environmental impacts associated with construction and operation of the Proposed Project would not occur. There would be no climate change and air quality impacts associated with the No Action Alternative.

4.4 BIOLOGICAL RESOURCES

4.4.1 METHODS

The impact assessment for biological resources was conducted by evaluating impacts to vegetation communities, suitable or occupied habitats and/or known species occurrences within the Crow Lake and Winner Alternatives. If suitable or occupied habitats would be impacted by development of either alternative, the level of impact was determined and significance criteria (described in **Section 4.4.2**) were applied to each community, habitat or species.

4.4.2 SIGNIFICANCE CRITERIA

Significance criteria for biological resources are different for vegetation, common wildlife and special-status species. These criteria are used to disclose whether biological resources would be impacted by the Proposed Project to assist the Agencies with their final determinations.

Vegetation

A significant impact to vegetation resources would occur if:

1. An activity resulted in the long-term loss of riparian vegetation
2. An activity resulted in uncontrolled expansion of noxious weeds (Presidential Executive Order 13112 – Invasive Weed Species)

Wildlife

A significant impact to wildlife resources would occur if:

1. An activity affected the biological viability of a local, regional or national population of wildlife species
2. An activity violated Federal or State wildlife conservation policy. For birds not Federally-listed, the applicable policy is the MBTA or BGEPA

Special Status Species: Endangered, Threatened, Proposed, Candidate and Other Sensitive Species

A significant impact to endangered, threatened, proposed, candidate and other sensitive species would occur if:

1. An activity affected the biological viability of a local, regional or national population of a State-listed wildlife species or one of concern/interest resulting in the increase in severity of listing status (*e.g.*, from threatened to endangered)(SDCL 34A-8)
2. An activity violated the SDCL 34A-8, which protects State-listed species
3. An activity resulted in take of a protected species beyond that authorized by permit (SDCL 34A-8)
4. An activity violated the MBTA or BGEPA

A BA is being prepared under Section 7 of the ESA for Federally-listed species. Findings of the BA will be summarized in the FEIS. While SDCL 34A-8 does not require agency consultation for State-listed threatened and endangered species, SDGFP has been active in the preparation of this DEIS.

4.4.3 IMPACT ASSESSMENT

4.4.3.1 Crow Lake Alternative

Vegetation

Construction of the Proposed Project would result in temporary and permanent impacts to existing vegetation within the Crow Lake Alternative. The majority of these impacts would be in the mixed-grass prairie and cropland vegetation communities. Any damage to field crops on cultivated lands during construction would be compensated by the Applicants. Within non-cultivated lands, mixed-grass prairie (mostly rangeland and pasture) and wetlands are the vegetation communities most sensitive to disturbance. Areas of direct and indirect impacts within each vegetation class are based on vegetation community mapping for the Proposed Project (Tierra EC 2009), as presented in **Table 4.4-1**.

The Proposed Project would result in the temporary disturbance of approximately 1,009 acres of mixed-grass prairie, 391 acres of cropland, 4.0 acres of wetlands and 1.0 acre of shelterbelts. The Proposed Project would result in the permanent disturbance of approximately 97 acres of mixed-grass prairie, 36 acres of cropland and 0.6 acres of shelterbelts. Mixed-grass prairie is principally rangeland and pasture. Impacts that would occur to cultivated lands are not considered biologically significant because these lands are frequently disturbed by tilling, planting and harvesting activities associated with crop production.

The Crow Lake Alternative would permanently remove approximately 97 acres of mixed-grass prairie. These losses would be widely dispersed across the Crow Lake Alternative which has approximately 23,007 acres of mixed-grass prairie, amounting to a very small percentage of the

total area (0.4 percent). Access roads would increase fragmentation of native rangeland, in some cases resulting in smaller patches of the remaining grassland types (**Figure 3.4-1**).

The Crow Lake Alternative would result in the temporary disturbance of 82 acres and the permanent disturbance of 11 acres within USFWS grassland easements. It would also result in the temporary disturbance of 140 acres and the permanent disturbance of 9 acres within USFWS wetland easements. These acreages are included within, not in addition to, the total areas cited in the previous paragraph. As currently proposed, location of turbines in grassland easements would comply with the permit conditions for those easements. Within areas proposed for easements, turbines would be placed at low densities so as not to substantially alter habitat quality.

Table 4.4-1 Summary of Disturbance Areas within Vegetation Communities in the Crow Lake Alternative

| Vegetation Type | Total Temporary Disturbance (acres) | Total Permanent Disturbance (acres) |
|---------------------|-------------------------------------|-------------------------------------|
| Mixed-grass prairie | 1,009 | 97 |
| Cropland | 391 | 36 |
| Wetlands | 4.0 | 0 |
| Farmstead | 0.11 | 0.04 |
| Shelterbelt | 1.0 | 0.6 |
| Deciduous forest | 0 | 0 |
| Total area | 1,405 | 133 |

Note: Discrepancies may exist in total values due to rounding.

Permanent vegetation loss would result from removal of vegetation at turbines, collector and interconnection substations, the O&M building, underground and overhead collection lines and access roads. Temporary disturbance would result from turbine work areas, crane walks, temporary lay down areas, the underground and overhead collection system and areas along the access roads. Permanent loss of vegetation would be minimized by limiting the area of physical ground disturbance through the use of existing roads and by reseeding all temporarily disturbed areas with native mixtures of grasses upon completion of construction activities. Impacts in these areas that occur as a result of construction, operation and decommissioning activities would not substantially increase disturbance levels compared with existing, non-project-related disturbances such as roads and agriculture. Impacts to temporarily disturbed rangeland and pasture would be short-term, and the disturbed areas would revegetate quickly after re-seeding.

Physical ground disturbance and construction vehicles, and possibly increased public access, could facilitate the establishment and spread of noxious weeds. Noxious weeds compromise native biodiversity and create financial burdens. South Dakota has 27 documented noxious weed species, 11 of which occur in Aurora, Brule and Jerauld counties (see **Table 3.4-2**). The establishment of noxious/invasive vegetation could be limited by early detection and eradication. State law requires that listed weeds be controlled by the landowner, and the Applicants would comply with local and State requirements for noxious weed control during construction of the Proposed Project.

To prevent the possible introduction of noxious weed seed, heavy equipment from other geographic regions used during construction would be washed prior to departure from the equipment storage facility. Washing equipment prior to transport from one work site to another is not recommended. On-site equipment washing increases the chance of weed seed dispersal by drainage of water off the site, across an area greater than the size of the work site. Instead, accumulations of mud would be “knocked off”. This method promotes containment of weed seeds on the work site.

Follow-up monitoring of the presence, distribution and density of noxious weeds would be conducted for three years post-construction to ensure the success of control measures. Surveys would be conducted as early in the year as feasible to control noxious weeds before they produce seed. Control methods would be based on the available technology and the weed species present. Methods used to control weeds may include mowing or handpulling; in extreme cases of noxious weed infestation, an approved herbicide may be applied.

Fugitive dust generated during clearing, grading and vehicle travel could adversely affect vegetation, but any effects would be short-term and localized to the immediate area of construction. Control measures would be implemented to minimize fugitive dust emissions from construction-related traffic and ground disturbance (see **Chapter 2, Tables 2.2 and 2.3**). Access road construction could result in increased public access depending on the amount of access permitted by the landowners. If public access is increased, there could be an increase in wildfires ignited by catalytic converters and careless cigarette use. The risk for wildfires would be greatest in summer and autumn when native grasses have gone dormant and fuel loads are at their peak. To limit new or improved access into the area, all new access roads not required for maintenance would be closed. Due to the private ownership of the leased lands, the majority of roads would be gated, further limiting public access and thus minimizing noxious weed spread and wildfire ignition.

These impacts would not affect the biological viability of any local, regional or national plant species. Because the footprint of the Proposed Project is relatively small compared with the overall size of the Crow Lake Alternative, and much of the area is tilled annually for agricultural production, direct impacts to vegetation would be minimal.

As included in the Proposed Project BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), the Applicants would locate the Proposed Project Components to avoid wetlands; if wetlands cannot be avoided, the Applicants would work with the USFWS and/or USACE to obtain permits and minimize impacts. Therefore, impacts to wetlands would be less than significant. The Applicants have committed to complying with USACE mitigation requirements.

Based on the minimal impacts to vegetation resources described above, impacts to Vegetation Significance Criteria 1 and 2 (**Section 4.4.2**) would be met, and impacts to vegetation resources due to construction, operation and decommissioning of the Proposed Project would be less than significant.

Wildlife

Mammals (excluding bats)

Most impacts to mammal species would be temporary and associated with the construction phases. Development of the Proposed Project would temporarily and permanently remove habitat. The Crow Lake Alternative would result in the temporary disturbance of 1,405 acres of habitat, while 133 acres would become permanently unavailable. The areas of temporary disturbance would be reclaimed and reseeded with an approved native seed mix. It would likely take two growing seasons before these areas would be restored to the pre-construction condition. The area of habitat permanently lost represents a relatively small amount of habitat available regionally (less than 1 percent), and the overall habitat quality has been reduced by grazing and agricultural practices. This small loss (less than 0.4 percent) of moderate quality habitat (grasslands are currently grazed) would not disrupt breeding, rearing or wintering behavior and would not influence the viability of local populations.

Noise, excavation and other forms of disturbance during construction would likely temporarily displace wildlife species within or adjacent to the disturbed areas. Upon completion of construction, wildlife species would become accustomed to operation and maintenance activities and would be expected to resume use of the Crow Lake Alternative. Permanent vegetation loss could destroy small mammal habitat, but population level effects would be negligible because less than 0.4 percent of the area would be permanently disturbed.

The risk for direct mortality of species resulting from construction activities or vehicle collision is limited. Adults are typically mobile and would be able to avoid construction equipment or vehicles (unless they were traveling at high rates of speed).

Based on the minimal impacts to mammals described above, Wildlife Significance Criteria 1 and 2 (**Section 4.4.2**) would not be exceeded, and impacts to mammals would be less than significant.

Bats

Construction of the Proposed Project could affect bats through direct mortality, habitat loss and fragmentation and disturbance effects (SDBWG and SDGFP 2009). Bat surveys for the Crow Lake Alternative are ongoing. There are no known roosts within or adjacent to the area. The probability of construction-related bat mortality is extremely low given their mobility and the absence of any roosts. Habitat loss and fragmentation effects to bats are also expected to be minimal. The permanent loss of approximately 97 acres of mixed-grass prairie foraging habitat would not represent an adverse effect to bats given the large adjacent tracts of similar habitat. No shrub or forested riparian habitats or other areas of concentrated bat use would be affected. A total of 0.6 acres of shelterbelt representing less than 0.2 percent of potential daytime roosting habitat may be permanently removed. Construction would generally occur during daylight hours and would not disturb these nocturnal animals.

Operation and maintenance impacts to bats include disturbance and displacement, habitat fragmentation and direct mortality. As noted above, general disturbance and displacement effects would be minimal given the small percentage of potential daytime roost tree removal within or adjacent to the Crow Lake Alternative. Maintenance activities would be conducted during daylight hours when bats are not active, and noise and movement associated with operating turbines are not likely to affect bats. Wind turbines and access roads could fragment foraging habitat for bats.

Collision-related bat mortality has been documented at most wind farms in the western U.S. (Erickson *et al.* 2002). Annual bat mortality rates have ranged between 0.74 and 2.3 fatalities per turbine at wind farms in Wyoming, Oregon and Minnesota (Young *et al.* 2003). Researchers have concluded that observed mortality rates do not have population-level effects, and no significant difference has been noted in mortality rates at lit and unlit turbines (Johnson *et al.* 2003). However, bat populations in the northeastern United States have been experiencing recent declines due to a fungus (white-nose syndrome). If bat populations in South Dakota have been infected with this fungus, wind turbine mortalities could have a more significant cumulative impact on populations. However, little is known about bat populations in South Dakota. Most mortality has involved migrant or dispersing bats rather than residents (Johnson 2005; Johnson *et al.* 2003; Keeley 2001). Bat mortality from collisions with turbines at the Crow Lake Alternative would likely occur. However, bat call studies in 2009 indicate low bat activity at the Crow Lake Alternative so the frequency of collisions may be low based on recently collected bat data.

Based on the expected impacts to bats described above, Wildlife Significance Criteria 1 and 2 (**Section 4.4.2**) would not be exceeded, and impacts to bats would be less than significant.

Reptiles/Amphibians

Impacts to reptiles and amphibians would be similar to those described for mammals (**Section 4.4.3.1 Wildlife, Mammals**), although they are not as mobile as many mammals. Activities associated with construction, operation and decommissioning could result in the direct mortality of reptiles and amphibians if they are not able to move away from equipment and other vehicles. These impacts would be less than significant based on the small amount of habitat that would be temporarily and permanently removed and the low likelihood for direct mortality of individuals. Wildlife Significance Criteria 1 and 2 would not be exceeded, and impacts to reptiles/amphibians would be less than significant.

Birds

The 2008 PII study evaluated possible impacts to biological resources in accordance with USFWS guidelines. A reference site was chosen (Lake Andes National Wildlife Refuge) in an area with good habitat values for birds for comparison purposes. High scores indicate good general habitat value, and that biological resource impacts would be more likely if the area was to be disturbed. The Crow Lake Alternative PII score of 239 is considerably lower than that of the Lake Andes reference area (PII of 331). The high score at the reference site can be attributed

to the presence of more, and probably higher quality, wetland and grassland areas. The results of ongoing migratory and breeding bird surveys at the Crow Lake Alternative, when available, will aid in further assessing possible impacts to avian species and developing additional conservation measures.

Construction impacts common to all avian species include direct mortality, habitat alteration (fragmentation) or loss, disturbance related to noise, the presence of large structures on the landscape and increased human presence resulting in displacement of individual birds. Mortality is associated with destruction of eggs or abandonment of active nests due to disturbance. Migratory and breeding bird surveys in 2009 indicate that the Crow Lake Alternative supports populations of grassland birds, including a number of species protected under the MBTA and USFWS BCC.

Construction would not last longer than one nesting season, but would occur during the nesting period for many bird species. Ground nesting species such as Ferruginous Hawk, Northern Harrier, Greater Prairie Chicken, and Sharp-tailed Grouse along with low vegetation nesting songbirds would be at higher risk for impacts from disturbance. Although construction activities may result in some level of egg loss and nest abandonment, measures would be implemented to minimize these impacts. The Applicants would attempt to do as much grading and other ground disturbance as possible before the start of the breeding season. If construction is to take place during the migratory bird breeding or nesting season, avian nest surveys, including grouse lek surveys, would be conducted within all non-cropland areas subject to temporary or permanent disturbance immediately prior to construction in that area. All active nests and leks would be marked as avoidance areas. Ongoing consultation with SDGFP is in progress to evaluate potential impacts to leks. Thus, loss and nest abandonment would represent a less than significant impact, because Wildlife Significance Criteria 1 and 2 (**Section 4.4.2**) would not be exceeded.

The Proposed Project would result in the permanent loss of approximately 97 acres of mixed-grass prairie habitat (**Table 4.4-1**), which represents a small proportion of this habitat (0.4 percent). The spacing of turbines and access roads could contribute to habitat fragmentation in the Crow Lake Alternative. Construction noise and associated human activity could temporarily disturb or displace individual birds and may interfere with migration, foraging, breeding and nesting. Studies have suggested that noise from construction and human activities disturb upland bird species, displacing birds from traditional habitats, reducing use of leks and causing nest abandonment (Young *et al.* 2003a). Disturbance would be limited to the duration of construction activities. Construction-related disturbance would be limited to a single migratory (both spring and fall) and breeding-nesting season; however, survival and reproductive success would be temporally reduced. Impacts would be less than significant, because Wildlife Significance Criteria 1 and 2 (**Section 4.4.2**) would not be exceeded.

The types of impacts associated with operation and maintenance of the Proposed Project are similar to those described for construction activities, although several mechanisms are different. Bird fatalities resulting from collisions with turbines have been documented at most operational

wind farms and have involved a variety of bird species, including passerines, raptors, waterfowl and shorebirds (Erickson *et al.* 2003). Data indicate bird vulnerability to collisions with turbines is species-specific, habitat-specific and facility-specific (Erickson *et al.* 2001), with mortality rates being related to the number of turbines (EFSEC 2003). Other factors that influence avian mortality include the arrangement of turbines (*i.e.*, end turbines have higher collision rates), proximity to migration corridors and rim edges, structure type (*e.g.*, lattice structures provide perches within the Rotor Sweep Area [RSA]), tower height (*i.e.*, blades are closer to the ground on shorter turbines), conditions that reduce visibility (*i.e.* fog), and attractants such as abundant prey resources and certain FAA marker lights (Johnson *et al.* 2003; NWCC 2003).

U.S. wind farm facilities average 2.19 avian fatalities per turbine per year (Erickson *et al.* 2001). The average is reduced to 1.83 fatalities per turbine per year if the Altamont Pass wind farm in California is excluded from calculations (Altamont Pass has experienced high mortality rates due to facility design and siting factors). Passerines make up more than 80 percent of all bird fatalities at wind farms (Erickson *et al.* 2001), and mortality rates at wind farms have not created population-level effects for any species (Young and Erickson 2003). Waterfowl and shorebird mortality at wind farms has been minimal (Erickson *et al.* 2003; Koford 2005). Average raptor mortality rates are 0.03 raptor per turbine per year overall, and 0.006 raptors per turbine per year excluding Altamont Pass (Erickson *et al.* 2001). Raptor mortality has been absent to very low at most newer generation wind facilities (NWCC 2003). Based on the results from other wind farms, a ranking of seasonal mean raptor use was developed. Mean raptor use in the Crow Lake Alternative during spring of 2009 was low (0.34 raptors/plot/20-minute survey), ranking thirty-third relative to data collected at 43 other existing and proposed wind farms (WEST 2009a).

Mean raptor use is determined by dividing the total number of raptors observed by the total number of 800-meter plots and the total number of surveys. Based upon these data, raptor use of the Crow Lake area is not greater than that observed at most existing and proposed wind farms (WEST 2009a). Higher raptor concentrations are known along the Missouri River corridor 30 miles west of the Crow Lake area (South Dakota Birds 2009).

As part of the Proposed Project, BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**) have been included to reduce avian mortality associated with turbine operation. Tubular structures and newer generation turbines (GE 1.5sle; see **Section 2.3.1**) would eliminate the creation of perching sites within the area and decrease the risk of avian collisions (Erickson *et al.* 2002). A post-construction monitoring program to assess avian mortality, including adaptive management provisions, would be designed and implemented in coordination with the USFWS, Western, RUS and SDGFP. Data obtained through baseline avian use surveys and local habitat characterization suggest that avian mortality rates are likely to be similar to or lower than those experienced at other wind farms. While the Proposed Project design and application of the included BMPs and APMs (as listed in **Chapter 2, Table 2.2 and Table 2.3**) would further reduce fatalities, avian mortality would occur. Impacts would be less than significant, because Wildlife Significance Criteria 1 and 2 (**Section 4.4.2**) would not be exceeded.

Noise and human activities associated with operation and maintenance of the Proposed Project would result in temporary disturbance similar to those discussed for construction, but at reduced intensity. Regional roads may experience increased traffic due to interest in seeing the operational turbines, although traffic would generally be restricted to public roads, thereby minimizing potential impacts. New roads would be constructed for access to the turbines, but the majority of these roads would be gated and located on private land, minimizing or eliminating increased public access.

The presence of turbines and operation and maintenance activities could result in longer-term effects, including avoidance and abandonment of habitats in proximity to the Proposed Project. Research has indicated that displacement effects associated with wind turbines are specific to the project location and individual bird species. Studies have identified reduced avian use in habitats within 164 to 590 feet of turbines (Johnson *et al.* 2000; Erickson *et al.* 2007), and grassland species specifically decreased use of habitats near turbines (Erickson *et al.* 2007, Leddy *et al.* 1999). Displacement could result in reduced breeding success, productivity and survival. Baseline surveys have been initiated to assess pre-construction avian abundance and habitat use in the Crow Lake Alternative. Reference sites have been established outside of potential impact areas within the Crow Lake Alternative boundary for comparison. Post-construction monitoring would continue surveys for a minimum of three years to evaluate species-specific changes in abundance, habitat use and displacement effects associated with operation of the Proposed Project compared to general avian communities (**Chapter 2, Tables 2.2 and 2.3**). In addition, Whooping Crane and Sandhill Crane monitoring would occur concurrently for a minimum of three years. Both of these studies would improve the understanding of species-specific disturbance and displacement effects associated with development of the Proposed Project.

Operation and maintenance activities and the presence of turbines could also fragment habitat for grassland species. The Crow Lake Alternative mixed-grass prairie ecosystem is relatively fragmented, mainly due to the presence of cropland and roads. Human activity, turbines and access roads could further fragment habitats for avian species. The actual fragmentation effects are difficult to quantify, but would likely be species-specific and could disrupt movement between seasonal habitats. In the worst case, these effects would lead to some reduction of breeding success, productivity and survival. A post-construction monitoring program would help determine fragmentation effects (**Chapter 2, Tables 2.2 and 2.3**).

Based on the localized impacts to birds described above and implementation of the included BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), Wildlife Significance Criteria 1 and 2 (**Section 4.4.2**) would not be exceeded. If the MBTA is violated, Wildlife Significance Criterion 2 would be exceeded; however, impacts to birds would be less than significant.

Special Status Species

Federal-Listed Species

Whooping Crane: Suitable habitat for the Whooping Crane in the Crow Lake Alternative includes stopover, roosting and foraging habitats. The Crow Lake Alternative is within the

Aransas-Wood Buffalo Population migration corridor. Previous sightings in the region, large numbers of Sandhill Cranes (a surrogate species of the Whooping Crane), and the presence of suitable habitat make it possible that Whooping Cranes occasionally fly over and land in the Crow Lake Alternative during seasonal migrations, and operating turbines could pose a threat. Whooping Crane occurrence increases closer to the Missouri River, the approximate centerline of the migration corridor, 30 miles west of the Crow Lake Alternative. Suitable habitat is present throughout the migration corridor and the Crow Lake Alternative, and use of the entire corridor is likely during any migratory cycle. Inclement weather, predation and human disturbance may cause Whooping Cranes to stray considerable distances from the centerline of the corridor. Structures, such as wind turbines and transmission lines, pose a collision risk (although unlikely) for Whooping Cranes due to poor visibility during inclement weather and poor flying agility of cranes. To date, there are no documented occurrences of Whooping Crane collisions with wind turbines; however, it is theoretically foreseeable. As included in the BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), surveys of the transmission lines would be conducted as part of the post-construction avian monitoring program, and the transmission line would be marked with bird flight diverters where appropriate to reduce the risk to Whooping Cranes.

During migration, Whooping Cranes may also forage and roost in habitats at the Crow Lake Alternative during stopovers. Whooping Cranes fly at lower altitudes between roosting and foraging habitat, placing them at risk of collision with turbines during take-off, landing, inclement weather and movement between foraging and roosting habitat.

Effects will be determined in the BA, which is under preparation. Western and RUS will follow USFWS recommendations provided through the Section 7 consultation process.

Topeka Shiner: Direct effects to the Topeka shiner would not occur; no stream crossings are proposed to tributaries to West Branch Firesteel Creek. Further, there would be no water withdrawals from this watershed for construction, operation or maintenance activities. Indirect impacts, such as sedimentation, would be precluded through the implementation of the BMPs and APMs (**Chapter 2, Tables 2.2. and 2.3**).

Effects will be determined in the BA, which is under preparation. Western and RUS will follow USFWS recommendations provided through the Section 7 consultation process.

Piping Plover: While it is possible that Piping Plovers could collide with turbines or overhead lines, such collisions would be unlikely due to the lack of suitable habitat in the area. Nesting activities occur along the Missouri River and alkaline shores; therefore, it is unlikely that Piping Plover occur in the Crow Lake Alternative.

Effects will be determined in the BA, which is under preparation. Western and RUS will follow USFWS recommendations provided through the Section 7 consultation process.

State-Listed Species

Bald Eagle: The Bald Eagle may occur in the Crow Lake Alternative during winter months as a transient resident. The Proposed Project could affect the Bald Eagle as a result of temporary disturbance or displacement associated with construction, operation and decommissioning activities, minor losses of foraging habitat, and mortality of individuals via collision with turbines. Traffic, noise and human presence during construction, operation and decommissioning could displace individual Bald Eagles foraging in the vicinity. However, the Crow Lake Alternative contains a limited amount of suitable foraging habitat, so construction, operation and decommissioning activities would have minimal effect on Bald Eagles. The included BMPs and APMs (as listed in **Chapter 2, Tables 2.2 and 2.3**) would be implemented as part of the Proposed Project to minimize disturbance and displacement effects. Construction activities would be modified or curtailed when Bald Eagles are present to reduce disturbance. Also, construction crews would be instructed to avoid disturbing or harassing wildlife (including Bald Eagles) and to report any Bald Eagle sightings to the appropriate agencies as dictated by an ABPP.

The Proposed Project is not likely to result in Bald Eagle mortality. Raptor mortality has been relatively low at wind farms and there have been no reported Bald Eagle fatalities at any wind facilities in the western U.S. (Erickson *et al.* 2002; Johnson *et al.* 2000; Young *et al.* 2003). The probability of Bald Eagle mortality would be further minimized because there are very few roosting trees and no known nesting in the Crow Lake Alternative. The collection system would be underground, eliminating the risk of collision and electrocution from new transmission lines. Overhead transmission lines would be constructed using Avian Power Line Interaction Committee (APLIC) guidelines to reduce the potential for collision or electrocution (APLIC 2006). As included in the BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), surveys of the transmission lines would be conducted as part of the post-construction avian monitoring program, and the transmission line would be marked with bird flight diverters where appropriate. Impacts would be less than significant, because Special Status Species Significance Criteria 1, 2, 3 and 4 (**Section 4.4.2**) would not be exceeded.

State and Federal Species of Concern

Greater Prairie Chicken and Sharp-tailed Grouse: As discussed above, suitable habitat for Greater Prairie Chickens and Sharp-tailed Grouse is present in the Crow Lake Alternative.

Construction effects would be similar to those previously described for grassland species. To minimize effects upon Greater Prairie Chickens and Sharp-tailed Grouse, no construction activities would be permitted within a pre-determined radius of a known active lek between March 1 and May 1. Impacts would be less than significant (the Applicants are currently in consultation with SDGFP), because Special Status Species Significance Criteria 1, 2, 3 and 4 (**Section 4.4.2**) would not be exceeded.

Possible operation and maintenance impacts for Prairie Chickens and Sharp-tailed Grouse are similar to those described for grassland species, although collision-related mortality of Prairie Chickens and Sharp-tailed Grouse has been relatively rare at wind farms (Erickson *et al.* 2002). Grouse and Greater Prairie Chickens could fly within the turbine's RSA, which puts them at risk for collision with turbine blades. While the chance for collision-related mortality of Greater Prairie Chicken and Sharp-tailed Grouse is low, post-construction monitoring of avian mortality would help to evaluate fatalities and identify turbines causing disproportionate mortality rates (**Chapter 2, Tables 2.2 and 2.3**). The turbine design would prevent the creation of raptor perches that can result in increased predation upon Sharp-tailed Grouse and Greater Prairie Chickens. If increased predation does occur and the cause is identifiable, onsite mitigation (*i.e.* raptor or raven deterrent devices) would be developed to correct the issue. Impacts would be less than significant, because Special Status Species Significance Criteria 1, 2, 3 and 4 (**Section 4.4.2**) would not be exceeded.

Noise and human activities associated with operation and maintenance would result in temporary disturbances to Sharp-tailed Grouse and Greater Prairie Chickens similar to those previously discussed for construction, although to a lesser extent. Although no studies have been conducted to evaluate the effects of turbine presence on Greater Prairie Chickens and Sharp-tailed Grouse, there is anecdotal evidence that these species exhibit avoidance of tall structures (Braun 1998; Bidwell *et al.* 2004). For example, Lesser Prairie Chickens avoid even high-quality habitat within 656 feet of a single oil or gas well pump, within 1,968 feet of an improved road and within 3,280 feet of a transmission line (Bidwell *et al.* 2004). Greater Prairie Chickens in Oklahoma have been shown to avoid areas within 1,600 feet of transmission lines (Pruett *et al.* 2009). Accordingly, the presence of turbines and transmission lines could displace Greater Prairie Chickens and Sharp-tailed Grouse from habitats in the vicinity of these facilities. Turbines could also fragment Greater Prairie Chicken and Sharp-tailed Grouse habitat by disrupting movement between seasonal habitats. While difficult to quantify, it is likely that the Proposed Project would result in the effective loss of a small portion of suitable Greater Prairie Chicken and Sharp-tailed Grouse habitat and could adversely affect individual reproduction and survival, although population level impacts are not anticipated. As included in the BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), pre- and post-construction avian use surveys would help document habitat effects associated with the presence of turbines, and the ABPP would provide protective measures. Impacts would be less than significant (the Applicants are currently in consultation with SDGFP), because Special Status Species Significance Criteria 1, 2, 3 and 4 (**Section 4.4.2**) would not be exceeded.

Grassland Bird Species (Le Conte's Sparrow, Chestnut-collared Longspur, Grasshopper Sparrow, Western Meadowlark, Upland Sandpiper, Marbled Godwit, Long-billed Curlew, Lark Bunting, Red-headed Woodpecker, McCown's Longspur, Dickcissel, Loggerhead Shrike): Grassland species of concern occur in the Crow Lake Alternative as migratory and breeding residents, and several were observed during spring and summer surveys. Adverse impacts associated with construction, operation and decommissioning would be similar to those described in **Section 4.4.3.1, Wildlife, Birds** and would be reduced through implementation of

the included BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**). Impacts would be less than significant because Special Status Species Significance Criteria 1, 2 and 3 (**Section 4.4.2**) would not be exceeded. If the MBTA is violated, Special Status Species Significance Criterion 4 would be exceeded; however with the implementation of the BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), impacts to grassland birds would be less than significant.

Wetland Bird Species (American Bittern, Wilson's Phalarope, Black-crowned Night Heron, Black Tern): Wetland bird species may occur in the Crow Lake Alternative as summer residents since suitable breeding habitat is present. Black-crowned Night Herons were observed during spring or summer surveys; the other three species were not observed. Pre-construction nest surveys would identify nesting species and nest disturbance would be avoided.

Construction activities could temporarily disturb wetland species in the vicinity, although direct impacts to wetland habitats would be minimal or avoided completely. Operation may result in collisions with turbines, causing injury or death or result in displacement if turbines are constructed near wetlands. Impacts would be less than significant, because Special Status Species Significance Criteria 1, 2, and 3 (**Section 4.4.2**) would not be exceeded. If the MBTA is violated, Special Status Species Significance Criterion 4 would be exceeded; however with the implementation of the BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), impacts to wetland birds would be less than significant.

Raptor Species (Northern Harrier, Ferruginous Hawk, Swainson's Hawk, Burrowing Owl, Prairie Falcon): Raptor species may occur in the Crow Lake Alternative as summer residents, and suitable breeding habitat is present (WEST 2009a). Adverse impacts associated with construction, operation and decommissioning of the Proposed Project would be the same as those described in **Section 4.4.3.1, Wildlife, Birds**. Pre-construction nest surveys would identify nesting raptors and nest disturbance would be avoided. Impacts would be less than significant, because Special Status Species Significance Criteria 1, 2, and 3 (**Section 4.4.2**) would not be exceeded. If the MBTA is violated, Special Status Species Significance Criterion 4 would be exceeded; however with the implementation of the BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), impacts to raptors would be less than significant.

Regal Fritillary Butterfly: Regal fritillary butterflies may occur in the area and suitable habitat is assumed to be present. Adverse impacts associated with construction include habitat loss and mortality. Habitat loss would be directly proportional to the amount of ground disturbance and would be minimal when compared to suitable habitat in the region. Regal fritillary butterflies were not observed during spring or summer avian use surveys, but there has been no survey specifically designed to determine the presence or absence of this species. No studies have evaluated the effects of wind farms on regal fritillary butterflies, and it is difficult to predict the disturbance and displacement effects. General studies of butterfly mortality attributed to turbine strikes indicate that it is likely low due to wind currents generated from turbine rotation (Grealey and Stephenson 2007). Construction activities would temporarily disturb regal fritillary butterflies in the vicinity and could result in habitat loss. Operation could result in collisions with

turbines, resulting in injury or death. These impacts would be less than significant because Special Status Species Significance Criterion 1 (**Section 4.4.2**) would not be exceeded.

Western's Proposed Federal Action

If the Proposed Project is approved, development of the Western system modifications at its Wessington Springs Substation would not cause the loss of habitat for wildlife species since any changes would be confined to a previously disturbed and graded area. Construction, operation and decommissioning activities could result in the direct mortality of wildlife species if they are not able to move away from equipment and vehicles traveling to the substation. There is a potential for wildlife-electrical equipment interactions during the operation of the proposed substation additions, but it is expected that these interactions would be low. The substation additions would be designed in accordance with the latest APLIC guidelines (APLIC 2006), and would employ the included BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**). The effects of any interactions would be less than significant.

4.4.3.2 Winner Alternative

Vegetation

Construction of the Proposed Project would result in temporary and permanent impacts to existing vegetation within the Winner Alternative. The majority of these impacts would be in the mixed-grass prairie and cropland vegetation communities. The area of direct and indirect impacts within each vegetation class based on vegetation community mapping for the Proposed Project (Tierra EC 2009) is presented in **Table 4.4-2**. Additionally, the Winner Alternative would not result in temporary or permanent disturbance within USFWS grassland easements.

The Winner Alternative would result in the temporary disturbance of approximately 2,314 acres of mixed-grass prairie, 741 acres of cropland, 16 acres of wetlands, 63 acres of farmstead and already disturbed areas, 31 acres of shelterbelts, and 22 acres of deciduous forest. Construction at the Winner Alternative would result in the permanent disturbance of approximately 184 acres of mixed-grass prairie, 62 acres of cropland, 1.8 acres of wetlands, 8.2 acres of farmstead and already disturbed areas, 3.6 acres of shelterbelts and 0.9 acres of deciduous forest. Mixed-grass prairie is principally rangeland and pasture. Impacts that would occur to cultivated lands are not considered biologically significant because these lands are frequently disturbed by tilling, planting and harvesting activities associated with crop production.

The Winner Alternative would permanently remove approximately 184 acres of mixed-grass prairie (rangeland and pasture). These losses would be widely dispersed across the area which has 53,925 acres of mixed-grass prairie, amounting to a very small percentage of the total area (0.3 percent). Access roads would increase fragmentation of native rangeland, in some cases resulting in smaller patches of the remaining grassland types, although the Winner Alternative is currently a mosaic of mixed-grass prairie and cropland (**Figure 3.4-3**), more so than the Crow Lake Alternative.

Table 4.4-2 Summary of Disturbance Areas within Vegetation Communities in the Winner Alternative

| Vegetation Type | Total Temporary Disturbance (acres) | Total Permanent Disturbance (acres) |
|---------------------|-------------------------------------|-------------------------------------|
| Mixed-grass prairie | 2,314 | 184 |
| Cropland | 741 | 62 |
| Wetlands | 16 | 1.8 |
| Farmstead | 63 | 8.2 |
| Shelterbelt | 31 | 3.6 |
| Deciduous forest | 22 | 0.9 |
| Total area | 3,187 | 261 |

Note: Discrepancies may exist in total values due to rounding.

The types of permanent and temporary loss of vegetation would be similar to those described in **Section 4.4.3.1, Vegetation**, although temporary and permanent disturbance areas would be more than double that for the Crow Lake Alternative, mainly due to the need for more access roads, longer underground collection lines and more crane walks.

Physical ground disturbance, construction vehicles and possibly increased public access could facilitate the establishment and spread of noxious weeds. South Dakota has 27 documented noxious weed species, 12 of which occur in Tripp County (see **Table 3.4-4**). The types of impacts would be similar to those described in **Section 4.4.3.1, Vegetation** for noxious weeds, although impacts may be higher at the Winner Alternative because more than twice the area would be disturbed.

Fugitive dust impacts would be similar to those described in **Section 4.4.3.1, Vegetation**, although more fugitive dust would be generated during construction, operation and decommissioning activities due to the larger temporary and permanent disturbance areas at the Winner Alternative.

The construction of more access roads could result in a greater increase in public access than that described in **Section 4.4.3.1, Vegetation**, although most new roads would be on private land and access would be limited.

These impacts would not affect the biological viability of any local, regional or national plant populations. Because the footprint of the Proposed Project is relatively small compared with the overall size of the Winner Alternative and much of the area is tilled annually for agricultural production, direct impacts to vegetation would be minimal.

Wetland delineation will be completed, and facilities would be moved based on the results such that wetland impacts are minimized or avoided. If the Applicants cannot avoid wetland impacts, a Section 404 permit under the Clean Water Act would be obtained through the USACE.

Based on the minimal impacts to vegetation resources described above, impacts to Vegetation Significance Criteria 1 and 2 (**Section 4.4.2**) would not occur, and impacts to vegetation resources due to construction and operation of the Proposed Project would be less than significant.

Wildlife

Mammals (excluding bats)

The types of impacts to mammal species would be similar to those described in **Section 4.4.3.1, Wildlife, Mammals**, although the impacts would occur on a larger scale. The Winner Alternative would result in the temporary disturbance of 3,188 acres of habitat, while 261 acres would become permanently unavailable. The area permanently disturbed represents a relatively small amount (0.3 percent) of habitat available regionally. This small loss of habitat would not disrupt breeding, rearing or wintering behavior and would not influence the viability of local populations.

Noise, excavation and other forms of disturbance during construction could potentially temporarily displace more wildlife species than at the Crow Lake Alternative within or adjacent to the disturbed areas. Upon completion of construction, wildlife species would become accustomed to operation and maintenance activities and would be expected to resume utilization of the area. Permanent vegetation loss could destroy small mammal habitat, but population level effects would be negligible because only 0.3 percent of the area would be permanently disturbed.

The probability for direct mortality of species resulting from construction activities or vehicle collision is low at the Winner Alternative, although it is higher than at the Crow Lake Alternative. Based on the minimal impacts to mammals described above, Wildlife Significance Criteria 1 and 2 (**Section 4.4.2**) would not be exceeded, and impacts to mammals would be less than significant.

Bats

Construction could affect bats through direct mortality, habitat loss and fragmentation and disturbance effects (SDBWG and SDGFP 2009). Bat use surveys for the Winner Alternative are ongoing. There are no known roosts within or adjacent to the area. The probability of construction-related bat mortality is extremely low given their mobility and the absence of any roosts. Habitat loss and fragmentation effects to bats are also expected to be minimal. The permanent loss of approximately 184 acres of mixed-grass prairie foraging habitat would not represent an adverse effect to bats given the large adjacent tracts of similar habitat. No shrub or forested riparian habitats or other areas of concentrated bat use would be affected. A total of 3.6 acres of shelterbelt and 0.9 acres of deciduous forest, representing less than 0.2 percent of potential daytime roosting habitat, may be permanently removed. Construction would generally occur during daylight hours and would not result in any disturbance effects for these nocturnal animals.

Operation and maintenance impacts to bats would be similar to those described in **Section 4.4.3.1, Wildlife, Bats**, although the increase in access roads could further fragment foraging habitat for bats.

Collision-related bat mortality would be similar to that described in **Section 4.4.3.1, Wildlife, Bats**. However, bat call studies in 2009 indicate low bat activity in the Winner Alternative area so the frequency of collisions may be low.

Based on the expected impacts to bats described above, Wildlife Significance Criteria 1 and 2 (**Section 4.4.2**) would not be exceeded, and impacts to bats would be less than significant.

Reptiles/Amphibians

The types of impacts to reptiles and amphibians would be similar to those described in **Section 4.4.3.1, Wildlife, Amphibians/Reptiles**, although impacts may be higher at the Winner Alternative because there would be more than twice the area disturbed. These impacts would be minimal based on the small amount of habitat that would be temporarily and permanently removed and the low likelihood for direct mortality of individuals. Wildlife Significance Criteria 1 and 2 would not be exceeded, and impacts to reptiles and amphibians would be less than significant.

Birds

The 2008 PII study evaluated possible impacts to biological resources in accordance with USFWS guidelines. The Winner PII score of 269 is lower than that of the Lake Andes National Wildlife Refuge reference area (PII of 331) but higher than that of the Crow Lake Alternative (PII of 239). The higher score can be attributed to the presence of more wetlands and grassland areas. WEST, Inc. is conducting additional migratory and breeding bird surveys in the site area. These data, when available, will aid in assessing potential impacts to avian species and developing additional conservation measures.

Construction activities common to all avian species include direct mortality, habitat alteration (fragmentation) or loss and disturbance related to noise and increased human presence resulting in the displacement of individual birds. The types of construction impacts would be similar to those described in **Section 4.4.3.1, Wildlife, Birds** for avian species, although impacts may be higher at the Winner Alternative because there would be more than twice the area of disturbance. Loss and nest abandonment would result in less than significant impacts (including the Applicants' continuing consultation with SDGFP), because Wildlife Significance Criterion 1 (**Section 4.4.2**) would not be exceeded. If the MBTA is violated, Wildlife Significance Criterion 2 would be exceeded; however with the implementation of the BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), impacts to birds would be less than significant.

The Proposed Project would result in the permanent loss of 184 acres of mixed-grass prairie habitat (**Table 4.4-2**), which represents a small proportion of the area (0.2 percent). The spacing

of turbines and access roads could contribute to habitat fragmentation and may be higher at the Winner Alternative because of the need for more access roads. Construction noise and associated human activity could temporarily disturb or displace individual birds, and may interfere with migrating, foraging, breeding and nesting; these impacts are expected to be higher for the Winner Alternative. Construction-related disturbance would be limited to a single migratory (both spring and fall) and breeding-nesting season; however, survival and reproductive success would be temporally reduced. Impacts would be less than significant, because Wildlife Significance Criterion 1 (**Section 4.4.2**) would not be exceeded. If the MBTA is violated, Wildlife Significance Criterion 2 would be exceeded; however with the implementation of the BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), impacts to birds would be less than significant.

Operation and maintenance of the Proposed Project could affect avian species through direct mortality, disturbance and displacement and habitat fragmentation, as described in **Section 4.4.3.1, Wildlife, Birds**. Based on the results from other wind farms, a ranking of seasonal mean raptor use in the Winner Alternative during spring of 2009 was low (0.23 raptors/plot/20-minute survey), ranking thirty-ninth relative to data collected at 43 other existing and proposed wind farms (WEST 2009b) (**Table 3.4-10**). Based upon these data, raptor use of the Winner area is lower than that observed at most existing and proposed wind farms (WEST 2009b), and it is lower than that observed at the Crow Lake Alternative. Higher raptor concentrations are known along the Missouri River corridor 25 miles east of the Winner area (South Dakota Birds 2009).

As described in **Section 4.4.3.1, Wildlife, Birds** and through implementation of the included BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), measures have been included to reduce avian mortality. Data obtained through baseline avian use surveys and habitat characterization suggest that avian mortality rates are likely to be similar to or lower than those experienced at other wind farms. While the Proposed Project design, including BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), would further reduce likely fatalities, avian mortality would occur as a result of the Proposed Project. Impacts would be less than significant, because Wildlife Significance Criterion 1 (**Section 4.4.2**) would not be exceeded. If the MBTA is violated, Wildlife Significance Criterion 2 would be exceeded; however with the implementation of the BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), impacts to birds would be less than significant.

Noise and human activities associated with operation and maintenance of the Proposed Project would result in temporary disturbance similar to those discussed for construction, but at reduced intensity. Regional roads may experience increased traffic due to interest in seeing the operational turbines; traffic would generally be restricted to public roads, thereby minimizing potential impacts. New roads would be constructed for access to the turbines, but the majority of these roads would be gated and located on private land, minimizing or eliminating increased public access.

The presence of turbines and operation and maintenance activities could result in longer-term effects, including avoidance and abandonment of habitats in proximity to the turbines (see **Section 4.4.3.1, Wildlife, Birds**). Baseline surveys have been initiated to assess pre-construction

avian abundance and habitat use in the Winner Alternative. Reference sites have also been established outside of potential impact areas within the Winner Alternative boundary for comparison. Post-construction monitoring would continue pre-construction baseline surveys for three years to evaluate species-specific changes in abundance, habitat use and displacement effects associated with operation of the Proposed Project compared to general avian communities (**Chapter 2, Tables 2.2 and 2.3**). In addition, Whooping Crane and Sandhill Crane monitoring would occur concurrently for a minimum of three years. Both of these studies would improve the understanding of species-specific disturbance and displacement effects associated with development of the Proposed Project.

Operation and maintenance activities and the presence of turbines could also fragment habitat for grassland species. The Winner mixed-grass prairie ecosystem is relatively fragmented, mainly due to the presence of cropland and roads, although it is more intact than the Crow Lake Alternative. Human activity, turbines and access roads could further fragment habitats for avian species. The actual fragmentation effects are difficult to quantify, but would likely be species-specific and could disrupt movement between seasonal habitats. In the worst case, these effects would lead to some reduction of breeding success, productivity and survival. A post-construction monitoring program would help determine fragmentation effects.

Based on the localized impacts to birds described above, Wildlife Significance Criterion 1 (**Section 4.4.2**) would not be exceeded and impacts to birds would be less than significant. If the MBTA is violated, Wildlife Significance Criterion 2 would be exceeded; however with the implementation of the BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), impacts to birds would be less than significant.

Special Status Species

Federal-Listed Species

Whooping Crane: Suitable habitat for the Whooping Crane in the Winner Alternative includes stop over, roosting and foraging habitats. The Winner Alternative is within the Aransas-Wood Buffalo Population migration corridor. Previous sightings in the region, large numbers of Sandhill Cranes (a surrogate species of the Whooping Crane), and the presence of suitable habitat make it possible that Whooping Cranes occasionally fly over and land in the Winner Alternative during seasonal migrations. Operating turbines could pose a threat. Whooping Crane occurrence increases closer to the Missouri River, the approximate centerline of the migration corridor 25 miles east of the Winner Alternative. Suitable habitat is present throughout the migration corridor, and Whooping Cranes have been documented in the Winner Alternative. Use of the entire corridor is likely during any migratory cycle. Inclement weather, predation and human disturbance may cause Whooping Cranes to stray from the centerline of the migration corridor. Structures, such as wind turbines and transmission lines, pose a collision risk (although unlikely) for Whooping Cranes due to poor visibility during inclement weather and poor flying agility of cranes. To date, there are no documented occurrences of Whooping Crane collisions with wind turbines; however, it is theoretically foreseeable. As included in the BMPs and APMs

(Chapter 2, Tables 2.2 and 2.3), surveys of the transmission lines would be conducted as part of the post-construction avian monitoring program, and the transmission line would be marked with bird flight diverters where appropriate to reduce the risk to Whooping Cranes.

During migration, Whooping Cranes may also forage and roost in habitats at the Winner Alternative during stopovers. Whooping Cranes fly at lower altitudes between roosting and foraging habitat, placing them at risk of collision with turbines during take-off, landing, inclement weather and movement between foraging and roosting habitat.

Effects will be determined in the BA, which is under preparation. Western and RUS will follow USFWS recommendations provided through the Section 7 consultation process.

American Burying Beetle: Suitable habitat for the American burying beetle occurs within most of the Winner Alternative and the beetle has been documented in the area. Suitable habitat could include mixed-grass prairie, deciduous forest and shelterbelts (56,650 acres). It is difficult to estimate the population within the area, although temporary and permanent disturbance could result in disturbance and loss of 2,367 acres and 189 acres of habitat, respectively.

Effects will be determined in the BA, which is under preparation. Western and RUS will follow USFWS recommendations provided through the Section 7 consultation process.

State-Listed Species

Fish Species (blacknose shiner, northern redbelly dace, pearl dace): Direct impacts on the blacknose shiner, northern redbelly dace and pearl dace would be unlikely because turbines would be placed in upland areas. There is a potential for indirect impacts due to the construction of stream crossings for access roads and collection lines introducing sedimentation into stream channels. Increased sedimentation can result in the loss of spawning substrate, which may reduce recruitment. Siltation of gravel substrate may also greatly reduce invertebrate populations, thereby affecting the food source for these species. Access roads would be designed as low-water, at-grade gravel crossings, or culverts would be installed, reducing impacts to fish habitat. The roadbed would be designed to allow water to percolate through the gravel overlay. Construction would not involve any dewatering practices or disruption of the streambed. No damming effect would occur. Any increases in sedimentation would be short term during the construction phase. Sedimentation is not expected to increase as a result of operation and maintenance activities.

Other possible indirect impacts to fish species include the introduction of hazardous waste into stream channels through accidental spilling. This risk would be minimized by maintaining refueling areas and hazardous waste storage areas away from the stream channels.

Stormwater and erosion and sediment control BMPs and APMs would be used during construction and operation of the Proposed Project including the use of directional boring under all streams with flowing water, silt traps, stream bank stabilization and revegetation of disturbed

areas adjacent to perennial streams. Impacts to this species would be less than significant because Special Status Species Significance Criteria 1, 2 and 3 (**Section 4.4.2**) would not be exceeded.

State and Federal Species of Concern

Greater Prairie Chicken and Sharp-tailed Grouse: Suitable habitat for Greater Prairie Chickens and Sharp-tailed Grouse is present in the Winner Alternative, and active leks are known in the area (WEST 2009b). Construction effects would be similar to those described in **Section 4.4.3.1, Wildlife, Birds** for grassland species, although more leks were confirmed at the Winner Alternative, so impacts may be higher. To minimize effects upon Greater Prairie Chickens and Sharp-tailed Grouse, no construction activities would be permitted within a pre-determined radius of known, active leks between March 1 and May 1. Impacts would be less than significant (the Applicants are currently in consultation with SDGFP), because Special Status Species Significance Criteria 1, 2, 3 and 4 (**Section 4.4.2**) would not be exceeded.

Possible operation and maintenance impacts for Greater Prairie Chickens and Sharp-tailed Grouse are similar to those described in **Section 4.4.3.1, Wildlife, Birds**, although more leks were confirmed (WEST 2009b) so impacts to these species may be higher. Impacts would be less than significant, because Special Status Species Significance Criteria 1, 2, 3 and 4 (**Section 4.4.2**) would not be exceeded.

Noise and human activities associated with operation and maintenance would result in temporary disturbances to Greater Prairie Chickens and Sharp-tailed Grouse similar to those previously discussed in **Section 4.4.3.1, Wildlife, Birds**. These temporary disturbances would represent a less than significant impact (the Applicants are currently in consultation with SDGFP), because Special Status Species Significance Criteria 1, 2, 3 and 4 (**Section 4.4.2**) would not be exceeded.

Grassland Bird Species (Chestnut-collared Longspur, Grasshopper Sparrow, Western Meadowlark, Upland Sandpiper, Marbled Godwit, Long-billed Curlew, Lark Bunting, Orchard Oriole, Prairie Falcon, Red-headed Woodpecker, Loggerhead Shrike, Dickcissel): Grassland species of concern occur in the Winner Alternative as migratory and breeding residents. Suitable non-breeding and breeding habitat is present for these species, and several were observed during spring and summer surveys. Adverse impacts associated with construction, operation and decommissioning would be similar to those described in **Section 4.4.3.1, Wildlife, Birds**.

Impacts would be less than significant, because Special Status Species Significance Criteria 1, 2 and 3 (**Section 4.4.2**) would not be exceeded. If the MBTA is violated, Special Status Species Significance Criterion 4 would be exceeded; however with the implementation of the BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), impacts to grassland birds would be less than significant.

Wetland Bird Species (American Bittern, Wilson's Phalarope, Black Tern, Trumpeter Swan, American White Pelican): Wetland bird species may occur in the Winner Alternative as summer

residents, since suitable breeding habitat is present. Wilson's Phalaropes were observed during spring or summer surveys; the other four species were not observed (WEST 2009b). Pre-construction nest surveys would identify nesting species and nest disturbance would be avoided.

Construction activities would temporarily disturb wetland species in the vicinity. Operation may result in collisions with turbines, causing injury or death. Impacts would be less than significant, because Special Status Species Significance Criteria 1, 2 and 3 (**Section 4.4.2**) would not be exceeded. If the MBTA is violated, Wildlife Significance Criterion 4 would be exceeded; however with the implementation of the BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), impacts to wetland birds would be less than significant.

Raptor Species (Northern Harrier, Ferruginous Hawk, Swainson's Hawk, Burrowing Owl):

Raptor species may occur in Winner Alternative as summer residents, and suitable breeding habitat is present (WEST 2009b). Adverse impacts associated with construction, operation and decommissioning would be similar to those described in **Section 4.4.3.1, Wildlife, Birds**. Impacts would be less than significant, because Special Status Species Significance Criteria 1, 2 and 3 (**Section 4.4.2**) would not be exceeded. If the MBTA is violated, Wildlife Significance Criterion 4 would be exceeded; however with the implementation of the BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), impacts to raptors would be less than significant.

Plains Spotted Skunk: Plains spotted skunks occur in the northern portion of the Winner Alternative just south of Winner (SDNHP 2009). Impacts to this species would be similar to those described in **Section 4.4.3.1, Wildlife, Mammals**, although they would occur on a larger scale. Overall, 2,314/ 184 acres of mixed-grass prairie and 741/ 62 acres of cropland would be temporarily/ permanently disturbed, respectively. The area of habitat permanently disturbed represents a relatively small amount (0.3 percent) of habitat available regionally. This small loss of habitat would not disrupt breeding, rearing or wintering behavior and would not influence the viability of local populations. Impact to plains spotted skunk would be less than significant because Special Status Species Significance Criterion 1 (**Section 4.4.2**) would not be exceeded.

Plains Topminnow: Direct impacts on the Plains topminnow would be unlikely because turbines would be placed in upland areas. There is the possibility for indirect impacts due to the construction of stream crossings for access roads and collection lines introducing sedimentation into stream channels. Increased sedimentation can result in the loss of spawning substrate, which may reduce Plains Topminnow recruitment. Siltation of gravel substrate may also greatly reduce invertebrate populations, thereby affecting the food source for this species. Access roads would be designed as low-water, at-grade gravel crossings or culverts would be installed, reducing impacts to fish habitat. The roadbed would be designed to allow water to percolate through the gravel overlay. Construction would not involve any dewatering practices or disruption of the streambed. No damming effect would occur. Any increases in sedimentation would be short term during the construction phase. Sedimentation is not expected to increase as a result of operation and maintenance activities.

Other possible indirect impacts to fish species include the introduction of hazardous waste into stream channels through accidental spilling. This risk would be minimized by maintaining refueling areas and hazardous waste storage areas away from stream channels.

Stormwater and erosion and sediment control BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**) would be used during construction and operation of the Proposed Project including the use of directional boring under all streams with flowing water, silt traps, stream bank stabilization and revegetation of disturbed areas adjacent to perennial streams. Impacts to this species would be less than significant because Special Status Species Significance Criterion 1 (**Section 4.4.2**) would not be exceeded.

Plains Leopard Frog: Impacts to plains leopard frog could include temporary and permanent loss of grassland dispersal habitat and equipment or vehicle collisions along roads in dispersal habitat. Impacts to breeding habitat are not expected because there are only isolated areas of standing or flowing water in the Winner Alternative and these areas would be avoided by placing access roads and turbines in upland areas. Impacts to this species would be less than significant based on the small amount of habitat that would be temporarily or permanently removed and Special Status Species Significance Criterion 1 (**Section 4.4.2**) would not be exceeded.

Lesser Earless Lizard: Impacts to lesser earless lizard could include temporary and permanent loss of habitat and equipment or vehicle collisions along roads within suitable habitat. This species prefers sparsely vegetated areas in short grass ecosystems, including prairie dog towns. Unless heavily grazed, grassland habitats in the Winner Alternative do not support high-quality habitat and the prairie dog town would not be impacted by development of the Proposed Project; therefore, very little habitat would be impacted. Impacts to this species would be less than significant based on the small amount of habitat that would be temporarily or permanently removed, and Special Status Species Significance Criterion 1 (**Section 4.4.2**) would not be exceeded.

Western Box Turtle: Preferred habitat for the western box turtle (lakes, rivers and large streams) would not be impacted by the Proposed Project. Impacts to this species are not anticipated. Therefore, impacts to this species would be less than significant because Special Status Species Significance Criterion 1 (**Section 4.4.2**) would not be exceeded.

Regal Fritillary Butterfly: Regal fritillary butterflies are known to occur five miles south of the Winner Alternative and suitable habitat may be present. Adverse impacts associated with construction include habitat loss and mortality. Habitat loss would be directly proportional to the amount of ground disturbance. Regal fritillary butterflies were not observed during spring or summer avian use surveys, but there has been no survey specifically designed to determine the presence or absence of this species. No studies have evaluated the effects of wind farms on regal fritillary butterflies, and it is difficult to predict the disturbance and displacement effects. General studies of butterfly mortality attributed to turbine strikes indicate that it is likely low due to wind currents generated from turbine rotation (Grealey and Stephenson 2007). Construction activities would temporarily disturb regal fritillary butterflies in the vicinity and could result in habitat

loss. Operation could result in collisions with turbines, resulting in injury or death. These impacts would be less than significant because Special Status Species Significance Criterion 1 (**Section 4.4.2**) would not be exceeded.

Western's Proposed Federal Action

If the Proposed Project is approved, development of the Western system modifications at its Winner Substation would not cause the loss of habitat for wildlife species since any changes would be confined to a previously disturbed and graded area. Construction, operation and decommissioning activities could result in the direct mortality of wildlife species if they are not able to move away from equipment and vehicles traveling to the substation. There is a potential for wildlife-electrical equipment interactions during the operation of the proposed substation additions, but it is expected that these interactions would be low. The substation additions would be designed in accordance with the latest APLIC guidelines, and would employ the included BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**). The effects of any interactions would be less than significant.

4.4.3.3 No Action Alternative

Under the No Action Alternative, Western would not approve an interconnection request with the Applicants and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the Proposed Project would not be built and that the environmental impacts associated with construction and operation of the Proposed Project would not occur. There would be no biological resource impacts associated with the No Action Alternative.

4.5 CULTURAL RESOURCES

The Proposed Project must comply with Federal laws relating to identification, management, and protection of cultural resources. Western and RUS assessed the existing previously recorded cultural resource data for the Proposed Project under the requirements, including those in Section 106 of the NHPA and its implementing regulations (36 CFR Part 800). This EIS is not intended to address all of the requirements of Section 106. Because of the extensive nature of the Proposed Project alternatives, Western is conducting Section 106 compliance in accordance with its implementing regulations, 36 CFR 800.4 (b)2, which State:

(2) Phased identification and evaluation. Where alternatives under consideration consist of corridors or large land areas, or where access to properties is restricted, the agency official may use a phased process to conduct identification and evaluation efforts. The agency official may also defer final identification and evaluation of historic properties if it is specifically provided for in a memorandum of agreement executed pursuant to §800.6, a programmatic agreement executed pursuant to § 800.14 (b), or the documents used by an agency official to comply with the National Environmental Policy Act pursuant to § 800.8. The process

should establish the likely presence of historic properties within the area of potential effects for each alternative or inaccessible area through background research, consultation and an appropriate level of field investigation, taking into account the number of alternatives under consideration, the magnitude of the undertaking and its likely effects, and the views of the SHPO/THPO and any other consulting parties. As specific aspects or locations of an alternative are refined or access is gained, the agency official shall proceed with the identification and evaluation of historic properties in accordance with paragraphs (b)(1) and (c) of this section.

Resources listed or eligible for listing in the NRHP are defined by the regulations as “historic properties” and impacts to these resources must be considered.” In addition, there may be areas of interest to Native Americans, such as traditional use areas or TCPs that extend outside the geographic boundaries of the Proposed Project area. These concerns must be considered through consultation with interested tribes.

4.5.1 METHODS

A Class I cultural resources inventory was completed. The inventory includes a review of existing cultural resources documentation on file in State repositories, a preliminary architectural history windshield survey within the Proposed Project area, and a review of 19th century Public Land Survey maps. Information used in the cultural resources analysis for this EIS includes:

- A Class I survey/records review
- Review of General Land Office maps
- Review of historic atlases
- Review of topography (slope, proximity to water, *etc.*)
- Research on Indian/pioneer/military conflict areas and trails and whether any occur within the Proposed Project alternatives

Areas that typically have a high level of sensitivity include those with the ecological or environmental, ethnohistorical, and historical potential to contain habitation sites and some temporary camps, all cremation and burial sites (and all sites described as containing evidence of human remains), rock art, intaglios, TCPs, and sites of any type that would be eligible to be included on national and State registers. Habitation sites and some temporary camps may hold significant scientific research potential and may also be of traditional cultural significance to Native Americans. Sites with evidence of human remains, rock art, intaglios, and TCPs are of demonstrated significance to Native Americans.

Areas that typically have a moderate level of sensitivity include those with conditions similar to what is described for areas of high sensitivity, but which have been subject to disturbance (such as agricultural activities) or other diminishing conditions; and as a result of these disturbances, the surface expression of the site may be less apparent.

Areas that typically have a low level of sensitivity include those that lack the ecological or environmental, ethnohistorical, and historical potential to contain sites of any type that would be eligible to be included on national and State registers. Isolates and single category sites, such as lithic or ceramic scatters are generally considered to have relatively low sensitivity because of their limited research potential. However, it is acknowledged that even an isolate (for example a Clovis point or a ceremonial object) could be significant to Native Americans and researchers. It should be noted that, when considered alone, many areas with these types of sites may be classified as having low to moderate sensitivity; however, such sites may acquire greater importance when considered part of a district of sites that together contain information relevant to answering important research questions.

4.5.2 SIGNIFICANCE CRITERIA

The threshold of significance for cultural resources is based on whether the resource is listed in, or considered eligible for listing in, the NRHP. There are four criteria under the regulations implementing the NHPA in 36 CFR 60.4 used to evaluate the significance and integrity of a resource. The degree of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or (b) that are associated with the lives of persons significant in our past; or (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or (d) that has yielded, or may be likely to yield, information important in prehistory or history.

Within the context of the NHPA, effects to sites are classified as “no adverse effect” or “adverse effect.” Under NEPA, a significant impact to cultural resources would occur if a site of archaeological, tribal, or historical value that is listed or eligible for listing in the NRHP could not be avoided or mitigated during siting and construction of the Proposed Project. In addition, NEPA regulations consider impacts to cultural resources as “direct” or “indirect.” Under the regulations implementing Section 106 of the NHPA, the definition of direct or indirect refers to the APE within which the Federal undertaking may directly or indirectly cause alterations in historic properties (36 CFR 800.16[d]). Therefore, avoidance or mitigation of historic properties can ensure that sites are not adversely impacted (NHPA) and that there are no significant impacts (NEPA).

4.5.3 IMPACT ASSESSMENT

A portion of the Crow Lake Alternative and the majority of the Winner Alternative would be located on rangeland and agricultural lands, where surface cultural resources may have already been disturbed. Earthmoving activities, such as grading and digging, have the highest potential for disturbing or destroying significant cultural resources; however, pedestrian, animal, and vehicular traffic and indirect impacts of earthmoving activities, such as soil erosion, could also

have an effect. The construction and decommissioning of the infrastructure necessary for wind-powered facilities has the greatest potential to impact subsurface cultural resources because of the increased ground disturbance during these phases.

Visual impacts to significant historic properties, such as sacred landscapes, historic trails, and structures could also occur. There are four criteria under the regulations implementing the NHPA in 36 CFR 60.4 used to evaluate the significance and integrity of a resource. The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or (b) that are associated with the lives of persons significant in our past; or (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or (d) that has yielded, or may be likely to yield, information important in prehistory or history. An adverse visual impact, as it applies to built environments, is generally defined (36 CFR 800) as one that occurs when an undertaking carries the potential to directly or indirectly alter any qualifying characteristic of historic properties either listed or eligible for listing in the NRHP. There is no universally accepted yardstick for measuring visual effects, and since those effects do not always damage the defining characteristics of historic properties in any physical manner, assessing them can be difficult, complicated, and is almost always subjective. Furthermore, because an undertaking would be visible from a historic property does not mean it automatically has created adverse visual effect. A visual impact assessment will be conducted prior to construction.

4.5.3.1 Crow Lake Alternative

Data retrieved from the Class I records review shows that six previously recorded sites are present within the Crow Lake Alternative boundary (see **Table 3.5-2**). Two sites are listed on the NRHP, one is recommended for listing, and one is undetermined (**Table 4.5-1**). One historic foundation (39AU0007) dating to 1861 is recommended eligible for the NRHP by the recording archaeologist with concurrence by the SHPO and Western. The eligibility of one stone circle site (39JE0039) is undetermined. The remaining two historic sites were not recommended eligible by the recording archaeologist. Measures would be taken by the Applicant to ensure that site 39AU0007 is avoided and protected during construction; therefore, no impact would occur. Site 39JE0039 requires additional review to determine eligibility for the NRHP. This site would also be avoided, and therefore, no impact would occur.

One historic structure, the Patten Consolidated School, is listed on the NRHP under Criterion A as a good example of what old county schoolhouses represented to rural communities in South Dakota. The Underwood United Methodist Church is also listed on the NRHP under Criterion C as an example of an early-twentieth century rural wooden country church. An adverse visual effect (NHPA) or visual impact (NEPA) is one that negatively visual effects the integrity to an historic built environment resource, to the extent significance and eligibility for listing in the

NRHP are compromised. In particular, adverse visual effects can be seen as negatively affecting any of the seven characteristics of integrity, to wit: location, design, setting, materials, workmanship, feeling, or association. The Patten Consolidated School is located within the Proposed Project boundary and the Underwood United Methodist Church is located within the one mile buffer.

Table 4.5-1 Crow Lake Alternative Historic Properties

| Site | Site Type | NRHP Eligibility | Location |
|------------|-----------------------------------|----------------------------------|---|
| 39AU0007 | Foundation | Eligible | Within Proposed Project boundary |
| 39JE0039 | Stone Circle | Unevaluated | Within Proposed Project boundary |
| AU00000059 | Patten Consolidated School | Eligible – listed Criterion A | Within Proposed Project boundary |
| AU00000060 | Underwood United Methodist Church | Eligible – listed Criterion C | Within one-mile of Proposed Project boundary |

The Patten Consolidated School would be evaluated for visual impacts, and avoidance would ensure that no impact would occur, or mitigation of historic properties would ensure a less than significant impact. An indirect impact is an effect that is caused by and results from an activity, although further removed in distance, still reasonably foreseeable. The Underwood United Methodist Church would also be evaluated for secondary or indirect visual impacts. Avoidance would ensure that no impact would occur, or mitigation of historic properties would ensure that there is a less than significant impact.

Prior to construction, a complete pedestrian survey of the entire APE for cultural resources would be completed. A qualitative approach has been developed that incorporated factors that are strong predictors of cultural resources, including climatic zone, slope, access, and water sources to predict site types and densities. The areas are rated as high, moderate or low sensitivity.

In the Crow Lake Alternative, the landscape is characterized by hilly terrain, intermittent and perennial lakes and ponds associated with prairie potholes and intermittent streams. Given the tribes' repeated use of the area between the Missouri River and the James River as hunting grounds, historic period settlements and villages, and military excursions and mapping expeditions to find roads and routes from the east to the Missouri, it is expected that site sensitivity in certain areas of the Proposed Project area would be high:

- **Agricultural Lands: Low to Moderate.** This rating is primarily due to generations of disturbance from agricultural activities. However, subsurface archaeological sites may be encountered during ground-disturbing activities. Application of cultural resources mitigation measures (to be identified), BMPs and APMs (as listed in **Chapter 2, Tables 2.2 and 2.3**) would ensure that less than significant impacts would occur if subsurface sites are encountered during construction.

- **Prairie Lands: High.** The portion of the Crow Lake Alternative that is characterized as Prairie Lands has extensive prehistoric and historic use by tribes, traders, explorers, settlers, and the military that was instrumental, not only in the broad pattern of United States military, transportation, and commerce history, but world history in terms of the early trade industry. This site was also important in the political/economic struggle for control of North America, as well as for the history and prehistory of the tribal people of the Central Plains. The Applicants would make a reasonable effort to design the Proposed Project to avoid NRHP-eligible properties. If a NRHP-eligible property could not be avoided, then application of cultural resources mitigation measures (to be identified) would ensure that less than significant impacts would occur. If unknown subsurface archaeological sites are encountered during construction, application of cultural resources mitigation measures (to be identified), BMPs and APMs (as listed in **Chapter 2, Tables 2.2 and 2.3**) would ensure that less than significant impacts would occur.

4.5.3.2 Winner Alternative

Thirteen previously recorded sites are present within the Winner Alternative (see **Table 3.5-5**), six of which have undetermined NPHP eligibility (**Table 4.5-2**). They include one historic cairn (39TP0019), the North East Washington Rural School foundation with privy depressions (39TP0027), three farmsteads (39TP0026, 39TP0035, 39TP0036), and a concrete barn foundation (39TP0038). The remaining six sites were not recommended eligible for the NRHP by the recording archaeologist; the SHPO and Western concurred with this recommendation. The six unevaluated historic properties require additional review to determine eligibility for the NRHP. In the event these historic properties are determined eligible, avoidance would ensure that no impact would occur, or application of mitigation measures (to be identified), BMPs and APMs (as listed in **Chapter 2, Tables 2.2 and 2.3**) would ensure that less than significant impacts would occur.

One historic structure within the Winner Alternative, the Manthey Barn, is listed on the NRHP under Criterion C as an example of a variation of the Midwest Three-Portal Barn in South Dakota. The Manthey Barn would be evaluated for visual impacts and avoidance would ensure that there is no impact, or mitigation of historic properties would ensure a less than significant impact.

Six additional historic structures that are listed or recommended eligible for the NRHP are located within one mile of the Winner Alternative and include the Key Residence, the Winner Post Office, Winner Drive-In, Immaculate Conception Church, St. Mary's Parish Hall, and the Winner Grade School (**Table 4.5-3**). The Key Residence is listed on the NRHP under Criterion C as an example of an early concrete residential structure and as one of the first residences erected in Winner. The Winner Grade School is recommended eligible for the NRHP by the recording archaeologist and concurrence with the SHPO and Western under Criterion C as an example of the style developed by Harold Spitznagel and used in several communities in South Dakota during the 1950s and may also be eligible as an example of the building boom in Winner following WWII. The Winner Post Office is recommended eligible for the NRHP by the

recording archaeologist and concurrence with the SHPO and Western under Criterion C. The Winner Drive-In, Immaculate Conception Church, and St. Mary’s Parish Hall are all recommended eligible for the NRHP by the recording archaeologist and concurrence with the SHPO and Western under Criterion C for their association with post-war (WWII) era building development. In addition, the Immaculate Conception Church may retain sufficient integrity to be eligible for its architecture. These structures would also be evaluated for indirect visual impacts. Avoidance would ensure that no impact would occur, or application of mitigation measures (to be identified), BMPs and APMs (as listed in **Chapter 2, Tables 2.2 and 2.3**) would ensure that less than significant would occur.

A pedestrian survey of sites within the Winner Alternative is not available, so a qualitative approach that incorporated factors that are strong predictors of cultural resources, including climatic zone, slope, access, and water sources was used to predict site types and densities. The rating system that was used refers to each site as high, moderate or low sensitivity.

The Winner Alternative landscape is characterized by rolling plains of relatively low relief that give way to butte and mesa topography that is typical of the high plains with intermittent streams throughout the Winner Alternative area. The area has been used extensively as hunting grounds for the Sioux tribes, as well as for military excursions. It is expected that site sensitivity in certain areas of this Proposed Project area would be low to moderate.

The low rating is primarily due to the generations of disturbance from agricultural activities since the majority of the Winner Alternative is within agricultural fields. However, subsurface archaeological sites may be encountered during ground disturbing activities. If subsurface sites are encountered during construction, application of cultural resources mitigation measures (to be identified), BMPs and APMs (as listed in **Chapter 2, Tables 2.2 and 2.3**) would ensure that less than significant impacts would occur.

Table 4.5-2 Winner Alternative Historic Properties

| Site | Site Type | NRHP Eligibility | Location |
|----------|-------------------|------------------|--|
| 39TP0019 | Cairn | Unevaluated | Within Proposed Project boundary |
| 39TP0026 | Farmstead | Unevaluated | Within one-mile of Proposed Project boundary |
| 39TP0027 | School Foundation | Unevaluated | Within Proposed Project boundary |
| 39TP0035 | Farmstead | Unevaluated | Within Proposed Project boundary |
| 39TP0036 | Farmstead | Unevaluated | Within Proposed Project boundary |
| 39TP0038 | Foundation | Unevaluated | Within Proposed Project boundary |

Table 4.5-3 Winner Alternative Historic Structures

| Site | Site Type | NRHP Eligibility | Location |
|------------|------------------------------|----------------------------------|---|
| TP00000010 | Manthey Barn | Eligible – Listed Criterion C | Within Proposed Project boundary |
| TP00000001 | Key Residence | Eligible – Listed Criterion C | Within one-mile of Proposed Project boundary |
| TP00000002 | Winner Post Office | Eligible – Criterion C | Within one-mile of Proposed Project boundary |
| TP00000065 | Winner Drive-In | Eligible – Criterion C | Within one-mile of Proposed Project boundary |
| TP00000066 | Immaculate Conception Church | Eligible – Criterion C | Within one-mile of Proposed Project boundary |
| TP00000069 | St. Mary's Parish Hall | Eligible – Criterion C | Within one-mile of Proposed Project boundary |
| TP00000071 | Winner Grade School | Eligible – Criterion C | Within one-mile of Proposed Project boundary |

The moderate rating is primarily due to the Winner Alternative's proximity to archaeological regions such as the Fort Randall Archaeological Region. The 39-mile archaeological region that encompasses Fort Randall is less than two miles east of the Winner Alternative, but military excursions may have extended beyond that boundary and further into the Plains. Other archaeological regions that contribute to a higher rating include the Lower White and Sand Hills. The Sand Hills Archaeological Region is located primarily in Nebraska but also extends into south central South Dakota and into the Winner Alternative. These sites are often buried and located along streams and rivers. The Winner Alternative is within the Tertiary tablelands, also known as the Sand Hills; limited archaeological work has been done in the South Dakota area of the Sand Hills Archaeological Region. Since the majority of sites found in the Sand Hills Archaeological Region tend to be buried sites, the likelihood of finding sites is low, but would be more likely to be encountered during construction. This does not preclude displaced surface sites that may be encountered within agricultural fields where artifacts have been turned up from plowing activities, or sites along creeks, drainages, and cutbanks. The possibility of these types of sites was discussed with the Rosebud Sioux Tribe at the conclusion of their records search; they have not had access to the area since it was removed from reservation status in the early 1900s (**Appendix D**).

In the event that NRHP-eligible properties are encountered the Applicants would make a reasonable effort to design the Proposed Project to avoid the eligible properties. If a NRHP-eligible property could not be avoided, then the application of cultural resources mitigation measures (to be identified), BMPs and APMs (as listed in **Chapter 2, Tables 2.2 and 2.3**) would ensure that less than significant impacts would occur. If unknown subsurface archaeological sites are encountered during construction, application of cultural resources mitigation measures (to be identified), BMPs and APMs (as listed in **Chapter 2, Tables 2.2 and 2.3**) would ensure that less than significant impacts would occur.

4.5.3.3 No Action Alternative

Under the No Action Alternative, Western would not approve an interconnection request with the Applicants and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the Proposed Project would not be built and that the environmental impacts associated with construction and operation of the Proposed Project would not occur. There would be no cultural resources impacts associated with the No Action Alternative.

4.6 LAND USE

4.6.1 METHODS

The ROI for land use includes areas of immediate disturbance associated with the Proposed Project and the proposed Federal actions. Additionally, adjacent land uses have been considered. Analyses completed for this section evaluate environmental impacts as a result of the Proposed Project Components and the proposed Federal actions. Land use plans for Aurora and Brule counties are currently being revised. Jerauld County's Comprehensive Plan was approved in 1998. No land use plan is available for Tripp County. Reviews of aerial photographs, existing public inventories (*e.g.*, USFWS, NWI, NRCS databases), and field studies have been used to identify the land uses within the alternatives.

The evaluation of impacts to land uses considered potential impacts to existing productive uses of the land, such as agriculture, rangeland and preservation of natural environments, as well as prime farmland and farmland of statewide importance, residential uses and recreational opportunities as a result of the Proposed Project and the proposed Federal actions.

4.6.2 SIGNIFICANCE CRITERIA

A significant impact to land use would occur if:

- An activity would conflict with any applicable land use policy or regulation of an agency with jurisdiction over those areas

4.6.3 IMPACT ASSESSMENT

For either alternative, the Proposed Project and proposed Federal actions would not conflict with any applicable policy or regulation of an agency with jurisdiction in the area. The majority of the area is used for rangeland and agriculture. Current land uses would continue, even though some land would be converted to industrial use. Additionally, the Applicants have coordinated with landowners and are establishing lease agreements for the Proposed Project development. Additionally, BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**) would be employed. Impacts to land use would be less than significant.

4.6.3.1 Crow Lake Alternative

Development of the Crow Lake Alternative would result in approximately 12 acres of temporary impact and approximately 1.8 acres of permanent impact to prime farmlands, and approximately 976 acres of temporary impact and approximately 99 acres of permanent impact to farmland of statewide importance. Temporary impacts due to construction would be revegetated with native grasses and/or crops matching the surrounding agriculture landscape. The permanent impacts account for less than 0.5 percent of available respective farmland within the Crow Lake Alternative boundary. In addition, there is a small area of prime farmland, if irrigated, that would be impacted by the Proposed Project; however, the land is not being used for agricultural purposes, and therefore would not result in a reduction in active agriculture. It would not substantially alter the use of farmland in areas designated for turbine and access road installations. The FPPA does not authorize the Federal government to affect the property rights of private landowners or regulate the use of private land, so conversion of some prime farmland and farmland of statewide importance to different uses would not conflict with FPPA policy.

The Crow Lake Alternative would result in the temporary disturbance of 82 acres and the permanent disturbance of 11 acres within USFWS grassland easements. It would also result in the temporary disturbance of 140 acres and the permanent disturbance of 9 acres within USFWS wetland easements (additional biological information pertaining to USFWS easements can be found in **Section 4.4**). The Applicants would work with the USFWS to obtain permits for the impact. The Proposed Project would not conflict with current USFWS land uses and policies for wetland and grassland easements.

During construction and decommissioning, noise, dust, traffic and the presence of a construction force would temporarily affect the rural to primitive character of the area. No residences are within 1,000 feet of the proposed turbine locations, in accordance with the Applicants' siting parameters. Further, the minimum distance from the centerlines of the alternative transmission line corridors to the nearest residence is at least 1,900 feet, so residential use would not be affected.

People engaging in casual hiking, birding and hunting within the Proposed Project alternative ROIs could be temporarily affected during the construction and decommissioning activities due to limited access.

If the Proposed Project is approved, system modifications at Western's Wessington Springs Substation would be confined within the existing substation and not alter current uses for the site.

4.6.3.2 Winner Alternative

Development of the Winner Alternative would result in approximately 2.1 acres of temporary impact and approximately 0.2 acres of permanent impact to prime farmlands, and approximately 509 acres of temporary impact and approximately 59 acres of permanent impact to farmland of statewide importance. Temporary impacts due to construction of the Proposed Project would be revegetated with native grasses and crops matching the surrounding agriculture landscape. The

permanent impacts account for less than 0.5 percent of available respective farmland within the Winner Alternative boundary. In addition, there is a small acreage of prime farmland, if irrigated, that would be impacted by the Proposed Project; however, the land is not being used for agricultural purposes and therefore would not result in a reduction in active agriculture.

Additionally, the Winner Alternative would not result in temporary or permanent disturbance within USFWS grassland easements.

During construction and decommissioning, noise, dust, traffic and the presence of a construction force would temporarily affect the rural to primitive character of the area. One residence is located within approximately 800 feet from a proposed turbine location. It is anticipated that this turbine location would be eliminated from further consideration, because it does not meet the Applicants' siting criteria. The second nearest residence is 1,050 feet away from a proposed turbine location, and meets the Applicants' siting criteria.

The closest residence to the centerline of the alternative 1 transmission line corridor is approximately 100 feet away, and due to this proximity, does not meet the Applicants' line siting criteria. It is anticipated that the alternative 1 transmission line corridor would be eliminated from further consideration. The closest residence to centerline of the alternative 2 transmission line corridor is at least 900 feet away, and meets the Applicants' siting criteria. Impacts associated with the short-term construction of the transmission corridor would be minimized through the included BMPs and APMs as described in **Chapter 2, Tables 2.2 and 2.3**.

Similar to the Crow Lake Alternative, people engaging in casual hiking, birding and hunting could be temporarily affected during the construction and decommissioning activities due to limited access.

If the Proposed Project is approved, system modifications at Western's Winner Substation would not alter current uses for the site. All additions would be confined within or adjacent to the existing substation.

4.6.3.3 No Action Alternative

Under the No Action Alternative, Western would not approve an interconnection request with the Applicants and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the Proposed Project would not be built and that the environmental impacts associated with construction and operation of the Proposed Project would not occur. Local landowners would not receive lease payments from the Applicants and could sign leases with another wind power developer. There would be no land use impacts associated with the No Action Alternative.

4.7 TRANSPORTATION

4.7.1 METHODS

The ROI for roads and highways includes roads near the Proposed Project area that would be used for delivery of construction equipment, construction worker access and maintenance access. The impact analysis only includes roads and highways within the counties in which the site would be located. The ROI for aviation includes airports within 20 miles. Additionally, information has been reviewed from the Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM Administered Lands in the Western United States (Bureau of Land Management [BLM] 2005).

4.7.2 SIGNIFICANCE CRITERIA

A significant impact to transportation would occur if:

- An activity would result in the permanent disruption of regional and local traffic
- An activity would result in the destruction of existing transportation infrastructure
- An activity would result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks; or impact an FAA-designated air safety zone around an existing airport

4.7.3 IMPACT ASSESSMENT

In general, a variety of transportation operations are necessary to support wind energy development. A list of representative transportation requirements for each phase of development is provided below. Most of these requirements would involve the transportation of material and equipment necessary for the Proposed Project and the proposed Federal actions.

Roads and Highways

Construction

The construction and operation of the Proposed Project would result in an increase in the ADT on the respective roadway network surrounding the Proposed Project alternatives. The majority of the additional traffic would be during the initial construction phase.

- Site and road grading and preparation would require heavy earthmoving equipment, typically involving 10 to 40 pieces of heavy machinery
- Road, pad and staging areas would require sand or gravel, delivered by dump trucks
- Tower foundations would require concrete, aggregate, sand and cement to be delivered by dump trucks; typically 15 to 35 truck shipments per foundation
- Tens of thousands of gallons per day of water typically would be obtained locally in the Proposed Project area that may require a State specific appropriation permit

- Turbines would be brought to the site by specialized equipment; overweight and/or oversized loads may require State and county specific permits and traffic management
- Turbine assembly and installation would require specialized cranes; overweight and/or oversized loads may require State and county specific permits and traffic management
- Turbine interconnections and transmission lines would require trenching or auger equipment and line trucks

Construction hours are expected to be from 6:00 a.m. to 6:00 p.m. on weekdays, and possibly weekends. Some activities may require extended construction hours, and nighttime construction may be necessary to meet the overall schedule. The movement of equipment and materials to the Proposed Project alternatives would cause a relatively short-term increase in the level of service of local roadways during the construction period. Most equipment (*e.g.*, heavy earthmoving equipment and cranes) would remain at the site for the duration of construction. Shipments of materials, such as gravel, concrete and water, would not be expected to substantially affect local primary and secondary road networks.

Shipments of overweight and/or oversized loads could be expected to cause temporary disruptions on the secondary and primary roads used to access a construction site. The transport vehicles may require defined routes, and by obtaining necessary permits for hauling heavy loads would comply with all Federal, State and local rules and ordinances. Local roads might require fortification of bridges and removal of obstructions to accommodate overweight or oversized shipments. The need for such actions would be determined on a site-specific basis. Access roads may need to be upgraded or constructed to accommodate overweight or oversize shipments. Because of the anticipated weight of the turbine components and electrical transformers that would be brought to the site, maximum grade becomes a critical road design parameter.

Operation

Once the Proposed Project is in operation, the expected traffic would be minimal. Minimal support personnel would be needed to maintain and operate the facility. Normally, no heavy or large loads would be expected; pickup or medium-duty trucks would be used for daily operations. Turbine site locations may be attended during business hours by a small maintenance crew of 10 to 12 people that would work in teams of two. Consequently, transportation activities would be limited to about 12 trips from the maintenance building to turbines in a typical day, using pickup trucks, medium-duty vehicles or personal vehicles. Large components may be required for equipment replacement in the event of a major mechanical breakdown. However, such shipments would be expected to be infrequent. Transportation activities during operations would be minimal, similar to those currently occurring, and not be expected to cause noticeable impacts to local road networks.

Decommissioning

Most transportation activities during site decommissioning would be similar to those during site development and construction.

- Foundation removal, site regrading and recontouring would require heavy earthmoving equipment transported to the site using flatbed or goose-neck trailers
- Turbine and tower disassembly would require cranes; overweight and/or oversized loads may require State-specific permits and traffic management
- Equipment and debris removal would require medium- to heavy-duty trucks

Heavy equipment and cranes would be required for turbine and tower dismantlement, breaking up tower foundations, and regrading and recontouring the site to the original grade. With the possible exception of a main crane, oversized and/or overweight shipments are not expected during decommissioning activities because the major turbine components could be disassembled, segmented or size-reduced prior to shipment. Thus, potential disruptions to local traffic during decommissioning would likely be fewer than those during original construction activities; therefore, decommissioning impacts would be less than significant.

Short-term traffic congestion may exist when construction delivery vehicles are on the road, and localized increases in road wear and maintenance may occur. However, the construction, operation and decommissioning of the Proposed Project would result in less than significant impacts to permanent, regional and local traffic and transportation infrastructure through the implementation of traffic control measures and other standard construction practices described above.

Aviation

The FAA regulates obstructions to navigable airspace (14 CFR 77, or “FAA Part 77”). The Applicants are required to notify the FAA Administrator of any proposed construction “of facilities more than 200 feet in height above the ground level at its site” (Section 77.13[a][1]). The height of towers and length of blades have a combined height of approximately 389 feet, exceeding the FAA notice threshold. The Applicants have provided preliminary information to the FAA regarding the Proposed Project. Prior to construction, the Applicants would notify the FAA regarding exact facility heights and latitude and longitude coordinates.

FAA requires that aircraft warning lights be installed on turbines taller than 200 feet. Recently, the FAA drafted new recommendations for lighting of wind-powered facilities. Based on studies prompted by the American Wind Energy Association and DOE, the FAA has developed a new set of recommendations for lighting wind farms that would require fewer lights than needed under its current policy. The new recommendations suggest red or white synchronized flashing strobe lights, at most 0.5 mile apart around the perimeter of wind farms. Daytime lighting and dual lighting of the turbines were both deemed unnecessary. However, the USFWS discourages the use of red flashing lights due to wildlife impacts (USFWS 2003). Prior to construction, the Applicants would consult with the FAA to identify applicable lighting requirements.

4.7.3.1 Crow Lake Alternative

Roads and Highways

The heavy equipment and materials needed for site access, site preparation and foundation construction are typical of heavy construction projects and do not pose unique transportation considerations. Construction, operation and decommissioning of the Proposed Project Components would not result in a permanent disruption of regional and local traffic, nor would these activities result in the destruction of existing transportation infrastructure; therefore development of the Proposed Project Components would result in less than significant impacts.

Aviation

The Proposed Project would not impact an FAA-designated air safety zone, nor would it result in a change in air traffic patterns, an increase in traffic levels or a change in location that results in substantial safety risks. Therefore, with the included BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), the construction, operation and decommissioning of the Proposed Project would result in less than significant impacts to aviation.

If the Proposed Project is approved, Western's system modifications at its Wessington Springs Substation would require personnel and shipments of materials, such as electrical equipment, gravel, concrete and water. Such shipments would similarly be expected to result in less than significant impacts to transportation.

4.7.3.2 Winner Alternative

Transportation impacts associated with the Winner Alternative would be similar to those described for the Crow Lake Alternative because the Proposed Project design requirements are comparable despite the alternative selected; therefore, with the included BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), impacts would be less than significant.

Shipments to Western's Winner Substation would similarly be expected to result in less than significant impacts.

4.7.3.3 No Action Alternative

Under the No Action Alternative, Western would not approve an interconnection request with the Applicants and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the Proposed Project would not be built and that the environmental impacts associated with construction and operation of the Proposed Project would not occur. There would be no transportation impacts associated with the No Action Alternative.

4.8 VISUAL RESOURCES

4.8.1 METHODS

The ROI includes areas within and adjacent to the Proposed Project area from which a person may be able to observe changes to the visual landscape resulting from constructing the Proposed Project Components. In addition, the ROI includes residences within the alternative boundaries, nearby population centers and nearby roadways from which the Proposed Project Components may be viewed if built. The impact analysis for visual resources evaluates the visual quality of the existing setting, assesses the sensitivity of visual resources, and evaluates modifications that would occur as a result of the Proposed Project. The following aesthetic values have been considered when evaluating the visual quality of, and modifications to, the existing landscape:

- Form – topographical variation, mountains, valleys
- Line/Pattern – roads, transmission lines
- Color/Contrast – brightness, diversity
- Texture – vegetation, buildings, disturbed areas

The sensitivity of the existing visual resources to changes associated with the Proposed Project and proposed Federal actions are based on a number of factors:

- The extent to which the existing landscape is already altered from its natural condition.
- The number of people within visual range of the area, including residents, highway travelers, and those involved in recreational activities.
- The degree of public concern or agency management directives for the quality of the landscape.

KOPs were selected to depict viewpoints that would be visually sensitive to change as a result of the Proposed Project. The KOPs depict the general visual setting of each of the alternatives and provide a baseline for developing visual simulations. As described in **Section 3.8.2**, based on public input received during the EIS scoping process, local (*i.e.*, residents within and near the alternative boundaries) sensitivity to visual changes as a result of the Proposed Project is low. The LCTDR and LCIC were identified as sensitive viewpoints for the Proposed Project; therefore, KOPs were selected for each of the alternatives based on topography and the potential to view the Proposed Project from the LCTDR and LCIC, as depicted in **Figure 3.8-1**. Visual simulations were prepared for each of the KOPs using computer software that considered the elevation, topography and distance from the viewpoint to the visible Proposed Project Components. Proposed Project Components have been labeled in the simulations in which they would be visible. If the simulation has determined that the Proposed Project Components would not be visible, then there is no additional label on the photograph. The existing condition photographs from **Section 3.8** are repeated in this section for side-by-side comparison between the existing condition and the simulation.

4.8.2 SIGNIFICANCE CRITERIA

A significant impact to visual resources would occur if:

- An activity would permanently and substantially alter or degrade scenic resources, including, but not limited to, geologic and topographic features, major stands of vegetation and/or trees, and other visual resources within a State scenic highway
- An activity would substantially degrade the existing visual character or quality of the Proposed Project site and its surroundings

4.8.3 IMPACT ASSESSMENT

For visual resource analysis, the following impact assessment applies to both alternatives. The KOP analysis is separated for each alternative into **Sections 4.8.3.1** and **4.8.3.2** below. Additionally, potential impacts to historic property settings would be addressed through the NHPA, Section 106 process.

Aboveground facilities would consist of up to 101 turbines, access roads, overhead electric transmission lines and a new collection substation. The most visible component of the Proposed Project would be the addition of the turbines to the landscape. Impacts to visual resources from the construction, operation and decommissioning of a wind-powered facility in a rural, agricultural area would occur by altering the physical setting and visual quality of the existing landscape and by effects on the landscape as experienced from sensitive viewpoints, including residential areas and travel routes. The proposed turbines would introduce new or different elements into the landscape and would alter the existing form, line, color and texture that characterize the existing landscape. To avoid or minimize visual impacts, all wind turbines would be uniform in design and color throughout the area. The neutral color of the turbines would minimize contrast against the sky. The turbines would be visible at greater distances on clear days with blue skies compared with cloudy, overcast skies when the neutral turbines have a greater ability to blend with the background. All KOP photographs were taken on clear sky days so that the simulations would represent the conditions of greatest potential contrast between the turbines and landscape. The low-reflectivity finish of the turbines would minimize reflection and glare.

Flickering shadows could be cast by moving rotors. Flickering is the result of alternating changes in light intensity caused by the moving blade casting shadows on the ground and stationary objects, such as a window at a residence. Flickering would be limited to daylight hours when the sun is shining, would be noticeable only in the immediate area, and would vary throughout the day and by season. Flickering shadows would be greatest or longest – up to approximately 1,000 feet – at sunrise and sunset when the sun is shining and shadows are at their longest (WIND Engineers 2003). The uppermost portion of the turbine blades would stand approximately 389 feet above the ground surface. The visual character of the area would be altered from minimally developed agricultural land use to somewhat industrial. Some of the turbines would require lights on top of the nacelle, for aircraft safety, potentially changing the view from nearby rural

residences and roadways. Turbines would not be sited near trees or cause trees to be removed. The regional landscape is generally uniform, does not contain highly distinctive or important landscape features, is not densely populated or used, and the local residents' sensitivity to visual changes associated with the Proposed Project is low; therefore, impacts to the existing visual character or quality within either of the alternatives from development of the Proposed Project would be less than significant.

If the Proposed Project is approved, system modifications at either of Western's substations would be confined within or adjacent to the existing substation, so system additions would not introduce new or different elements into the landscape, or substantially alter the characteristics of the existing landscape.

4.8.3.1 Crow Lake Alternative KOPs

Figures 4.8-1 and **4.8-2** depict the existing condition and visual simulation, respectively, from KOP 1. KOP 1 is one of the highest elevations on the LCTDR from which the Proposed Project may be viewed. The nearest turbine to KOP 1 would be approximately 22 miles away and, as demonstrated by the visual simulation, Proposed Project Components would not be visible in the existing landscape (see **Figure 4.8-2**).

Figures 4.8-3 and **4.8-4** depict the existing condition and visual simulation, respectively, from KOP 2. KOP 2 is the view from the LCIC. The nearest turbine to KOP 2 would be approximately 24 miles away and, as demonstrated by the visual simulation, Proposed Project Components would not be visible in the existing landscape (see **Figure 4.8-4**).

Figures 4.8-5 and **4.8-6** depict the existing condition and visual simulation, respectively, from KOP 3. KOP 3 is the nearest location on the LCTDR from which the Proposed Project may be viewed. The nearest turbine to KOP 3 would be approximately 17 miles away and would be barely perceptible on the horizon within the existing landscape (see **Figure 4.8-6**). The turbines (labeled on the simulation) would be a minimal addition to the existing landscape, but would be indistinguishable from the existing transmission line structures.

As illustrated by the photographic simulations, development of the Proposed Project would not substantially alter or degrade scenic resources and would not substantially degrade the visual quality of the Crow Lake Alternative as viewed from the LCTDR or LCIC; therefore, impacts to visual resources would be less than significant.



Figure 4.8-1 KOP 1 Existing Condition



Figure 4.8-2 KOP 1 Simulation



Figure 4.8-3 KOP 2 Existing Condition



Figure 4.8-4 KOP 2 Simulation

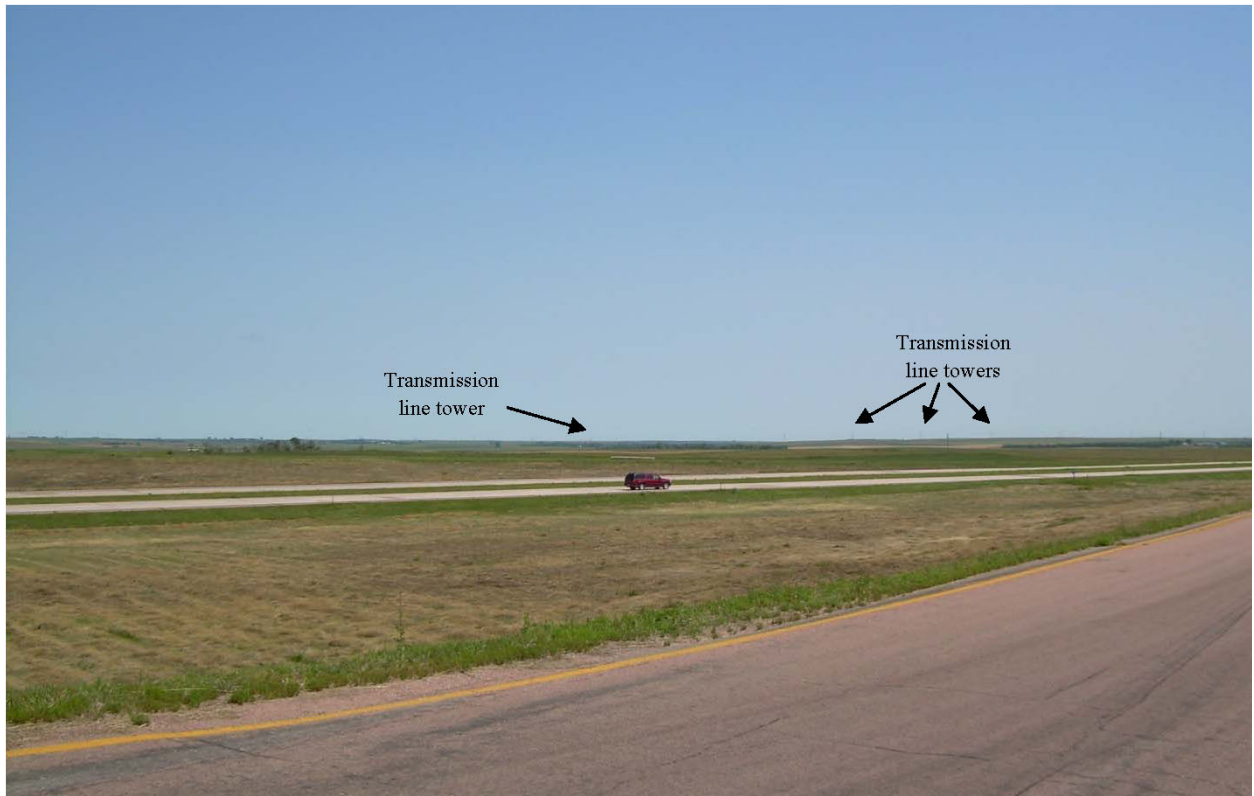


Figure 4.8-5 KOP 3 Existing Condition

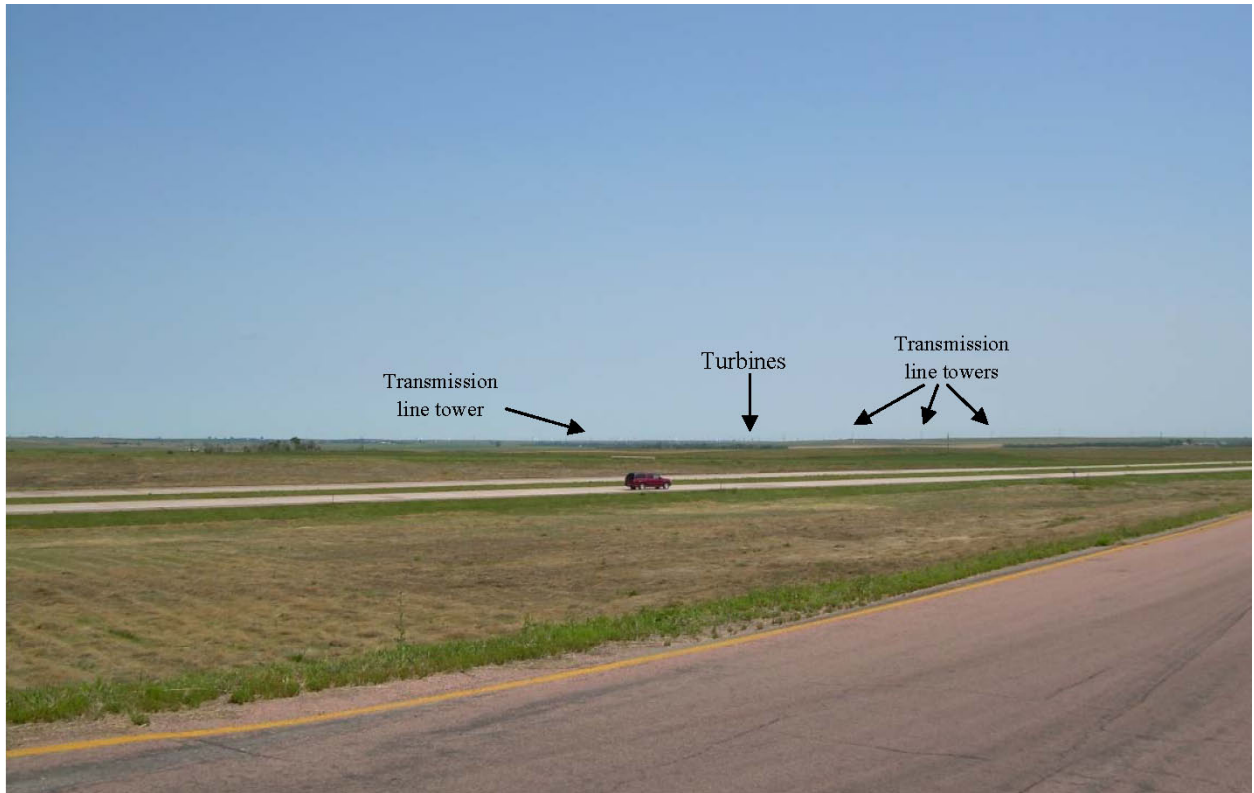


Figure 4.8-6 KOP 3 Visual Simulation

4.8.3.2 Winner Alternative KOPs

Figures 4.8-7 and 4.8-8 depict the existing condition and visual simulation, respectively, from KOP 4. KOP 4 is near the intersection of SR44 and SR47. The nearest turbine (labeled on the simulation) within the KOP 4 field of view would be approximately 22 miles away and would be nearly imperceptible on the horizon within the existing landscape (see **Figure 4.8-8**).

Figures 4.8-9 and 4.8-10 depict the existing condition and visual simulation, respectively, from KOP 5. KOP 5 provides another viewing angle from near the intersection of SR44 and SR47. The nearest turbine (labeled on the simulation) within the KOP 5 field of view would be approximately 15 miles away and would be nearly imperceptible on the horizon within the existing landscape (see **Figure 4.8-10**).

Figures 4.8-11 and 4.8-12 depict the existing condition and visual simulation, respectively, from KOP 6. KOP 6 is one of the highest elevations on the LCTDR from which the Proposed Project may be viewed. The nearest turbine to KOP 6 would be approximately 19.5 miles away and, as demonstrated by the visual simulation, Proposed Project Components would not be visible in the existing landscape (see **Figure 4.8-12**).

Figures 4.8-13 and 4.8-14 depict the existing condition and visual simulation, respectively, from KOP 7. KOP 7 is the nearest location on the LCTDR from which the Proposed Project may be viewed. The nearest turbine to KOP 7 would be approximately 8.4 miles away and would be barely perceptible on the horizon within the existing landscape (see **Figure 4.8-14**). The turbines (labeled on the simulation) would be a minimal addition to the existing landscape, but would draw less attention than the existing roadway and water tower.

As illustrated by the photographic simulations, development of the Proposed Project would not substantially alter or degrade scenic resources and would not substantially degrade the visual quality of the Winner Alternative as viewed from the LCTDR or LCIC; therefore, impacts to visual resources would be less than significant.



Figure 4.8-7 KOP 4 Existing Condition



Figure 4.8-8 KOP 4 Simulation



Figure 4.8-9 KOP 5 Existing Condition



Figure 4.8-10 KOP 5 Simulation



Figure 4.8-11 KOP 6 Existing Condition



Figure 4.8-12 KOP 6 Simulation



Figure 4.8-13 KOP 7 Existing Condition



Figure 4.8-14 KOP 7 Simulation

4.8.3.3 No Action Alternative

Under the No Action Alternative, Western would not approve an interconnection request with the Applicants and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the Proposed Project would not be built and that the environmental impacts associated with construction and operation of the Proposed Project would not occur. There would be no visual resource impacts associated with the No Action Alternative.

4.9 NOISE

4.9.1 METHODS

The ROI for noise includes residences located within the Proposed Project alternatives and residences adjacent to the areas of the proposed Federal actions. Examples of construction and decommissioning related noise-emitting sources include heavy equipment used in earthmoving, foundation preparation and demolition, structure assembly and other activities. Operational noise-emitting sources include the wind turbines, as well as the low, continuous vibrational hum which can be heard from the completed transmission lines and facilities.

As described in **Section 3.9**, dBA represents the human hearing response to sound for a single sound event. In 1974, the EPA identified safe noise levels that could be used to protect public health and welfare, including prevention of hearing damage, sleep disturbance and communication disruption. Outdoor L_{dn} values of 55 dBA were identified as desirable to protect against activity interference in residential areas. When annual averages of the daily level are considered over a period of 40 years, the EPA identified average noise levels equal to or less than 70 dBA as the level of environmental noise that would prevent any measurable hearing loss over the course of a lifetime. Low-frequency sound is discussed in **Section 4.12**.

Construction

Construction noise levels associated with a wind farm vary greatly depending on equipment, operation schedule and condition of the area being worked (BLM 2005). **Table 4.9-1** identifies noise levels for typical construction equipment.

Operation

Table 4.9-2 provides a comparison of wind turbine noise to other noise sources.

The Wessington Springs Wind Project located in Jerauld County, South Dakota, modeled operational noise impacts associated with the same make and model wind turbine as identified for the Proposed Project. Based on these results, the anticipated noise level at the base of the wind turbine would be 55 dBA and would be between 50 dBA and 45 dBA at a distance between 660 feet and 1,320 feet from the wind turbine (Western 2007). As a conservative approach, noise levels would be reduced for receptors further removed from the noise source by approximately 6 dBA for each doubling of distance from the source (Harris 1991).

Table 4.9-1 Noise Levels at Various Distances from Typical Construction Equipment

| Construction Equipment | Noise Level $L_{eq(1-h)}$ ^a at Distances [dBA] | | | | | |
|------------------------|---|--------|--------|----------|----------|----------|
| | 50 ft | 250 ft | 500 ft | 1,000 ft | 2,500 ft | 5,000 ft |
| Bulldozer | 85 | 71 | 65 | 59 | 51 | 45 |
| Concrete mixer | 85 | 71 | 65 | 59 | 51 | 45 |
| Concrete pump | 82 | 68 | 62 | 56 | 48 | 42 |
| Crane, derrick | 88 | 74 | 68 | 62 | 54 | 48 |
| Crane, mobile | 83 | 69 | 63 | 57 | 49 | 43 |
| Front-end loader | 85 | 71 | 65 | 59 | 51 | 45 |
| Generator | 81 | 67 | 61 | 55 | 47 | 41 |
| Grader | 85 | 71 | 65 | 59 | 51 | 45 |
| Shovel | 82 | 72 | 62 | 56 | 48 | 42 |
| Truck | 88 | 74 | 68 | 62 | 54 | 48 |

Source: Harris Miller Miller & Hanson, Inc. 1995 and BLM 2005

^a $L_{eq(1-h)}$ is the equivalent steady-State sound level that contains the same varying sound level during a 1-hour period.

Table 4.9-2 Comparison of Wind Turbine Noise to Other Noise Sources

| Noise Source | Typical dBA |
|--|-------------|
| Threshold of pain | 140 |
| Fire engine siren at 100 feet | 130 |
| Flyover of an F-16 aircraft at 500 feet | 104 |
| Average street traffic | 85 |
| Vacuum cleaner | 70 |
| Normal conversation | 55 |
| Large wind turbine at base of tower | 55 |
| Soft music, moderate rainfall | 50 |
| Background noise in a rural environment | 48 |
| Typical living room | 40 |
| Large wind turbine from 0.25 mile | 35 |
| Whisper, quiet library | 35 |
| Rustling leaves | 20 |
| Threshold of hearing | 0 |

Source: Western 2007

Decommissioning

The decommissioning phase of the Proposed Project would be anticipated to require similar types of activities and generate similar noise levels as described in construction.

4.9.2 SIGNIFICANCE CRITERIA

The impact analysis for noise is based on the following significance criteria. A significant impact to noise would occur if:

- An activity would expose persons to or generate noise or vibration levels in excess of EPA-recommended levels
- An activity would result in a substantial permanent increase in ambient noise or vibration levels in the vicinity above levels existing without the Proposed Project. A 3 dB increase in noise is considered barely noticeable to humans, a 5 dB increase would typically result in a noticeable community response, and a 10 dB increase is considered a doubling of the sound and is generally considered to be substantial

4.9.3 IMPACT ASSESSMENT

The following considerations for construction and operation apply to both alternatives. Site specific analysis is provided in the following sections.

Construction

Construction equipment would generally not operate at the same time and would be spread throughout the construction area depending on the activity. Construction would occur intermittently at each of the wind turbine locations, typically during normal daytime working hours. Nighttime construction may be necessary to meet the overall Proposed Project schedule, and in such cases, residents would be notified of this temporary, short-term activity. Construction would generally occur for one week or less in any given area. As identified in **Table 4.9-1**, between 250 feet and 500 feet from the construction location, the anticipated noise levels would drop below the EPA-recommended noise guideline (70 dBA) to prevent hearing loss. Between 1,000 feet and 2,500 feet from the construction location, the construction noise levels are anticipated to drop below the EPA-recommended noise guideline (55 dBA) for residential areas.

Operation

During dry weather conditions, noise from transmission lines (operational “hum”) is generally lost in the background noise at locations beyond the edge of the transmission line right-of-way (DOE 2005). In wet conditions, however, water drops collecting on the lines provide favorable conditions for corona discharges, which can result in a humming noise. During rainfall events, the noise level at the edge of the right-of-way of a 230-kV transmission line would be less than 39 dBA (BPA 1996), which is typical of the noise level at a library or rural residential area. Operation of the transmission line would result in no impact to noise.

4.9.3.1 Crow Lake Alternative

Construction

The nearest residence to a proposed turbine location would be located approximately 1,270 feet away. On the basis of the noise levels presented in **Table 4.9-1**, it is estimated that noise levels would be 57 to 59 dBA. The minimum distance to a residence from the centerline of the alternative transmission line corridors would be approximately 1,900 feet. On the basis of the noise levels presented in **Table 4.9-1**, it is estimated that noise levels during construction of the transmission line would be 52 to 54 dBA or less at the nearest residence. The nearest residence to the proposed collector substation would be located approximately 6,700 feet away. On the basis of the noise levels presented in **Table 4.9-1**, it is estimated that noise levels would be 41 to 43 dBA. Construction of the turbines, transmission line, and proposed collector substation would result in a temporary increase in background noise to levels near the 55 dBA level, identified as desirable to protect against activity interference. This would be a noticeable, temporary increase over background noise levels. Thus, with the included BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), construction-related noise impacts would be less than significant.

The nearest residence to Western's existing Wessington Springs Substation is 1,500 feet away. On the basis of the noise levels presented in **Table 4.9-1**, it is estimated that construction noise levels would be approximately 56-58 dBA. If the Proposed Project is approved, Western system modifications at the existing Wessington Springs Substation, would include BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), and would result in short-term, temporary construction impacts. Therefore, impacts would be less than significant.

Operation

Based on noise modeling results of a similar wind project (Western 2007), anticipated noise levels would be between 50 dBA and 45 dBA at a distance between 660 feet and 1,320 feet from the wind turbine; therefore, noise levels associated with the wind turbines at the nearest residence would be near or below 45 dBA. As identified in **Section 3.9.3**, the average outdoor noise levels for rural residential and agricultural areas typically range from 39 dBA to 44 dBA. At the nearest residence, operational noise associated with the Proposed Project would likely be between 3 dB and 5 dB greater than existing ambient noise levels. With the included BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), impacts from operational noise would be less than significant, and operation of the transmission line would result in no impact to noise.

If the Proposed Project is approved, development of the Western system modifications at the existing Wessington Springs Substation, would include BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), and would similarly be expected to result in less than significant noise impacts.

Decommissioning

The decommissioning phase of the Proposed Project would be anticipated to result in similar noise effects as described for construction.

4.9.3.2 Winner Alternative

Construction

The nearest residence to a proposed turbine location would be located approximately 800 feet away. It is anticipated that this turbine location would be eliminated from further consideration, because it doesn't meet the Applicants' siting criteria.

The next nearest residence to a proposed turbine location would be 1,050 feet away from a proposed turbine location, and meets the Applicants' siting criteria. On the basis of the noise levels presented in **Table 4.9-1**, it is estimated that noise levels would be 57 to 59 dBA. Construction of the turbines would result in a temporary increase in background noise to levels above 55 dBA, but below the 70 dBA average level to prevent hearing loss over the course of a lifetime. This would be a noticeable, but temporary increase over background noise levels; with the included BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), construction-related noise impacts would be less than significant.

The nearest residence to the proposed collector substation would be located approximately 1,400 feet away. On the basis of the noise levels presented in **Table 4.9-1**, it is estimated that noise levels would be 56 to 58 dBA. Construction of the proposed collector substation would result in a temporary increase in background noise to levels above 55 dBA, but below the 70 dBA average level to prevent hearing loss over the course of a lifetime. This would be a noticeable, but temporary increase over background noise levels. With the included BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), construction-related noise impacts would be less than significant.

The closest residence to the centerline of the alternative 1 transmission line corridor is approximately 100 feet away, and due to this proximity, does not meet the Applicants' line siting criteria. It is anticipated that the alternative 1 transmission line corridor would be eliminated from further consideration.

The closest residence to centerline of the alternative 2 transmission line corridor is at least 900 feet away, and meets the Applicants' siting criteria. On the basis of the noise levels presented in **Table 4.9-1**, it is estimated that construction noise levels would be approximately 59 to 61 dBA. Construction of the alternative 2 transmission would result in a temporary increase above background noise, but would be within the level identified as desirable to protect against activity interference. With the included BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), construction-related noise impacts would be less than significant.

The nearest residence to Western's existing Winner Substation is 300 feet away. On the basis of the noise levels presented in **Table 4.9-1**, it is estimated that noise levels would be 69 to 71 dBA; therefore construction noise at the closest point would be near the EPA-recommended level of 70 dBA. However, the EPA-recommended level of 70 dBA applies to an estimated 40-year average exposure. Therefore the short-term, temporary construction impacts would likely be perceived at

the nearest residence. With the included BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), impacts would be less than significant.

Operation

Anticipated noise levels would be between 50 dBA and 45 dBA at a distance between 660 feet and 1,320 feet from the wind turbine. The two nearest residences to a proposed turbine location would be located approximately 800 feet away and 1,050 feet away from a proposed turbine location. Noise levels associated with the wind turbines at the two nearest residences would be between 50 dBA and 45 dBA. As identified in **Section 3.9.3**, the average outdoor noise levels for rural residential and agricultural areas typically range from 39 dBA to 44 dBA.

At the nearest residence, operational noise associated with the Proposed Project would be closer to 50 dBA and well below the EPA guideline for outdoor noise levels; however, the increase would likely be between 5 dBA and 10 dBA greater than existing ambient noise levels. With the turbine locations currently indicated, the increased noise would likely be noticeable at the nearest residence. However, it is anticipated that the nearest turbine location would be eliminated from further consideration, because it doesn't meet the Applicants' siting criteria. With this consideration, impacts from operational noise would be less than significant. Operational noise at the second nearest residence, which meets the Applicants' siting criteria, would be closer to 45 dBA and would likely be between 3 dB and 5 dB greater than existing ambient noise levels. With the included BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), impacts from operational noise would be less than significant.

During dry weather conditions, noise from transmission lines (operational "hum") is generally lost in the background noise at locations beyond the edge of the transmission line right-of-way (DOE 2005). In wet conditions, however, water drops collecting on the lines provide favorable conditions for corona discharges, which can result in a humming noise. During rainfall events, the noise level at the edge of the right-of-way of a 230-kV transmission line would be less than 39 dBA (BPA 1996), which is typical of the noise level at a library or rural residential area. With the included BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), operation of the transmission line would result in no impact to noise.

The nearest residence to Western's existing Winner Substation is 300 feet away. If the Proposed Project is approved and employing the BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), Western system modifications at its Winner Substation would be expected to result in less than significant noise impacts.

Decommissioning

The decommissioning phase of the Proposed Project would be anticipated to result in similar noise impacts as described for construction.

4.9.3.3 No Action Alternative

Under the No Action Alternative, Western would not approve an interconnection request with the Applicants and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the Proposed Project would not be built and that the environmental impacts associated with construction and operation of the Proposed Project would not occur. There would be no noise impacts associated with the No Action Alternative.

4.10 SOCIOECONOMICS

4.10.1 METHODS

The socioeconomic analysis evaluates only the counties in which the Proposed Project alternatives are located. While economic effects could occur to additional counties and regions of the U.S., depending on where the specific Proposed Project Components are manufactured, these effects are impossible to determine at this time. For this reason, the ROI for the Crow Lake Alternative is limited to Aurora, Brule and Jerauld counties. The ROI for the Winner Alternative is limited to Tripp County. Potential impacts have been identified for each alternative based on the available resource information for the ROI with consideration to the significance criteria.

4.10.2 SIGNIFICANCE CRITERIA

A significant impact to socioeconomics would occur if:

- An activity would induce population growth that would impact government and community facilities and services from the in-migration of the Proposed Project workforce
- An activity would result in insufficient existing housing in the ROI within commuting distance sufficient to meet the influx of workers and their families
- An activity would result in a need for new or altered governmental services such as fire protection, police protection, schools, or other governmental services
- An activity would result in a need for new systems, or substantial alterations to utilities including power or natural gas, communications systems, water, sewer or septic tanks, solid waste and disposal

4.10.3 IMPACT ASSESSMENT

The below pertinent socioeconomic considerations have been included in the DEIS analysis, although they are not tied to a specific significance criteria.

Lease and Easement Arrangements

The Applicants' right-of-way agents have contacted landowners in the Proposed Project and the proposed Federal actions areas and have negotiated with landowners to acquire leasing rights for specific parcels of land. In general, a landowner who provides leasing rights would receive

annual rental payments resulting in supplemental income. Potential lease payments would provide a long term supplement to farm and ranch incomes in these rural areas.

Employment and Secondary Economic Effects

According to the American Wind Energy Association (AWEA) *Wind Energy and Economic Development: Building Sustainable Jobs and Communities* (AWEA 2009a), the European Wind Energy Association has estimated that in total, every MW of installed wind capacity directly and indirectly creates about 60 person-years of employment and 15 to 19 jobs.

At the local level, new jobs are likely to be created that may involve site preparation and facility construction, maintenance during facility operation (which is typically about 20 years), and crews to perform decommissioning and site restoration work when the facility is closed. Secondary effects of the Proposed Project and the proposed Federal actions on the local economy may also exist through the need for service-sector businesses and jobs (gas stations, motels, restaurants, *etc.*).

Surveying 13 studies of economic impacts (actual and forecast) of wind facilities on rural economies, one NREL report concluded that these facilities have a large direct impact on the economies of rural communities, especially those with few other supporting industries; however, such communities also see greater “leakage” of secondary economic effects to outside areas. In addition, the report concluded that the number of local construction and operations jobs created by the facility depends on the skills locally available (NRC 2007).

Public Revenues and Costs

Typically, a wind-energy project generates tax dollars for both the local and State governments. Direct monies are collected through income, excise and property taxes, and indirect monies are generated from sales, use, and income taxes on project created employment. The State of South Dakota does not impose corporate or personal income taxes. However, South Dakota does generate revenue from sales, use, property and contractor excise taxes.

Sales/use tax in South Dakota is a combination of a four percent State tax and a general, municipal tax, which varies from zero to two percent (municipal taxes only apply if sale/use is within city limits). Property taxes in South Dakota are levied by local government (*e.g.* counties and municipalities). Real property taxes are determined by taking the local mill levy and applying it to 85 percent of the market value of a property. The contractors' excise tax (tax imposed upon the gross receipts of contractors who are engaged in construction services or realty improvements in South Dakota collectible from both public and private entities) is two percent.

The South Dakota State Legislature has been active in passing laws that affect the development, taxation and operation of wind-energy facilities in the State.

A number of recent laws have been passed by the State to provide construction rebates and an alternate taxation method on wind-energy facilities exceeding five MW.

4.10.3.1 Crow Lake Alternative

Given the short-term duration of construction activities, no significant increase in permanent population to local communities would be expected as a result of construction and operation of the Proposed Project. It would not result in significant increased needs for public services, including fire protection. In addition, there would be no discernible impact on local utilities, government, or community services from the construction workforce under the Proposed Project. Any impacts to social and economic resources would be primarily short-term effects to the local economy. Revenue would likely increase for some local businesses such as hotels, restaurants, gas stations and grocery stores, due to workers associated with construction. Other impacts to community services would be unlikely because of the short-term nature of construction.

The relatively short-term nature of construction and the limited number of workers who would be hired from outside of the local counties would result in limited positive economic impacts to the area in the form of increased spending on lodging, meals and other consumer goods and services. As described in **Chapter 2**, the Applicants would begin construction in mid-2010 and complete construction by the end of 2010. It is anticipated that local workers from the counties would fill the majority of the open construction jobs. The Applicants have estimated the Proposed Project would create an average of 225 to 250 temporary jobs and 10 to 12 permanent jobs.

Anticipated labor trades required during construction include electricians, crane operators, heavy equipment operators and other skilled construction laborers. Local businesses such as ready-mix concrete, hardware stores, welding and machine shops, packaging and postal services, and heavy equipment repair and maintenance service providers would also likely benefit from construction of the Proposed Project.

Minor employment or population changes are anticipated as a direct result of development of the Proposed Project. Any increase in population would be for the duration of the construction period, and would be small relative to the total population. Most of the non-local construction workforce would likely reside within a 60-mile commuting distance of the area, so there would be very little demand for additional temporary or permanent housing near the site. There would be no impact to the available supply of housing in Aurora, Brule or Jerauld counties. In the event that construction workers hired from outside the 60-mile radius of the standard commuting distance from the Proposed Project area, there would likely be sufficient capacity in the existing motel rooms in the local counties. Therefore, less than significant impacts are likely to occur from the influx of the construction workforce.

Benefits would also result from wages paid to the construction workforce. There would be beneficial long-term impacts to the counties' tax base for the life of the Proposed Project as a result of the construction and operation of the facilities. Aurora, Brule and Jerauld counties would receive revenues from property taxes, fees and permits. Additional personal income would be generated for residents in the counties and the State of South Dakota by circulation and recirculation of dollars paid out as business expenditures, and as State and local taxes. The most

direct beneficial impact would be the net economic benefit to participating landowners from lease payments, which would provide a supplementary source of income. An increase in Aurora, Brule and Jerauld's county tax base would also provide benefits to all county residents. Indirect economic benefits would accrue to businesses in the area from construction workers purchasing goods and services. There would also be economic benefits for the counties from added taxes paid on real property. Increased tax revenues collected as a result of the Proposed Project operation could be utilized to benefit or improve local government or community services.

If the Proposed Project is approved, Western's system modifications at Wessington Springs Substation would similarly be expected to result in beneficial economic impacts. The influx of construction workers to install new electrical equipment would similarly be expected to result in less than significant impacts to housing availability or local services.

4.10.3.2 Winner Alternative

The positive local economic benefits to the Winner Alternative would be similar to those identified for the Crow Lake Alternative. The influx of construction workers for the Proposed Project would similarly be expected to result in less than significant impacts to housing availability or local services.

4.10.3.3 No Action Alternative

Under the No Action Alternative, Western would not approve an interconnection request with the Applicants and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the Proposed Project would not be built and that the environmental impacts associated with construction and operation of the Proposed Project would not occur. Local landowners would not receive lease payments from the Applicants and could sign leases with another wind power developer. There would be no socioeconomic impacts associated with the No Action Alternative.

4.11 ENVIRONMENTAL JUSTICE

4.11.1 METHODS

The ROI for the Crow Lake Alternative includes the following census tracts: 9731, 9736 and 9746. The ROI for the Winner Alternative includes the following census tracts: 9716 and 9717. **Section 3.11** identifies minority and low-income populations in the Proposed Project area pursuant to Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (59 FR 7629). This section discusses the potential for impacts to those populations (**Section 3.11**). The environmental justice analysis has been performed in three steps:

- Identify minority and/or low income populations in the ROI (see **Section 3.11**)

- Identify the anticipated impacts from development of the Proposed Project and/or the proposed Federal actions
- Determine if the anticipated activity impacts would disproportionately impact the minority and/or low-income populations

The analysis protocol for identifying minority or low-income populations follows the guidelines described in the *Environmental Justice Guidance under the National Environmental Policy Act* (CEQ 1997). Information on locations and numbers of minority and low-income populations for each census tract within the Proposed Project and the areas of the proposed Federal actions was obtained and derived from 2000 Census data. “Minority” refers to people who classified themselves in the 2000 Census as Black or African American, Asian or Pacific Islander, American Indian or Alaskan Native, Hispanic of any race or origin, or other non-White races (CEQ 1997). Environmental justice guidance defines low-income populations using U.S. Census Bureau statistical poverty thresholds. Information on low-income populations was developed from 1999 incomes reported in the 2000 Census. In 1999, the poverty-weighted average threshold for an individual was \$8,501 (U.S. Census 2001).

Analyses of potential impacts from the Proposed Project and the proposed Federal actions are provided in **Chapter 4** for each resource including: geology and soils, water resources, air resources, biological resources, cultural resources, land use and recreation, transportation, visual resources, noise, socioeconomics, and health and safety, during the construction, operation and decommissioning phases.

An analysis was performed to determine if the anticipated impacts of the Proposed Project and the proposed Federal actions would disproportionately affect minority and low-income populations. The basis for making this determination was a comparison of locations predicted to experience human health or environmental impacts with any areas in the ROI known to contain high percentages of minority or low-income populations, as reported by the U.S. Census Bureau and defined by the CEQ. Impacts on minority or low-income populations that could result from the proposed activities were analyzed for the geographic areas in which the Proposed Project would be located. Impacts were analyzed within the census tracts containing the alternative sites to determine if minority or low-income populations would have disproportionately high and adverse impacts.

Environmental justice impacts are also analyzed for issues that are unique to and involve Native Americans, in particular, to cultural resource issues. Input from tribal representatives would determine if adverse impacts are likely to occur to cultural resources of importance to the tribes. Potential impacts of the proposed activities related to Native American cultural resources could occur not only to individual resources, but also to the traditional, sacred and historic landscape of the area within which the Proposed Project and the areas of the proposed Federal actions are located. Impacts to the cultural landscape and individual resources could have an adverse impact on the role of the landscape in tribal traditions and the use of the landscape by tribal members.

The following definitions are excerpted from Executive Order 12898:

Disproportionately high and adverse human health effects: When determining whether human health effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:

- (a) Whether the health effects, which may be measured in risks and rates, are significant (as employed by NEPA), or above generally accepted norms. Adverse health effects may include bodily impairment, infirmity, illness, or death
- (b) Whether the risk or rate of hazard exposure by a minority population, low-income population, or Indian tribe to an environmental hazard is significant (as employed by NEPA) and appreciably exceeds or is likely to appreciably exceed the risk or rate to the general population or other appropriate comparison group
- (c) Whether health effects occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards

Disproportionately high and adverse environmental effects: When determining whether environmental effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:

- (a) Whether there is or would be an impact on the natural or physical environment that significantly (as employed by NEPA) and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment
- (b) Whether environmental effects are significant (as employed by NEPA) and are or may be having an adverse impact on minority populations, low income populations, or Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group
- (c) Whether the environmental effects occur or would occur in a minority population, low income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards

4.11.2 SIGNIFICANCE CRITERIA

Significance criteria were developed based on Executive Order 12898. A significant impact to environmental justice would occur if:

- An activity would disproportionately affect a minority, Native American, or low income subsistence population
- An activity would result in high and adverse health or environmental impacts, such as impacts from noise, dust or air emissions, displacement of residences, visual effects, traffic increases or delays, EMF effects, or other effects to a minority, Native American, or low income population

4.11.3 IMPACT ASSESSMENT

4.11.3.1 Crow Lake Alternative

Disproportionately high and significant effects to minority populations are unlikely based on three factors: a lower percentage of minority populations in the Crow Lake Alternative area (approximately one to five percent) compared with South Dakota as a whole (approximately 11 percent), a low population density within the Proposed Project area, and overall low expected impacts from the construction, operation and decommissioning of the Proposed Project. Potential impacts to minority residents, like any other resident, are expected to be less than significant.

As identified in **Table 3.11-1**, income for 13.2 percent of the population of South Dakota is considered below the poverty level, whereas the percentage of the population below the poverty level ranges between approximately 11 to 21 percent in the vicinity of the Crow Lake Alternative. The Proposed Project may generate positive economic benefits to the local economy, including opportunities for lease agreements, employment and earning potential for local individuals. Overall the Proposed Project is expected to result in low environmental impacts; therefore, the impacts to low-income populations would be less than significant.

If the Proposed Project is approved, development of the Western system modifications at Wessington Spring Substation would similarly not be expected to disproportionately affect a minority, Native American, or low income subsistence population.

4.11.3.2 Winner Alternative

Year 2000 demographic information from the U.S. Census Bureau characterizes the population in the vicinity of the Winner Alternative as approximately 84 percent White and 15 percent American Indian and Alaskan Natives. The Winner Alternative would be located in an area with a higher percentage of minority population compared to the Crow Lake Alternative; however, disproportionately high and significant effects to minority populations are unlikely given the low population density within the Proposed Project area, and overall low expected impacts from constructing, operating and decommissioning the Proposed Project. Potential impacts to minority residents, like any other resident, are expected to be less than significant.

Income for 13.2 percent of the population of South Dakota is considered below the poverty level, whereas the percentage of the population below the poverty level ranges between approximately 19 to 21 percent in the vicinity of the Winner Alternative. The Proposed Project may generate positive economic benefits to the local economy, including opportunities for lease agreements, employment, and earning potential for local individuals; therefore, the impacts to low-income populations would be less than significant.

Developing Western's system modifications at Winner Substation would not be expected to disproportionately affect a minority, Native American, or low income subsistence population.

4.11.3.3 No Action Alternative

Under the No Action Alternative, Western would not approve an interconnection request with the Applicants and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the Proposed Project would not be built and that the environmental impacts associated with construction and operation of the Proposed Project would not occur. There would be no environmental justice impacts associated with the No Action Alternative.

4.12 HUMAN HEALTH AND SAFETY

4.12.1 METHODS

The ROI for health and safety includes areas of immediate disturbance associated with the Proposed Project Components and proposed Federal actions. The ROI associated with the proposed transmission line includes the area within the right-of-way. The assessment to human health and safety has been undertaken with the assistance of the previous compilations of technical memoranda (Terracon 2009a and 2009b) and the *Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM Administered Lands in the Western United States* (BLM 2005).

4.12.2 SIGNIFICANCE CRITERIA

A significant impact to human health and safety would occur if:

- An activity would result in a substantial increase in health and safety risks to area residents and the general public
- An activity would create potential impacts to public health as a result of increased electric and magnetic fields and electrocution hazards
- An activity would violate any local, State, or Federal regulations regarding handling, transport, or containment of hazardous materials

4.12.3 IMPACT ASSESSMENT

The *Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM Administered Lands in the Western United States* (BLM 2005) evaluates the potential health and safety impacts for a typical wind generation project. A summary of the Programmatic EIS is provided herein.

Solid Waste and Hazardous Materials

Types of hazardous materials that may be used in the construction, operation and decommissioning phases of the proposed activities may include: fuels (*e.g.*, gasoline, diesel), lubricants, cleaning solvents, paints, pesticides and explosives. **Table 4.12-1** lists these hazardous materials associated with a typical wind energy project, their use and typical quantities

Table 4.12-1 Hazardous and Regulated Materials Associated with a Typical Wind Energy Project

| Hazardous and Regulated Material | Uses | Typical Quantities Present |
|---|--|---|
| Fuel: diesel fuel ^a | Powers most construction and transportation equipment during construction and decommissioning phases. | Less than 1,000 gallons (gal); stored in aboveground tanks during construction and decommissioning phases. ^b |
| | Powers emergency generator during operational phase. | Less than 100 gal; stored in aboveground tank to support emergency power generator throughout the operation phase. |
| Fuel: gasoline ^c | May be used to power some construction or transportation equipment. | Because of the expected limited number of construction and transportation vehicles utilizing gasoline, no on-site storage is likely to occur throughout any phase of the life cycle of the wind energy. |
| Fuel: propane ^d | Most probable fuel for ambient heating of control building. | Typically 500 to 1,000 gal; stored in aboveground propane storage vessel. |
| Lubricating oils/ grease/ hydraulic fluids/ gear oils | Lubricating oil is present in some wind turbine components and in the diesel engine of the emergency power generator. | Limited quantities stored in portable containers (capacity of 55 gal or less); maintained on-site during construction and decommissioning phases. |
| | Maintenance of fluid levels in construction and transportation equipment is needed. | Limited quantities stored in portable containers (capacity of 55 gal or less); stored on-site during operational phase. |
| | Hydraulic fluid is used in the rotor driveshaft braking system and other controls. Gear oil and/or grease are used in the drive train transmission and motor gears. | Limited quantities stored in portable containers (capacity of 55 gal or less); stored on-site during operational phase. |
| Glycol-based antifreeze | Present in some wind turbine components for cooling (e.g., 5 to 10 gal [19 to 38 L] present in recirculating cooling system for the transmission). Present in the cooling system of the diesel engine for the emergency power generator. | Limited quantities (10 to 20 gal of concentrate) stored on-site during construction and decommissioning phases. Limited quantities (1 to 10 gal of concentrate) stored on-site during operational phase. |
| Lead-acid storage batteries and electrolyte solution | Present in construction and transportation equipment. Backup power source for control equipment, tower lighting and signal transmitters. | Limited quantities of electrolyte solution (< 20 gal) for maintenance of construction and transportation equipment during construction and decommissioning phases. Limited quantities of electrolyte solution (< 10 gal) for maintenance of control equipment during operational phase. |
| Other batteries (e.g., nickel-cadmium [NI-CAD] batteries) | Present in some control equipment and signal transmitting equipment. No maintenance of such batteries is expected to take place on-site. | |
| Cleaning solvents | Organic solvents (most probably petroleum-based but not Resource Conservation and Recovery Act listed) used for equipment cleaning and maintenance. Where feasible, water-based cleaning and degreasing solvents may be used. | Limited quantities (< 55 gal) on-site during construction and decommissioning to maintain construction and transportation equipment. Limited quantities (< 10 gal) on-site during operational phase to maintain equipment. |

| Hazardous and Regulated Material | Uses | Typical Quantities Present |
|----------------------------------|---|---|
| Paints and coatings ^e | Used for corrosion control on all exterior surfaces of turbines and towers. Limited quantities (< 50 gal [189 L]) for touch-up painting during construction phase. | Limited quantities (< 20 gal) for maintenance during operational phase. |
| Dielectric fluids ^f | Present in electrical transformers, bushings and other electric power management devices as an electrical insulator. | Some transformers may contain more than 500 gal of dielectric solutions. |
| Explosives | May be necessary for excavation of tower foundations in bedrock. May be necessary for construction of access and/or on-site roads or for grade alterations on-site. | Limited quantities equal only the amount necessary to complete the task. On-site storage expected to occur only for limited periods of time as needed by specific excavation and construction activities. |
| Pesticides | May be used to control vegetation around facilities for fire safety. | Pesticides would likely be brought to the site and applied by a licensed applicator as necessary. |

Source: BLM 2005

^a It is assumed that commercial vendors would replenish diesel fuel stored on-site as necessary.

^b This value represents the total on-site storage capacity, not the total amounts of fuel consumed. See footnote a. On-site fuel storage during construction and decommissioning phases would likely be in aboveground storage tanks with a capacity of 500 to 1,000 gal. Tanks may be of double-wall construction or may be placed within temporary, lined earthen berms for spill containment and control. At the end of construction and decommissioning phases, any excess fuel as well as the storage tanks would be removed from the site, and any surface contamination resulting from fuel handling operations would be remediated. Alternatively, rather than store diesel fuel on-site, the off-road diesel-powered construction equipment could be fueled directly from a fuel transport truck.

^c Gasoline fuel is expected to be used exclusively by on-road vehicles (primarily automobiles and pickup trucks). These vehicles are expected to be refueled at existing off-site refueling facilities.

^d Delivered and replenished as necessary by a commercial vendor.

^e It is presumed that all wind turbine components, nacelles, and support towers would be painted at their respective points of manufacture. Consequently, no wholesale painting would occur on-site. Only limited amounts would be used for touch-up purposes during construction and maintenance phases. It is further assumed that the coatings applied by the manufacturers during fabrication would be sufficiently durable to last throughout the operational period of the equipment and that no wholesale repainting would occur.

^f It is assumed that transformers, bushings and other electrical devices that rely on dielectric fluids would have those fluids added during fabrication. However, very large transformers may be shipped empty and have their dielectric fluids added (by the manufacturer's representative) after installation. It is further assumed that servicing of electrical devices that involves wholesale removal and replacement of dielectric fluids would not likely occur on-site and that equipment requiring such servicing would be removed from the site and replaced. New transformers, bushings or electrical devices are expected to contain mineral-oil-based or synthetic dielectric fluids that are free of polychlorinated biphenyls; some equipment may instead contain gaseous dielectric agents (*e.g.*, sulfur hexafluoride) rather than liquid dielectric fluids.

that may be anticipated in each phase. Handling and disposal of these items fall under Federal, State, and local laws and regulations.

Construction Activities

Minimal solid waste is expected to be generated during construction of the Proposed Project Components. Shipping and packing materials and ground clearing are expected to be the most likely activities generating solid wastes. Solid wastes generated from construction activities would be stored in closed containers in accordance with regulatory requirements. The Applicants and Western would adhere to their BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**), and all construction waste including trash and litter, garbage, other solid waste, petroleum products and

other potentially hazardous materials would be removed to a disposal facility authorized to accept such materials.

To minimize impacts from potential leaks of hazardous materials or industrial wastes during on-site storage, materials storage and dispensing areas (*e.g.*, fueling stations for off-road construction equipment), as well as waste storage areas, would be equipped with secondary containment features.

Small amounts of hazardous waste may be generated during construction of the Proposed Project (**Table 4.12-1**). All petroleum fluids would be contained within the wind turbines and electrical equipment. The Applicants and Western would adhere to their BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**) regarding petroleum hazardous waste and material would be handled and disposed of in accordance with all applicable Federal, State and local laws and regulations. To further minimize risks and ensure timely response to accidental leaks or spills, spills would be immediately reported to construction inspectors so that cleanup activities could be implemented.

Operation

There would be only small volumes of solid waste produced during operation of the Proposed Project. Unlike traditional power generation facilities, wind farms do not produce solid waste products as a direct result of energy conversion. Typically, the facility would be maintained by personnel who would generate approximately 0.5 to 1.0 cubic yards/month/personnel of recyclable waste and 1.0 to 2.0 cubic yards/month/personnel of non-recyclable waste.

Small amounts of hazardous waste may be generated due to typical maintenance activities during operation of the Proposed Project Components (**Table 4.12-1**). Hazardous wastes would be handled and disposed in accordance with all applicable Federal, State and local laws and regulations, and the BMPs and APMs (**Chapter 2, Tables 2.2 and 2.3**).

Decommissioning

At the end of the wind farm life cycle, large amounts of solid wastes would result from dismantling the Proposed Project Components. Recycling Proposed Project Components, where feasible, would be a priority, and the remaining materials would be placed in an appropriate waste disposal facility. Possible components that may be recycled include tower segments, electrical transformers and concrete foundations.

Waste Collection

Waste receptacle bins for both solid and hazardous waste would be provided during both construction, operation and decommissioning for the Proposed Project Components. The amount of waste generated should be minimal. Recycling of materials would occur when feasible.

The solid waste resulting from construction and decommissioning would be transported by a commercial trash company and disposed of in a designated landfill. "Roll-offs" may be available

at multiple locations for disposal construction debris. Mixed-material waste would be transported to a transfer station, waste disposal facility, or commercial recycling facility.

Occupational Hazards

The types of activities that typically occur during construction, operation and decommissioning of a wind energy development project include a variety of major actions, such as establishing site access; excavating and installing tower foundations; tower assembly; constructing the central control building, electrical substation, meteorological towers and access roads; and routine maintenance of the turbines and ancillary facilities. Construction and operations workers at any facility are subject to risks of injuries and fatalities from physical hazards. While such occupational hazards can be minimized when workers adhere to safety standards and use appropriate protective equipment, fatalities and injuries from on-the-job accidents can still occur. Occupational health and safety are protected through the Federal Occupational Safety and Health Administration (OSHA) (29 U.S. Code 651, *et seq.*) and State laws.

An operator's instruction manual would be prepared in conformance with the International Electrotechnical Commission (IEC) minimum safety requirements for wind turbine generators (IEC 1999), with supplemental information on special local conditions. The manual would include system safe operating limits and descriptions, start-up and shutdown procedures, alarm response actions and an emergency procedures plan. The emergency procedures plan would identify probable emergency situations and the actions required of operating personnel. The emergency procedures plan may address over-speeding, icing conditions, lightning storms, earthquakes, broken or loose guy wires, brake failure, rotor imbalance, loose fasteners, lubrication defects, sandstorms, fires, floods and other component failures.

Chemical exposures during construction and operation of a typical wind energy project are expected to be routine and minimal, and reduced by using personal protective equipment and/or engineering controls to comply with OSHA permissible exposure limits applicable for construction activities.

Public Safety and Site Security

The Programmatic EIS (BLM 2005) identifies a rotor blade breaking and parts being thrown as one of the primary safety hazards of wind turbines. This type of occurrence is anticipated to be extremely rare, particularly with today's generation of turbines. The probability of a fragment hitting a person is even lower. The related issue of ice throw can occur if ice builds up on the turbine blades. As a design characteristic, wind turbines would be set back at least 1,000 feet from occupied residences.

Unauthorized or illegal access to site facilities and the potential for members of the public to attempt to climb towers, open electrical panels, or encounter other hazards is another concern. This section also evaluates the potential for sabotage and terrorism-related impacts (also referred to as Intentional Destructive Acts).

Security measures would be taken during construction and operation, including temporary and permanent (safety) fencing at the substation, warning signs and locks on equipment and wind power facilities. Also, turbines would sit on solid-steel-enclosed tubular towers in which all electrical equipment would be located, except for the pad-mounted transformer. Access to the turbines would only be through a solid steel door that would be locked when not in use. These measures would also act to reduce potential sabotage and terrorism-related impacts. Western and RUS believe that the Proposed Project presents an unlikely target for an act of terrorism, with an extremely low probability of attack. The potential for the Proposed Project to be targeted in terrorism-related activity would be negligible. All authorized personnel would be issued specific access entry codes/keys to regulate entry into the facilities, including substation and O&M building areas. These measures would limit access and deter intruders.

Electric and Magnetic Fields

EMF is composed of both electric and magnetic fields. Electric fields are produced by voltage (or electric charges). Electric fields increase in strength as the voltage increases and are measured in units of volts per meter (V/m). Magnetic fields result from the flow of load current in transmission line conductors or any electrical device. The magnetic field also increases in strength as the current increases and is measure in units of Gauss (G) or Tesla (T). The Gauss is the unit most commonly used in the United States and the Tesla is the internationally accepted scientific term; 1 T is equivalent to 10,000 G. Since a Gauss or Tesla are both very large fields and the majority of magnetic field exposure are substantially lower, values typically reported and measured are in milligauss (mG) (1/1,000 of a Gauss) and microtesla (μ T) (1/1,000,000 of a Tesla, equivalent to 10 mG). Both the electric and magnetic field decrease rapidly, or attenuate, with distance from the source. Electric field induction effects are not generally associated with 230 kV transmission lines.

Exposures to extremely low-frequency EMF from natural and anthropogenic sources are ubiquitous. However, concerns about potential adverse health effects from residential and occupational exposures have been explored. Over the past 25 to 30 years, hundreds of studies have been performed to examine whether power-frequency (60-Hertz [Hz]) electric and magnetic fields pose a potential human health risk. The majority of the scientific studies have been conducted in the following research fields: epidemiology, laboratory cellular research and animal studies. In the U.S. and internationally, expert scientists from a variety of disciplines were assembled to review this very large body of research material and to assess the potential health risk. Major reviews of the existing research have concluded that the current body of scientific evidence does not show that exposure to power-frequency 60-Hz electric and magnetic fields represent a human health hazard.

EMF would be present in the vicinity of overhead power lines and the electric substation. While there is the potential for any generator to produce EMF, the 60-Hz frequencies are thought to be too low to damage human tissue, and EMF would diminish to background levels near the edge of the transmission line right-of-way.

Aviation Operations and Electromagnetic Interference

The Programmatic EIS (BLM 2005) considered two primary aviation safety considerations, including (1) the physical obstruction of the tower itself, and (2) the effects on communications, navigation, and surveillance systems, such as radar. The potential vertical obstruction of the wind turbine, like any tall structure, could pose a hazard to aircraft arriving or departing at a nearby airfield. See **Sections 3.7** and **4.7** for additional description of the proximities to local airports.

Moving wind turbine blades interfere with radar by essentially creating radar echoes, however radar installations can be modified to eliminate this potential problem. Interference with other electromagnetic transmissions can occur when a large wind turbine is placed between a radio, television, or microwave transmitter and receiver, including potential disruptions of public safety communication systems.

Low-Frequency Sound

In addition to more audible noise as discussed in **Section 4.9**, wind turbines are capable of generating low-frequency sound waves. Low-frequency sound may be perceived audibly as well as a vibration. Research suggests that low-frequency sound is disturbing, irritating and even tormenting to some people. Insomnia, headaches and heart palpitations have also been reported as secondary effects.

Infrasound and low-frequency noise are ubiquitous, since they are generated from natural sources (*e.g.*, earthquakes, wind) and anthropogenic sources (*e.g.*, automobiles, industrial machinery, household appliances) and are common in urban environments. The primary effect appears to be annoyance, and has not been proven to result in adverse health impacts.

Shadow Flicker

As discussed in the Programmatic EIS (BLM 2005), shadow flicker refers to the phenomenon that occurs when the moving blades of wind turbines cast moving shadows that cause a flickering effect. While the flickering effect may be considered an annoyance, there is also concern that the variations in light frequencies may trigger epileptic seizures in the susceptible population. However, the rate at which modern three-bladed wind turbines rotate generates blade-passing frequencies of less than 1.75-Hz, below the threshold frequency of 2.5-Hz, indicating that seizures should not be an issue.

Wastewater

Especially during the construction and decommissioning phases, and, to a lesser extent, during the operational phase, sanitary wastewater is generated by the work crews or maintenance personnel present on-site. During the construction and decommissioning phases, work crews of 50 to 300 individuals may be present. During the operational phase, a maintenance crew of 10 to 12 individuals is likely to be present on the site daily during business hours. Wastewater would be collected in portable facilities and periodically removed by a licensed hauler and introduced

into existing municipal sewage treatment facilities. A septic tank and drainage field would likely be included at the O&M building.

Storm Water and Excavation Water

Except in those instances of spills or accidental releases, storm water runoff and excavation waters from the Proposed Project alternatives are not expected to have industrial contamination but may contain sediment from disturbed land surfaces.

4.12.3.1 Crow Lake Alternative

The health and safety risks to area residents and the general public for the Crow Lake Alternative would be restricted to short periods during construction, operation and decommissioning at small, individual sites. The included BMPs and APMs (as listed in **Chapter 2, Tables 2.2 and 2.3**) would be employed during all ground disturbing activities. Due to the low voltage at which turbines and overhead and underground collector lines operate, and the setback distances from roads and residences, the potential impacts associated with EMF would be minimal. Magnetic field exposure from the facilities would be minimal in close proximity, and both electric and magnetic fields would dissipate from the facility corridors. Further, the development of the Proposed Project Components would comply with applicable local, State and Federal regulations regarding handling, transport or containment of hazardous materials. For these reasons, impacts to human health and safety would be less than significant.

Western's Wessington Springs Substation is fenced and specific access is limited to authorized personnel. Western maintains a security plan for the facility and any intrusions would be addressed by Western's security personnel and/or law enforcement personnel. The Wessington Springs Substation would be operated in accordance with Western's safety requirements; wastewater would be collected in portable facilities. Stormwater from would be directed away from the site in accordance with the Proposed Project's SWPPP, and BMPs and APMs (as listed in **Chapter 2, Tables 2.2 and 2.3**) would be employed. Impacts to human health and safety would be less than significant.

4.12.3.2 Winner Alternative

Impacts of the Winner Alternative would be similar to those identified for the Crow Lake Alternative. With the included BMPs and APMs (as listed in **Chapter 2, Tables 2.2 and 2.3**), impacts to health and safety would be less than significant.

Western's system modifications proposed for the Winner Substation would result in less than significant impacts, similar to the Wessington Springs Substation proposed for the Crow Lake Alternative.

4.12.3.3 No Action Alternative

Under the No Action Alternative, Western would not approve an interconnection request with the Applicants and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the Proposed Project would not be built and that the environmental impacts associated with construction and operation of the Proposed Project would not occur. There would be no human health and safety impacts associated with the No Action Alternative.

5 Cumulative Impacts

The CEQ regulations for implementing NEPA define cumulative effects as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 CFR 1508.7).

5.1 METHODS

Cumulative impacts were assessed by combining the effects of past activities, present ongoing activities, and reasonably foreseeable future actions with the potential effects of the Proposed Project. Each of the resource categories were analyzed, however, differences between the two alternative sites were considered marginal for this cumulative impacts analysis of past, present and reasonably foreseeable actions and therefore both sites were addressed simultaneously.

The CEQ regulations (40 CFR 1508.7) further explain, “cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.” Based on these regulations, if the project does not have direct or indirect effects there can be no cumulative effects resulting from the project because there would be no impacts added to past, present, or reasonably foreseeable actions. Because the No Action Alternative has no direct or indirect effects on any resources, it would have no cumulative impacts and is not further evaluated in this chapter. Anticipated Proposed Project activities and resultant effects were described in **Chapters 1** through **4** of this DEIS. The ROI varies by resource, as described in **Chapter 3**, Affected Environment.

5.2 PAST AND PRESENT ACTIONS

Wind and other renewable sources are expected to become a larger share of the total electric generation resource in the U.S. for several reasons, primarily a desire to reduce overall GHG emissions, help increase energy security, and aid in economic stimulus efforts. Local, State and national energy policies are increasingly incorporating renewable portfolio standards, with wind as a major component, and targeting implementation of such standards by 2020 or sooner. Consequently, installation of wind and other renewable generation has increased dramatically, especially in the last 8-10 years. Between 2002 and 2006, wind generation (in thousands of kilowatt hours [kWh]) rose from approximately 10,400,000 to 26,600,000 (EIA 2008). In 2008, approximately 8,500 MW of new wind energy were installed in the U.S., representing roughly 40% of new power producing capacity, and making wind the second largest new generation source (AWEA 2009). See **Figure 5.1** for a depiction of the Midwest Independent Transmission System Operator (MISO) projects with approved interconnection agreements (which also depicts migratory flyways referenced in **Section 5.4.1**).

The Federal Production Tax Credit, recently extended through the American Recovery and Reinvestment Act of 2009, has been a major incentive for wind energy development. With the recent economic downturn, difficulties in obtaining credit reportedly have hampered the addition

of wind power capacity by some developers. Also in early 2009, the EPA declared that GHGs are a threat to human health, which may lead to additional regulatory or legislative action to reduce GHG emissions.

The Federal government has also recognized the need for improvement to the nation's transmission infrastructure and the alleviation of transmission constraints. The current administration has raised attention to this situation as it emphasizes renewable energy development. The American Reinvestment and Recovery Act granted Western \$3.2 billion in budget authority "... to construct, finance, facilitate, own, plan, operate, maintain or study construction of new and/or upgraded electric power transmission lines and related facilities ... for delivering or facilitating the delivery of power generated by renewable energy resources constructed or reasonably expected to be constructed" (Western 2009). The acting FERC chairman has highlighted transmission line infrastructure needs and planning, siting, and interconnection considerations for renewable energy, including development of a so-called 'smart grid' (FERC 2009).

Basin Electric alone has 214 MW generated from current renewable energy facilities, and additional total generation under construction of 630 MW, as well as a total committed in-construction and future wind projects in the Dakotas of 555 MW. These currently consume some of the transmission capacity identified as available.

Existing utility infrastructure within the Crow Lake Alternative area includes Western's existing transmission system including a 230-kV transmission line and the Wessington Springs Substation. In addition, the existing Wessington Springs Wind Project, a 51 MW wind energy generating facility (Western 2007), is located adjacent to the northeast edge of the Crow Lake Alternative. Existing utility infrastructure within the Winner Alternative area includes Western's existing transmission system, including a 115-kV transmission line and the Winner Substation.

5.3 REASONABLY FORESEEABLE FUTURE ACTIONS

Growth in wind generation is expected to slow appreciably through 2010, after having grown 50 percent in 2008 (EIA 2009). Nonetheless, the EIA forecast through 2030 indicates steady growth in wind capacity through 2012, after which capacity increases slightly, but essentially levels off, through 2030. In 2030, wind is forecast to be 2.5 percent of total generation. Also, an increase in the cost of carbon-based generation would make wind power more economical, which could drive wind development. If legislation allowed for the conversion of renewable energy credits to emissions offsets, wind development could be even more prolific (SDPUC 2009). See **Figure 5.1** for a depiction of the MISO approved interconnection projects.

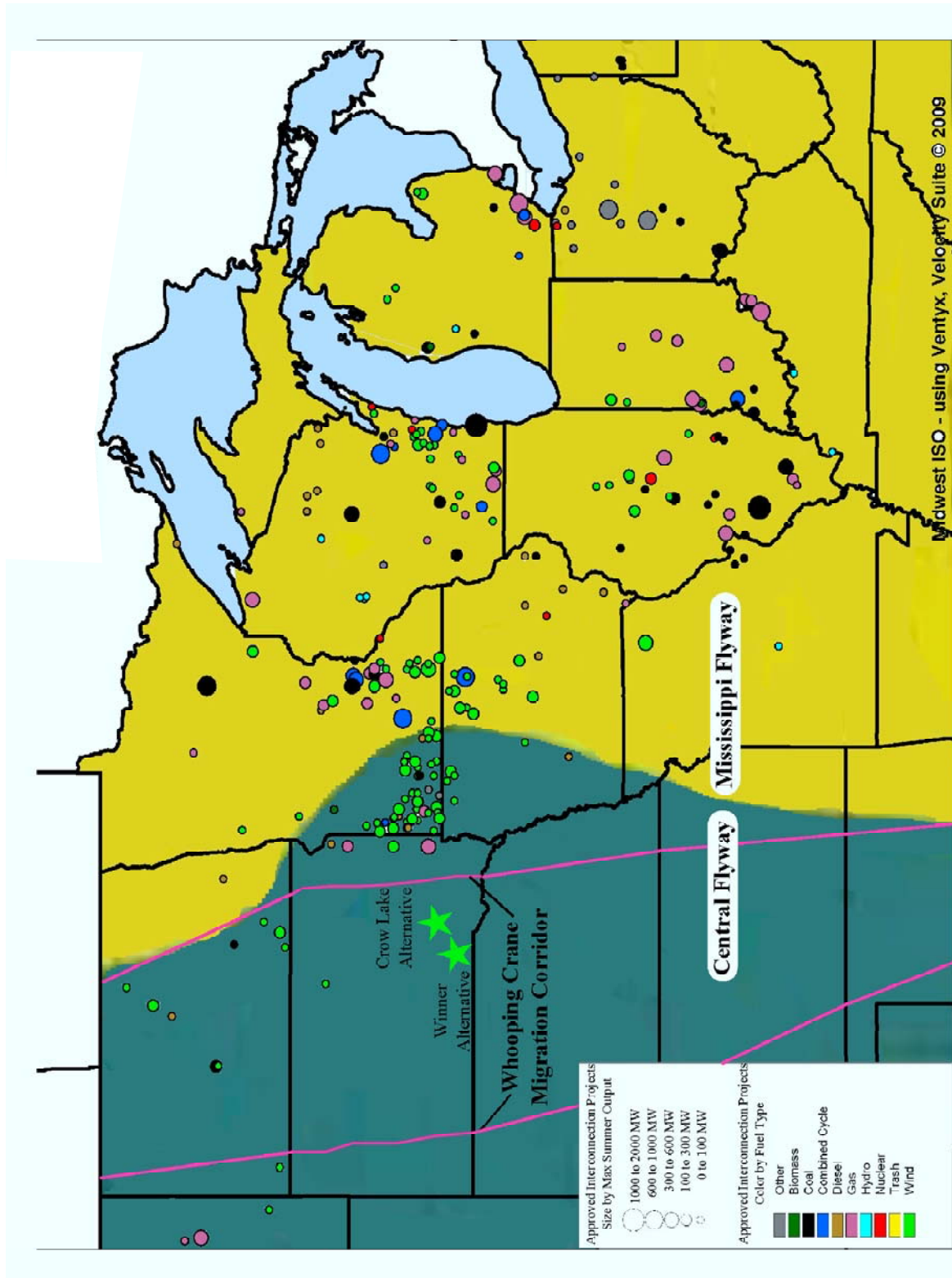


Figure 5.1 Midwest Independent System Operator Approved Interconnection Projects and Migratory Flyways






Table 5.1 Existing Wind Energy Projects in South Dakota

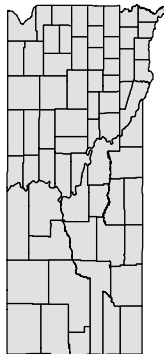
| Name | Location | Power Capacity (MW) | Units | Turbine Mfr. | Developer | Owner | Power Purchaser | Year Online |
|-----------------------------------|---------------------------|---------------------|-------|--------------|---|---|---|-------------|
| Buffalo Ridge | Brookings County | 50.4 | 24 | Suzlon | Iberdrola Renewables | Iberdrola Renewables | NIPSCO | 2009 |
| Wessington Springs | Jerauld County | 51 | 34 | GE Energy | Babcock & Brown | Pattern Energy Group LP | Heartland Consumers Power District | 2009 |
| Tatanka Wind Project | McPherson County | 88.5 | 59 | Acciona | Acciona Energy | Acciona Energy | | 2008 |
| Minn-Dakota Wind Farm | Brookings County | 54 | 36 | GE Energy | PPM Energy | PPM Energy | Xcel Energy | 2007 |
| Highmore Wind Energy Project | Highmore | 40.5 | 27 | GE Energy | FPL Energy | FPL Energy | Basin Electric | 2003 |
| Rosebud Sioux Wind Energy Project | Rosebud Sioux reservation | 0.75 | 1 | NEG Micon | Rosebud Sioux | Rosebud Sioux | Rosebud Sioux | 2003 |
| Canova | Near Carthage | 0.11 | 1 | Micon | City of Howard | City of Howard | City of Howard | 2002 |
| Gary Wind Energy Project | Gary | 0.09 | 1 | Vestas | Energy Maintenance Services-Distributed Energy Services | Energy Maintenance Services-Distributed Energy Services | Energy Maintenance Services-Distributed Energy Services | 2002 |
| Chamberlain Wind Project | Chamberlain | 2.6 | 2 | Nordex | Crown Butte Wind Power | Basin Electric | Basin Electric/East River Coop | 2001 |
| Howard Wind Energy Project | Howard | 0.22 | 2 | Micon | City of Howard | City of Howard | City of Howard | 2001 |

South Dakota is one of the top ranked States for potential wind development in the U.S., and has actively promoted development of wind energy. The State offers a wind energy tax credit and a reduced property tax for wind facilities; the wind energy credit was extended in March 2009. Although South Dakota has high wind potential, like many other States, it has not been fully developed because of the limited amount of installed transmission. The distance of the markets from the wind regions of South Dakota further compounds this issue.

Recognizing this, South Dakota and 4 nearby States have discussed integrated transmission development in support of wind energy that will promote regional electric transmission investment and cost sharing. The States working together are contributing to the Upper Midwest Transmission Development Initiative to identify energy generation resources, transmission projects and infrastructure needed to support those resources in a cost-effective manner. Over the next 10 months, participants will determine a reasonable allocation of costs for necessary infrastructure ultimately leading to the development of a concrete plan or tariff proposal for

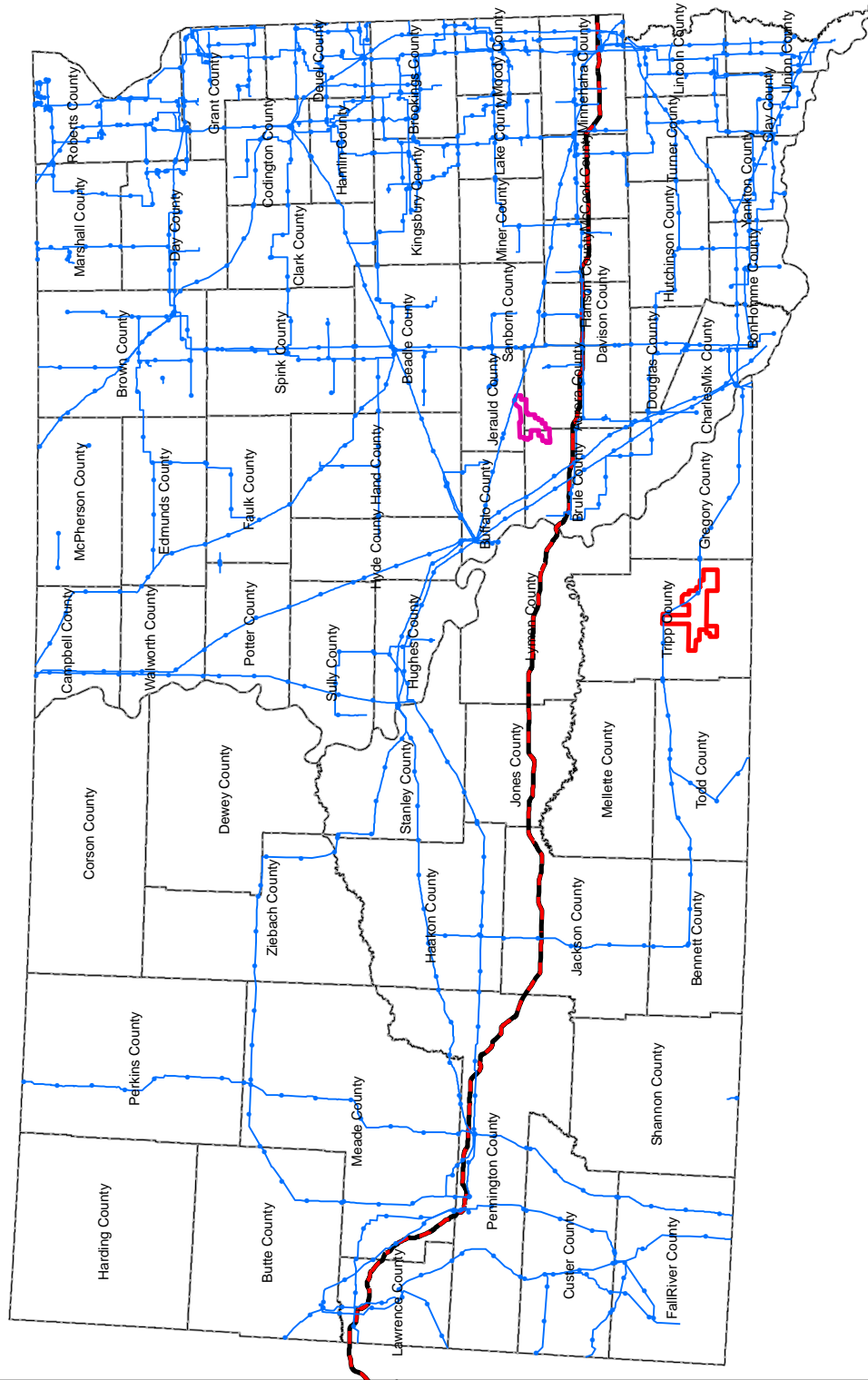
Alternatives

-  Crow Lake
-  Winner
-  Existing Utility Line
-  County Boundary
-  Interstate 90



SDPW Project

Figure 5.2



consideration by the MISO. See **Figure 5.2** for a depiction of existing utilities across South Dakota.

Communications with planning and zoning personnel from Aurora (Vissia 2009), Brule (Westendorf 2009), Jerauld (Reindle 2009), and Tripp (Hirsh 2009) did not identify any proposed projects within these counties. Based on the excellent wind resource in South Dakota, it is likely that more renewable energy and associated transmission projects will be proposed in the near future. However, the following actions were identified through the regional research conducted, but were excluded from the cumulative impacts analysis for the stated reasons.

South Dakota State Transportation Improvement Plan Transportation Project

The 2010 to 2014 South Dakota State Transportation Improvement Plan (SDDOT 2009) identified projects associated with SR45 in Brule County and US183 in Tripp County. Both of these projects are identified as resurfacing projects and would occur during the 2011 to 2012 timeframe. These resurfacing projects have not been included in the cumulative impacts analysis because both would result in temporary impacts associated only with duration of the resurfacing project and would occur after completion of construction of the Proposed Project and, therefore, would not result in a cumulative impact.

Rosebud Sioux Tribe Wind Project

The Rosebud Sioux Tribe proposes to construct a wind project in Todd County approximately 2.5 miles north of Mission, South Dakota. The tribe currently has interconnection requests within Western's queue for 90 MW and/or 100 MW; however, system impact studies relating to these interconnection requests have not yet begun. Depending on the outcome of system impact studies, the tribe may develop the project as a 90 MW, 100 MW or 190 MW wind farm (Haukaas 2009). At this time, the Rosebud Sioux Tribe project proponents are conducting preliminary environmental studies. Because this proposed wind project is in preliminary study stages and is not sufficiently advanced in project development, it has been excluded from the cumulative impact analysis.

5.4 CUMULATIVE IMPACT ANALYSIS

Cumulative effects were evaluated for both the construction (pending approvals, anticipated to begin mid-2010 and complete construction by the end of 2010) and post-construction (operation) periods of the Proposed Project. As identified in **Chapter 4**, the Proposed Project's impacts to the following resources are anticipated to be minimal and primarily occur during construction: geology and soils, water, land use, noise, socioeconomics, environmental justice, and health and safety. Additionally, there are no other proposed projects identified within the ROI for the aforementioned resources, therefore, these resources will not be further evaluated for cumulative impacts. Where applicable, the Applicants' and Agencies' standard BMPs (see **Table 2.2**), and Applicants' APMs (see **Table 2.3**) have been included and would be used for the Proposed Project and proposed Federal actions as appropriate, thereby reducing or eliminating the potential for incremental effects resulting from the Proposed Project.

5.4.1 CLIMATE CHANGE AND AIR QUALITY

Cumulative impact analysis for climate change includes consideration of the ROI for the project, and State and national GHG emission reduction efforts. Current national and State practices include the inventory of GHG emissions to compare the relative contribution of different emission sources and GHG emissions to climate change. According to the EPA, “a GHG inventory is an accounting of the amount of GHGs emitted to or removed from the atmosphere over a specific period of time (e.g., one year). A GHG inventory also provides information on the activities that cause emissions and removals, as well as background on the methods used to make the calculations. Policy makers use GHG inventories to track emission trends, develop strategies and policies and assess progress. Scientists use GHG inventories as inputs to atmospheric and economic models. To track the national trend in emissions and removals since 1990, EPA develops the official U.S. GHG inventory each year. The national GHG inventory is submitted to the United Nations in accordance with the Framework Convention on Climate Change. In addition to the U.S. inventory, GHG emissions can be tracked at the global, State and local levels as well as by companies and individuals.”

CO₂ is one of six GHGs that contribute to climate change. CO₂ emissions represent approximately 84 percent of all GHG emissions in the U.S. The greatest advantage of wind power is electricity generation without air emissions, including CO₂. Within South Dakota, CO₂ emissions resulting from fossil fuel combustion totaled 13.78 million tons in 2007 (EPA 2009a). Of these, activities related to the generation of electric power accounted for 2.96 million tons of CO₂ emitted in South Dakota (EPA 2009a). Further, operation of the Proposed Project would offset emission sources when compared to similarly-sized electric generating facilities using carbon-based fuel sources; thus, contribute to the national and State efforts to minimize GHG emissions.

5.4.2 BIOLOGICAL RESOURCES

There are three cumulative impact analysis areas for biological resources: 1) the ROI for vegetation, mammals (excluding bats), reptiles, amphibians; 2) the Aransas-Wood Buffalo National Park migration corridor (Whooping Crane); and 3) the State of South Dakota central flyway (bats and birds, excluding Whooping Crane).

Some biological resources would be lost due to the construction and operation of the Proposed Project. Construction of the Proposed Project Components would result in the permanent loss of a small amount of native vegetation and wildlife habitat, and could result in a minor number of mammal, reptile, and amphibian mortalities. Impacts to these biological resources resulting from the Proposed Project would be minimal within the ROI, and incremental impacts would not increase cumulative impacts.

A BA is being prepared under Section 7 of the ESA for Federally-listed species. Impacts, including cumulative impacts, will be determined in the BA and findings will be summarized in the FEIS. Western and RUS will follow USFWS recommendations provided during the Section 7

consultation process. While SDCL 34A-8 does not require agency consultation for State-listed threatened and endangered species, SDGFP has been active in the preparation of this DEIS.

Operation of the Proposed Project would likely result in avian and bat mortalities (see **Sections 4.4.3.1 and 4.4.3.2**), mainly as a result of habitat fragmentation, and potential collisions with new overhead transmission lines and wind turbines. FAA marker lights would be installed on turbines taller than 200 feet and may incrementally increase cumulative effects on avian species in areas where they are highly concentrated. As discussed in **Sections 5.2 Past and Present Actions and 5.3 Reasonably Foreseeable Future Actions**, there are numerous existing and proposed transmission and wind generation projects in South Dakota that have or may have similar impacts on birds and bats. However, most of these projects are located in eastern South Dakota and considerably distant from the Proposed Project areas. Existing transmission lines and wind generation projects have negatively affected birds and bats, and, as discussed in **Sections 5.2 and Section 5.3**, the likely need for additional wind generation facilities and transmission capacity to meet increasing demand could increase cumulative effects in areas where these facilities are concentrated, such as eastern South Dakota. Incremental impacts associated with the Proposed Project may result in increased cumulative impacts when added to other wind and transmission projects near the Proposed Project. However, the Proposed Project is geographically isolated from the majority of existing and proposed wind generation facilities and transmission lines. Therefore, bird and bat species utilizing the habitats in eastern South Dakota would not likely be incrementally impacted by the Proposed Project.

Given the current economic climate and a host of other variables, it is difficult to accurately predict the actual growth of wind energy in South Dakota and other top wind states, many of which also lie within the central flyway. However, the number of turbines and associated infrastructure is growing, and will likely continue to grow into the near future. Research on how birds and bats respond to wind turbines remains nascent, so it is difficult to predict the cumulative impacts of wind energy project development and transmission line development and disturbance within the central flyway. It can be assumed that as development and disturbance within the central flyway continues to increase, this would continue to degrade migratory and resident bird and bat habitat quality and quantity. Past activities that have affected habitat in the project area include conversion of native vegetation and CRP lands for farming, and construction of roads, transmission lines, and residences. Development of electrical power generation and transmission within the central flyway has contributed to a baseline condition that presents some level of risk to a bird and bat populations. Continued development of power generation and transmission, whether from renewable or non-renewable sources, will increase the potential for habitat fragmentation and collisions with structures.

5.4.3 CULTURAL RESOURCES

Cumulative impacts to cultural resources, such as prehistoric properties, historic properties, and cultural landscapes, cannot be determined until the results of the Class III Survey and TCP Survey are completed. A MOA is being developed among Western, RUS, SHPO, affected Federal agencies, Applicants and interested Native American Tribes. The preferred minimization

measure is to avoid identified sites; however, the MOA would provide an agreement among the parties for the treatment of the unavoidable adverse impacts. Compliance with the MOA provisions would ensure that Section 106 requirements are met, and incremental increases to cumulative cultural effects reduced.

5.4.4 TRANSPORTATION

FAA recently developed a new set of recommendations for lighting wind farms that would require fewer lights than needed under its current policy. The new recommendations suggest red or white synchronized flashing strobe lights, at most 0.5 mile apart around the perimeter of wind farms. Daytime lighting and dual lighting of the turbines were deemed unnecessary. However, the USFWS discourages the use of red flashing lights due to wildlife impacts (USFWS 2003). Prior to construction, the Applicants would consult with FAA to identify applicable lighting requirements. Based on this, the Proposed Project would not incrementally increase cumulative impacts to aviation.

5.4.5 VISUAL

Additional transmission line installation and wind energy development from the Proposed Project would incrementally increase cumulative effects on the visual landscape in the Proposed Project counties caused by the addition of man-made elements to a landscape that is primarily natural or agricultural. As the number or density of tall, man-made structures increased in the local rural counties, it is possible that viewer sensitivity would also increase. The significance of the visual changes would vary according to the location of the wind project and the perceptions of the viewers.

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6 Unavoidable Adverse Impacts

Unavoidable adverse impacts are those that would occur after implementation of all incorporated BMPs, APMs and mitigation measures. Unavoidable adverse impacts do not include temporary or permanent impacts which would be mitigated.

The Applicants and Western have committed to implementing BMPs and APMs to minimize or eliminate potential impacts from constructing and operating the Proposed Project. If additional impacts are identified through other Federal, State or County permitting processes, the Applicants would develop appropriate mitigation measures in consultation with the requesting agency (*i.e.*, USFWS, USACE). Additional mitigation identified will be disclosed in the FEIS.

Constructing and operating the Proposed Project would unavoidably convert less than 0.5 percent of available farmland within the Proposed Project boundary. Loss of this agricultural farmland would have a minimal effect on the overall agricultural production in the area.

Constructing, operating and maintaining the Proposed Project may result in unavoidable adverse impacts to biological resources and cultural resources as described below. The Proposed Project would have a less than significant impact on the other resource areas as identified in **Chapter 4**; although identified as less than significant, unavoidable impacts to land use and visual resources are also discussed below.

Some biological resources would be lost due to the construction and operation of the Proposed Project. Construction of the Proposed Project Components would result in the permanent loss of a small amount of native vegetation and wildlife habitat. Operation of the Proposed Project would likely result in avian and bat mortalities. A BA is being prepared under Section 7 of the ESA for Federally-listed species. Impacts will be determined in the BA and findings will be summarized in the FEIS. The agencies will follow USFWS recommendations provided during the Section 7 consultation process.

Unavoidable adverse impacts to cultural resources, such as prehistoric properties, historic properties, and cultural landscapes, cannot be determined until the results of the Class III Survey and TCP Survey are completed. A MOA is being developed among Western, RUS, SHPO, affected Federal agencies, Applicants, and all interested Native American Tribes in conjunction with preparation of the EIS. The preferred mitigation measure is to avoid identified sites; however, the MOA would provide an agreement among the parties for the treatment of the unavoidable adverse impacts. Compliance with the MOA provisions would ensure that Section 106 requirements are met.

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7 Irreversible and Irretrievable Commitments of Resources

This section describes the irreversible and irretrievable commitments of resources associated with implementing the Proposed Project. An “irreversible commitment of resources” occurs when, once committed to the Proposed Project, the resource would continue to be committed throughout the life of the Proposed Project. An “irretrievable commitment of resources” refers to those resources that, once used, consumed, destroyed or degraded during construction, operation, or decommissioning of the Proposed Project, would cause the resource to be unavailable for use by future generations. Examples of irretrievable types of resources include nonrenewable resources, such as minerals and cultural resources, as well as renewable resources that would be unavailable for the use of future generations such as loss of production, harvest, or habitat.

If wind turbines are not upgraded, upon termination of operations, the Applicants have a contractual obligation to the landowners to remove the wind facilities, including foundations to a depth of four feet. The Applicants also have an obligation to restore the area to a condition reasonably similar to the condition of the surrounding soil. The Applicants may explore alternative methods to accomplish decommissioning of the Proposed Project at the time that this activity approaches. Decommissioning activities would be conducted in compliance with applicable rules and regulations.

Constructing and operating the Proposed Project Components would constitute an irreversible commitment of land, soil and vegetation for the life of the Proposed Project. The area of the underground collector and communication systems would be revegetated. While the Winner Alternative would require a slightly larger use of land, soil and vegetation, the commitments of these resources would be similar for either of the proposed alternatives.

Constructing the wind turbines and transmission structures would remove a minimal amount of agricultural lands from production and is an irreversible and irretrievable commitment of farmland. The Proposed Project would result in few changes to existing agricultural practices because farming and grazing would continue in and around the wind turbines and other Proposed Project Components.

Some biological resources would be lost due to the construction and operation of the Proposed Project. Construction of the Proposed Project Components would result in the permanent loss of a small amount of native vegetation and wildlife habitat. Operation of the wind farm would likely result in avian and bat mortalities. A BA is being prepared under Section 7 of the ESA for Federally-listed species. Findings of the BA will be summarized in the FEIS.

Cultural resources are nonrenewable resources. Irretrievable commitments of cultural resources, such as prehistoric properties, historic properties and cultural landscapes, cannot be determined until the results of the Class III Survey and TCP Survey are completed. A MOA is being developed among Western, RUS, SHPO, affected Federal agencies, Applicants, and interested Native American Tribes in conjunction with preparation of the EIS. The preferred mitigation

measure is to avoid identified sites; however, the MOA would provide an agreement among the parties for the treatment of the unavoidable adverse impacts. Compliance with the MOA provisions would ensure that Section 106 requirements are met.

9 Consultation and Coordination

9.1 AGENCIES AND PERSONS CONTACTED/ CONSULTED

Western and RUS, as co-lead Federal Agencies, have consulted with Federal, State, and local agencies and Native American groups regarding the potential alternatives for the Proposed Project. The following is a list of contacts that were made during preparation of this DEIS.

Federal Agencies

Bureau of Indian Affairs – Great Plains Office
Federal Emergency Management Agency
Federal Highway Administration
National Park Service – Lewis and Clark National Historic Trail
Natural Resources Conservation Service
U.S. Army Corps of Engineers – South Dakota Regulatory Office
U.S. Department of Agriculture – Farm Service Agency, Jerauld County
U.S. Department of Agriculture – Farm Service Agency, Lyman County
U.S. Department of Energy
U.S. Department of the Interior – Office of Environmental Policy and Compliance
U.S. Environmental Protection Agency Region 8
U.S. Environmental Protection Agency – Head Quarters in Washington D.C.
U.S. Fish and Wildlife Service – Ecological Services Field Office
U.S. Fish and Wildlife Service – Lake Andes Wetland Management District
U.S. Fish and Wildlife Service – Huron Wetland Management District
U.S. Forest Service – Black Hills National Forest
U.S. Forest Service – Nebraska & Samuel R. McKelvie National Forests
U.S. Forest Service – Fort Pierre National Grassland
U.S. Forest Service – Buffalo Gap National Grassland
U.S. Forest Service – Oglala National Grasslands
U.S. Geological Survey, Northern Prairie Wildlife Research Center
U.S. Geological Survey, South Dakota State University

State Agencies

South Dakota Aeronautics Commission
South Dakota Department of Agriculture
South Dakota Department of Environment and Natural Resources
South Dakota Department of Health
South Dakota Department of Transportation
South Dakota Game, Fish, and Parks
South Dakota Game, Fish, and Parks – National Heritage Program

South Dakota Highway Patrol
 South Dakota Indian Affairs Commission
 South Dakota Public Utilities Commission
 South Dakota State Historic Preservation Office
 South Dakota State Historical Society
 South Dakota State Land Department
 South Dakota Transmission Authority

Local Agencies

| | |
|---|--|
| Aurora County | City of Winner |
| Aurora County Board of Commissioners | Gregory County Board of Commissioners |
| Brule County | Jerauld County |
| Brule County Board of Commissioners | Jerauld County Board of Commissioners |
| City of Chamberlain | Town of Alpena |
| City of Colome | Town of Wessington Springs |
| City of Kimball | Tripp County |
| City of Plankinton | Tripp County Board of Commissioners |
| City of White Lake | |

Organizations

Basin Electric Power Cooperative
 Ducks Unlimited
 Sierra Club
 The Nature Conservancy
 Wessington Springs Area Development Corporation

Elected Officials

South Dakota Governor – Honorable Mike Rounds
 South Dakota Senator – Honorable Tim Johnson
 South Dakota Senator – Honorable John Thune
 South Dakota U.S. House of Representatives – Representative Stephanie Herseth

Native American Tribes and Communities

Cheyenne River Sioux Tribe
 Crow Creek Sioux Tribe
 Flandreau Santee Sioux Executive Committee
 Fort Peck Sioux and Assiniboine Tribe
 Lower Brule Sioux Tribe
 Lower Sioux Indian Community
 Oglala Sioux Tribe

Rosebud Sioux Tribe of Indians
 Santee Sioux Tribe of Nebraska
 Sisseton-Wahpeton Oyate
 Spirit Lake Tribal Council
 Standing Rock Sioux Tribe
 Three Affiliated Tribes Business Council
 Turtle Mountain Band of Chippewa
 Upper Sioux Indian Community
 Wahpetkute Band of the Dakota
 Yankton Sioux Tribe
 South Dakota State Historical Society

9.2 INDIVIDUALS TO RECEIVE THE EIS

In addition to the Federal, State, and local agencies and Native American groups listed in **Section 9.1**, the DEIS has been distributed to the following individuals:

Individuals

| | | |
|-------------------|-------------------|-------------------|
| E. Bailey | J. Keierleber | G & O. Peterson |
| K. & S. Bradwisch | R. Kovacevich | W. S. |
| G. Brodkorb | R. & K. Kreinbuhl | D. Salmen |
| B. Brozik | B. Kroupa | M. Schochenmaier |
| E. Brumbaugh | M. LaPointe | P. Seppanen |
| B. & P. Cerny | P. Licht | V. Svoboda |
| R. Clifford | B. Lindbloom | D. & C. Thomas |
| R. & K. Demers | R. & G. Meier | V. Vanderhule |
| R. Hartog | D. & M. Moerike | D. Vaughn |
| G. Higgins, Jr. | L. Nelson | J. Waterbury |
| G. Higgins, Sr. | E. Odenbach | D. Weiland |
| V. & G. Hoing | J. Patmore | L. & A. Wihelmsen |
| H. Hotchkiss | R. Pearson | L. & F. Woods |
| K. & K. Janouselo | K. Perrin | |
| K. & W. Kayl | J. Peters | |

Copies of the DEIS have also been provided to the following locations and are available for public review.

Cozard Memorial Library in Chamberlain – Brule County
 Kimball Public Library – Brule County
 Plankinton City Library – Aurora County
 Winner Public Library – Tripp County
 Wessington Springs Carnegie Library – Jerauld County

Western Area Power Administration
 Upper Great Plains Customer Service Region
 South Dakota Maintenance Office
 200 4th Street SW.
 Huron, SD 57350

Rural Utilities Service
 1400 Independence Ave. SW.
 Mail Stop 1571, Room 2244
 Washington DC 20250-1571

9.3 LIST OF PREPARERS

| WESTERN CO- LEAD FEDERAL AGENCY | | |
|--|--|--------------------------------|
| Name/Title | Education/Experience | Responsibility |
| David Swanson – Technical | <ul style="list-style-type: none"> ▪ B.A., Biological Sciences ▪ 32 years experience | NEPA compliance review |
| Liana G. Reilly, PMP – Project Manager | <ul style="list-style-type: none"> ▪ B.S., Biological Psychology ▪ Masters of Environmental Management ▪ Masters of Public Health ▪ 8 years experience | Project management |
| Misti K. Schriener – Biologist | <ul style="list-style-type: none"> ▪ B.S., Biology ▪ M.S., Environmental Science | Review of biological resources |
| Rod O’Sullivan – Environmental Protection Specialist | | Project management |
| Stephen Tromly – Tribal Energy Program Manager | <ul style="list-style-type: none"> ▪ B.S., Resource Conservation, MA Anthropology ▪ 19 years experience | Cultural resources |

| RUS CO-LEAD FEDERAL AGENCY | | |
|---|--|--|
| Name/Title | Education/Experience | Responsibility |
| David Hui | <ul style="list-style-type: none"> ▪ B.S., Electrical Engineering ▪ 20 years experience | Purpose and need, engineering review |
| Dennis Rankin – Project Manager/ Environmental Protection Specialist | <ul style="list-style-type: none"> ▪ B.A., Biology ▪ M.S., Biology ▪ 32 years experience | Avian impacts |
| Laura Dean - Archeologist, Federal Preservation Officer | <ul style="list-style-type: none"> ▪ B.S., Anthropology ▪ B.A., Anthropology ▪ Ph.D., Archeology ▪ 30 years experience | Cultural resources, Section 106 compliance |
| Richard Fristik - Senior Environmental Protection Specialist | <ul style="list-style-type: none"> ▪ B.S., Wildlife & Fisheries Science ▪ M.S., Wildlife Management ▪ 20 years experience | ESA Section 7 consultation |
| Steve Slovikosky | <ul style="list-style-type: none"> ▪ B.S., Electrical Engineering ▪ 32 years experience | Transmission/ engineering review |

| USFWS COOPERATING FEDERAL AGENCY | | |
|--|--|--|
| Name/Title | Education/Experience | Responsibility |
| Mark Heisinger – Wildlife Refuge Specialist | <ul style="list-style-type: none"> ▪ B.S. Wildlife Biology ▪ 32 years experience | Cooperating agency, considering refuge lands in Aurora, Brule and Tripp counties |
| Sandra Uecker – Wildlife Refuge Manager | <ul style="list-style-type: none"> ▪ B.S. Wildlife Biology ▪ 22 years experience | Cooperating agency, considering refuge lands in Jerauld County |

| CONSULTANTS FOR THE EIS | | |
|---|---|--|
| Name/Title | Education/Experience | Responsibility |
| Jason Ramsey – Senior GIS Analyst | <ul style="list-style-type: none"> ▪ M.S., GIS ▪ B.A., Anthropology ▪ 6 years experience | Geospatial analysis, map generation |
| Jessica Wilton – Project Manager | <ul style="list-style-type: none"> ▪ B.A, Biology ▪ 6 years experience | Project management, technical editing, land use, visual resources, noise, biological resources, socioeconomics and environmental justice, cumulative effects |
| Jodi Strohmayr, RPA – Archaeologist | <ul style="list-style-type: none"> ▪ M.S., GIS & Spatial Analysis in Archaeology ▪ B.A., Anthropology ▪ 6 years experience | Land use, visual resources, air quality, noise, geology and seismicity, cultural resources, socioeconomics and environmental justice, public health and safety, transportation, cumulative effects |
| Joe Gregory – Senior GIS Analyst | <ul style="list-style-type: none"> ▪ M.S., GIS ▪ B.S., Anthropology ▪ 6 years experience | Geospatial analysis, map generation |
| Kenda Pollio – Project Manager | <ul style="list-style-type: none"> ▪ B.S., Environmental/Urban & Regional Planning ▪ M.A., Political Science – International Environmental Policy ▪ 14 years experience | Project management |
| Larry Killman – Principal | <ul style="list-style-type: none"> ▪ 30 years experience | Project management, technical input, land use, water resources |
| Molly Cresto – Assistant Project Manager | <ul style="list-style-type: none"> ▪ M.S., Science Technology and Policy (expected 2010) ▪ Graduate Certificate in Sustainable Technology Management ▪ B.S., Plant Biology Environmental Science & Ecology ▪ 6 years experience | Project management, technical editing, biological resources, land use, visual resources, transportation, socioeconomics and environmental justice, cumulative effects |
| Pat Golden – Senior Biologist | <ul style="list-style-type: none"> ▪ B.A., Environmental, Population, Organismic Biology ▪ 14 years experience | Biological resources, Section 7 consultation |
| Sarah Bresnan – Scientist | <ul style="list-style-type: none"> ▪ B.S., Plant Biology, Environmental Science and Ecology ▪ 3 years experience | Biological resources |
| Sheila Logan, P.E. – Senior Project Manager | <ul style="list-style-type: none"> ▪ B.S., Civil and Environmental Engineering ▪ Graduate work, Civil and Environmental Engineering ▪ Registered Professional Engineer in AZ ▪ 16 years experience | Geology and soils, water resources, public health and safety, technical editing |
| Trish Mitchell, RPA – Senior Project Archeologist | <ul style="list-style-type: none"> ▪ M.S., Anthropology ▪ 23 years experience | Cultural resources |

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10 Disclosure Statement

Organizational Conflict of Interest Representation Statement

I hereby certify as a representative of my organization that, to the best of my knowledge and belief, no facts exist relevant to any past, present or currently planned interest or activity (financial, contractual, personal, organizational or otherwise) that relate to the proposed work; and bear on whether I or the organization has a possible conflict of interest with respect to (1) being able to render impartial, technically sound, and objective assistance or advice; or (2) being given an unfair competitive advantage.

Signature:  _____

Date: January 8, 2010

Name: Larry Killman

Title: Principal

Organization: Tierra Environmental Consultants, LLC

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12 Glossary

This chapter contains a glossary of words, legislative terms and regulatory requirements used in this DEIS.

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| Administrative Rule (AR) | Administrative rules officially proclaim the State of South Dakota's regulations and have the force of law. Administrative rules and regulations elaborate or detail the requirements of a law or policy. |
| Aesthetics | Referring to the perception of beauty. |
| Affected environment | Existing biological, physical, social, and economic conditions of an area subject to change, both directly and indirectly, as the result of a proposed human action. |
| Air pollutant | Generally, an airborne substance that could, in high enough concentrations, harm living things or cause damage to materials. From a regulatory perspective, an air pollutant is a substance for which emissions or atmospheric concentrations are regulated or for which maximum guideline levels have been established due to potential harmful effects on human health and welfare. |
| Air Quality Standards | The level of pollutants prescribed by regulation that may not be exceeded during a specified time in a defined area. |
| Alluvial deposits | Deposits of earth, sand, gravel and other materials carried by moving surface water deposited at points of weak water flow. |
| Ambient air | Any unconfined portion of the atmosphere; open air, surrounding air. That portion of the atmosphere, external to buildings, to which the general public has access. |
| American Wind Energy Association (AWEA) | National trade association representing wind power project developers, equipment suppliers, service providers, parts manufacturers, utilities, researchers, and others involved in the wind industry. |
| Anabat | A system to identify and survey bats by detecting and analyzing their echolocation calls. |
| Applicants | Basin Electric Power Cooperative and PrairieWinds SD1, Incorporated |
| Aquifer | A body of rock or sediment in a formation, group of formations, or part of a formation that is saturated and sufficiently permeable to transmit economic quantities of water to wells and springs. |

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| Archaeological Resources Protection Act | A Federal law, passed in 1979 (16 USC 1B, Pub. L. 96-95), to protect archaeological resources on public and Indian lands. |
| Archaeological sites (resources) | Any location where humans have altered the terrain or discarded artifacts during either prehistoric or historic times. |
| Archaeology | A scientific approach to the study of human ecology, cultural history, and cultural process. |
| Area of potential effects (APE) | The area in which disturbance to cultural resources may occur and within which a systematic cultural resource inventory is required. |
| Artifact | An object produced or shaped by human workmanship of archaeological or historical interest. |
| Attainment area | An area which the U.S. Environmental Protection Agency (EPA) has designated as being in compliance with one or more of the National Ambient Air Quality Standards (NAAQS) for sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and particulate matter. Any area may be in attainment for some pollutants but not for others. |
| Average daily traffic (ADT) | The average volume of vehicles at a given point or section of highway over a 24-hour period. |
| Avian monitoring study | A study done to characterize and monitor the quality of avian species. Avian monitoring studies are used in the preparation of impact assessments, as well as in many circumstances in which human activities carry a risk of harmful effects on avian species natural environment. |
| Avian Power Line Interaction Committee | Committee that works in partnership with other utilities, resource agencies and the public to develop and provide educational resources, identify and fund research, develop and provide cost-effective management options, and serve as the focal point for avian interaction utility issues. |
| Bald and Golden Eagle Protection Act (BGEPA) | Law that provides for the protection of the Bald Eagle and the Golden Eagle by prohibiting the taking, possession and commerce of such birds (16 U.S.C. 668-668d, 54 Stat. 250). |
| Biological Assessment (BA) | An evaluation of potential effects of a proposed project on proposed, endangered, threatened, and sensitive animal and plant species and their habitats. Information prepared by, or under the direction of, a Federal agency to determine whether a proposed action is likely to adversely affect listed species or designated critical habitat, jeopardize the continued existence of species that are proposed for listing, or adversely modify proposed critical habitat. |

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| Board of County Commissioners | A group of elected officials charged with administering the policies and regulations of county government. |
| Bounding | A credible upper limit to consequences or impacts. |
| Breaker | A switching device that is capable of closing or interrupting an electrical circuit under over-load or short-circuit conditions as well as under normal load conditions. |
| Bus | A set of two or more electrical conductors that serve as common connections between load circuits and each of the phases (in alternating current systems) of the electric power source. |
| Candidate species | A species of plant or animal for which there is sufficient information to indicate biological vulnerability and threat, and for which proposing to list as “threatened” or “endangered” is or may be appropriate. |
| Capability | The maximum load that a generator, turbine, transmission circuit, apparatus, station, or system can supply under specified conditions for a given time interval, without exceeding approved limits of temperature and stress. |
| Capacity | The load for which a generator, turbine, transformer, transmission circuit, apparatus, station, or system is rated. Capacity is also used synonymously with capability. |
| Carbon dioxide (CO ₂) | A chemical compound composed of two oxygen atoms covalently bonded to a single carbon atom. It is a gas at standard temperature and pressure and exists in Earth's atmosphere in this state. CO ₂ is also recognized as the most prominent greenhouse gas. |
| Carbon monoxide (CO) | A colorless, odorless gas that is toxic if breathed in high concentrations over a period of time. It is formed as the product of the incomplete combustion of hydrocarbons (fuel). |
| Class I, II and III Areas | Area classifications, defined by the Clean Air Act, for which there are established limits to the annual amount of air pollution increase. Class I areas include international parks and certain national parks and wilderness areas; allowable increases in air pollution are very limited. Air pollution increases in Class II areas are less limited, and are least limited in Class III areas. Areas not designated as Class I start out as Class II and may be reclassified up or down by the State, subject to Federal requirements. |
| Clast | A rock fragment or grain resulting from the breakdown of larger rocks. |

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| Clean Air Act (CAA) | (42 U.S.C. 7401 <i>et seq.</i>) Establishes (1) national air quality criteria and control techniques (Section 7408); (2) NAAQS (Section 7409); (3) State implementation plan requirements (Section 4710); (4) Federal performance standards for stationary sources (Section 4711); (5) National Emission Standards for Hazardous Air Pollutants (NESHAP) (Section 7412); (6) applicability of CAA to Federal facilities (Section 7418), <i>i.e.</i> , Federal agency must comply with Federal, State, and local requirements respecting control and abatement of air pollution, including permit and other procedural requirements, to the same extent as any person; (7) Federal new motor vehicle emission standards (Section 7521); (8) regulations for fuel (Section 7545); (9) aircraft emission standards (Section 7571). |
| Clean Water Act (CWA) | (33 U.S.C. 1251 <i>et seq.</i>) Restores and maintains the chemical, physical, and biological integrity of the nation's waters. |
| Code of Federal Regulations (CFR) | All Federal regulations in force are published in codified form in the Code of Federal Regulations. |
| Colluvium | A loose deposit of rock debris accumulated through the action of gravity at the base of a cliff or slope. |
| Community (biotic) | All plants and animals occupying a specific area under relatively similar conditions. |
| Conditional Use Permit | A permit issued by a city, county, or other administrative entity to consider special uses which may be essential or desirable to a particular community, but which are not allowed as a matter of right within a particular zoning district or zoning ordinance. A conditional use permit can provide flexibility in planning, allowing, with conditions, a special use of property that is the public interest. |
| Conservation | A reduction in electric power consumption as a result of increases in the efficiency of energy use, production, or distribution. |
| Conservation Reserve Program (CRP) | A cost-share and rental payment program under the U.S. Department of Agriculture (USDA) administered by the Farm Service Agency. Technical assistance for CRP is provided by the USDA Forest Service and the USDA Natural Resources Conservation Service (NRCS). The CRP program encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filter strips, or riparian buffers. |

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| Council on Environmental Quality (CEQ) | Established by the National Environmental Policy Act (NEPA), the CEQ consists of three members appointed by the President. A CEQ regulation (Title 40 CFR 1500-1508, as of July 1, 1986) describes the process for implementing NEPA, including preparation of environmental assessments and environmental impacts statements, and the timing and extent of public participation. |
| Criteria pollutants | An air pollutant that is regulated by the NAAQS. The EPA must describe the characteristics and potential health and welfare effects that form the basis for setting or revising the standard for each regulated pollutant. Criteria pollutants include sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and particulate matter. |
| Critical habitat | Habitat identified as essential to the conservation of a threatened or endangered species, and which may require special management considerations or protection. |
| Cultural resources | Districts, sites, structures, and objects and evidence of some importance to a culture, a subculture, or a community for scientific, traditional, religious, and other reasons. These resources and relevant environmental data are important for describing and reconstructing past lifeways, for interpreting human behavior, and for predicting future courses of cultural development. |
| Cumulative impact | The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. |
| Customer | Any entity or entities purchasing power from the power generator or distributor provider. |
| Day-night average sound level (L_{dn}) | The average noise level over a 24 hour period. |
| Decibel (dB) | A unit for expressing the relative intensity of sounds on a logarithmic scale from 0 for the average least perceptible sound to about 130 for the average level at which sound causes pain to humans. For traffic and industrial noise measurements, the A-weighted decibel (dBA), a frequency-weighted noise unit, is widely used. The A-weighted decibel scale corresponds approximately to the frequency response of the human ear and thus correlates well with loudness. |

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| Decommissioning | The process to remove the Proposed Project Components, or portions thereof, from service. Decommissioning may include decontamination, dismantling, shipment and final disposition of project components, and site rehabilitation, in compliance with applicable rules and regulations. |
| Demand | The rate at which energy is used at a given instant or averaged over a designated period of time. |
| Dendritic | Stream pattern resembling the branching pattern of blood vessels or tree branches. |
| Deposition | In geology, the laying down of potential rock-forming materials; sedimentation. In atmospheric transport, the settling out on ground and building surfaces of atmospheric aerosols and particles (“dry deposition”) or their removal from the air to the ground by precipitation (“wet deposition” or “rainout”). |
| Drinking water standards | The prescribed level of constituents or characteristics in a drinking water supply that cannot be exceeded legally. |
| Ecology | A branch of science dealing with the interrelationships of living organisms with one another and with their nonliving environment. |
| Ecosystem | Living organisms and their non-living (abiotic) environment functioning together as a community. |
| Effects (impacts) | As used in NEPA documentation, the terms effects and impacts are synonymous. Effects can be ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial. |
| Elevation | Height in feet above mean sea level. |
| Eligibility | The criteria of significance in American history, architecture, archeology, engineering, and culture. The criteria require integrity and association with important people or events, distinctiveness for any of a variety of reasons, or importance because of information the property does or could hold. |

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| Eligible cultural resource | A cultural resource that has been evaluated and reviewed by an agency and the State Historic Preservation Officer and recommended as eligible for inclusion in the National Register of Historic Places, based on the criteria of significance. |
| Electric and magnetic fields (EMF) | The invisible lines of force associated with the production, transmission, and use of electric power, such as those associated with high-voltage transmission lines, secondary power lines, and home wiring and lighting. EMFs are present around any electrical device. |
| Emission Standards | Requirements established by a State, local government, or the EPA Administrator that limits the quantity, rate, or concentration of emissions of air pollutants on a continuous basis. |
| Emissions | Pollution discharged into the atmosphere from smoke stacks, other vents, and surface areas of commercial or industrial facilities, residential chimneys, and vehicle exhausts. |
| Endangered species | Plants or animals that are in danger of extinction through all or a significant portion of their range. |
| Endangered Species Act of 1973 | (16 U.S.C. 1531 <i>et seq.</i>) Provides for listing and protection of animal and plant species identified as in danger, or likely to be in danger, or extinction throughout all or a significant portion of their range. Section 7 places strict requirements on Federal agencies to protect listed species. |
| Energy | That which does or is capable of doing work. It is measured in terms of the work it is capable of doing; electric energy is usually measured in kilowatt-hours. |
| Environmental Impact Statement (EIS) | The detailed written statement that is required by Section 102(2)(C) of NEPA for a proposed major Federal action significantly affecting the quality of the human environment. |
| Environmental Justice | Identification of potential disproportionately high and adverse impacts on low-income and/or minority populations that may result from proposed Federal actions (required by Executive Order 12898). |
| Eolian | Sediment materials eroded and deposited by the wind. |
| Erosion | Wearing away of soil and rock by weathering and the actions of surface water, wind, and underground water. |
| Ethnographic | Information about cultural beliefs and practices. |
| Facility | The wind power generating components of the Proposed Project. |

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| Farmland Protection Policy Act | A statute enacted in 1981 by the USDA to ensure that significant agricultural lands are protected from conversion to nonagricultural uses. |
| Federal Aviation Administration | An agency that regulates civil aviation to promote safety, encourages and develops civil aeronautics including new aviation technology, develops and operates a system of air traffic control and navigation for both civil and military aircraft, researches and develops the National Airspace System and civil aeronautics, develops and carries out programs to control aircraft noise and other environmental effects of civil aviation, and regulates U.S. commercial space transportation. |
| Federal Energy Regulatory Commission (FERC) | An independent agency that regulates the interstate transmission of electricity, natural gas, and oil. FERC also reviews proposals to build liquefied natural gas (LNG) terminals and interstate natural gas pipelines as well as licensing hydropower projects. |
| Floodplain | The lowlands adjoining inland and coastal waters and relatively flat areas, including at a minimum that area inundated by a 1-percent or greater chance flood in any given year. The base floodplain is defined as the 100-year (1.0 percent) floodplain. The critical action floodplain is defined as the 500-year (0.2 percent) floodplain. |
| Fluvial | Sediment materials eroded and deposited by the action of a stream. |
| Formation | In geology, the primary unit of formal stratigraphic mapping or description. Most formations possess certain distinctive features. |
| Game Production Areas (GPA) | Areas owned and managed by the South Dakota Department of Game, Fish and Parks for game production and public hunting. |
| Gauss (G) | The unit most commonly used in the United States to measure magnetic fields. |
| Generation | The act or process of producing electricity from other forms of energy. |
| Generator | A machine that converts mechanical energy into electrical energy. |
| Glaciofluvial | Sediments deposited by streams fed by melting glaciers. |

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| Grassland Easements | A legal agreement signed with the United States of America, through the U.S. Fish and Wildlife Service that pays to permanently keep land in grass. This restriction is to help grassland nesting species, such as ducks and pheasants, complete their nesting before the grass is disturbed. |
| Groundwater | Water within the earth that supplies wells and springs. |
| Hazardous Air Pollutants | Air pollutants that are not covered by ambient air quality standards, but that may present a threat of adverse human health effects or adverse environmental effects. |
| Hazardous waste | A category of waste regulated under the Resource Conservation and Recovery Act (RCRA). To be considered hazardous, a waste must be a solid waste under RCRA and must exhibit at least one of four characteristics described in 40 CFR 261.20 through 40 CFR 261.24 (<i>i.e.</i> , ignitability, corrosivity, reactivity, or toxicity) or be specifically listed by the EPA in 40 CFR 261.31 through 40 CFR 261.33. |
| Historic properties | Resources of national, State, or local significance in American history, architecture, archaeology, engineering, or culture, and worthy of preservation. |
| Hydric soils | Soils containing considerable moisture. |
| Hydrophytic | Growing wholly or partially in water or having or characterized by excessive moisture. |
| Hydrophytic vegetation | Vegetation adapted to an aquatic or very wet environment. |
| Impacts (effects) | An assessment of the meaning of changes in all attributes being studied for a given resource; an aggregation of all the positive and negative effects, usually measured using a qualitative and nominally subjective technique. In this EIS, as well as in the CEQ regulations, the word impact is used synonymously with the word effect. |
| Impaired waters | Under Section 303(d) of the Clean Water Act, States, territories, and authorized tribes are required to develop lists of impaired waters. These are waters that are too polluted or otherwise degraded to meet the water quality standards set by States, territories or authorized tribes. The law requires that these jurisdictions establish priority rankings for waters on the lists and develop total maximum daily loads for these waters. Total maximum daily loads are calculations of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards. |

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| Indirect impacts | Impacts resulting from an action that are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect impacts may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. |
| Infrastructure | The basic installations and facilities (e.g., roads, schools, power plants, transportation, communication systems) on which the continuance and growth of a community or State are based. |
| Interested parties | Those groups or individuals that are interested, for whatever reason, in the project and its progress. Interested parties include but are not limited to private individuals, public agencies, organizations, customers, and potential customers. |
| Invertebrate | Animals characterized by not having a backbone or spinal column, including a wide variety of organisms such as insects, spiders, worms, clams, crayfish, <i>etc.</i> |
| K Factor (K) | Represents the potential for soil erosion accounting for several factors, including rainfall/runoff, slope length and steepness, cover management, and the physical properties of the soil itself. |
| Kame | A short ridge or mound of sand and gravel deposited during the melting of glacial ice. |
| Key Observation Point (KOP) | An element of the contrast rating system used by the Bureau of Land Management (BLM) to analyze the potential visual impact of proposed projects and activities. The rating is done from the most critical viewpoints, or Key Observation Points. Factors that should be considered in selecting KOPs are: angle of observation, number of viewers, length of time the project is in view, relative project size, season of use, and light conditions. |
| Kilovolt (kV) | The electrical unit of power that equals 1,000 volts. |
| Landowner agreements | A lease agreement established between the Applicants and a private landowner for the construction of the Proposed Project. These leases would allow construction and operation of wind facilities for a negotiated term. |
| Large Generator Interconnection | The protocols established by Western for customers requesting an interconnection with a capacity greater than 20 MW. |

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| Large Generator Interconnection Agreement (LGIA) | The agreement established between Western and an interconnection customer outlining the terms and provisions of the interconnection. |
| Lewis and Clark Interpretive Center (LCIC) | An educational center, managed by the USDA Forest Service, providing information to the public a personal sense of President Thomas Jefferson's vision of expanding America to the west. Information based toward the challenges faced by the Lewis and Clark expedition as they portaged the great falls of the Missouri River and explored the 'unknown', brings to life the daily experiences of the expedition and the environment and native peoples of the 'uncharted West.' |
| Lewis and Clark National Historic Trail (NHT) | Meriwether Lewis and William Clark traveled over a three-year period through lands that later became 11 States. Most of the trail follows the Missouri and Columbia Rivers. At 3,700 miles (5,950 km), it begins at Hartford, Illinois, and passes through portions of Missouri, Kansas, Iowa, Nebraska, South Dakota, North Dakota, Montana, Idaho, Oregon, and Washington. It is part of the National Trails System of the United States. |
| Lewis and Clark Trail Driving Route (LCTDR) | The LCTDR is a network of roads that generally tracks the Lewis and Clark NHT along the Missouri River and provides vistas as well as historic markers. The Lewis and Clark NHT extends more than 3,700 miles and includes the entire Missouri River from its headwaters in Montana to its confluence with the Mississippi River near St. Louis, Missouri. |
| Liter (L) | Unit of volume of the metric system. |
| Lithic | A stone artifact that has been modified or altered by human hands. |
| Load | The amount of electric power required at a given point on a system. |
| Loam | A rich, permeable soil composed of a mixture of clay, silt, sand, and organic matter. |
| Low-income population | A population that is classified by the U.S. Bureau of the Census as having an aggregated mean income level for a family of four that correlates to \$13,359, adjusted through the poverty index using a standard of living percentage change where applicable, and whose composition is at least 25 percent of the total population of a defined area or jurisdiction. |

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| Mammal | Animals in the class Mammalia that are distinguished by having self regulating body temperature, hair, and in females, milk-producing mammary glands to feed their young. |
| Megawatt (MW) | The electrical unit of power that equals 1 million watts or 1 thousand kilowatts. |
| Megawatt-hours (MWh) | A unit of energy. Energy in watt hours is the multiplication of power in watts and time in hours. |
| Mesic | Ecological term indicating characterized by, or adapted to a moderately moist habitat. |
| Meteorology | The science dealing with the dynamics of the atmosphere and its phenomena, especially relating to weather. |
| Microtesla (μ T) | The Tesla is the internationally accepted scientific unit for measuring magnetic fields. Since a Tesla is very large, and the majority of magnetic field exposure is substantially lower, values typically reported and measured are in microtesla (μ T) (or 1/1,000,000 of a Tesla). |
| Migratory Bird Treaty Act (MBTA) | Establishment of a Federal prohibition, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention for the protection of migratory birds or any part, nest, or egg of any such bird." (16 U.S.C. 703) |
| Miles per hour (mph) | The ratio of the distance traveled (measured in miles) to the time expended traveling that distance (measured in hours). |
| Milligauss (mG) | A unit of measurement for measuring magnetic fields. Since a Gauss is very large and the majority of magnetic field exposure is substantially lower, values typically reported and measured are in milligauss (mG) (1/1,000 of a Gauss). |
| Minority population | A population that is classified by the U.S. Bureau of the Census as African American, Hispanic American, Asian and Pacific American, American Indian, Eskimo, Aleut, and other non-White persons, whose composition is at least 25 percent of the total population of a defined area or jurisdiction. |

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| Mitigation | The alleviation of adverse impacts on environmental resources by avoidance through project redesign or project relocation, by protection, or by adequate scientific study. |
| National Ambient Air Quality Standards (NAAQS) | Standards defining the highest allowable levels of certain pollutants in the ambient air. Because the EPA must establish the criteria for setting these standards, the regulated pollutants are called criteria pollutants. |
| National Environmental Policy Act (NEPA) | This Act (42 U.S.C. 4341, passed by Congress in 1975) established a national policy designed to encourage consideration of the influences of human activities (e.g., population growth, high-density urbanization, industrial development) on the natural environment. NEPA also established the CEQ. NEPA procedures require that environmental information be made available to the public before decisions are made. Information contained in NEPA documents must focus on the relevant issues in order to facilitate the decision-making process. |
| National Historic Preservation Act (NHPA) | The National Historic Preservation Act of 1966, as amended, recognized the nation's cultural and historical heritage, and established requirements for ensuring the protection of cultural resources considered significant at the local, State, and national levels (16 U.S.C. 470). The NHPA also provides for an expanded National Register of Historic Places (NRHP) to include districts, sites, buildings, structures, and objects significant to American history, architecture, archaeology, and culture. Section 106 requires that the President's Advisory Council on Historic Preservation be afforded an opportunity to comment on any undertaking that adversely affects properties listed in, or eligible for listing in, the NRHP. |
| National Pollutant Discharge Elimination System Permit (NPDES) | Federal regulation (40 CFR Parts 122 and 125) that requires permits for the discharge of pollutants from any point source into the waters of the United States regulated through the Clean Water Act, as amended. |
| National Register of Historic Places (NRHP) | A list maintained by the Keeper (an individual who has been delegated by the National Park Service) of districts, sites, buildings, structures, and objects of prehistoric or historic local, State, or national significance. The list is expanded as authorized by Section 2(b) of the Historic Sites Act of 1935 (16 U.S.C. 462) and Section 101(a)(1)(A) of the National Historic Preservation Act of 1966, as amended. |

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| National Renewable Energy Laboratory (NREL) | A national laboratory of the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC. |
| National Wetlands Inventory (NWI) | A series of maps produced by U.S. Fish and Wildlife Service (USFWS) to show wetlands and deepwater habitats to illustrate reconnaissance level information on the location, type, and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology, and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis. |
| Native American | A tribe, people, or culture that is indigenous to the United States. |
| Native American Graves Protection and Repatriation Act (NAGPRA) | A Federal law requiring Federal agencies and institutions that receive Federal funding to return Native American cultural items and human remains to their respective peoples. Cultural items include funerary objects, sacred objects, and objects of cultural patrimony. |
| Native vegetation | Plant life that occurs naturally in an area without agricultural or cultivation efforts. It does not include species that have been introduced from other geographical areas and have become naturalized. |
| Natural Resources Conservation Service | A USDA service that provides a partnership effort to help America's private land owners and managers conserve their soil, water, and other natural resources. |
| Nitrogen dioxide (NO ₂) | A highly reactive toxic gas and one of the six criteria pollutants regulated by EPA through the NAAQS. |
| Noise | Unwanted or undesirable sound, usually characterized as being so loud as to interfere with, or be inappropriate to, normal activities such as communication, sleep, study or recreation. |
| Non-attainment area | An area that the EPA has designated as not meeting (that is, not being in attainment of) one or more of the NAAQS for criteria pollutants. An area may be in attainment for some pollutants, but not others. |

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| Noxious weeds | Plant species that have been designated by State or national agricultural authorities as a plant that is injurious to agricultural and/or horticultural crops and/or humans and livestock. Most have been introduced into a foreign ecosystem either by accident or mismanagement, but some are also native species. Typically they are plants that are aggressive growing, multiply quickly, and adversely affect desirable plants, or are somehow injurious to livestock or humans either by contact or when ingested. They are a large problem in many parts of the world, greatly affecting areas of agriculture, forest management and other open lands. |
| Obligate species | Plant species that almost always occur in wetlands (<i>i.e.</i> , greater than 99 percent of the time). |
| Off-peak | Power that is generated during low-demand periods of the day, typically evenings and to a lesser extent, weekends. There is less demand for power during these times, thus more power is available in the marketplace at a lower cost. |
| On-peak | Power that is generated during high-demand periods of the day, typically mornings and evenings. Power generated during this time is generally more expensive because baseload power plants are fully operational and excess power in the marketplace is relatively scarce. |
| Open Access Transmission Service Tariff (Tariff) | A document (typically filed with a regulatory body) that sets forth the rates, terms, and conditions under which an interested entity can receive transmission service from an electric utility. Western's Tariff filed with FERC requires Western to offer its transmission lines for delivery of electricity when capacity is available. |
| Outwash | A broad, outspread flat or gently sloping deposit of sediment deposited by streams flowing away from a melting glacier. |
| Oyate | Native American word meaning <i>people</i> or <i>nation</i> . |
| Ozone | A molecule of three oxygen atoms bound together. In the stratosphere, ozone protects the earth from the sun's ultraviolet rays but in the lower levels of the atmosphere, ozone is considered an air pollutant. |
| Paleontology | The study of fossils. |
| Palustrine | All nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean derived salts is below 0.5 parts per trillion. |

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| Particulate matter (PM, PM10, and PM2.5) | Any finely divided solid or liquid material, other than uncombined water. A subscript denotes the upper limit of the diameter of particles included. Thus, PM10 includes only those particles equal to or less than 10 micrometers (0.0004 inch) in diameter; PM2.5 includes only those particles equal to or less than 2.5 micrometers (0.0001 inch) in diameter. |
| Peak capacity | The maximum capacity of a system to meet loads. |
| Peak demand | The highest demand for power during a stated period of time. |
| Permeability | The ability of rock or soil to transmit a fluid. |
| pH | A measure of the relative acidity or alkalinity of a solution, expressed on scale from 0 to 14, with the neutral point at 7.0. Acid solutions have pH values lower than 7.0, and basic (<i>i.e.</i> alkaline) solutions have pH values higher than 7.0. Because pH is the negative logarithm of the hydrogen ion (H ⁺) concentration, each unit increase in pH value expresses a change of state of 10 times the preceding state. Thus, pH 5 is 10 times more acidic than pH 6, and pH 9 is 10 times more alkaline than pH 8. |
| Potential Impact Index (PII) | A scoring protocol used to evaluate the potential for wind development sites to affect plant and wildlife species. |
| Prairie Pothole Region (PPR) | An area of the northern Great Plains and midgrass and tallgrass prairies that contains thousands of shallow wetlands known as potholes. These potholes are the result of glacier activity in the Wisconsin glaciation, which ended approximately 10,000 years ago. The decaying ice sheet left behind depressions formed by the uneven deposition of till in ground moraines, and melting ice blocks which created kettle lakes. These depressions filled with water, creating the potholes. |
| Prehistoric | Of, relating to, or existing in times before written history. Prehistoric cultural resources are those that precede written records of the human cultures that produced them. |
| Presidential Executive Order 11988 (Floodplain Management) | Executive Order 11988 requires Federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. |

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| Presidential Executive Order 11990 (Wetlands Management) | Executive Order 11990 directs Federal agencies to minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. The order requires Federal agencies, in planning their actions, to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided. |
| Presidential Executive Order 12088 (Federal Compliance with Pollution Control) | Executive Order 12088 requires all Federal agencies to be in compliance with environmental laws and fully cooperate with EPA, State, interstate, and local agencies to prevent, control, and abate environmental pollution. |
| Presidential Executive Order 12898 (Environmental Justice) | Executive Order 12898 directs Federal agencies to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. |
| Presidential Executive Order 13007 (Indian Sacred Sites) | Executive Order 13007 directs Federal land managing agencies to accommodate access to, and ceremonial use of, Indian sacred sites by Indian religious practitioners and to avoid adversely affecting the physical integrity of such sacred sites. |
| Presidential Executive Order 13112 (Invasive Weed Species) | Executive Order 13112 requires the prevention of the introduction of invasive species and provides for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. |
| Presidential Executive Order 13186 (Protection of Migratory Birds) | Executive Order 13186 directs executive departments and agencies to take certain actions to further implement the MBTA. Each Federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations is directed to develop and implement a Memorandum of Understanding (MOU) with the USFWS that shall promote the conservation of migratory bird populations. |
| Prime farmland | Soil types with a combination of characteristics that make the soils particularly productive for agriculture. |
| Raptor | Birds of prey including various types of hawks, falcons, eagles, vultures, and owls. |

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| Record of Decision (ROD) | A concise public document that records a Federal agency's decision(s) concerning a proposed action for which the agency has prepared, or cooperated in the preparation of an EIS. The ROD is prepared in accordance with the requirements of the CEQ NEPA regulations (40 CFR 1505.2). |
| Region of Influence (ROI) | The geographical region that would be expected to be affected in some way by a proposed action and alternatives. |
| Reliability | The ability of the power system to provide customers uninterrupted electric service, including generation, transmission, and distribution reliability. |
| Renewable Portfolio Standard | A provision stating that any load serving entity shall derive a percentage of its total retail energy sold from new solar resources or environmentally friendly renewable electricity technologies, whether that energy is purchased or generated by the seller. |
| Right-of-way | An easement for a certain purpose over the land of another use, such as a strip of land used for a transmission line, roadway, or pipeline. |
| Riparian | Of or pertaining to the bank of a river, stream, lake, or other water bodies. |
| Runoff | The portion of rainfall, melted snow, or irrigation water that flows across the ground surface and may eventually enter streams. |
| Safe Drinking Water Act | The principal Federal law in the United States that ensures safe drinking water for the public. Pursuant to the act, the EPA is required to set standards for drinking water quality and oversee all States, localities, and water suppliers who implement these standards. |
| Scoping | An early, open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. |
| Section 106 Process | Section 106 of the National Historic Preservation Act and its implementing regulations (36 CFR 800) require Federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. The purpose of the Section 106 process is to identify, evaluate, and protect cultural resources eligible for listing in the NRHP that may be affected by Federal actions or undertakings (16 U.S.C. §470 <i>et seq.</i>). |

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| Sediment | Material deposited by wind or water. |
| Sedimentation | The process of deposition of sediment, especially by mechanical means from a state of suspension in water. |
| Sensitive species | Those plants and animals for which population viability is a concern, as shown by a significant current or predicted downward trend in populations or density and significant or predicted downward trend in habitat capability. |
| Socioeconomics | The social and economic condition in the study area. |
| Solid waste | In general, solid wastes are non-liquid, non-soluble discarded materials ranging from municipal garbage to industrial wastes that contain complex and sometimes hazardous substances. Solid wastes include sewage sludge, agricultural refuse, demolition wastes, and mining residues. |
| South Dakota Ambient Air Quality Standards (SDAAQS) | The thresholds established and regulated for criteria air pollutants. The Department of Environment and Natural Resources (DENR) has adopted the NAAQS for the State air quality program. |
| South Dakota Codified Laws (SDCL) | Statutes, laws, and regulations established through the State's legislative process. |
| South Dakota Department of Game, Fish and Parks | The Department of Game, Fish and Parks conserves, manages, protects and enhances South Dakota's wildlife resources, parks, and outdoor recreational opportunities. |
| South Dakota State Historic Preservation Office | The State Historic Preservation Office manages the National Register of Historic Places program of the National Park Service in South Dakota. The program surveys, inventories, and registers historical properties; monitors State, Federal, and local government activities which affect cultural and historic resources; provides advice on preservation methods; promotes public education on historical properties; and supports municipal and county historic preservation commissions to advance the State's economic, social, and educational objectives. |
| Special Use Permit (SUP) | A permit issued under specific circumstances to regulate activities that may otherwise be prohibited. |
| Special-status species | Those species that have been identified as endangered, threatened, proposed, State species of special concern, or State protected. |

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| Spill Prevention Control and Countermeasures Plan (SPCC) | A plan implemented to help prevent any discharge of oil into navigable waters or adjoining shorelines. As stipulated by EPA, SPCC plans are required for non-transportation facilities that have a total above-ground oil storage capacity of 1,320-gallons. |
| State Historic Preservation Officer | The official within each State, authorized by the State at the request of the Secretary of the Interior, to act as liaison for purposes of implementing the National Historic Preservation Act. |
| Step-up transformer | Transformer in which the energy transfer is from a low- to a high-voltage winding or windings. (Winding means one or more turns of wire forming a continuous coil for a transformer, relay, rotating machine, or other electric device.) |
| Storm Water Pollution Prevention Plan (SWPPP) | A plan required to be implemented for construction projects disturbing more than one acre of land. Implementation of a SWPPP is a requirement to obtain NPDES permit coverage for storm water discharges. |
| Stratigraphy | The study of rock strata, especially the distribution, deposition and age of sedimentary rocks. |
| Substation | A facility where electric energy is passed for transmission, transformation, distribution, or switching. |
| Sulfur dioxide (SO ₂) | One of the six criteria pollutants regulated by EPA through the NAAQS. |
| Sulfur hexafluoride (SF ₆) | A colorless, odorless gas considered by the Intergovernmental Panel on Climate Change to be one of the more potent greenhouse gases (GHGs) in the atmosphere. SF ₆ is used in electrical equipment, such as circuit breakers. |
| Super long extreme (sle) | A technical specification of one of the proprietary wind turbines manufactured by General Electric. |
| Supervisory control and data acquisition (SCADA) | A software program used to communicate directly with individual wind turbines to monitor performance, report energy output, and trouble-shoot technical difficulties. |
| Surface water | All bodies of water on the surface of the earth and open to the atmosphere, such as rivers, lakes, reservoirs, ponds, seas, and estuaries. |
| Switchyard | Facility with circuit breakers and automatic switches to turn power on and off on different transmission lines. Switchyards are typically associated with substations. |
| Tesla (T) | The internationally accepted scientific unit for measuring magnetic fields. |

| | |
|--|--|
| Threatened species | Plant and wildlife species likely to become endangered in the foreseeable future. |
| Total suspended solids (TSS) | A measure of the amount of small, particulate solid pollutants that are suspended in water. |
| Traditional Cultural Property/Use Area | Areas of significance to the beliefs, customs, and practices of a community of people that have been passed down through generations. |
| Transformer | Its most frequent use in power systems is for changing voltage levels. |
| Transmission line | The structures, insulators, conductors and other equipment used to transfer electrical power from one point to another. |
| Trophic state index | A measure of eutrophication (increase in chemical nutrients resulting in increased productivity) of a body of water using a combination of measures of water transparency or turbidity, chlorophyll-a concentrations and total phosphorus levels. |
| U.S. Army Corps of Engineers (USACE) | A Federal Army construction management agency. Generally associated with dams, canals and flood protection in the United States, U.S. Army Corps of Engineers is involved in a wide range of public works support to the nation and the Department of Defense throughout the world. U.S. Army Corps of Engineers specializes in planning, designing, building, operating locks and dams, and environmental regulation and ecosystem restoration. |
| U.S. Code (USC) | The United States Code is the codification by subject matter of the general and permanent laws of the United States. It is divided by broad subjects into 50 titles and published by the Office of the Law Revision Counsel of the U.S. House of Representatives. |
| U.S. Environmental Protection Agency (EPA) | The independent Federal agency, established in 1970, that regulates Federal environmental matters and oversees the implementation of Federal environmental laws. |
| U.S. Fish and Wildlife Service (USFWS) | The U.S. Fish and Wildlife Service is the unit of the U.S. Department of the Interior dedicated to the management and preservation of wildlife. Units within the USFWS include: National Wildlife Refuge System, Migratory Birds program, Federal Duck Stamp, National Fish Hatchery System, Endangered Species Program and the Office of Law Enforcement. |

| | |
|---|--|
| Vertebrate | Animals that are members of the subphylum Vertebrata, including fishes, amphibians, reptiles, birds, and mammals, all of which are characterized by having a segmented bony or cartilaginous spinal column. |
| Volt | The unit of voltage or potential difference. It is the electromotive force which, if steadily applied to a circuit having a resistance of one ohm, will produce a current of one ampere. |
| Voltage | Potential for an electric charge to do work; source of an electric field. |
| Waterfowl Production Areas (WPAs) | Public lands purchased by the Federal government for the purpose of increasing the production of migratory birds, especially waterfowl. |
| Waters of the United States (WUS) | As defined by the Clean Water Act, waters of the United States applies only to surface waters, rivers, lakes, estuaries, coastal waters, and wetlands. Waters of the United States include all interstate waters, intrastate waters used in interstate and/or foreign commerce, tributaries of the above, territorial seas at the cyclical high tide mark, and wetlands adjacent to all the above. |
| Wetland | Land or areas exhibiting hydric soil concentrations saturated or inundated soil during some portion of the year, and plant species tolerant of such conditions. |
| Wetland Management District (WMD) | Public lands managed by the USFWS as part of the National Wildlife Refuge System to provide habitat for endangered species, migratory birds, and other wildlife and to provide places for people to learn about and enjoy wildlife. |
| Wind Resource Assessment Network (WRAN) | A network of 11 towers throughout South Dakota used for measuring wind speed and direction to allow for statistical verification of wind resources within the State. |

Appendix A

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Appendix A

Scoping Materials

- Interagency and Scoping Meeting Materials
- Interagency Meeting Invitation Letters and Recipients
- Local Newspaper Notices
- Native American Tribe Letter and Recipient List
- Notice of Intent
- Post Card Scoping Advertisement

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South Dakota PrairieWinds Project Environmental Impact Statement

The NEPA Process

An Environmental Impact Statement (EIS) is being prepared under the direction of the U.S. Department of Energy (DOE), Western Area Power Administration (Western) and the U.S. Department of Agriculture, Rural Utilities Service (RUS) for the South Dakota PrairieWinds Project . The project proponent seeks an interconnection with Western and financing from RUS, and thus an EIS will be developed in accordance with National Environmental Policy Act (NEPA) requirements and agencies' implementing regulations.

Public involvement is part of the NEPA environmental review process. The public participation effort focuses on providing information to and gathering input from the public. You will have numerous opportunities to participate in the decision-making process as shown on the figure to the right.

How you can participate

- Attend a public meeting. The meeting will provide the opportunity to ask questions, express concern, and submit written comments.
- Participate and provide comments during scoping as well as during the public review of the EIS. The availability of the Draft EIS and Final EIS will be announced. If requested, you will be provided the Draft EIS and Final EIS for review when completed.
- Designate on a comment form that you would like to be kept informed of the ongoing progress of this project and be included on the mailing list.



For more information on the proposed project:

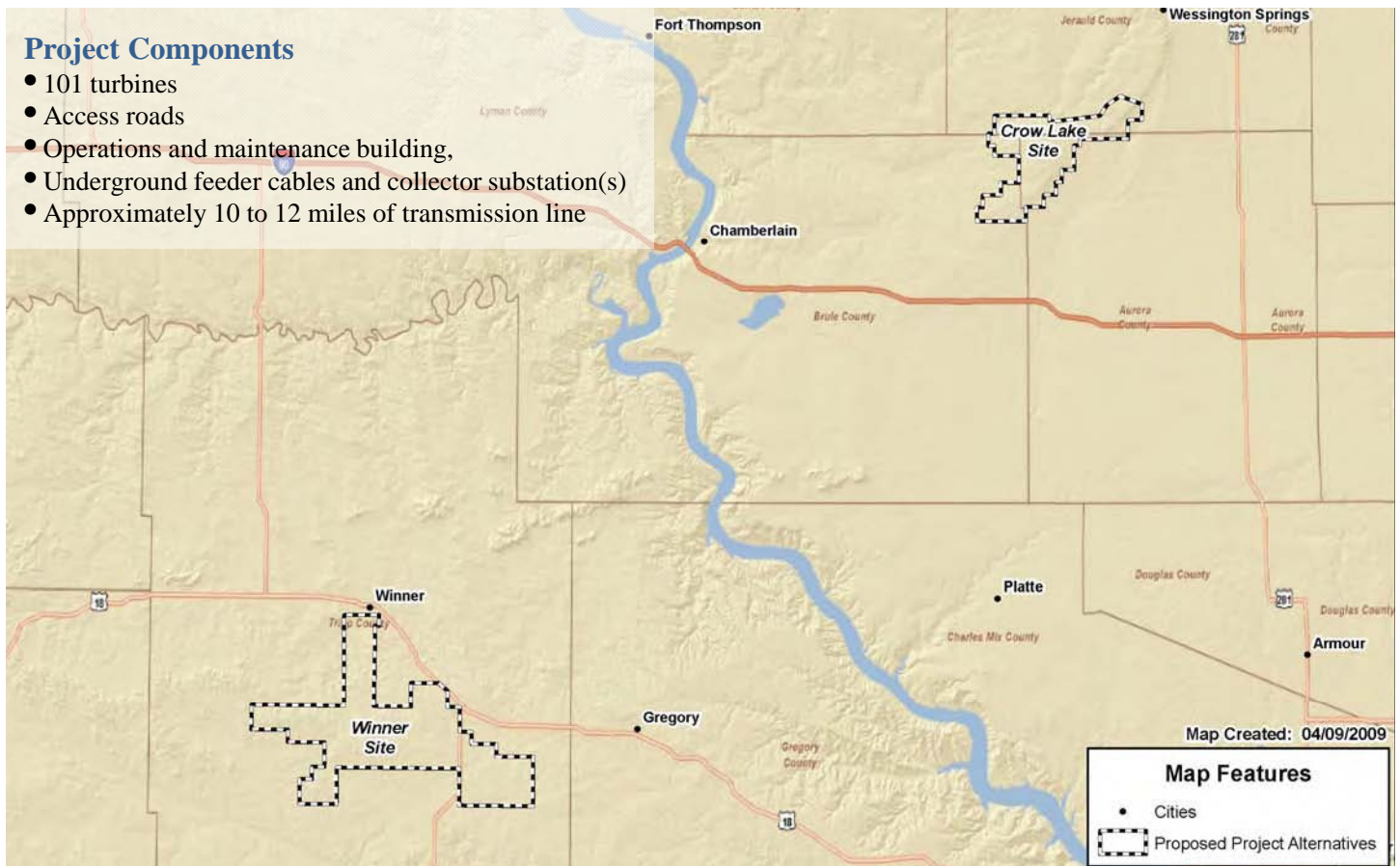
Call the Project Phone Number: (800) 336-7288

Send an e-mail to the Project E-mail: sdprairiewinds@wapa.gov

Visit the Project Website: <http://www.wapa.gov/sdprairiewinds.htm>

Project Components

- 101 turbines
- Access roads
- Operations and maintenance building,
- Underground feeder cables and collector substation(s)
- Approximately 10 to 12 miles of transmission line



Project Description

PrairieWinds SD1, Inc. (PrairieWinds), a wholly owned subsidiary of Basin Electric Power Cooperative (Basin Electric), is proposing to construct a new 151.5-megawatt (MW) wind energy facility at one of two locations in south-central South Dakota (see map to the right). Project components would include:

Power from the facility would be supplied to Basin Electric's customers through an interconnection with Western's transmission system. RUS is considering financing the project. Once environmental permitting is complete, and if the agency decisions are to go forward with the project, construction would begin Fall 2010/Winter 2010. Facility commercial operation is anticipated to begin in late 2010 or early 2011.

Project Purpose and Need

Incentives and regulations to encourage or require the generation of power from renewable or low environmental impact resources are being actively considered and/or implemented within the Basin Electric member service areas. A number of proposals for national Renewable Portfolio Standards (RPS) are pending in Congress.

Basin Electric's Participation: With members in nine states, Basin Electric recognizes the need for additional renewable energy capacity to service forecasted member load growth demands and to meet state mandated RPS. A 151.5-MW wind energy facility was determined to be the least-cost renewable resource option to satisfy these requirements.

PrairieWinds's Participation: A subsidiary of Basin Electric, and the project applicant. To be the owner and operator of the proposed project.

RUS's Participation: Co-lead agency for the EIS process, providing oversight of the NEPA process and preparation of the EIS. They are also considering granting financing assistance.

Western's Participation: Co-lead agency for the EIS process, providing oversight of the NEPA process and preparation of the EIS. They are also considering approval of an interconnection request.

Note, that consultation is occurring and Native American Tribes and agencies with jurisdiction or special expertise have been invited to be cooperating agencies



South Dakota PrairieWinds Project Environmental Impact Statement Scoping Process

What is Scoping?

The Council on Environmental Quality's scoping definition (Sec. 1501.7) states:

There shall be an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. This process shall be termed scoping.

Scoping is the process by which Federal agencies invite other agencies, organizations, and the public to provide input on the scope of a project. More specifically, it is the process that Federal agencies utilize to get input on the issues and effects related to a proposed action and alternatives. The items identified are then addressed in an Environmental Impact Statement (EIS). The EIS is addressed in accordance with National Environmental Policy Act (NEPA) requirements and agencies' implementing regulations.

Scoping and the South Dakota PrairieWinds Project:

Western Area Power Administration (Western), an agency within the U.S. Department of Energy; Rural Utilities Service (RUS), an agency within the U.S. Department of Agriculture (USDA); are conducting scoping for the proposed South Dakota PrairieWinds Project. Throughout the scoping period, written comments may be submitted to the address below. As a part of the scoping process, two scoping meetings are being held for this project. At these meetings, Western, RUS and PrairieWinds SD1, Inc. (PrairieWinds, the Applicant) representatives will be available for one-on-one discussions, to provide information about the proposed project, answer questions, and take verbal and written comments from interested parties.

Ways to Provide Comments:

We would appreciate any comments you have concerning the proposed project. We would like to ensure that important environmental concerns are addressed and that natural resources and places of interest within the project area are considered in the EIS. Comments on the project scope and alternatives should be received by **May 15, 2009**, to be considered in defining the scope for the Draft EIS. This is not your only opportunity to submit comments on the EIS. There will be additional opportunities for the public to provide input during the development of the EIS. Comments could be submitted through the project's web address, or sent by letter, fax or e-mail. Written comments on the scope of the EIS should be addressed to **Ms. Liana Reilly**, at the address listed below.

Ms. Liana Reilly
Document Manager
Western Area Power Administration
Corporate Services Office, A7400
P.O. Box 281213
Lakewood, Colorado 80228-8213
Fax: (720) 962-7263

Call the Project Phone Number: (800) 336-7288

Send an e-mail to the Project E-mail: sdprairiewinds@wapa.gov

Visit the Project Website: <http://www.wapa.gov/sdprairiewinds.htm>

How to Receive Additional Information:

For more information about the project, or if you would like to be included on the Project mailing list and/or to receive copies of the Draft and Final EIS, please provide your contact information to Ms. Liana Reilly, at the address above. For information on RUS financing please contact Mr. Dennis Rankin, Project Manager, Engineering and Environmental Staff, Rural Utilities Service, Utilities Program, 1400 Independence Ave. SW, Mail Stop 1571 Washington D.C. 20250-1571 telephone: (202) 720-1953, fax: (202) 720-0820 or e-mail: dennis.rankin@wdc.usda.gov.

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South Dakota PrairieWinds Project Environmental Impact Statement (EIS)

Thank you for your interest in the proposed South Dakota PrairieWinds Project (Project). Please complete the appropriate sections of this form to be included on the Project mailing list and/or to provide comments. Written comments can be submitted at the Scoping Meeting, faxed to (720) 962-7263, mailed to the address on the back of this form or sent to the **Project Email Address: sdprairiewinds@wapa.gov**. Comments on the project scope and alternatives should be received by **May 15, 2009**, to be considered in defining the scope for the Draft EIS. For more information about the Project, please go to the **Project Website: <http://www.wapa.gov/sdprairiewinds.htm>**.

- I would like to be kept informed of the ongoing progress of this Project. Please include my name on the mailing list.
- I prefer electronic/email communication.
- I prefer paper mailings.

Please Print Contact Info Below

| | |
|------------------------|--------------------------------------|
| <u>Name:</u> | <u>Organization:</u> |
| <u>E-mail address:</u> | <u>Daytime Phone No. (optional):</u> |
| <u>Street Address:</u> | <u>City / State / Zip Code:</u> |

Please indicate any questions, comments or concerns you have about the Project in the comment section below (continue on separate sheet if necessary).

Thank you for your time and interest in the South Dakota PrairieWinds Project.

Please fold in thirds and staple

Affix
postage
here

Ms. Liana Reilly
Western Area Power Administration
Corporate Services Office, A7400
P.O. Box 281213
Lakewood, Colorado 80228-8213



National Environmental Policy Act

The U.S. Department of Energy (DOE) prepared this brochure to encourage and help you to participate in the National Environmental Policy Act (NEPA) process. All Federal agencies must comply with NEPA, but their procedures vary. This brochure describes DOE's NEPA process, focusing on your role in DOE's preparation of Environmental Impact Statements (EISs).

What is NEPA?

NEPA is a Federal law that serves as the Nation's basic charter for environmental protection. It requires that all Federal agencies consider the potential environmental impacts of their proposed actions. NEPA promotes better agency decisionmaking by ensuring that high quality environmental information is available to agency officials and the public before the agency decides whether and how to undertake a major Federal action. Through the NEPA process, you have an opportunity to learn about DOE's proposed actions and to provide timely information and comments to DOE.

To implement NEPA, all Federal agencies follow procedures issued by the President's Council on Environmental Quality in the Code of Federal Regulations (40 CFR Parts 1500-1508). DOE also follows its own supplementary procedures, found in 10 CFR Part 1021.

How Does DOE Prepare an EIS?

The EIS process consists of several steps, each with opportunities for you to be involved.

- **Notice of Intent.** First, DOE publishes a Notice of Intent to prepare an EIS in the *Federal Register* and makes local announcements. This notice states the need for action and provides preliminary information on the EIS scope, including the

alternative actions to be evaluated, the kinds of potential environmental impacts to be analyzed, and related issues. The Notice of Intent also serves as the beginning of the next step, the "scoping process."

TIP: The Notice of Intent explains how you can participate in the scoping process and provides information about dates and locations of public meetings.

- **Scoping Process.** DOE requests your comments on the scope of the EIS. What alternatives should be evaluated? What potential environmental impacts should be analyzed? DOE's scoping process will last at least 30 days, with at least one public meeting.

TIP: During the scoping process, tell DOE what EIS information you would like to receive (e.g., a summary of the EIS or the full document on CD or on paper).

- **Draft EIS.** DOE considers scoping comments in preparing a Draft EIS. An EIS (Draft or Final) analyzes and compares the potential environmental impacts of the various alternatives, one of which is always a "no action" alternative. The EIS also discusses ways to avoid or reduce adverse impacts. A Draft EIS will identify DOE's preferred alternative(s) if known at the time.

TIP: DOE EIS schedules and related NEPA information are available at <http://www.eh.doe.gov/nepa>. DOE often has EIS-specific Web sites as well.

- **Public Comment on the Draft EIS.** After DOE issues a Draft EIS, the U.S. Environmental Protection Agency (EPA) publishes a Notice of Availability in the *Federal Register* to begin the public comment period, which will last at least 45 days. DOE also will announce details regarding how you may comment on the Draft EIS, either orally at a public hearing (at least one must be held) or in writing.

TIP: Check your local paper, the DOE NEPA Web site (<http://www.eh.doe.gov/nepa>, click on "What's New" or "NEPA Public Participation Calendar"), or other DOE notices for information about public hearings and ways to submit comments.

- **Final EIS.** DOE considers all timely public comments on the Draft EIS in preparing the Final EIS, which must respond to such comments. The Final EIS identifies DOE's preferred alternative(s). After DOE issues the Final EIS, EPA publishes a Notice of Availability in the *Federal Register*.

- **Record of Decision.** DOE must wait at least 30 days after the EPA Notice of Availability of the Final EIS before issuing a Record of Decision. A Record of Decision announces and explains DOE's decision and describes any commitments for mitigating potential environmental impacts.

TIP: DOE publishes Records of Decision in the *Federal Register* and makes them available on the DOE NEPA Web site. You may also ask DOE to send you a copy.



How Does NEPA Work?

Early in its planning process for a proposed action, DOE considers how to comply with the National Environmental Policy Act (NEPA). The appropriate level of review depends on the significance (i.e., the context and intensity) of the potential environmental impacts associated with the proposed action. There are three levels of NEPA review:

- **Environmental Impact Statement (EIS)** – For major Federal actions that may significantly affect the quality of the human environment, NEPA requires preparation of an EIS. An EIS is a detailed analysis of the potential environmental impacts of a proposed action and the range of reasonable alternatives. Public participation is an important part of the EIS process.
- **Environmental Assessment (EA)** – When the need for an EIS is unclear, an agency may prepare an EA to determine whether to prepare an EIS or to issue a Finding of No Significant Impact. An EA is a brief analysis. DOE's procedures provide notification and comment opportunities for host states and tribes. DOE also may provide notification and comment opportunities for other interested people. DOE then considers any comments received, makes revisions as appropriate, and issues the EA.
- **Categorical Exclusion** – DOE's NEPA regulations list classes of actions that normally do not require an EIS or an EA because, individually or cumulatively, they do not have the potential for significant environmental impacts. Examples are information gathering activities and property transfers when the use is unchanged.

How Can I Learn More?

We encourage you to learn more about NEPA, the EIS process, and DOE's current NEPA activities by visiting or contacting the following:

- DOE's NEPA Web site at <http://www.eh.doe.gov/nepa> – to learn about upcoming opportunities to participate in DOE's NEPA process, download DOE NEPA documents, and find requirements and guidance that DOE follows for NEPA implementation.
- DOE's Office of NEPA Policy and Compliance at 1-800-472-2756 (toll-free) – to leave a message regarding EIS-specific or general NEPA information.
- The Council on Environmental Quality's NEPAnet at <http://ceq.eh.doe.gov/nepa/nepanet.htm> – for government-wide NEPA information.



Office of NEPA
Policy and Compliance



Printed on recycled paper

DOE, NEPA, and You

A Guide to Public Participation



South Dakota PrairieWinds Wind Energy Project



Outline of Presentation

- Basin Electric Information
- Proposed Project Purpose and Need
- Proposed Project Details
- Permitting Process and NEPA Schedule
- Comparison of Wind Speed and Energy Generation
- Example Photos
- Additional Considerations
- Scoping Meeting Format

South Dakota PrairieWinds Wind Energy Project

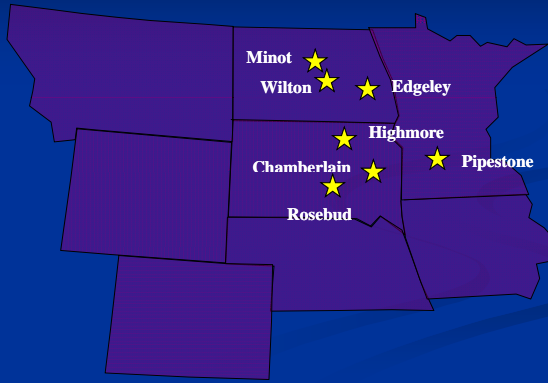
Basin Electric Information

Basin Electric Information:

- Wholesale power supplier to 126-member rural electric systems
- Serves 2.6 million consumers
- Formed in May, 1961 as supplemental power supplier
- Consumer-owned; consumer-controlled

Basin Electric's Wind Portfolio

Existing Wind Energy Generation – 136 MW



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South Dakota PrairieWinds

Wind Energy Project

Proposed Project

Purpose and Need

6

Purpose and Need

- Current incentives/regulations encourage or require power from renewable or low environmental impact resources
- Proposals in Congress for national Renewable Portfolio Standards (RPS)
- Basin Electric needs additional renewable energy capacity to serve forecasted growth demands and meet state-mandated RPS
 - A 150 MW wind project was determined to be the best alternative to satisfy these requirements
 - Applicant – PrairieWinds SD1, Incorporated, a wholly owned subsidiary of Basin Electric

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Agencies Involved

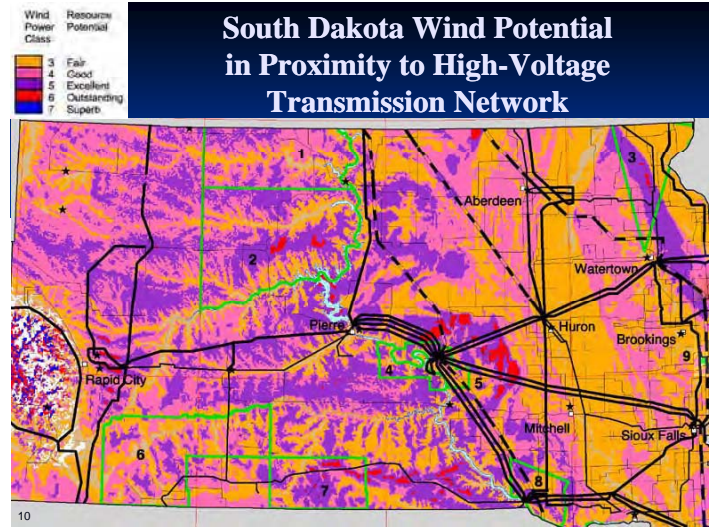
- Western's Action Basin Electric has requested to interconnect the proposed Project with Western's transmission system
- RUS's Action PrairieWinds has requested financing for the proposed Project from the RUS
- Both agencies intend to jointly prepare an environmental impact statement (EIS) for the Project

8

South Dakota PrairieWinds Wind Energy Project

Proposed Project Details

9



Proposed Project Alternatives



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Project Details

- Will generate approximately 150 MW
- 2 site alternatives - Project components:
 - 101 turbines,
 - Access roads,
 - O&M building,
 - Underground feeder cables and collector substation(s),
 - Approximately 10 to 12 miles of transmission line
- Fall 2010/Winter 2010 – commercial operation

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GE 1.5sle Turbine Specifications

- Variable speed blades rotate at 12 to 23 RPM
- Start-up wind speed: approximately 7 to 8 MPH
- Shut-down wind speed: approximately 56 MPH
- Optimum wind speed: 26 to 55 MPH
- Operational temperature range: - 20° to 104° F
- Variable pitch blades
- High tech electronic controls
- 3 fiberglass blades (14,000 lbs per blade)
- Hub height: 262 feet
- Blade length: 135 feet

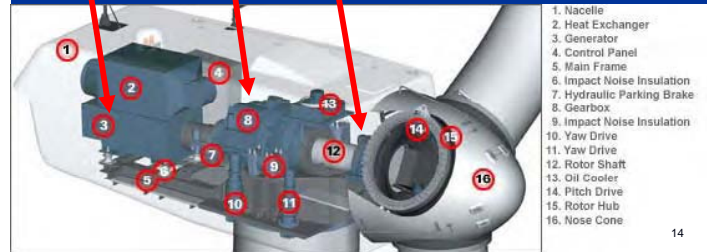
13

3 Major Components of Turbines

Generator

Gearbox

Rotor/Blades/Main Shaft



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South Dakota PrairieWinds Wind Energy Project

Permitting Process and NEPA Schedule

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Permitting Process – Scoping and environmental analysis

- NEPA
 - Scoping to gain agency, organization, and public input
 - Environmental Impact Statement
 - Agency involvement:
 - financing – RUS
 - interconnection Western
- South Dakota Public Utilities Commission – siting approval
- Local zoning
- Other pre-construction permits and authorizations

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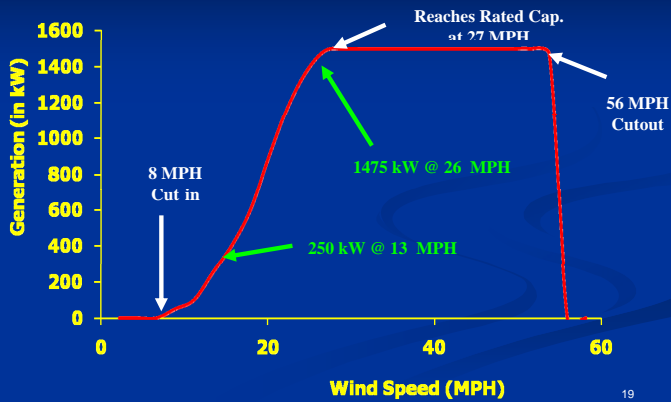


South Dakota PrairieWinds Wind Energy Project

Comparison of Wind Speed and Energy Generation

Power Curve:

A 1 MPH change in annual average speed can change production by 15%



South Dakota PrairieWinds Wind Energy Project

Example Photos:

- Turbine Construction
- Collector Substation
- Transmission Structures
- Facility Layout

Initial Construction Step: Complete Foundation



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Construction of Turbines



Tower Section Delivery

Setting the Base



Nacelle (includes Generating Components) and Turbine Module



Blade Installation

Completed Turbines



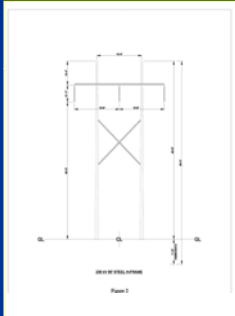
23

Collector Substation (Example Only)



24

Typical Transmission Structure



25

Facility Layout

(Example Only)



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South Dakota PrairieWinds Wind Energy Project

Additional Considerations:

- Potential Local Benefits
- Schedule and Cost

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Potential Local Benefits

- Project construction
 - Increase demand for local lodging, meals and construction materials
 - 225 - 250 temporary jobs
- Project operation
 - 10-12 permanent jobs
- Increase tax base
- Increase renewable energy capacity, and system reliability

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Proposed Schedule/Cost

- Obtain permits/approvals ongoing
- Summer 2010 begin construction
- Fall 2010/Winter 2010 commercial operation
- Project cost estimate = \$350 million

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South Dakota PrairieWinds Wind Energy Project

Scoping Meeting Format

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Open House Scoping Meeting

- Please sign in at the registration table
- Feel free to visit the various stations around the room
- Ask questions
- Provide input
- Your comments are important to this process

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Thank You

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Welcome to:

South Dakota PrairieWinds Project

Scoping Meeting



Outline of Presentation

- Basin Electric Information
- Proposed Project Purpose and Need
- Proposed Project Details
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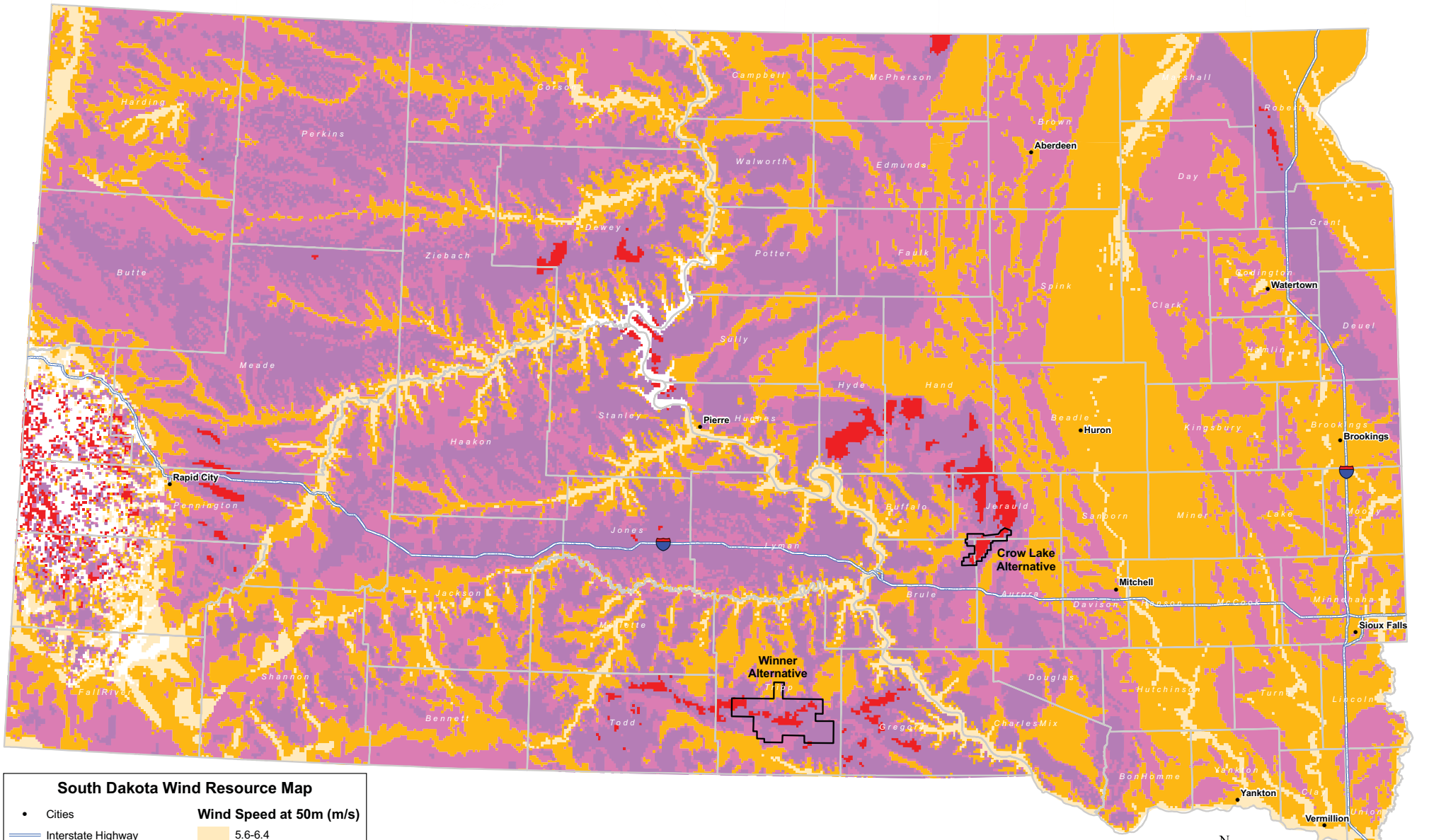


Basin Electric's Project Objectives

Renewable Energy Goals

- **Meet current incentives/regulations that encourage or require power from renewable or low environmental impact resources**
- **Conform with proposals in Congress for national Renewable Portfolio Standards (RPS)**
- **Basin Electric needs additional renewable energy capacity to serve forecasted growth demands and meet state-mandated RPS**
 - **A 150 MW wind project was determined to be the best alternative to satisfy these requirements**
 - **Applicant – PrairieWinds SD1, Incorporated, a wholly owned subsidiary of Basin Electric**





South Dakota Wind Resource Map

- Cities
- Interstate Highway
- ▭ Proposed Project Alternatives
- ▭ Counties

| Wind Speed at 50m (m/s) | |
|-------------------------|---------|
| | 5.6-6.4 |
| | 6.4-7.0 |
| | 7.0-7.5 |
| | 7.5-8.0 |
| | 8.0-8.8 |

Wind Data Source: NREL

Map Created: 04/22/2009

0 30 60 120 Miles



[Empty rectangular box]

- Wind potential and topography
- Ability to lease contiguous parcels of land
- Minimum distance of 400 feet from section lines or existing roads
- Minimum distance of 1000 feet from occupied residences
- Minimum distance of 400 feet from existing transmission line
- Avoidance of hydric soils areas
- Siting on USFWS grasslands easements was near edges to minimize impact
- 1000 to 2000-foot minimum between turbine locations within the predominant wind direction
- Avoid siting within existing micro-wave paths

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- Minimization of transmission line length
- Consider right-of-way requirements and availability of contiguous parcels of land
- Land use considerations (i.e., potential visual impacts, proximity to residences, potential impact to agricultural activities, and existing/future land use)
- Environmental resource considerations such as potential impacts to sensitive resources (i.e., cultural resources, wildlife, vegetation, and wetlands)
- Jurisdiction and regulatory considerations
- Consider airport height restrictions

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- Geology, Soils, Paleontology, and Seismicity
- Water Resources
- Climate Change and Air Quality
- Biological Resources
- Wetlands/Riparian Areas
- Cultural Resources
- Land Use
- Transportation
- Recreation
- Visual Resources
- Noise
- Socioeconomics
- Environmental Justice
- Health and Safety



ENVIRONMENTAL IMPACT STATEMENT PROCESS

Public Scoping and Interagency Communication Begin

Issue Notice of Intent

*April
2009*

Public Scoping Meetings

*April
2009*

Identify Issues and Develop / Screen Alternatives

Conduct Analysis on Feasible Alternatives

Determine Impacts / Evaluate Alternatives

Issue Draft EIS for Review

Public Comment Period

Prepare and Publish Final EIS (opportunity for public review)

*April
/May
2010*

Prepare Records of Decision

*June
/July
2010*



**BASIN ELECTRIC
POWER COOPERATIVE**

A Touchstone Energy® Cooperative

Western's Role and Need for Agency Action

Who is Western?

- Agency within the USDOE
- Owns, operates and maintains transmission lines including lines near the proposed PrairieWinds project
- Markets federal hydroelectric power including power from power plants on the Missouri River

Why is Western involved?

- Evaluate interconnection request per its generator interconnection procedures
- Evaluate involvement
- Co-lead for NEPA process



RUS's Role and Need for Agency Action

Who is RUS?

- Formerly the Rural Electrification Administration
- Agency within the USDA
- Delivers USDA's Rural Development Utilities Programs
- Makes loans/loan guarantees for electric distribution, transmission and generation facilities, telecommunication facilities and water and waste water facilities

Why is RUS involved?

- Evaluate financing request
- Evaluate engineering and technical aspects of the project
- Co-lead for NEPA process





April 09, 2009

Gail Arnott
President
Wessington Springs Area Development Corporation
P.O Box 132
Wessington Springs, SD 57382

Dear Gail Arnott:

The purpose of this letter is to inform you of a proposed project and to provide notice that Western and RUS intend to prepare an Environmental Impact Statement (EIS) addressing their respective Federal actions. This letter also serves as an invitation for your agency to participate in our interagency meeting on April 28th and to attend scoping meetings for the project.

PrairieWinds SD1, Incorporated (PrairieWinds), a subsidiary of Basin Electric Power Cooperative (Basin Electric), has proposed to develop a wind-powered generating facility in south-central South Dakota, either near Wessington Springs or near Winner. Basin Electric has requested to interconnect the proposed project with Western Area Power Administration's (Western) transmission system. PrairieWinds has requested financing for the proposed project from the Rural Utilities Service (RUS), an agency within the U.S. Department of Agriculture (USDA).

Basin Electric's generator interconnection request and PrairieWinds's financing request triggers a National Environmental Policy Act (NEPA) review process of the proposed project by Western and RUS, respectively. Western and RUS are serving as co-lead Federal agencies for preparation of the EIS. Western will serve as the lead Federal agency for consultations with the U.S. Fish and Wildlife Service under section 7 of the Endangered Species Act and for consultations with the South Dakota State Historic Preservation Office under section 106 of the National Historic Preservation Act.

Western and RUS invite you to attend an interagency meeting occurring on April 28, 2009, to provide you input on the proposed project's scoping process. During the meeting we would like

to discuss the project component details, obtain input to understand any issues that your Agency believes are important in the EIS analysis, and review the project schedule. The interagency meeting details are as follows:

Best Western Ramkota Hotel
920 W Sioux Ave
Pierre, South Dakota 57501-1800
Tuesday, April 28, 2009
9 a.m. to 11 a.m.

Western and RUS are conducting scoping, including open-house public scoping meetings, to ensure that interested members of the public, potentially affected landowners and lessees, and Federal, state, local, and tribal agencies have an opportunity to provide input on the scope of the EIS and the alternatives that will be addressed in the EIS. Western, RUS, and PrairieWinds representatives will be available at the scoping meetings for one-on-one discussions, to provide information about the proposed project, answer questions, and take verbal and written comments from interested parties. Information for each alternative wind generating site will be available at two public scoping meetings as follows:

Holiday Inn Express and Suites
1360 East Highway 44
Winner, South Dakota 57580
Tuesday, April 28, 2009
4 p.m. to 7 p.m.

Commerce Street Grille
118 North Main Street
Plankinton, South Dakota 57368
Wednesday, April 29, 2009
4 p.m. to 7 p.m.

The proposed PrairieWinds project would involve the installation and operation of a 150-megawatt (MW) wind energy facility that would feature 101 wind turbine generators. Each turbine generator would have a hub height of 262 feet and a turbine rotor diameter of 252 feet. The total height of each wind turbine would be 389 feet with a blade in the vertical position. The towers would be constructed of tubular steel, approximately 15 feet in diameter at the base, with internal joint flanges. The color of the towers and rotors would be standard white or off-white. During construction, a work/staging area at each turbine would include the crane pad and rotor assembly area, temporarily disturbing an area about 190 feet by 210 feet.

Each wind turbine would be connected by a service road for access and a 34.5-kilovolt (kV) buried electrical collection system that would ultimately route the power from each turbine to a central collector substation, where voltage would be stepped up for interconnection to Western's transmission system. About 30 to 40 miles of new access roads would be built to facilitate both

construction and maintenance of the turbines. Approximately 25 to 35 miles of existing roads would be used and, where appropriate, improved.

Two sites for the wind-powered generation facility are under consideration (see enclosed map). One site is located on about 37,000 acres and is approximately 15 miles north of White Lake, South Dakota, within Brule, Aurora, and Jerauld counties. The other alternative site would be located within an area about 83,000 acres, and is about 8 miles south of Winner, South Dakota, and is entirely within Tripp County.

The site that is approximately 37,000 acres near White Lake, South Dakota, would require a new 230-kV transmission line to deliver the power from the collector substation(s) to a new 230-kV Western interconnection point at Western's Wessington Springs Substation, located in Jerauld County. The Wessington Springs Substation is located approximately 9 to 12 miles from the proposed collector substation(s). The proposed line would be built using wood or steel H-frame (two pole) structures or steel single-pole structures. The structures would be about 85 to 95 feet high and span about 800 feet.

The other alternative site, approximately 83,000 acres near Winner, South Dakota, would require a 34.5-kV to 115-kV collector substation(s) as well as a 115-kV transmission line to interconnect to Western's existing 115-kV Winner Substation. Other facilities necessary for this site would be similar to those described for the site above.

The no action alternative will also be considered.

There is a chance that the final interconnection studies will conclude that other transmission facilities, such as network upgrades remote from the project site, would be required. If the project moves forward and it is determined that other facilities are needed to support the interconnection request, Western and RUS will complete the appropriate level of environmental review.

We want to ensure that any important environmental concerns and natural resources and/or places of interest for your Agency within the project area are considered and addressed in the EIS. At this time, we would appreciate receiving any information that you would be willing to share with us on any unique or special resources or areas in or near the proposed project. If you are aware of any other individuals or affiliated organizations that should be consulted regarding this project, please let us know. A full list of all other agencies and individuals receiving this letter is enclosed.

If any additional agency representatives wish to be added to the project's mailing list and/or receive a copy of the Draft and Final EIS, please contact Ms. Liana Reilly or Mr. Dennis Rankin

at the phone numbers or addresses listed below. Comments on the project scope and alternatives should be received by May 15, 2009, to be considered in defining the scope for the Draft EIS. Comments on the proposed project will be accepted and considered throughout the NEPA process.

During this scoping phase, we would like to obtain input to understand any issues that your Agency believes are important. Western and RUS request that you comment on the proposal, offer suggestions to improve the proposal and suggest alternative actions. Please identify any issues of concern about potential environmental impacts. Please address comments, questions or concerns to Ms. Liana Reilly or Mr. Dennis Rankin at the addresses below.

Ms. Liana Reilly
Document Manager
Western Area Power Administration
Corporate Services Office - A7400,
P.O. Box 281213
Lakewood, Colorado 80228-8213
Phone: (720) 962-7253 or (1-800) 336-7288
Fax: (720) 962-7263
E-mail: sdprairiewinds@wapa.gov

Mr. Dennis Rankin
Project Manager
Engineering and Environmental Staff
Rural Utilities Service, Utilities Program
1400 Independence Ave. SW, Mail Stop 1571
Washington D.C. 20250-1571,
Phone: (202) 720-1953
Fax: (202) 720-0820
E-mail: dennis.rankin@wdc.usda.gov

We look forward to hearing from you.

Sincerely,



Nick Stas

Environmental Manager
Upper Great Plains Region
Western Area Power Administration

Enclosures

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April 09, 2009

Natalie Gates
US Fish and Wildlife Service
Federal Wildlife Regulations
420 South Garfield Ave, Suite 400
Pierre, SD 57501

Dear Natalie Gates:

The purpose of this letter is to inform you of a proposed project and to provide notice that Western and RUS intend to prepare an Environmental Impact Statement (EIS) addressing their respective Federal actions. This letter also serves as an invitation for an interagency meeting as well as provides information to you about our scoping process.

PrairieWinds SD1, Incorporated (PrairieWinds), a subsidiary of Basin Electric Power Cooperative (Basin Electric), has proposed to develop a wind-powered generating facility in south-central South Dakota, either near Wessington Springs or near Winner. Basin Electric has requested to interconnect the proposed project with Western Area Power Administration's (Western) transmission system. PrairieWinds has requested financing for the proposed project from the Rural Utilities Service (RUS), an agency within the U.S. Department of Agriculture (USDA).

Basin Electric's generator interconnection request and PrairieWinds's financing request triggers a National Environmental Policy Act (NEPA) review process of the proposed project by Western and RUS, respectively. Western and RUS are serving as co-lead Federal agencies for preparation of the EIS. Western will serve as the lead Federal agency for consultations with the U.S. Fish and Wildlife Service under section 7 of the Endangered Species Act and for consultations with the South Dakota State Historic Preservation Office under section 106 of the National Historic Preservation Act.

Western and RUS invite you to attend an interagency meeting occurring on April 28, 2009 to provide you input on the proposed project's scoping process. During the meeting we would like

to discuss the project component details, obtain input to understand any issues that your Agency believes are important in the EIS analysis, and review the project schedule. The interagency meeting details are as follows:

Best Western Ramkota Hotel
920 W Sioux Ave
Pierre, South Dakota 57501-1800
Tuesday, April 28, 2009
9 a.m. to 11 a.m.

In addition, this letter serves to invite your agency to become a cooperating agency in the EIS process for the proposed project. The Council on Environmental Quality NEPA Implementing Regulations (40 CFR part 1501.6) emphasizes agency cooperation and authorizes the designated lead Federal agency to request that other Federal agencies with jurisdiction by law be a cooperating agency. Additionally, the lead Federal agency may request that any other Federal agency with special expertise with respect to any environmental issue to be addressed in the EIS also be a cooperating agency. Designated cooperating agencies have certain responsibilities to support the NEPA process, as specified in 40 CFR 1501.6 (b). The benefits of becoming a cooperating agency include disclosure of relevant information early in the EIS process and establishment of a mechanism to address any intergovernmental issues. Should your agency decide not to become a formal cooperating agency for the EIS, you will continue to be kept informed of project developments through the project mailing list, and you will receive the draft and final EIS documents. Any concerns or comments your agency provides to us during the NEPA process, and in a timely fashion, will be fully considered in finalizing the EIS and our Records of Decision (RODs).

The proposed PrairieWinds project would involve the installation and operation of a 150-megawatt (MW) wind energy facility that would feature 101 wind turbine generators. Each turbine generator would have a hub height of 262 feet and a turbine rotor diameter of 252 feet. The total height of each wind turbine would be 389 feet with a blade in the vertical position. The towers would be constructed of tubular steel, approximately 15 feet in diameter at the base, with internal joint flanges. The color of the towers and rotors would be standard white or off-white. During construction, a work/staging area at each turbine would include the crane pad and rotor assembly area, temporarily disturbing an area about 190 feet by 210 feet.

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Two sites for the wind-powered generation facility are under consideration (see enclosed map). One site is located on about 37,000 acres and is approximately 15 miles north of White Lake, South Dakota, within Brule, Aurora, and Jerauld counties. The other alternative site would be located within an area about 83,000 acres, and is about 8 miles south of Winner, South Dakota, and is entirely within Tripp County.

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If any additional agency representatives wish to be added to the project's mailing list and/or receive a copy of the Draft and Final EIS, please contact Ms. Liana Reilly or Mr. Dennis Rankin

at the phone numbers or addresses listed below. Comments on the project scope and alternatives should be received by May 15, 2009, to be considered in defining the scope for the Draft EIS. Comments on the proposed project will be accepted and considered throughout the NEPA process.

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Document Manager
Western Area Power Administration
Corporate Services Office - A7400,
P.O. Box 281213
Lakewood, Colorado 80228-8213
Phone: (720) 962-7253 or (1-800) 336-7288
Fax: (720) 962-7263
E-mail: reilly@wapa.gov

Mr. Dennis Rankin
Project Manager
Engineering and Environmental Staff
Rural Utilities Service, Utilities Program

1400 Independence Ave. SW, Mail Stop 1571
Washington D.C. 20250-1571,
Phone: (202) 720-1953
Fax: (202) 720-0820
E-mail: dennis.rankin@wdc.usda.gov

We look forward to hearing from you.

Sincerely,

A handwritten signature in black ink that reads "Nicholas J. Stas". The signature is written in a cursive style with a large, prominent "N" and "S".

Nick Stas
Environmental Manager
Upper Great Plains Region
Western Area Power Administration

Enclosures

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Agencies and Individuals who Received the Invitations

** Those with an asterisk were invited to be a cooperator*

* Aurora County Weed Supervisor
* Brule County Weed Supervisor & Highway
* Bureau of Indian Affairs
* Commission Chairperson for Chamberlain, South Dakota
* Commission Chairperson for Plankinton, South Dakota
* Commission Chairperson for Wessington Springs, South Dakota
* Commission Chairperson for Winner, South Dakota
DOE - South Dakota State NEPA Contact
Ducks Unlimited
Environmental Protection Agency, Region 8
* Farm Service Agency
Federal Emergency Management Agency
* Federal Highway Administration
* Highway Superintendent for Wessington Springs, South Dakota
* Jerauld County Weed Supervisor
Mayor of Wessington Springs, South Dakota
Mayor of Winner, South Dakota
Natural Resource Conservation Service
Nature Conservancy
Plankinton City Hall
Sierra Club
South Dakota Aeronautics Commission
South Dakota Department of Health
* South Dakota Department of Transportation
South Dakota Dept of Agriculture
South Dakota Dept of Environment and Natural Resources
South Dakota Forest Service
* South Dakota Game, Fish, and Parks
South Dakota Governor's Office
South Dakota Highway Patrol
South Dakota Indian Affairs Commission
* South Dakota Public Utilities Commission
South Dakota Senator
South Dakota State Historic Preservation Office
South Dakota State Historical Society
South Dakota State Land Department
South Dakota State Representative
South Dakota Transmission Authority
* Tripp County Weed Supervisor
* US Army Corps of Engineers
* US Fish and Wildlife Service
USGS Northern Prairie Wildlife Research Center
USGS South Dakota State University
Wessington Springs Area Development Corporation

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YOU ARE INVITED! TO A PUBLIC MEETING

The USDA Rural Utilities Service (RUS) and Western Area Power Administration (Western) are hosting two open-house public meetings to discuss a new 150-megawatt wind energy project.

PrairieWinds SD1, Inc., (PrairieWinds), a subsidiary of Basin Electric Power Cooperative, proposes to construct 101 wind turbines in one of two alternate locations. One location would be south of Wessington Springs, approximately **10 miles north of the town of White Lake**, in Aurora, Jerauld and

Brule counties in South Dakota. The other location would be approximately **15 miles south of the town of Winner**, in Tripp County, South Dakota.



Representatives from RUS, Western and PrairieWinds will be available to answer your questions, offer more information about the proposed project and take your comments. Your comments will help define the scope of the Environmental Impact Statement.

PLEASE JOIN US

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April 29, 2009, 4:00 p.m. to 7:00 p.m.

Commerce Street Grille

118 S Main Street

Plankinton, SD 57368

NEED MORE INFORMATION?

Liana Reilly

Western Area Power Administration

Corporate Services Office

A7400 P.O. Box 281213

Lakewood, Colorado 80228-8213

email: sdprairiewinds@wapa.gov

Phone: 1-800-336-7288



Or visit the Project Web site at:

www.wapa.gov/transmission/sdprairiewinds.htm

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Earth Day messages



and installing energy-efficient appliances and light bulbs in their homes.

In addition, beef producers ap-



possible. If you have a picture or early map that can be returned to you. It is difficult to find. Please help us preserve history.



Burning
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 ed "Independence on the didn't control where the l in 1913...it was at the e cow.

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Dismissed on motion by

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Department of Energy
Western Area Power Administration
Upper Great Plains Customer Service Region
P.O. Box 35800
Billings, MT 59107-5800

SEE ATTACHED LIST

Dear Honorable Chairperson, Mr. Lester Thompson:

Western Area Power Administration (Western), a power-marketing agency of the U.S. Department of Energy, has received a request to interconnect its transmission system near Wessington Springs, South Dakota with a wind generating facility that has been proposed by PrairieWinds, SD1, Incorporated (PrairieWinds), a subsidiary of Basin Electric. PrairieWinds has applied for financial assistance for the proposed project from the Rural Utility Service (RUS), an agency which administers the U.S. Department of Agriculture's Rural Development Utilities Programs. Western and RUS are considering these respective requests thereby making the project an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations (36 CFR Part 800). In accordance with 36 CFR § 800.2(a)(2), Western will serve as the lead agency for the purposes of Section 106 review.

The purpose of this letter is to inform you of the proposed project and to provide notice that Western and RUS intend to prepare an Environmental Impact Statement (EIS) addressing their respective Federal actions. This letter also serves to initiate Government-to-Government consultation. With this letter, Western and RUS invite your participation in the reviews conducted under the National Environmental Policy Act (NEPA) and Section 106 of NHPA..

The proposed PrairieWinds project would involve the installation and operation of a 150 megawatt (MW) wind energy facility that would feature 101 wind turbines (WTG). Each turbine generator would have a hub height of 262 feet and a turbine rotor diameter of 252 feet. The total height of each wind turbine would be 389 feet with a blade in the vertical position. The towers would be constructed of tubular steel, approximately 15 feet in diameter at the base, with internal joint flanges. The color of the towers and rotors would be standard white or off-white. During construction, a work/staging area at each turbine would include the crane pad and rotor assembly area, temporarily disturbing an area about 190 feet by 210 feet.

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Two sites for the wind generation facility are under consideration (see enclosed map). One site is located on about 37,000 acres about 15 miles north of White Lake, South Dakota, within Brule, Aurora, and Jerauld counties, South Dakota. Under this alternative, a new 230-kV transmission line would be required to deliver the power from the collector substation(s) to a

new 230-kV Western interconnection point at Western's Wessington Springs Substation, located in Jerauld County. The Wessington Springs Substation is located approximately 9 to 12 miles from the proposed collector substation(s). The proposed line would be built using wood or steel H-frame (two pole) structures or steel single-pole structures. The structures would be about 85 to 95 feet high and span about 800 feet.

The other alternative site, near Winner entirely in Tripp County, South Dakota, would be located within an area about 83,000 acres and require 34.5-kV to 115-kV collector substation(s) as well as a 115-kV transmission line to interconnect to Western's existing 115-kV Winner Substation. Other facilities would be similar to those described for the first alternative site above.

There is a chance that the final interconnection studies will conclude that other transmission facilities, such as network upgrades remote from the project site, would be required. If it is determined that other facilities are needed to support the interconnection request, Western will complete the appropriate level of environmental review.

Western and RUS are serving as co-lead Federal agencies under NEPA for preparation of the EIS. With this notice, you are invited to be cooperating agency. Designated cooperating agencies have certain responsibilities to support the NEPA process, as specified at 40 CFR 1501.6 (b).

Cultural resources are among the important environmental resources that will be addressed during the planning and the preparation of the EIS for the proposed project. We want to ensure that any important cultural and natural resources and/or places with traditional cultural significance for your Tribe within the project area are considered and addressed in the NEPA and Section 106 reviews. At this time, we would appreciate receiving any information that you would be willing to share with us on any unique, special, ethnographic, or archaeological resources or areas in or near the proposed Project. If you are aware of any other Tribes, individuals, or tribally affiliated organizations that should be consulted regarding this project, please let us know. A list of the other Tribes receiving this invitation to government-to-government consultation is enclosed.

Western and RUS are conducting scoping, including public scoping meetings, to ensure that interested members of the public, potentially affected landowners and lessees, and Federal, state, local, and tribal agencies have an opportunity to provide input on the scope of the EIS and the alternatives that will be addressed in the EIS. Western, RUS, and Project representatives at the scoping meetings will provide information about the proposed project, answer questions, and will take comments from interested parties. Western and RUS request that you comment on the proposal, offer suggestions to improve the proposal and suggest alternative actions. Please identify any issues of concern about potential environmental impacts. Written comments may be left with one of the Western or RUS representatives at the scoping meeting, or may be provided by fax, e-mail or the U.S. Postal Service to Ms. Liana Reilly or Steve Tromly, or by mailing the enclosed addressed response sheet.

Western will coordinate its compliance with Section 106 and its implementing regulations (36 CFR Part 800) with the steps taken to meet the requirements of NEPA. As part of this effort, Western will

use its NEPA procedures for public involvement to meet its responsibility to seek and consider the views of the public in Section 106 review, pursuant to 36 CFR § 800.2(d).

The open-house public scoping meetings will be held at the Holiday Inn Express and Suites, 1360 East Highway 44, in Winner South Dakota, on April 28, 2009, and the Commerce Street Grille, 1218 North Main Street, in Plankinton, South Dakota on April 29, 2009. You may attend a meeting of your choosing at any time between 4 and 7 p.m. You will have the opportunity to view the proposed project and NEPA process displays and other information.

If you wish to be added to the project's mailing list and/or receive a copy of the Draft EIS, please return the response sheet or contact Ms. Liana Reilly at the phone number or address listed below. Comments on the project scope and alternatives should be received by May 15, 2009, to be considered in defining the scope for the EIS. Comments on the proposed project will be accepted and considered throughout the NEPA process.

We would like to obtain input to understand any issues that you or your Tribe believes are important. We will also follow up with a telephone call to discuss issues and, if requested, arrange a site visit. Please address comments, questions or concerns to Ms. Liana Reilly or Mr. Steve Tromly, at the addresses below.

Ms. Liana Reilly
NEPA Document Manager
Western Area Power Administration
Natural Resource Office
12155 West Alameda Parkway
Lakewood, CO 80228-8213
Phone: (720) 962-7253
Fax: (720) 962-7263
E-mail: reilly@wapa.gov

Mr. Steve Tromly
Native American Liaison
Western Area Power Administration
Natural Resource Office
12155 West Alameda Parkway
Lakewood, CO 80228-8213
Phone: (720) 962-7256
Fax: (720) 962-7263
E-mail: tromly@wapa.gov

We look forward to hearing from you.

Sincerely,



Nick Stas
Environmental Manager

Enclosures

cc:

Mr. Dennis Rankin
Project Manager
Engineering and Environmental Staff
Rural Utilities Service, Utilities Program
1400 Independence Ave. SW, Mail Stop 1571
Washington D.C. 20250-1571

N. Stas, B0400
R. O'Sullivan, B0400
D. Kluth, B0400
L. Reilly, A7400, Lakewood, CO
S. Tromly, A7400, Lakewood, CO
D. Swanson, A7400, Lakewood, CO

*South Dakota PrairieWinds Project Nation-to-Nation Consultation List
(list of recipients in random order)*

Mr. Kevin Jensvold, Chairperson
Upper Sioux Indian Community

CC

Mr. Scott Larson
Upper Sioux Indian Community

Ms. Jean Stacy, President
Lower Sioux Indian Community

CC

Ms. Pamela Halverson, THPO
Lower Sioux Indian Community

Ms. Myra Pearson, Chairwoman
Spirit Lake Tribal Council

Mr. Mike Salvage, Chairman
Sisseton-Wahpeton Dakota Nation

CC

Ms. Dianne Derosiers, THPO
Sisseton-Wahpeton Oyate

Mr. Joshua Weston, President
Flandreau Santee Sioux Executive Committee

Mr. Robert Cournower, Chairperson
Yankton Sioux Tribal Business and
Claims Committee

CC

Faith Spotted Eagle
Cultural Resources

Mr. Roger Trudell, Chairman
Santee Sioux Tribe of Nebraska

CC

Mr. Robert Campbell, Councilman
Santee Sioux Tribe of Nebraska

Mr. Rodney Bordeaux, President
Rosebud Sioux Tribe

CC

Mr. Russell Eagle Bear, THPO
Rosebud Sioux Tribe of Indians

Mr. Lester Thompson, Jr., Chairman
Crow Creek Sioux Tribe

Mr. Harold Frazier, Chairman
Cheyenne River Sioux Tribe

CC

Mr. Albert LeBeau, THPO
Cheyenne River Sioux Tribe

Mr. Michael B. Jandreau, Chairman
Lower Brule Sioux Tribe

CC

Scott Jones, Director Cultural Resources
Lower Brule Tribe

Mr. Ron His-Horse-is Thunder
Standing Rock Sioux Tribe

CC

Mr. Tim Mentz, THPO
Standing Rock Sioux Tribe

Mr. Curley Youpee, THPO
Ft. Peck Tribes

Tex Hall, Chairman
Three Affiliated Tribes Business Council

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Web site at <http://www.ferc.gov/docs-filing/elibrary.asp>. Enter the docket number (P-13357) in the docket number field to access the document. For assistance, call toll-free 1-866-208-3372.

Kimberly D. Bose,
Secretary.

[FR Doc. E9-7768 Filed 4-6-09; 8:45 am]

BILLING CODE 6717-01-P

DEPARTMENT OF ENERGY

Western Area Power Administration

DEPARTMENT OF AGRICULTURE

Rural Utility Service

Proposed PrairieWinds Project, South Dakota

AGENCIES: Western Area Power Administration, U.S. Department of Energy; Rural Utilities Service, U.S. Department of Agriculture.

ACTION: Notice of Intent to Prepare an Environmental Impact Statement and to Conduct Scoping Meetings; Notice of Floodplain and Wetlands Involvement.

SUMMARY: The Western Area Power Administration (Western), an agency within the U.S. Department of Energy (DOE), and Rural Utilities Service (RUS), an agency within the U.S. Department of Agriculture (USDA), intend to jointly prepare an environmental impact statement (EIS) for the proposed PrairieWinds Project (Project) in South Dakota. Western is issuing this Notice of Intent (NOI) to inform the public and interested parties about the proposed Project, conduct a public scoping process, and invite the public to comment on the scope, proposed action, alternatives, and other issues to be addressed in the EIS.

The EIS will address the construction, maintenance and operation of the proposed Project, which would include a 151.5-megawatt (MW) nameplate capacity wind-powered generating facility consisting of wind turbine generators, electrical collector lines, collector substation(s), transmission line(s), communications system, and service roads to access wind turbine sites. The EIS will also address the proposed interconnection with existing Western substations. The proposed Project would be located within portions of Brule, Aurora, and Jerauld counties, South Dakota or entirely within Tripp County, South Dakota.

Portions of the proposed Project may affect floodplains and wetlands, so this NOI also serves as a notice of proposed

floodplain or wetland action. Western and RUS will hold public scoping meetings near the proposed Project areas to share information and receive comments and suggestions on the scope of the EIS.

DATES: Open house public scoping meetings will be held on April 28, 2009, at the Holiday Inn Express and Suites, 1360 East Highway 44, Winner, South Dakota, 57580, from 4 p.m. to 7 p.m. CDT; and on April 29, 2009, at the Commerce Street Grille, 118 N. Main Street, Plankinton, South Dakota, 57368, from 4 p.m. to 7 p.m. CDT. The public scoping period starts with the publication of this notice in the **Federal Register** and will continue through May 15, 2009. To help define the scope of the EIS, written comments should be submitted through the project's Web address: <http://www.wapa.gov/sdprairiewinds.htm>, or sent by letter, fax, or e-mail no later than May 15, 2009.

ADDRESSES: Written comments on the scope of the EIS should be addressed to Ms. Liana Reilly, Document Manager, Western Area Power Administration, Corporate Services Office, A7400, P.O. Box 281213, Lakewood, Colorado 80228-8213, fax (720) 962-7263, or sent by e-mail to sdprairiewinds@wapa.gov. Comments may also be submitted through the project's Web address: <http://www.wapa.gov/sdprairiewinds.htm>.

FOR FURTHER INFORMATION CONTACT: For information on the proposed Project, the EIS process, and general information about interconnections with Western's transmission system, contact Ms. Reilly at (800) 336-7288 or the address provided above. Parties wishing to be placed on the Project mailing list for future information, and to receive copies of the Draft and Final EIS when they are available, should also contact Ms. Reilly.

For information on RUS financing, contact Mr. Dennis Rankin, Project Manager, Engineering and Environmental Staff, Rural Utilities Service, Utilities Program, 1400 Independence Avenue, SW., Mail Stop 1571, Washington, DC 20250-1571, telephone (202) 720-1953 or e-mail dennis.rankin@wdc.usda.gov.

For general information on DOE National Environmental Policy Act (NEPA), 42 U.S.C. 4321-4347 review procedures or status of a NEPA review, contact Ms. Carol M. Borgstrom, Director of NEPA Policy and Compliance, GC-20, U.S. Department of Energy, 1000 Independence Avenue, SW., Washington, DC 20585, telephone (202) 586-4600 or (800) 472-2756.

SUPPLEMENTARY INFORMATION: Western, an agency within DOE, markets Federal hydroelectric power to preference customers, as specified by law. These customers include municipalities, cooperatives, public utilities, irrigation districts, Federal and State agencies, and Native American Tribes in 15 western states, including South Dakota. Western owns and operates about 17,000 miles of transmission lines.

RUS, an agency that delivers the USDA's Rural Development Utilities Program, is authorized to make loans and loan guarantees that finance the construction of electric distribution, transmission, and generation facilities, including system improvements and replacements required to furnish and improve electric service in rural areas, as well as demand side management, energy conservation programs, and on-grid and off-grid renewable energy systems.

Basin Electric is a regional wholesale electric generation and transmission cooperative owned and controlled by its member cooperatives. Basin Electric serves approximately 2.5 million customers covering 430,000 square miles in portions of nine states, including Colorado, Iowa, Minnesota, Montana, Nebraska, New Mexico, North Dakota, South Dakota, and Wyoming.

PrairieWinds, SD1, Incorporated (PrairieWinds), is a wholly owned subsidiary of Basin Electric.

Project Description

PrairieWinds proposes to construct, own, operate, and maintain the South Dakota PrairieWinds Project, a 151.5-MW nameplate capacity wind-powered generation facility, including wind-turbine generators, electrical collector lines, collector substation(s), transmission line, communications system, and service access roads to access wind-turbine sites.

There are two possible locations for the proposed Project. One site is located on about 37,000 acres about 15 miles north of White Lake, South Dakota, within Brule, Aurora, and Jerauld counties, South Dakota. For this alternative, the requested interconnection is with Western's electric transmission system at Wessington Springs Substation, located in Jerauld County, South Dakota. The other site is located on about 83,000 acres about 8 miles south of Winner, South Dakota, entirely within Tripp County, South Dakota. If this alternative is selected, the interconnection request will be with Western's electric transmission system at Winner Substation, located in Tripp County.

The proposed Project is subject to the jurisdiction of the South Dakota Public Utilities Commission (SDPUC), which has regulatory authority for siting wind generation facilities and transmission lines within the State. PrairieWinds will submit an application for an Energy Conversion Facility Permit to the SDPUC. The SDPUC permit would authorize PrairieWinds to construct the proposed Project under South Dakota rules and regulations. Western's Federal action is to consider Basin Electric's interconnection request under Western's Open Access Transmission Service Tariff and make a decision whether to approve or deny the interconnection request. If the decision is to approve the request, Western's action would include making necessary system modifications to accommodate the interconnection of the proposed Project. PrairieWinds has requested financial assistance for the proposed Project from RUS. RUS' Federal action is whether to provide financial assistance; accordingly, completing the EIS is one requirement, along with other technical and financial considerations in processing PrairieWind's application.

Western and RUS intend to prepare an EIS to analyze the impacts of their respective Federal actions and the proposed Project in accordance with NEPA, as amended, DOE NEPA Implementing Procedures (10 CFR 1021), the CEQ regulations for implementing NEPA (40 CFR 1500–1508), and RUS Environmental Policies and Procedures (7 CFR 1794). While Western's and RUS' Federal actions would be limited to the approval or denial of the interconnection request, any modifications to Western's power system necessary to accommodate the interconnection, and providing financial assistance for the proposed Project, the EIS will also identify and address the environmental impacts of the proposed Project. The EIS will evaluate in detail the two alternatives, any other viable alternatives identified during the public scoping process, and the No Action Alternative.

Regardless of the site selected, the proposed Project would consist of four main facilities: Turbines, collector system, roads, and transmission lines. PrairieWinds plans to install 101 General Electric 1.5-MW wind turbines for the proposed Project within one of the alternative generation sites. Fifteen additional turbines may be installed within the selected site, pending future load, transmission availability, and renewable production standard requirements. Each generator would have a hub height of 262 feet and a turbine rotor diameter of 252 feet. The

total height of each wind turbine would be 389 feet with a blade in the vertical position. The towers would be constructed of tubular steel, approximately 15 feet in diameter at the base, with internal joint flanges. The color of the towers and rotors would be standard white or off-white. During construction, a work/staging area at each turbine would include the crane pad and rotor assembly area. This area would measure about 190 feet by 210 feet. The turbine foundations would typically be mat foundations (inverted T-foundations) or a concentric-ring-shell foundation. The area excavated for the turbine foundations would typically be no more than 70 feet by 70 feet (approximately 0.1 acre). Pad mounted transformers 74 inches by 92 inches by 70 inches would be placed next to each turbine. In some cases, for step-and-touch voltage compliance, an area around a turbine may be covered in 4 inches of gravel, river rock or crushed stone.

Each wind turbine would be interconnected with underground power and communications cables, identified as the collector system. This system would be used to route the power from each turbine to a central collector substation(s) where the electrical voltage would be stepped up from 34.5 kilovolt (kV) to 230-kV. The collector substation(s) would be enclosed in a fence with dimensions about 350 feet by 140 feet. The underground collector system would be placed in one trench or two parallel trenches and connect each of the turbines to a central collector substation. The estimated trench length, including parallel trenches, is 317,000 feet (60 miles).

The fiber optic communication lines for the proposed Project would be installed in the same trenches as the underground electrical collector cables and connect each turbine to a proposed operations and maintenance (O&M) building and collector substation(s). It is anticipated that a 5,500-square foot (50 feet by 110 feet) O&M building would be built within the vicinity of the collector substation. The final location would be determined in consultation with future operations personnel.

New access roads would be built to facilitate both construction and maintenance of the turbines. This road network would be approximately 70 miles of new and/or upgraded roads. These roads would be designed to minimize length and construction impact. Initially, turbine access roads would be built to approximately 25-foot wide, to accommodate the safe operation of construction equipment.

Upon completion of construction, the turbine access roads would be reclaimed and narrowed to an extent allowing for the routine maintenance of the facility. Existing roads, including state and county roads and section line roads, would also be improved to aid in servicing the turbine sites.

Approximately 30 to 40 miles of new turbine access roads would be built and 25 to 35 miles of existing roads would be used and, where appropriate, improved.

Under one alternative, a new 230-kV transmission line would be required to deliver the power from the collector substation(s) to a new 230-kV Western interconnection point at the existing Wessington Springs Substation. The Wessington Springs Substation is located approximately 9 to 12 miles from the proposed collector substation(s). The proposed line would be built using wood or steel H-frame (two pole) structures or steel single-pole structures. The structures would be about 85 to 95 feet high and span about 800 feet.

The other alternative site, near Winner, would require 34.5-kV to 115-kV collector substation(s) as well as a 115-kV transmission line to interconnect to Western's existing 115-kV Winner Substation. Other facilities would be similar to those described for the proposed Project. Because the proposed Project may involve action in floodplains or wetlands, this NOI also serves as a notice of proposed floodplain or wetland action, in accordance with DOE regulations for Compliance with Floodplain and Wetlands Environmental Review Requirements at 10 CFR 1022.12(a). The EIS will include a floodplain/wetland assessment and, if required, a floodplain/wetland statement of findings will be issued with the Final EIS or Western's and RUS' Records of Decision.

Agency Responsibilities

Western and RUS are serving as co-lead Federal agencies, as defined at 40 CFR 1501.5, for preparation of the EIS. With this notice, Native American Tribes and agencies with jurisdiction or special expertise are invited to be cooperating agencies. Such tribes or agencies may make a request to Western to be a cooperating agency by contacting Western's NEPA Document Manager. Designated cooperating agencies have certain responsibilities to support the NEPA process, as specified at 40 CFR 1501.6(b).

Environmental Issues

This notice is to inform agencies and the public of Western's and RUS' Federal actions, and the proposed Project, and to solicit comments and suggestions for consideration in preparing the EIS. To help the public frame its comments, this notice contains a list of potential environmental issues that Western and RUS have tentatively identified for analysis. These issues include:

1. Impacts on protected, threatened, endangered, or sensitive species of animals or plants;
2. Impacts on avian and bat species;
3. Impacts on land use, recreation, and transportation;
4. Impacts on cultural or historic resources and tribal values;
5. Impacts on human health and safety;
6. Impacts on air, soil, and water resources (including air quality and surface water impacts);
7. Visual impacts; and
8. Socioeconomic impacts and disproportionately high and adverse impacts to minority and low-income populations.

This list is not intended to be all-inclusive or to imply any predetermination of impacts. Environmental issues associated with Western's action, RUS' action, and PrairieWinds' proposed Project will be addressed separately in the EIS. Western and RUS invite interested parties to suggest specific issues within these general categories, or other issues not included above, to be considered in the EIS.

Public Participation

Public participation and full disclosure are planned for the entire EIS process. The EIS process will include public scoping open house meetings and a scoping comment period to solicit comments from interested parties; consultation and involvement with appropriate Federal, State, local, and tribal governmental agencies; public review and a hearing on the draft EIS; publication of a final EIS; and publication of separate Records of Decision by Western and RUS, currently anticipated in 2010. Additional informal public meetings may be held in the proposed Project areas, if public interest and issues indicate a need.

The public scoping period begins with publication of this notice in the **Federal Register** and closes May 15, 2009. The purpose of the scoping meetings is to provide information about Western's Federal action, RUS's Federal action, and the proposed

Project, display maps, answer questions, and take written comments from interested parties.

Western and RUS will hold open house public scoping meetings in Plankinton, South Dakota and Winner, South Dakota as noted above. Attendees are welcome to come and go at their convenience and to speak one-on-one with Project representatives and agency staff. The public will have the opportunity to provide written comments at the meeting. In addition, attendees may provide written comments by letter, fax, e-mail, or through the project's Web address.

To be considered in defining the scope of the EIS, comments should be received by the end of the scoping period. Anonymous comments will not be accepted.

Dated: March 30, 2009.

Timothy J. Meeks,
Administrator.

Dated: March 26, 2009.

Mark S. Plank,
Director, Engineering and Environmental Staff, Rural Utilities Service.

[FR Doc. E9-7813 Filed 4-6-09; 8:45 am]

BILLING CODE 6450-01-P

ENVIRONMENTAL PROTECTION AGENCY

[FRL-8789-8; EPA-HQ-OEI-2007-1152]

Amendment to the Toxic Substances Control Act Confidential Business Information Records Access System, EPA-20

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: Pursuant to the provisions of the Privacy Act of 1974 (5 U.S.C. 552a), the Office of Pollution Prevention and Toxics is giving notice that it proposes to amend the "Toxic Substance Control Act Confidential Business Information Records Access System" to "Confidential Business Information Tracking System (CBITS)" to correct the official name of the system of record notice (SORN), system location and system manager.

DATES: Persons wishing to comment on this system of records notice must do so by May 18, 2009.

ADDRESSES: Submit your comments, identified by Docket ID No. EPA-HQ-2007-1152, by one of the following methods:

- <http://www.regulations.gov>: Follow the online instructions for submitting comments.

- *E-mail:* oei.docket@epa.gov
- *Fax:* 202-566-1752.
- *Mail:* OEI Docket, Environmental Protection Agency, Mailcode: 2822T, 1200 Pennsylvania Ave., NW., Washington, DC 20460.

- *Hand Delivery:* OEI Docket, EPA/DC, EPA West Building, Room B102, 1301 Constitution Ave., NW., Washington, DC. Such deliveries are only accepted during the Docket's normal hours of operation and special arrangements should be made for deliveries of boxed information.

Instructions: Direct your comments to Docket ID No. EPA-HQ-OEI-2007-1152. EPA's policy is that all comments received will be included in the public docket without change and may be made available online at <http://www.regulations.gov>, including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information for which disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through <http://www.regulations.gov>. The <http://www.regulations.gov> Web site is an "anonymous access" system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through <http://www.regulations.gov> your e-mail address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD-ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses. For additional information about EPA's public docket visit the EPA Docket Center homepage at <http://www.epa.gov/epahome/dockets.htm>.
Docket: All documents in the docket are listed in the <http://www.regulations.gov> index. Although listed in the index, some information is not publicly available, e.g., CBI or other information for which disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either

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Ms. Liana Reilly

Document Manager

Western Area Power Administration

Corporate Services Office - A7400

P.O. Box 281213

Lakewood, Colorado 80228-8213

PSRST STD
U.S. POSTAGE
PAID
Phoenix AZ
Permit #1039

YOU ARE INVITED!

TO A PUBLIC MEETING

The USDA Rural Utilities Service (RUS) and Western Area Power Administration (Western) are hosting two open-house public meetings to discuss a new 150-megawatt wind energy project.

PrairieWinds SD1, Inc., (PrairieWinds), a subsidiary of Basin Electric Power Cooperative, proposes to construct 101 wind turbines in one of two alternate locations. One location would be south of Wessington Springs, approximately **10 miles north of the town of White Lake**, in Aurora, Jerauld and Brule counties in South Dakota. The other location would be approximately **15 miles south of the town of Winner**, in Tripp County, South Dakota.



Representatives from RUS, Western and PrairieWinds will be available to answer your questions, offer more information about the proposed project and take your comments. Your comments will help define the scope of the Environmental Impact Statement.

PLEASE JOIN US

April 28, 2009, 4:00 p.m. to 7:00 p.m.

Holiday Inn Express & Suites
1360 E Highway 44
Winner, SD 57580

April 29, 2009, 4:00 p.m. to 7:00 p.m.

Commerce Street Grille
118 S Main Street
Plankinton, SD 57368

NEED MORE INFORMATION?

Liana Reilly

Western Area Power Administration
Corporate Services Office
A7400 P.O. Box 281213
Lakewood, Colorado 80228-8213
email: sdprairiewinds@wapa.gov
Phone: 1-800-336-7288



Or visit the Project Web site at:

www.wapa.gov/transmission/sdprairiewinds.htm

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Appendix B

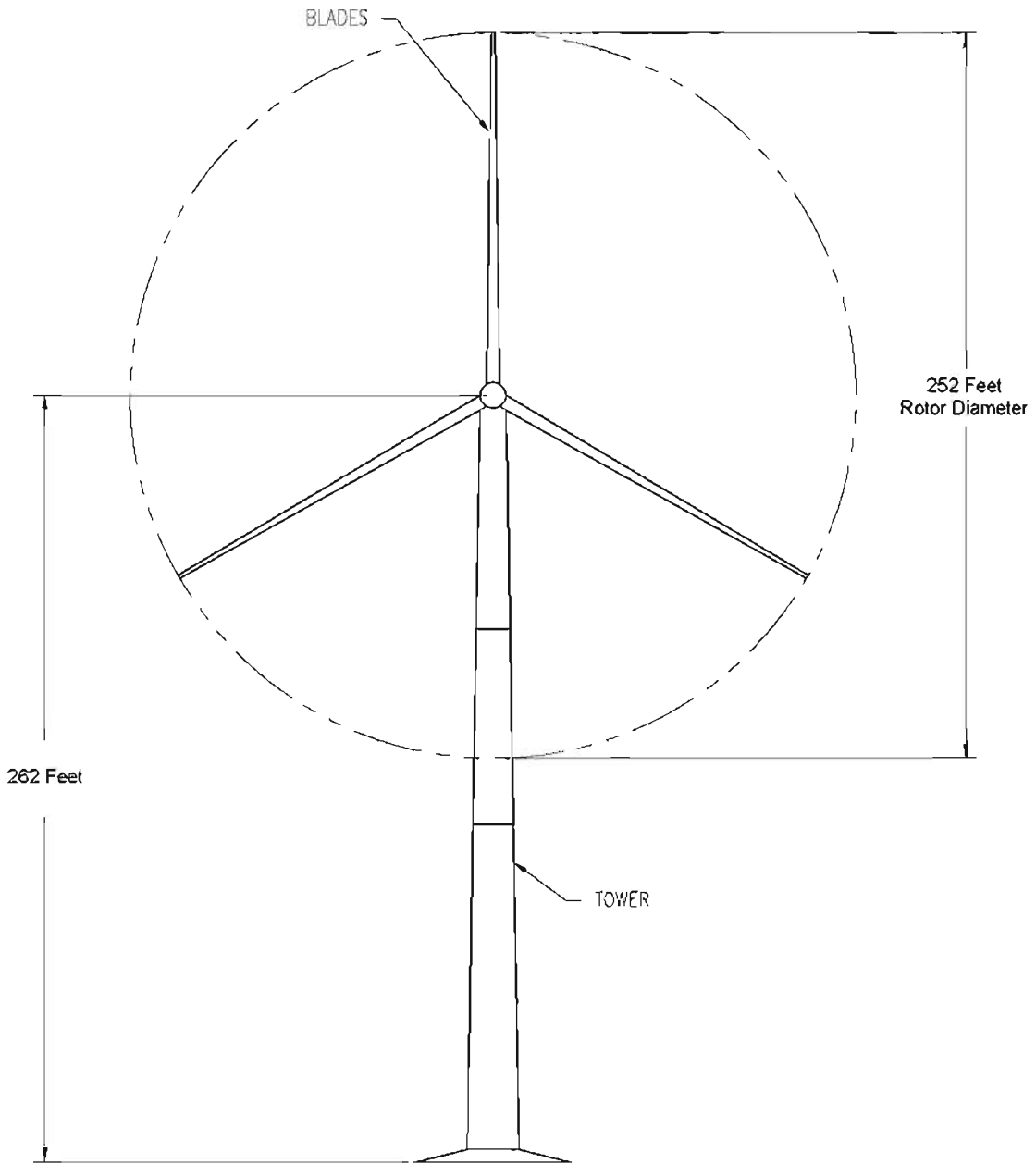
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Appendix B

Engineering Drawings

- **Figure B-1** General Electric 1.5sle Wind Energy Turbine
- **Figure B-2** Main Components of a Typical Wind Turbine
- **Figure B-3** Typical Crane Pad Layout
- **Figure B-4** Typical Layout for a Turbine Apron Plan
- **Figure B-5** Crow Lake Alternative Collector Substation Layout & Electrical Bus Arrangement

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GE WIND ENERGY 1.5 SLE 60 HZ WIND TURBINE

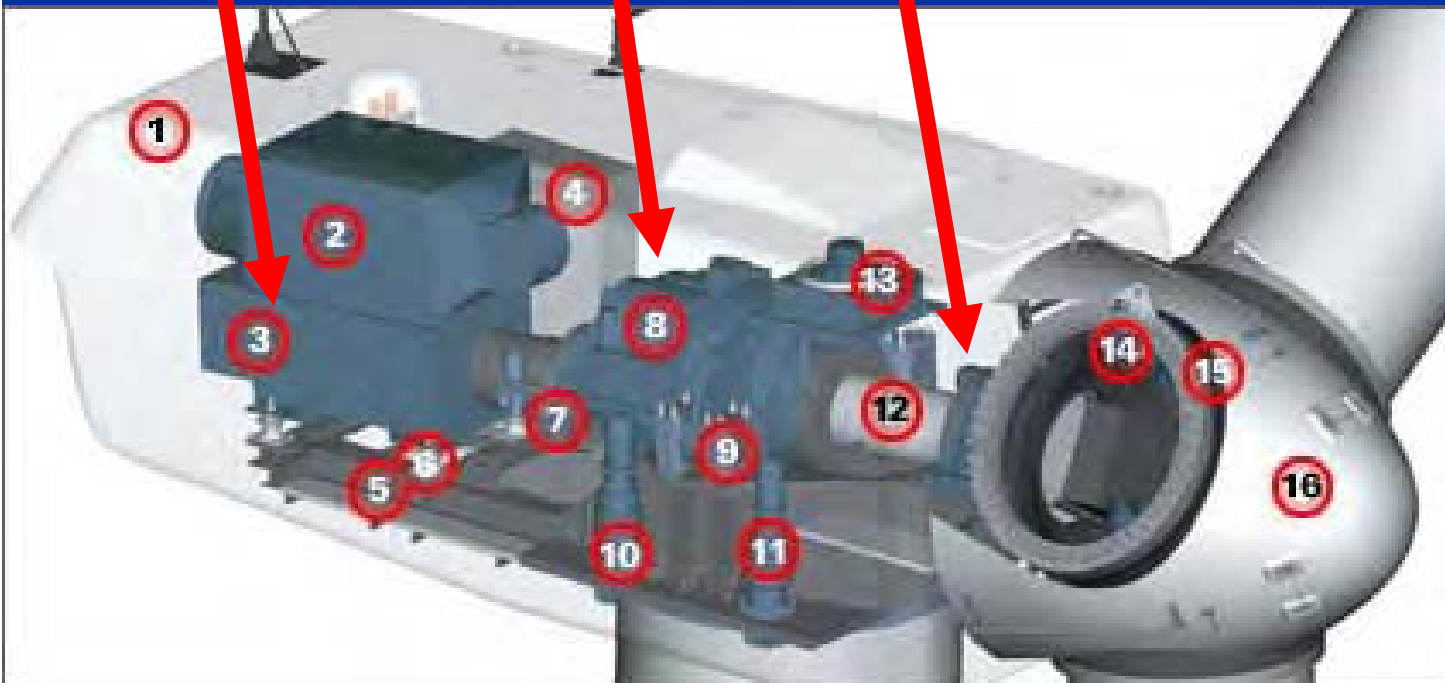
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3 Major Components of Turbines

Generator

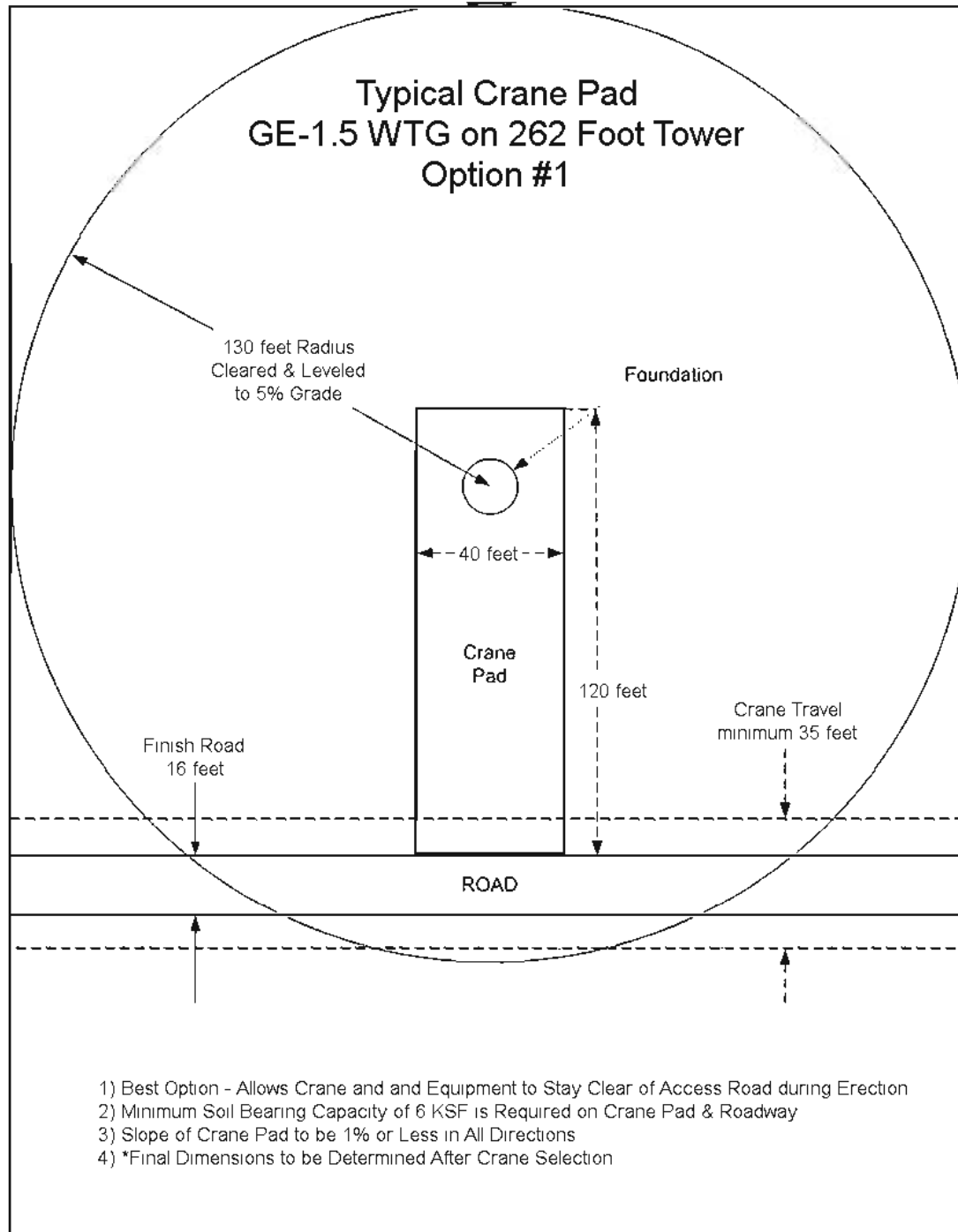
Gearbox

Rotor/Blades/Main Shaft



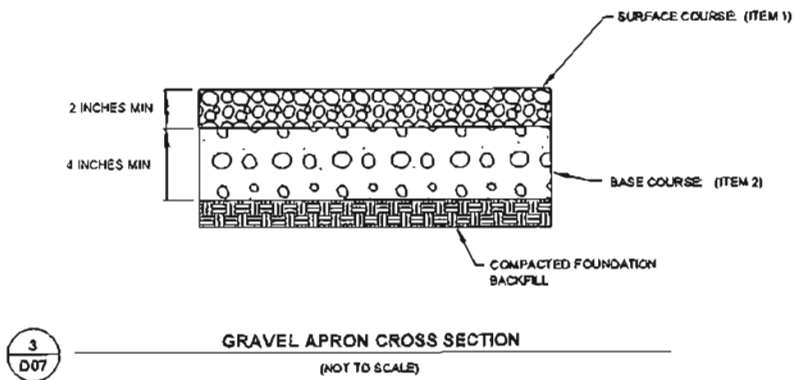
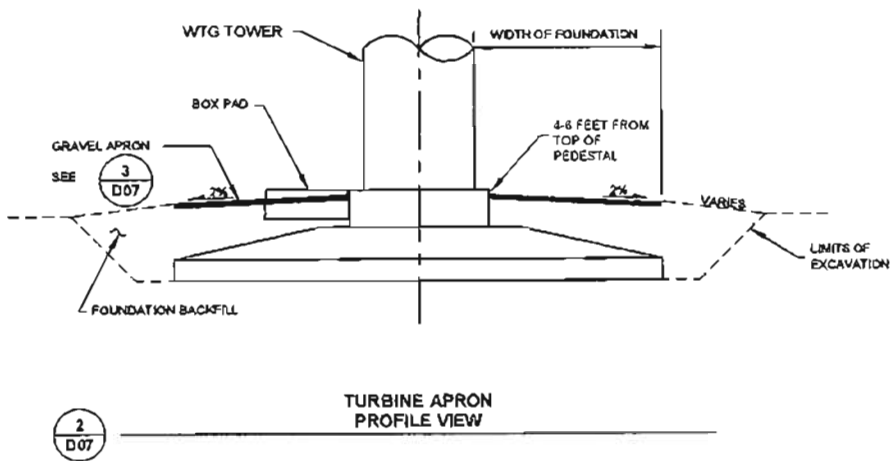
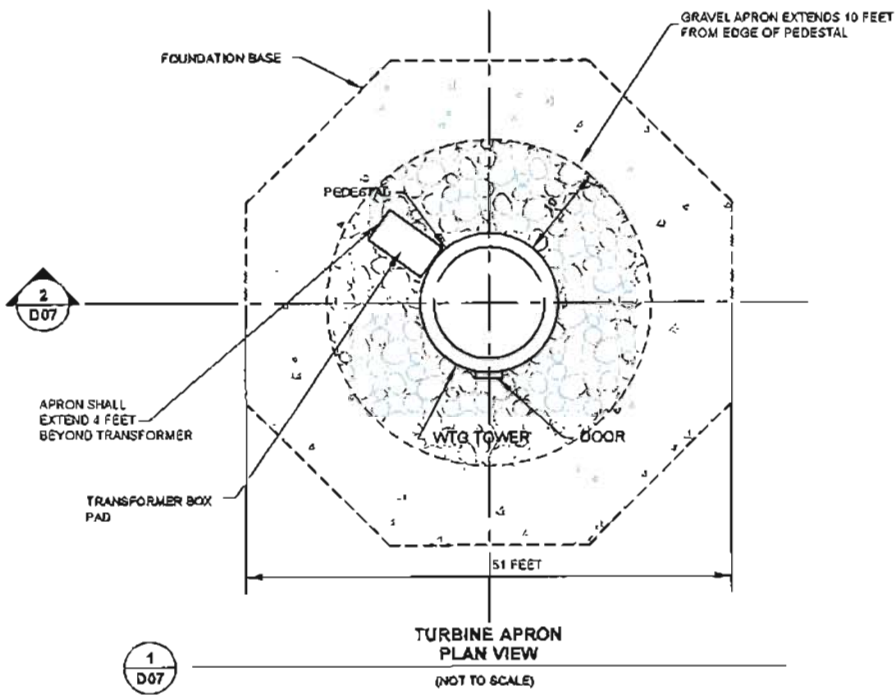
1. Nacelle
2. Heat Exchanger
3. Generator
4. Control Panel
5. Main Frame
6. Impact Noise Insulation
7. Hydraulic Parking Brake
8. Gearbox
9. Impact Noise Insulation
10. Yaw Drive
11. Yaw Drive
12. Rotor Shaft
13. Oil Cooler
14. Pitch Drive
15. Rotor Hub
16. Nose Cone

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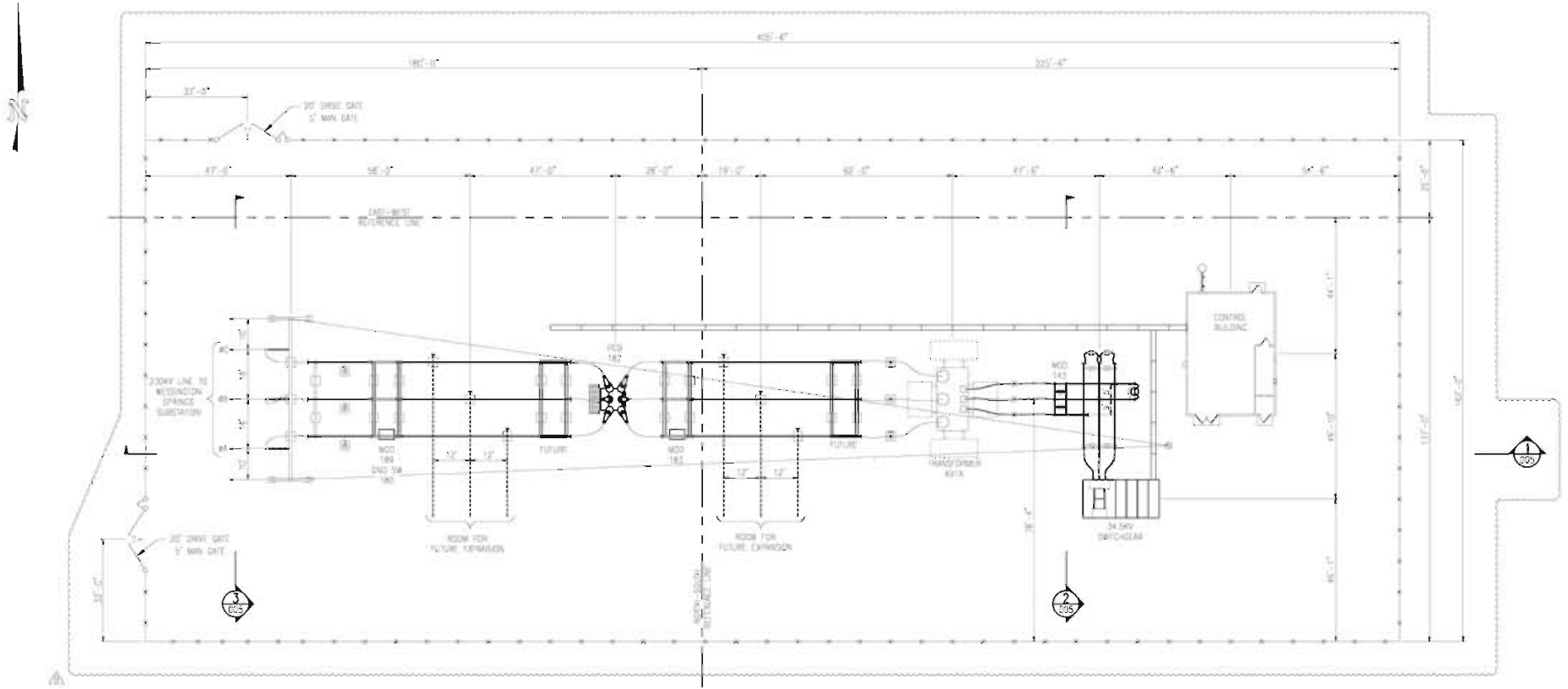


Typical Crane Pad Option 1

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ELECTRICAL BUS ARRANGEMENT

TO BE COMPLETED OR VERIFIED:
 1. PCB SIZE
 2. XFMR SIZE
 4. CABLE TRENCH SIZE

- TYPES OF CONNECTIONS**
- 1. 230KV
 - 2. 34.5
 - 3. EXPANSION
- RPC SUBMITTAL REVIEW**
- 1. NO EXCEPTIONS NOTIFICATION
 - 2. APPROVED AS NOTED: MAKE CORRECTIONS AND RE-REVIEW
 - 3. REVISE AND RESUBMIT FOR APPROVAL. REVISED PROCEEDINGS
- BY: _____ DATE: _____

PRELIMINARY

| <p>REVISIONS</p> <table border="1"> <tr> <th>NO.</th> <th>REVISIONS</th> <th>DATE</th> <th>BY</th> </tr> <tr> <td>1</td> <td>REVISED PER RPC COMMENTS</td> <td>11/11/2010</td> <td>MARKHAM JOHNSON</td> </tr> <tr> <td>2</td> <td>ISSUED FOR REVIEW</td> <td>11/11/2010</td> <td>MARKHAM JOHNSON</td> </tr> <tr> <td>3</td> <td></td> <td></td> <td></td> </tr> </table> | | | | NO. | REVISIONS | DATE | BY | 1 | REVISED PER RPC COMMENTS | 11/11/2010 | MARKHAM JOHNSON | 2 | ISSUED FOR REVIEW | 11/11/2010 | MARKHAM JOHNSON | 3 | | | | <p>PROJECT: 443-054-24-002</p> <p>DESCRIPTION: 34.5KV & 230KV ELEC. LAYOUT DETAILS SH. 2 OF 2</p> | | <p>TRANSMISSION SYSTEM MAINTENANCE</p> <p>443-34.5/230KV CHEW LAKE COLLECTOR SUBSTATION</p> <p>ELECTRICAL BUS ARRANGEMENT</p> | | <p>DATE: 11/11/2010</p> <p>BY: M. JOHNSON</p> <p>SCALE: AS SHOWN</p> <p>PROJECT: 443-054-24-002</p> <p>DESCRIPTION: 34.5KV & 230KV ELEC. LAYOUT DETAILS SH. 2 OF 2</p> <p>DATE: 11/11/2010</p> <p>BY: M. JOHNSON</p> | |
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| 1 | REVISED PER RPC COMMENTS | 11/11/2010 | MARKHAM JOHNSON | | | | | | | | | | | | | | | | | | | | | | |
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| <p>443-054-E3-002 230KV ELECTRICAL LAYOUT PLAN</p> <p>443-054-E3-004 34.5KV ELECTRICAL LAYOUT PLAN</p> <p>443-054-E3-005 34.5/230KV ELECTRICAL LAYOUT ELEVATIONS</p> <p>443-054-E3-001 34.5KV & 230KV ELEC. LAYOUT DETAILS SH. 1 OF 2</p> <p>443-054-E4-002 34.5KV & 230KV ELEC. LAYOUT DETAILS SH. 2 OF 2</p> | | | | <p>DATE: 11/11/2010</p> <p>BY: M. JOHNSON</p> <p>SCALE: AS SHOWN</p> <p>PROJECT: 443-054-24-002</p> <p>DESCRIPTION: 34.5KV & 230KV ELEC. LAYOUT DETAILS SH. 2 OF 2</p> <p>DATE: 11/11/2010</p> <p>BY: M. JOHNSON</p> | | <p>DATE: 11/11/2010</p> <p>BY: M. JOHNSON</p> <p>SCALE: AS SHOWN</p> <p>PROJECT: 443-054-24-002</p> <p>DESCRIPTION: 34.5KV & 230KV ELEC. LAYOUT DETAILS SH. 2 OF 2</p> <p>DATE: 11/11/2010</p> <p>BY: M. JOHNSON</p> | | | | | | | | | | | | | | | | | | | |



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Appendix C

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Appendix C

Biological Resources

- USFWS interagency letter dated April 9, 2009
- USFWS scoping response letter dated May 13, 2009
- USFWS request for Federally listed species dated October 14, 2009
- USFWS request response letter dated November 12, 2009
- **Table C-1** Wildlife Species Observed in the Crow Lake Alternative (2008-2009 Field Surveys)
- **Table C-2** Summary of individuals and group observations for fixed-point bird use surveys at the PrairieWinds SD1 Crow Lake Wind Resource Area, March 19 – May 27, 2009
- **Table C-3** Total number of groups and individuals for each bird type and species observed during transect bird use surveys at the PrairieWinds SD1 Crow Lake Wind Resource Area, June 2 – July 7, 2009
- **Table C-4** Wildlife Species Observed in the Winner Alternative (2008-2009 Field Surveys)
- **Table C-5** Summary of individuals and group observations for fixed-point bird use surveys at the PrairieWinds SD1 Winner Wind Resource Area, April 6 – May 22, 2009
- **Table C-6** Total number of groups and individuals for each bird type and species observed during transect bird use surveys at the PrairieWinds SD1 Winner Wind Resource Area, June 12 – July 10, 2009

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April 09, 2009

Pete Gober
US Fish and Wildlife Service
Ecological Services Field Office
420 S. Garfield Avenue, Suite 400
Pierre, SD 57501-5408

Dear Pete Gober:

The purpose of this letter is to inform you of a proposed project and to provide notice that Western and RUS intend to prepare an Environmental Impact Statement (EIS) addressing their respective Federal actions. This letter also serves as an invitation for an interagency meeting as well as provides information to you about our scoping process.

PrairieWinds SD1, Incorporated (PrairieWinds), a subsidiary of Basin Electric Power Cooperative (Basin Electric), has proposed to develop a wind-powered generating facility in south-central South Dakota, either near Wessington Springs or near Winner. Basin Electric has requested to interconnect the proposed project with Western Area Power Administration's (Western) transmission system. PrairieWinds has requested financing for the proposed project from the Rural Utilities Service (RUS), an agency within the U.S. Department of Agriculture (USDA).

Basin Electric's generator interconnection request and PrairieWinds's financing request triggers a National Environmental Policy Act (NEPA) review process of the proposed project by Western and RUS, respectively. Western and RUS are serving as co-lead Federal agencies for preparation of the EIS. Western will serve as the lead Federal agency for consultations with the U.S. Fish and Wildlife Service under section 7 of the Endangered Species Act and for consultations with the South Dakota State Historic Preservation Office under section 106 of the National Historic Preservation Act.

Western and RUS invite you to attend an interagency meeting occurring on April 28, 2009 to provide you input on the proposed project's scoping process. During the meeting we would like

to discuss the project component details, obtain input to understand any issues that your Agency believes are important in the EIS analysis, and review the project schedule. The interagency meeting details are as follows:

Best Western Ramkota Hotel
920 W Sioux Ave
Pierre, South Dakota 57501-1800
Tuesday, April 28, 2009
9 a.m. to 11 a.m.

In addition, this letter serves to invite your agency to become a cooperating agency in the EIS process for the proposed project. The Council on Environmental Quality NEPA Implementing Regulations (40 CFR part 1501.6) emphasizes agency cooperation and authorizes the designated lead Federal agency to request that other Federal agencies with jurisdiction by law be a cooperating agency. Additionally, the lead Federal agency may request that any other Federal agency with special expertise with respect to any environmental issue to be addressed in the EIS also be a cooperating agency. Designated cooperating agencies have certain responsibilities to support the NEPA process, as specified in 40 CFR 1501.6 (b). The benefits of becoming a cooperating agency include disclosure of relevant information early in the EIS process and establishment of a mechanism to address any intergovernmental issues. Should your agency decide not to become a formal cooperating agency for the EIS, you will continue to be kept informed of project developments through the project mailing list, and you will receive the draft and final EIS documents. Any concerns or comments your agency provides to us during the NEPA process, and in a timely fashion, will be fully considered in finalizing the EIS and our Records of Decision (RODs).

The proposed PrairieWinds project would involve the installation and operation of a 150-megawatt (MW) wind energy facility that would feature 101 wind turbine generators. Each turbine generator would have a hub height of 262 feet and a turbine rotor diameter of 252 feet. The total height of each wind turbine would be 389 feet with a blade in the vertical position. The towers would be constructed of tubular steel, approximately 15 feet in diameter at the base, with internal joint flanges. The color of the towers and rotors would be standard white or off-white. During construction, a work/staging area at each turbine would include the crane pad and rotor assembly area, temporarily disturbing an area about 190 feet by 210 feet.

Each wind turbine would be connected by a service road for access and a 34.5-kilovolt (kV) buried electrical collection system that would ultimately route the power from each turbine to a central collector substation, where voltage would be stepped up for interconnection to Western's transmission system. About 30 to 40 miles of new access roads would be built to facilitate both

construction and maintenance of the turbines. Approximately 25 to 35 miles of existing roads would be used and, where appropriate, improved.

Two sites for the wind-powered generation facility are under consideration (see enclosed map). One site is located on about 37,000 acres and is approximately 15 miles north of White Lake, South Dakota, within Brule, Aurora, and Jerauld counties. The other alternative site would be located within an area about 83,000 acres, and is about 8 miles south of Winner, South Dakota, and is entirely within Tripp County.

The site that is approximately 37,000 acres near White Lake, South Dakota, would require a new 230-kV transmission line to deliver the power from the collector substation(s) to a new 230-kV Western interconnection point at Western's Wessington Springs Substation, located in Jerauld County. The Wessington Springs Substation is located approximately 9 to 12 miles from the proposed collector substation(s). The proposed line would be built using wood or steel H-frame (two pole) structures or steel single-pole structures. The structures would be about 85 to 95 feet high and span about 800 feet.

The other alternative site, approximately 83,000 acres near Winner, South Dakota, would require a 34.5-kV to 115-kV collector substation(s) as well as a 115-kV transmission line to interconnect to Western's existing 115-kV Winner Substation. Other facilities necessary for this site would be similar to those described for the site above.

The no action alternative will also be considered.

There is a chance that the final interconnection studies will conclude that other transmission facilities, such as network upgrades remote from the project site, would be required. If the project moves forward and it is determined that other facilities are needed to support the interconnection request, Western and RUS will complete the appropriate level of environmental review.

We want to ensure that any important environmental concerns and natural resources and/or places of interest for your Agency within the project area are considered and addressed in the EIS. At this time, we would appreciate receiving any information that you would be willing to share with us on any unique or special resources or areas in or near the proposed project. If you are aware of any other individuals or affiliated organizations that should be consulted regarding this project, please let us know. A full list of all other agencies and individuals receiving this letter is enclosed.

If any additional agency representatives wish to be added to the project's mailing list and/or receive a copy of the Draft and Final EIS, please contact Ms. Liana Reilly or Mr. Dennis Rankin

at the phone numbers or addresses listed below. Comments on the project scope and alternatives should be received by May 15, 2009, to be considered in defining the scope for the Draft EIS. Comments on the proposed project will be accepted and considered throughout the NEPA process.

At this time, Western and RUS are conducting scoping, including public scoping meetings, to ensure that interested members of the public, potentially affected landowners and lessees, and Federal, state, local, and tribal agencies have an opportunity to provide input on the scope of the EIS and the alternatives that will be addressed in the EIS. Western, RUS, and PrairieWinds representatives will be available at the scoping meetings for one-on-one discussions, to provide information about the proposed project, answer questions, and will take verbal and written comments from interested parties. Information will be available at two public scoping meetings as follows:

Holiday Inn Express and Suites
1360 East Highway 44
Winner, South Dakota 57580
Tuesday, April 28, 2009
4 p.m. to 7 p.m.

Commerce Street Grille
118 North Main Street
Plankinton, South Dakota 57368
Wednesday, April 29, 2009
4 p.m. to 7 p.m.

During this scoping phase, we would like to obtain input to understand any issues that your Agency believes are important. Western and RUS request that you comment on the proposal, offer suggestions to improve the proposal and suggest alternative actions. Please identify any issues of concern about potential environmental impacts. Please address comments, questions or concerns to Ms. Liana Reilly or Mr. Dennis Rankin at the addresses below.

Ms. Liana Reilly
Document Manager
Western Area Power Administration
Corporate Services Office - A7400,
P.O. Box 281213
Lakewood, Colorado 80228-8213
Phone: (720) 962-7253 or (1-800) 336-7288
Fax: (720) 962-7263
E-mail: reilly@wapa.gov

Mr. Dennis Rankin
Project Manager
Engineering and Environmental Staff
Rural Utilities Service, Utilities Program

1400 Independence Ave. SW, Mail Stop 1571
Washington D.C. 20250-1571,
Phone: (202) 720-1953
Fax: (202) 720-0820
E-mail: dennis.rankin@wdc.usda.gov

We look forward to hearing from you.

Sincerely,

A handwritten signature in black ink that reads "Nicholas J. Stas". The signature is written in a cursive style with a large, prominent "N" and "S".

Nick Stas
Environmental Manager
Upper Great Plains Region
Western Area Power Administration

Enclosures

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

May 13, 2009

Ms. Liana Reilly, Document Manager
Western Area Power Administration
Corporate Services Office, A7400
P.O. Box 281213
Lakewood, Colorado 80228-8213

Mr. Dennis Rankin, Project Manager
Engineering and Environmental Staff
Rural Utilities Service, Utilities Program
1400 Independence Avenue SW, Mail Stop 1571
Washington D.C. 20250-1571

Re: Notice of Intent to Prepare an Environmental
Impact Statement for Prairie Winds SD1
Wind Farm, South Dakota

Dear Ms. Reilly and Mr. Rankin:

This letter is in response to your April 9, 2009, letter regarding the Notice of Intent to prepare an Environmental Impact Statement (EIS) for the above referenced project; a 150-megawatt, 101-turbine wind-powered generating facility proposed for south-central South Dakota to be located either near the town of Wessington Springs or the town of Winner. Coordination with the U.S. Fish and Wildlife Service (Service) has already been initiated for this project by your agencies and the applicant, Prairie Winds SD1, Inc. (a subsidiary of Basin Electric Power Cooperative), and their consultants. As part of this continued coordination effort, we herein submit formal comments on this project by the May 15, 2009, deadline as requested in your letter to assist in the development of the upcoming EIS.

The two sites being considered for placement of this wind farm are: 1) the Crow Lake Site (37,000 acres in Brule, Aurora, and Jerauld Counties) and 2) the Winner Site (83,000 acres in Tripp County). Per your letter, the proposed turbines will be 389 feet tall with turbine rotor diameters of 252 feet. The towers will be 15 feet wide at the base, placed on a concrete pad, temporarily disturbing a 190 x 210 foot area per turbine during construction. Thirty (30) to 40 miles of new access roads are planned, and a buried collection system will electrically connect

the turbines to a substation where voltage can be stepped up for interconnection with the Western Area Power Administration's (WAPA) transmission line. Construction of up to perhaps 12 miles of overhead high voltage transmission lines (34.5-115 kV) and other associated appurtenances will be required at both locations.

It is our understanding that the U.S. Department of Agriculture's Rural Utilities Service may provide funding for this project, and the WAPA is considering an interconnection request by Prairie Winds SD1 to WAPA's existing transmission lines. While your agencies are the Federal co-leads for this project, it has been decided that the WAPA will lead the section 7 process under the Endangered Species Act (ESA).

Your letter included an invitation to an agency meeting on April 28, 2009, which Natalie Gates of this office attended, plus an invitation to become a cooperating agency in the development of the EIS for this project. Mr. Harris Hoistad of our Huron Wetland Management District (WMD) also attended the April 28, 2009, meeting, and had indicated his interest in representing the Service as a cooperating agency for this project at that meeting. The Huron WMD administers Service fee title and easement properties in some of the counties proposed for construction. While Mr. Hoistad accepts your invitation and shall serve as your primary contact in that regard, we respectfully request that you include this office in such cooperating agency correspondences as well, thereby allowing the opportunity for input from the Ecological Services branch of the Service in addition to the Refuges program perspective provided by the Huron WMD. Natalie Gates will continue to serve as your Ecological Services contact.

Federally Listed Species

In accordance with section 7(c) of the ESA, as amended, 16 U.S.C. 1531 et seq., we have determined that the following federally listed species may occur in the project area(s) (this list is considered valid for 90 days):

| <u>Species</u> | <u>Status</u> | <u>Expected Occurrence</u> |
|--|---------------|---|
| Whooping crane (<u>Grus americana</u>) | Endangered | Migration |
| American burying beetle (<u>Nicrophorus americanus</u>) | Endangered | Resident, Tripp County |
| Piping plover (<u>Charadrius melodus</u>) | Threatened | Migration |
| Topeka shiner (<u>Notropis topeka</u>) | Endangered | Known resident , waterways in Jerauld and Aurora Counties |

Whooping cranes migrate through central South Dakota on their way to northern breeding grounds and southern wintering areas. They occupy numerous habitats such as cropland and pastures; wet meadows; shallow marshes; shallow portions of rivers, lakes, reservoirs, and stock

ponds; and both freshwater and alkaline basins for feeding and loafing. Overnight roosting sites frequently require shallow water in which to stand and rest. If whooping crane stopover habitat exists within either proposed project site, potential whooping crane impacts should be considered. Whooping cranes are large birds with low maneuverability. Line strike mortality is the greatest known threat to fledged whooping cranes. Whooping crane interactions with wind turbines are not currently known; however, collisions with turbines may be possible, and/or loss of stopover habitat in the migration corridor may be realized if whooping cranes tend to avoid wind farms. Additionally, should construction occur during spring or fall migration, the potential for disturbances exists, stressing the whooping cranes at critical times of the year. Any whooping crane sightings should be reported to the Service; a standard reporting form is available from this office.

The American burying beetle is a known resident of southern Tripp County and has also been documented within Bennett, Todd, and Gregory Counties. Recent studies have shown some preference by this species for sandy or sandy-loam grasslands with interspersed stands of low-meadow cottonwoods; however, they will use various types of soil and habitat if the right type of food is available. The life cycle of the American burying beetle includes time spent underground during the summer months as eggs, larvae, and pupae, with adults present for part of that time; thus, the potential exists to excavate American burying beetles during June, July, and August. Adults are also present underground during winter, so it is possible to destroy American burying beetles via ground disturbance as they hibernate. These potential affects to the American burying beetle should be considered at the proposed Winner Site.

Piping plovers may occur within the proposed project areas although, in South Dakota, this shorebird species occupies habitat primarily along the Missouri River; thus, any birds present at either proposed wind turbine site would likely be passing over/through the site during migration to breeding/wintering areas. The species has been known to collide with overhead power lines; interactions with wind turbines are unknown. Piping plovers use sparsely vegetated interchannel sandbars, islands, and shorelines for nesting, foraging, and brood-rearing. The birds typically breed in South Dakota between the dates of May 1 and August 15.

Topeka shiners occupy tributaries within the Big Sioux, Vermillion, and James River watersheds in eastern South Dakota. Firesteel Creek, West Branch of Firesteel Creek, and Dry Run Creek are waterways in Jerauld and Aurora Counties that are known to be occupied by this minnow species. Should the Crow Lake Site be selected and the project involves direct or indirect impacts to these known occupied waterways or other tributaries to the James River, potential effects to the Topeka shiner should be considered. Examples may include power line/road crossings of these streams or upland construction adjacent to these waterways that could result in instream sedimentation.

If the WAPA or their designated representative determines that the project "may adversely affect" listed species in South Dakota, it should request formal consultation from this office. If a "may affect - not likely to adversely affect" determination is made for this project, it should be submitted to this office for concurrence. If a "no effect" determination is made, further consultation may not be necessary. However, a copy of the determination should be sent to this office.

Wind Energy and Wildlife

Among the Service's primary concerns regarding wind turbines are avian collision mortality and the loss of habitat/habitat avoidance behaviors by wildlife. While there is still much to be learned regarding wind turbine-wildlife interactions, we do know that wind turbines can have adverse impacts on some species. Turbine location, spacing, aspect, lighting, size, and design are all potential factors related to the risk posed to resident and migratory wildlife as are the types of surrounding habitats, use of these habitats by various species of wildlife, landscape features, prey base, migration corridors, and behavioral patterns. Recent studies of grassland nesting birds have shown a tendency for avoidance of areas immediately surrounding turbines causing an indirect loss of habitat. Direct loss of habitat caused by the footprint of the turbines and associated roads and structures is another concern, along with loss of habitat that can occur with encroachment of invasive weeds as a result of these disturbances. Currently, perhaps the best means of minimizing impacts to wildlife is to avoid constructing within high wildlife use areas. Placement of turbines within existing cropland is recommended for this reason. When unavoidable impacts to fish and wildlife species and their habitats are anticipated, we recommend that offsetting measures be developed and implemented. We encourage inclusion of a mitigation plan within the draft EIS to serve this purpose.

Wind Turbine Guidelines

You are aware that the Service has developed voluntary "*Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines*" (available online at <http://www.fws.gov/habitatconservation/Service%20Interim%20Guidelines.pdf>.) to assist energy companies in accomplishing the goal of reducing the risk posed by turbines to wildlife. The guidelines stress the importance of proper evaluation of potential wind turbine development sites, appropriate location and design of turbines and related facilities, and pre- and post-construction research and monitoring. Potential Impact Index (PII) scores, as recommended by our guidelines, were developed for each proposed site (results: PIIs of 269 and 239 for Winner and Crow Lake sites, respectively) and a reference site (result: PII of 331) located near the Lake Andes/Karl Mundt National Wildlife Refuges, South Dakota. Again, please note that previously disturbed sites (e.g., cropland) are recommended areas for turbines to minimize habitat loss and associated wildlife impacts. If construction must occur within intact native grasslands, offsetting and/or mitigative measures should be considered for the conservation of prairie wildlife, particularly migratory birds.

The South Dakota Department of Game, Fish and Parks (SDDGFP) has coordinated with the South Dakota Public Utilities Commission (SDPUC) regarding distribution of the SDDGFP's "*Siting Guidelines for Wind Power Projects in South Dakota*" to wind developers intending to construct projects within the state of South Dakota. You may wish to contact the SDPUC and/or the Wildlife Diversity Division of the SDDGFP in Pierre, South Dakota, for more information. Contact information may be found on their respective websites: <http://puc.sd.gov/> and <http://www.sdgfp.info/Wildlife/Diversity/index.htm>. The guidelines themselves may be found online at: <http://www.sdgfp.info/wildlife/diversity/windpower.htm>.

Birds of Conservation Concern

The Migratory Birds Division of the Service has published "*Birds of Conservation Concern 2008*" (<http://www.fws.gov/migratorybirds/reports/BCC2008/BCC2008.pdf>). This document is intended to identify species in need of coordinated and proactive conservation efforts among State, Federal, and private entities with the goals of precluding future evaluation of these species for ESA protections and promoting/conserving long-term avian diversity. We refer you to page 71 (Table 46) of that report for a list of birds of conservation concern in Region 6 (the Service Region where your project is proposed). Recent avian surveys at other sites in central South Dakota have documented numerous species that are included in Region 6's Birds of Conservation Concern list, such as northern harrier, upland sandpiper, marbled godwit, burrowing owl, grasshopper sparrow, chestnut-collared longspur, and bobolink. Depending upon available habitat, it is likely that some/all of these and perhaps other species of concern may be found in either the Winner or Crow Lake Sites. A primary threat to these species is habitat loss and fragmentation. In accordance with the National Environmental Policy Act and Executive Order 13186 regarding migratory bird protection/conservation, we recommend avoidance, minimization, and finally, offsetting measures to reduce the unavoidable impacts to species protected by the Migratory Bird Treaty Act (MBTA). MBTA compliance may be partially addressed in an Avian and Bat Protection Plan (see below); however, a separate mitigation plan that specifically addresses direct and indirect take of birds during and after construction (via collision, habitat loss, and habitat avoidance) is also recommended. This office can assist with development of such a plan.

Meteorological Towers

Meteorological towers constructed in association with wind turbines are often similar in design to typical communications towers: tall, lighted, lattice structured, and guyed. These types of towers can be problematic for birds, particularly during inclement weather, as they enter the lighted area, become reluctant to leave it, and suffer mortality as they circle the structure and collide with the guy wires or the lattice of the tower itself. We are aware that meteorological towers already exist at the proposed sites but are uncertain of the tower designs. Guidance set forth in "*U.S. Fish and Wildlife Service Interim Guidelines for Recommendations on Communications Tower Siting, Constructions, Operation and Decommissioning*" may be found online at <http://www.fws.gov/habitatconservation/communicationtowers.html>. We recommend adherence to these guidelines for construction of new towers and retrofitting of existing towers to minimize the threat of avian mortality at these structures. Please note that it may be possible to apply some of these guidelines to the turbine towers as well.

In order to obtain information on the usefulness of the communications tower guidelines in preventing birds strikes and to identify any recurring problems with their implementation which may necessitate modifications, please advise us of the final location and specifications of any towers associated with the wind turbine project and which of the measures recommended for the protection of migratory birds were implemented. If any of the recommended measures cannot be implemented, please explain why they were not feasible. A Tower Site Evaluation Form is also available via the above communications tower website:

(<http://www.fws.gov/habitatconservation/communicationtowers.html>). Please complete this form and forward it to our office.

Power Lines

The construction of additional overhead power lines associated with wind farms creates the threat of avian electrocution, particularly for raptors. Thousands of these birds, including endangered species, are killed annually as they attempt to utilize overhead power lines as nesting, hunting, resting, feeding, and sunning sites. The Service recommends the installation of underground, rather than overhead, power lines whenever possible and appropriate to minimize environmental disturbances. For all new overhead lines or modernization of old overhead lines, we recommend incorporating measures to prevent avian electrocutions. The publication entitled "*Suggested Practices for Avian Protection on Power Lines - The State of the Art in 2006*" has many good suggestions including pole extensions, modified positioning of live phase conductors and ground wires, placement of perch guards and elevated perches, elimination of cross arms, use of wood (not metal) braces, and installation of various insulating covers. You may obtain this publication by contacting the Edison Electric Institute via their website at www.eei.org or by calling 1-800-334-5453.

Please note that utilizing just one of the "*Suggested Practices . . .*" methods may not entirely remove the threat of electrocution to raptors. In fact, improper use of some methods may increase electrocution mortality. Perch guards, for example, may be only partially effective as some birds may still attempt to perch on structures with misplaced or small-sized guards and may suffer electrocution as they approach too close to conducting materials. Among the most dangerous structures to raptors are poles that are located at a crossing of two or more lines, exposed above-ground transformers, or dead end poles. Numerous hot and neutral lines at these sites, combined with inadequate spacing between conductors, increase the threat of avian electrocutions. Perch guards placed on other poles have in some cases served to actually shift birds to these more dangerous sites, increasing the number of mortalities. Thus, it may be necessary to utilize other methods or combine methods to achieve the best results. The same principles may be applied to substation structures.

Please also note that the spacing recommendation within the "*Suggested Practices . . .*" publication of at least 60 inches between conductors or features that cause grounding may not be protective of larger raptors such as eagles. This measure was based on the fact that the skin-to-skin contact distance on these birds (i.e., talon to beak, wrist to wrist, etc.) is less than 60 inches. However, an adult eagle's wingspan (distance between feather tips) may vary from 66 to 96 inches depending on the species (golden or bald) and gender of the bird. Unfortunately, wet feathers in contact with conductors and/or grounding connections can result in a lethal electrical surge. Thus, the focus of the above precautionary measures should be to a) provide more than 96 inches of spacing between conductors or grounding features, b) insulate exposed conducting features so that contact will not cause raptor electrocution, and/or c) prevent raptors from perching on the poles in the first place.

Additional information regarding simple, effective ways to prevent raptor electrocutions on power lines is available in video form. "*Raptors at Risk*" may be obtained by contacting EDM International, Inc. at 4001 Automation Way, Fort Collins, Colorado 80525-3479, Telephone No. (970) 204-4001, or by visiting their website at <http://www.edmlink.com/raptorvideo.htm>.

In addition to electrocution, overhead power lines also present the threat of avian line strike mortality. Particularly in situations where these lines are adjacent to large wetlands or where waters exist on opposite sides of the lines, we recommend marking them in order to make them more visible to birds. For more information on bird strikes, please see "*Mitigating Bird Collisions With Power Lines: The State of the Art in 1994*" which may be obtained by contacting the Edison Electric Institute at the same website and telephone number listed above. While line marking is recommended to reduce the risk of collision, it does not preclude line strike mortality entirely. Thus, marking of additional, existing overhead lines is recommended as a means to further mitigate the potential for line strike mortality to migratory birds, including threatened/endangered species such as the whooping crane.

Avian and Bat Protection Plans

The Service has coordinated with the Avian Power Line Interaction Committee (APLIC) to develop guidelines to assist companies in formulating Avian Protection Plans (APP). APPs are utility-specific and designed to reduce avian and operational risks that result from avian interactions with electric utility facilities, but they may be adapted to wind energy facilities as well and include consideration of bat species which are known to suffer mortality at wind farms. We encourage the project developer of the proposed wind farm to investigate the formulation of an A(and B [bat])PP and incorporate that into the draft EIS. The guidelines may be accessed at APLIC's website at <http://www.aplic.org/>.

MBTA and Bald and Golden Eagle Protection Act (BGEPA)

Although the Service's tower, utility, and wind turbine guidelines will provide some protection for migratory birds, implementation of these measures alone will not remove any liability should violations of the law occur. Please be apprised of the potential application of the MBTA of 1918, as amended, 16 U.S.C. 703 et seq., and the BGEPA of 1940, as amended, 16 U.S.C. 668 et seq., to your project. The MBTA does not require intent to be proven and does not allow for "take," except as permitted by regulations. Section 703 of the MBTA provides: "Unless and except as permitted by regulations . . . it shall be unlawful at any time, by any means, or in any manner, to . . . take, capture, kill, attempt to take, capture, or kill, possess . . . any migratory bird, any part, nest, or eggs of any such bird . . ." The BGEPA prohibits knowingly taking, or taking with wanton disregard for the consequences of an activity, any bald or golden eagles or their body parts, nests, or eggs, which includes collection, molestation, disturbance, or killing activities.

It is understood that some birds may be killed even if all reasonable conservation measures are implemented. The Service's Office of Law Enforcement carries out its mission to protect migratory birds through investigations and enforcement and through fostering relationships with individuals and industries seeking to eliminate their impacts to migratory birds. While it is not

possible under the MBTA and the BGEPA to absolve individuals or companies from liability by following these guidelines, enforcement will be focused on those individuals or companies that take migratory birds with disregard for the law and where no legitimate conservation measures have been applied.

Bats

Bats are known to suffer mortality due to direct collisions with wind turbines, and it has been recently determined that many also die as a result of air pressure changes at the turbine blades that cause internal injuries. The SDDGFP has completed a state management plan for bats and may be able to provide additional information and/or recommendations regarding this project. If you have not already done so, please contact Silka Kempema at the SDDGFP-Wildlife Division, Joe Foss Building, 523 East Capitol Avenue, Pierre, South Dakota 57501, Telephone No. (605) 773-2742, for more information.

U.S. Geological Survey (USGS) Research

The Northern Prairie Wildlife Research Center of Jamestown, North Dakota, has initiated studies of avian responses to wind turbines in both North Dakota and South Dakota. Their research may be relevant to your project, depending on habitat within the project area(s). We recognize that a consultant has already been hired for the Prairie Winds Project and that wildlife surveys are currently underway as of this writing. However, we recommend that you contact Ms. Jill Shaffer of the Northern Prairie Wildlife Research Center at (701) 253-5547 for more information about the USGS project; the preliminary results of that ongoing study appear pertinent to Prairie Winds.

If changes are made in the project plans or operating criteria, or if additional information becomes available, the Service should be informed so that the above determinations can be reconsidered.

The Service appreciates the opportunity to provide scoping comments and looks forward to development of the draft EIS. If you have any questions on these comments, please contact Natalie Gates of this office at (605) 224-8693, Extension 234.

Sincerely,



*Acting
For*

Pete Gober
Field Supervisor
South Dakota Field Office

OCT 14 2009

Mr. Pete Gober, Field Supervisor
U.S. Fish and Wildlife Service
South Dakota Field Office
420 South Garfield Ave., Suite 400
Pierre, South Dakota 57501-5408

RE: Endangered Species Act Section 7 Consultation, Proposed Prairie Winds SD1 Wind Energy Facility, Aurora, Brule, Jerauld, and Tripp Counties, South Dakota

Dear Mr. Gober:

The U.S. Department of Energy's Western Area Power Administration (Western), and the U.S. Department of Agriculture's Rural Utilities Service (RUS) [the Agencies] are currently considering whether to provide electrical interconnection and financing, respectively, for the construction of a 150-MW wind generating facility on one of two proposed sites in the subject counties. The proposed facility called Prairie Winds SD1 would be developed, constructed, and operated by Prairie Winds SD1 Incorporated, a wholly owned subsidiary of Basin Electric Power Cooperative, Inc., of Bismarck, ND.

Western and RUS are the co-lead Federal agencies responsible for compliance with the National Environmental Policy Act (NEPA) and related statutes [including the Endangered Species Act of 1973 (ESA)] for the proposed project. The Agencies issued a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) dated April 9, 2009, to which your office responded in a letter dated May 13, 2009.

The purpose of this letter is to inform you of our intended approach to consultation under Section 7(a) of the ESA, and designate a non-federal agent for consultation. Your May 13, 2009, letter provided sufficient information on listed species in the proposed project counties to allow us to begin the preparation of a Biological Assessment (BA) and related activities. Per your letter, the following are the current Federally-listed species in the proposed project counties:

Mr. Pete Gober

| <u>Status</u> | <u>Species/Listing Name</u> |
|---------------|---|
| E | Crane, whooping except where EXPN (<i>Grus americana</i>) |
| T | Plover, piping except Great Lakes watershed (<i>Charadrius melodus</i>) |
| E | Shiner, Topoka (<i>Notropis topeka (=tristis)</i>) |
| E | American Burying beetle (<i>Nicrophorus americanus</i>) |

We request that you provide any updates or changes to this list, otherwise we will proceed with our analysis based on the four species listed. A project description was provided in the Agencies' April 9, 2009, letter and it has not changed since then.

RUS will be the lead agency for Section 7 consultation, with the assistance of Western and their EIS contractor. We wish to designate as our agent for consultation Mr. Patrick Golden of Heritage Environmental Consultants in Denver, Colorado. Mr. Golden can be reached at (303) 618-7910 or by email at pgolden@heritage-ec.com. Heritage will be preparing the BA under supervision and for final approval by the Agencies. We trust that Mr. Golden will be able to work with your office directly for any information or other needs as he prepares the BA.

If you have any questions or require additional information please contact Richard Fristik, Sr. Environmental Protection Specialist, RUS, Engineering and Environmental Staff at (202) 720-5093, or e-mail richard.fristik@wdc.usda.gov; or contact Ms. Misti Schriener, Biologist, Western at (720) 962-7239, or e-mail mschriener@wapa.gov.

Sincerely,

Mark S. Plank

MARK S. PLANK
 Director
 Engineering and Environmental Staff
 Water and Environmental Programs
 USDA, Rural Utilities Service

cc: EES file EES DRankin EES RFristik EES MPlank S/O SD

Ms. Liana Reilly
Western Area Power Administration
Corporate Services Office
P.O. Box 281213
Lakewood, CO 80228-8213

Ms. Misti K. Schriener
Western Area Power Administration
Corporate Services Office
P.O. Box 281213
Lakewood, CO 80228-8213

Mr. Patrick Golden
Heritage Environmental Consultants
2870 Emporia Ct.
Denver, CO 80238

Mr. Kevin Solie
Basin Electric Power Cooperative
1717 East Interstate Ave
Bismarck, ND 58503

Draft: EES RFristik, (202) 720-5093, 10/6/09; final mw 10/7/09
Recall: s/wep/rfristik/PW_SD_1_S 7 initial letter

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

November 12, 2009

Mr. Mark Plank, Director
USDA Rural Utilities Service
Engineering and Environmental Staff
Water and Environmental Program
1400 Independence Avenue, S.W.
Washington, DC 20250-0700

Re: Proposed Prairie Winds SD1 Wind Energy
Facility - Aurora, Brule, Jerauld, and Tripp
Counties, South Dakota

Dear Mr. Plank:

This letter is in response to your request dated October 14, 2009, for an update of federally-listed species (originally provided in our May 13, 2009, letter to your agency and the Western Area Power Administration [Western]) that may occur in the proposed project area(s) of the above referenced Prairie Winds SD1 Wind Energy Facility. It is our understanding that two sites are currently being evaluated for this facility: the Crow Lake site (Aurora/Jerauld/Brule Counties) and the Winner site (Tripp County).

We acknowledge your proposed approach to the section 7 consultation process with your agency, the U.S. Department of Agriculture- Rural Utilities Service (USDA-RUS), as the lead to be assisted by the Western/their Environmental Impact Statement contractor and the designation of Mr. Patrick Golden of Heritage Environmental Consultants in Denver, Colorado, as your agent for consultation purposes.

In accordance with section 7(c) of the Endangered Species Act (ESA), as amended, 16 U.S.C. 1531 et seq., we have determined that the following federally listed species may occur in the project area (this list is considered valid for 90 days):

| <u>Species</u> | <u>Status</u> | <u>Expected Occurrence</u> |
|--|---------------|---|
| Whooping crane (<u>Grus americana</u>) | Endangered | Migration. |
| American burying beetle (<u>Nicrophorus americanus</u>) | Endangered | Resident, Tripp County. |
| Piping plover (<u>Charadrius melodus</u>) | Threatened | Migration, Nesting. |
| Topeka shiner (<u>Notropis topeka</u>) | Endangered | Resident, Waterways of Jerauld and Aurora Counties. |

The detailed information for the above species provided in our May 13, 2009, letter remains pertinent.

If the USDA-RUS or their designated representative determines that the project "may adversely affect" listed species in South Dakota, it should request formal consultation from this office. If a "may affect - not likely to adversely affect" determination is made for this project, it should be submitted to this office for concurrence. If a "no effect" determination is made, further consultation may not be necessary. However, a copy of the determination should be sent to this office.

In addition to your consideration of the above federally listed species, please note that a substantial 90-day finding was recently issued by the U.S. Fish and Wildlife Service (Service) in response to a petition to list a species likely to occur within both of the potential Prairie Winds SD1 project sites: the northern leopard frog (Federal Register, Volume 74, No. 125, Wednesday, July 1, 2009, pages 31389-31401). The positive 90-day finding for the northern leopard frog does not afford it any level of protection under the ESA; however, a status review (12-month finding) is currently underway wherein the Service will determine whether listing of the western portion of the northern leopard frog's population - west of the Mississippi River/Great Lakes Region - is warranted. The conclusion of the status review will be either a) the species does not warrant listing (i.e., no further action will be taken), or b) the species is warranted for ESA protection (i.e., it becomes a candidate species and may be proposed for listing immediately or sometime in the future). We recommend that you remain vigilant for the changing status of the northern leopard frog and consider the development and implementation of proactive measures to conserve northern leopard frog individuals and populations during all phases and activities associated with the proposed Prairie Winds SD1 Wind Energy Facility. You may contact Natalie Gates of this office at (605) 224-8693, Extension 234, for updates of the northern leopard frog's status and/or view pertinent information the following website: http://www.fws.gov/southwest/es/Arizona/Northern_Frog.htm.

Please note that the bald eagle (*Haliaeetus leucocephalus*) occurs throughout South Dakota in all seasons, and new nests are appearing each year. While ESA protections for the bald eagle have been removed, effective August 8, 2007, the species will continue to be protected under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act. These laws protect bald eagles from a variety of harmful actions and impacts. Our agency has developed guidance for the public regarding means to avoid take of the bald eagle under these laws. The “*National Bald Eagle Management Guidelines*” are available online at: <http://www.fws.gov/migratorybirds/baldeagle.htm>. We recommend reviewing these guidelines as they serve to advise of circumstances where these laws may apply and to assist in avoiding potential violations on this and future projects.

While most species of migratory birds do not receive ESA protections, they are protected by the MBTA and are trust resources of the Service. As indicated in our May 13, 2009, letter submitted to the USDA-RUS and the Western, recent avian surveys in central South Dakota have detected species included in our “*Birds of Conservation Concern 2008*” publication; these species likely occur on both of the proposed sites for the Prairie Winds SD1 Wind Energy Facility based on known habitats occurring in these areas. The establishment of turbines in avian habitats has the potential to negatively affect migratory birds; thus, we continue to recommend avoidance, minimization, and finally, offsetting measures which may be outlined in an Avian and Bat Protection Plan or a separate plan designed to reduce any unavoidable detrimental effects to species protected by the MBTA. Particularly when turbine placement must occur within grasslands, we strongly recommend development of mitigative/offsetting measures for this habitat and its associated wildlife.

The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. While the MBTA has no provision for allowing unauthorized take, the Service realizes that some birds may be killed as a result of this project even if all reasonable measures to protect them are used. The Service’s Office of Law Enforcement carries out its mission to protect migratory birds through investigations and enforcement as well as by fostering relationships with individuals, companies, and industries that have taken effective steps to minimize their impacts on migratory birds and by encouraging others to enact such programs. It is not possible to absolve individuals, companies, or agencies from liability even if they implement avian mortality avoidance or similar conservation measures. However, the Office of Law Enforcement focuses its resources on investigating and prosecuting individuals and companies that take migratory birds without regard for their actions or without following an agreement to avoid take.

The Service has developed an online reporting system for avian mortalities. Instructions for our “*Bird Fatality/Injury Reporting Program*” may be found online at: http://www.aplic.org/USFWS_BirdFatality_FilerInstructions.pdf, and the reporting site itself is located online at: <https://birdreport.fws.gov/>. Migratory bird mortalities or injuries located by your company, by contractors, or other individuals should be recorded to this online site within 30 days of discovery. This reporting system may be used to compliment an Avian and Bat Protection Plan.

If changes are made in the project plans or operating criteria, or if additional information becomes available, the Service should be informed so that the above determinations can be reconsidered.

The Service appreciates the opportunity to provide comments. If you have any questions on these comments, please contact Natalie Gates of this office at (605) 224-8693, Extension 234.

Sincerely,



Pete Gober
Field Supervisor
South Dakota Field Office

cc: Western; Lakewood, CO
(Attention: Misti Schriener)
Heritage Environmental Consultants; Denver, CO
(Attention: Patrick Golden)

Table C-1 Wildlife Species Observed in the Crow Lake Alternative (2008-2009 Field Surveys)

| Common Name | Scientific Name | Common Name | Scientific Name |
|----------------------------|------------------------------------|---------------------------|-----------------------------------|
| Birds | | | |
| Cooper's Hawk | <i>Accipiter cooperii</i> | Northern Bobwhite | <i>Colinus virginianus</i> |
| Western Grebe | <i>Aechmophorus occidentalis</i> | Rock Pigeon | <i>Columba livia</i> |
| Red-winged Blackbird | <i>Agelaius phoeniceus</i> | Eastern Wood Pewee | <i>Contopus virens</i> |
| Grasshopper Sparrow | <i>Ammodramus savannarum</i> | American Crow | <i>Corvus brachyrhynchos</i> |
| Northern Pintail | <i>Anas acuta</i> | Yellow Warbler | <i>Dendroica petechia</i> |
| American Widgeon | <i>Anas Americana</i> | Bobolink | <i>Dolichonyx oryzivorus</i> |
| Green-winged Teal | <i>Anas carolinensis</i> | Little Blue Heron | <i>Egretta caerulea</i> |
| Northern Shoveler | <i>Anas clypeata</i> | Horned Lark | <i>Eremophila alpestris</i> |
| Cinnamon Teal | <i>Anas cyanoptera</i> | Brewer's Blackbird | <i>Euphagus cyanocephalus</i> |
| Blue-winged Teal | <i>Anas discors</i> | Prairie Falcon | <i>Falco mexicanus</i> |
| Mallard | <i>Anas platyrhynchos</i> | American Kestrel | <i>Falco sparverius</i> |
| Gadwall | <i>Anas strepera</i> | American Coot | <i>Fulica americana</i> |
| Great Blue Heron | <i>Ardea herodias</i> | Common Snipe | <i>Gallinago gallinago</i> |
| Redhead | <i>Aythya Americana</i> | Common Loon | <i>Gavia immer</i> |
| Ring-necked Duck | <i>Aythya collaris</i> | Common Yellowthroat | <i>Geothlypis trichas</i> |
| Greater Scaup | <i>Aythya marila</i> | Sandhill Crane | <i>Grus canadensis</i> |
| Canvasback | <i>Aythya valisineria</i> | Barn Swallow | <i>Hirundo rustica</i> |
| Upland Sandpiper | <i>Bartramia longicauda</i> | Baltimore Oriole | <i>Icterus galbula</i> |
| Canada Goose | <i>Branta canadensis</i> | Orchard Oriole | <i>Icterus spurius</i> |
| Snowy Owl | <i>Bubo scandiacus</i> | Loggerhead Shrike | <i>Lanius ludovicianus</i> |
| Great horned Owl | <i>Bubo virginianus</i> | California Gull | <i>Larus californicus</i> |
| Cattle Egret | <i>Bubulcus ibis</i> | Ring-billed Gull | <i>Larus delawarensis</i> |
| Bufflehead | <i>Bucephala albeola</i> | Franklin's Gull | <i>Larus pipixcan</i> |
| Red-tailed Hawk | <i>Buteo jamaicensis</i> | Marbled Godwit | <i>Limosa fedoa</i> |
| Broad-winged Hawk | <i>Buteo platypterus</i> | Red-headed Woodpecker | <i>Melanerpes erythrocephalus</i> |
| Swainson's Hawk | <i>Buteo swainsoni</i> | Song Sparrow | <i>Melospiza melodia</i> |
| McCown's Longspur | <i>Calcarius mccownii</i> | Common Merganser | <i>Mergus merganser</i> |
| Chestnut-collared Longspur | <i>Calcarius ornatus</i> | Brown-headed Cowbird | <i>Molothrus ater</i> |
| White-rumped Dandpiper | <i>Calidris fuscicollis</i> | Black-crowned Night-Heron | <i>Nycticorax nycticorax</i> |
| American Goldfinch | <i>Carduelis tristis</i> | Ruddy Duck | <i>Oxyura jamaicensis</i> |
| Willet | <i>Catoptrophorus semipalmatus</i> | House Sparrow | <i>Passer domesticus</i> |
| Chimney Swift | <i>Chaetura pelagica</i> | Savannah Sparrow | <i>Passerculus sandwichensis</i> |
| Killdeer | <i>Charadrius vociferous</i> | American White Pelican | <i>Pelecanus erythrorhynchos</i> |
| Snow Goose | <i>Chen caerulescens</i> | Cliff Swallow | <i>Petrochelidon pyrrhonota</i> |
| Common Nighthawk | <i>Chordeiles minor</i> | Double-crested Cormorant | <i>Phalacrocorax auritus</i> |
| Northern Harrier | <i>Circus cyaneus</i> | Ring-necked Pheasant | <i>Phasianus colchicus</i> |
| Marsh Wren | <i>Cistothorus palustris</i> | Black-capped Chickadee | <i>Poecile atricapillus</i> |

Table C-1 Wildlife Species Observed in the Crow Lake Alternative (2008-2009 Field Surveys)

| Common Name | Scientific Name | Common Name | Scientific Name |
|--------------------------|-----------------------------------|------------------------------|--------------------------------------|
| Northern Flicker | <i>Colaptes auratus</i> | Vesper Sparrow | <i>Pooecetes gramineus</i> |
| Bobwhite Quail | <i>Colinus virginianus</i> | Great-tailed Grackle | <i>Quiscalus mexicanus</i> |
| Bank Swallow | <i>Riparia riparia</i> | Common Grackle | <i>Quiscalus quiscula</i> |
| Dickcissel | <i>Spiza americana</i> | Greater Yellowlegs | <i>Tringa melanoleuca</i> |
| Clay Colored Sparrow | <i>Spizella pallida</i> | Solitary Sandpiper | <i>Tringa solitaria</i> |
| Chipping Sparrow | <i>Spizella passerine</i> | House Wren | <i>Troglodytes aedon</i> |
| Field Sparrow | <i>Spizella pusilla</i> | American Robin | <i>Turdus migratorius</i> |
| N. Rough-winged Swallow | <i>Stelgidopteryx serripennis</i> | Greater Prairie-Chicken | <i>Tympanuchus cupido</i> |
| Forster's Tern | <i>Sterna forsteri</i> | Sharp-tailed Grouse | <i>Tympanuchus phasianellus</i> |
| Western Meadowlark | <i>Sturnella neglecta</i> | Eastern Kingbird | <i>Tyrannus tyrannus</i> |
| European Starling | <i>Sturnus vulgaris</i> | Western Kingbird | <i>Tyrannus verticalis</i> |
| Tree Swallow | <i>Tachycineta bicolor</i> | Yellow-headed Blackbird | <i>Xanthocephalus xanthocephalus</i> |
| Brown Thrasher | <i>Toxostoma rufum</i> | Mourning Dove | <i>Zenaida macroura</i> |
| Mammals | | | |
| Coyote | <i>Canis latrans</i> | White-tailed Deer | <i>Odocoileus virginianus</i> |
| Black-tailed Prairie Dog | <i>Cynomys ludovicianus</i> | Fox Squirrel | <i>Sciurus niger</i> |
| White-tailed Jackrabbit | <i>Lepus townsendii</i> | ThirteenLine Ground Squirrel | <i>Spermophilus tridecemlineatus</i> |
| Striped Skunk | <i>Mephitis mephitis</i> | Cottontail Rabbit | <i>Sylvilagus floridanus</i> |
| Mink | <i>Mustela vison</i> | Eastern Cottontail Rabbit | <i>Sylvilagus floridanus</i> |
| Mule Deer | <i>Odocoileus hemionus</i> | Badger | <i>Taxidea taxus</i> |
| Amphibians | | | |
| Spring Peeper | <i>Pseudacris crucifer</i> | | |

Table C-2 Summary of individuals and group observations for fixed-point bird use surveys at the PrairieWinds SD1 Crow Lake Wind Resource Area, March 19 – May 27, 2009

| Species | Scientific Name | Spring | |
|---------------------------|----------------------------------|------------|--------------|
| | | # grps | # obs |
| Waterbirds | | 29 | 176 |
| American White Pelican | <i>Pelecanus erythrorhynchos</i> | 2 | 49 |
| Black-crowned Night-Heron | <i>Nycticorax nycticorax</i> | 1 | 4 |
| Double-crested Cormorant | <i>Phalacrocorax auritus</i> | 2 | 40 |
| Forster's Tern | <i>Sterna forsteri</i> | 1 | 1 |
| Franklin's Gull | <i>Larus pipixcan</i> | 6 | 25 |
| ring-billed Gull | <i>Larus delawarensis</i> | 12 | 30 |
| Sandhill Crane | <i>Grus canadensis</i> | 3 | 24 |
| unidentified gull | | 2 | 3 |
| Waterfowl | | 155 | 1,053 |
| Blue-winged Teal | <i>Anas discors</i> | 9 | 29 |
| Canada Goose | <i>Branta canadensis</i> | 20 | 666 |
| Gadwall | <i>Anas strepera</i> | 4 | 9 |
| Green-winged Teal | <i>Anas crecca</i> | 1 | 2 |
| Mallard | <i>Anas platyrhynchos</i> | 86 | 213 |
| Northern Pintail | <i>Anas acuta</i> | 23 | 55 |
| Northern Shoveler | <i>Anas clypeata</i> | 8 | 24 |
| Ring-necked Duck | <i>Aythya collaris</i> | 1 | 1 |
| Snow Goose | <i>Chen caerulescens</i> | 1 | 50 |
| unidentified duck | | 2 | 4 |
| Shorebirds | | 87 | 96 |
| Common Snipe | <i>Gallinago gallinago</i> | 1 | 1 |
| Killdeer | <i>Charadrius vociferous</i> | 64 | 69 |
| Marbled Godwit | <i>Limosa fedoa</i> | 9 | 12 |
| Upland Dandpiper | <i>Bartramia longicauda</i> | 13 | 14 |
| Rails/Coots | | 1 | 2 |
| American Coot | <i>Fulica americana</i> | 1 | 2 |
| Raptors | | 56 | 58 |
| American Kestrel | <i>Falco sparverius</i> | 5 | 5 |
| Broad-winged Hawk | <i>Buteo platypterus</i> | 3 | 3 |
| Cooper's Hawk | <i>Accipiter cooperii</i> | 1 | 1 |
| Great Horned Owl | <i>Bubo virginianus</i> | 1 | 1 |
| Northern Harrier | <i>Circus cyaneus</i> | 22 | 22 |
| Prairie Falcon | <i>Falco mexicanus</i> | 1 | 1 |
| Red-tailed Hawk | <i>Buteo jamaicensis</i> | 11 | 11 |
| Swainson's Hawk | <i>Buteo swainsoni</i> | 6 | 7 |
| unidentified buteo | | 6 | 7 |
| Upland Gamebirds | | 162 | 180 |
| Greater Prairie-Chicken | <i>Tympanuchus cupido</i> | 4 | 5 |
| Ring-necked Pheasant | <i>Phasianus colchicus</i> | 156 | 173 |
| Dharp-tailed Grouse | <i>Tympanuchus phasianellus</i> | 2 | 2 |
| Doves/Pigeons | | 47 | 62 |
| Mourning Dove | <i>Zenaida macroura</i> | 47 | 62 |
| Large Corvids | | 2 | 2 |
| American Crow | <i>Corvus brachyrhynchos</i> | 2 | 2 |
| Passerines | | 321 | 533 |
| American Goldfinch | <i>Carduelis tristis</i> | 1 | 2 |
| American Robin | <i>Turdus migratorius</i> | 4 | 6 |
| Baltimore Oriole | <i>Icterus galbula</i> | 2 | 2 |
| Barn Swallow | <i>Hirundo rustica</i> | 13 | 21 |
| Bobolink | <i>Dolichonyx oryzivorus</i> | 8 | 9 |
| Brown-headed Cowbird | <i>Molothrus ater</i> | 24 | 44 |

Table C-2 Summary of individuals and group observations for fixed-point bird use surveys at the PrairieWinds SD1 Crow Lake Wind Resource Area, March 19 – May 27, 2009

| Species | Scientific Name | Spring | |
|---------------------------|--------------------------------------|------------|--------------|
| | | # grps | # obs |
| Chipping Sparrow | <i>Spizella passerine</i> | 1 | 1 |
| Cliff Swallow | <i>Petrochelidon pyrrhonota</i> | 2 | 5 |
| Common Grackle | <i>Quiscalus quiscula</i> | 7 | 17 |
| Dickcissel | <i>Spiza Americana</i> | 2 | 2 |
| Eastern Kingbird | <i>Tyrannus tyrannus</i> | 2 | 2 |
| European Starling | <i>Sturnus vulgaris</i> | 3 | 8 |
| Horned Lark | <i>Eremophila alpestris</i> | 25 | 56 |
| Loggerhead Shrike | <i>Lanius ludovicianus</i> | 1 | 1 |
| Orchard Oriole | <i>Icterus spurius</i> | 1 | 1 |
| Red-winged Blackbird | <i>Agelaius phoeniceus</i> | 62 | 184 |
| Savannah Sparrow | <i>Passerculus sandwichensis</i> | 5 | 5 |
| Song Sparrow | <i>Melospiza melodia</i> | 1 | 1 |
| Tree Swallow | <i>Tachycineta bicolor</i> | 2 | 2 |
| unidentified sparrow | | 1 | 3 |
| unidentified swallow | | 1 | 2 |
| Western Kingbird | <i>Tyrannus verticalis</i> | 1 | 1 |
| Western Meadowlark | <i>Sturnella neglecta</i> | 150 | 156 |
| Yellow-headed Blackbird | <i>Xanthocephalus xanthocephalus</i> | 1 | 1 |
| Yellow Warbler | <i>Dendroica petechia</i> | 1 | 1 |
| Other Birds | | 14 | 15 |
| Common Nighthawk | <i>Chordeiles minor</i> | 4 | 4 |
| Northern Flicker | <i>Colaptes auratus</i> | 9 | 10 |
| unidentified woodpecker | | 1 | 1 |
| Unidentified Birds | | 1 | 1 |
| unidentified bird | | 1 | 1 |
| Overall | | 875 | 2,178 |

Table C-3 Total number of groups and individuals for each bird type and species observed during transect bird use surveys at the PrairieWinds SD1 Crow Lake Wind Resource Area, June 2 – July 7, 2009

| Species/Type | Scientific Name | # grps | # obs |
|---------------------------|--------------------------------------|---------------|--------------|
| Waterbirds | | 8 | 12 |
| Double-crested Cormorant | <i>Phalacrocorax auritus</i> | 3 | 7 |
| Forster's Tern | <i>Sterna forsteri</i> | 1 | 1 |
| Great Blue Heron | <i>Ardea herodias</i> | 2 | 2 |
| unidentified tern | | 2 | 2 |
| Waterfowl | | 43 | 128 |
| Blue-winged Teal | <i>Anas discors</i> | 8 | 20 |
| Canada Goose | <i>Branta canadensis</i> | 1 | 5 |
| Gadwall | <i>Anas strepera</i> | 1 | 1 |
| Mallard | <i>Anas platyrhynchos</i> | 15 | 44 |
| Northern Pintail | <i>Anas acuta</i> | 5 | 10 |
| Northern Shoveler | <i>Anas clypeata</i> | 2 | 10 |
| Redhead | <i>Aythya Americana</i> | 1 | 1 |
| Ring-necked Duck | <i>Aythya collaris</i> | 1 | 1 |
| unidentified Duck | | 9 | 36 |
| Shorebirds | | 71 | 93 |
| Common Snipe | <i>Gallinago gallinago</i> | 3 | 3 |
| Killdeer | <i>Charadrius vociferous</i> | 21 | 24 |
| Marbled Godwit | <i>Limosa fedoa</i> | 5 | 6 |
| unidentified sandpiper | | 1 | 1 |
| Upland Sandpiper | <i>Bartramia longicauda</i> | 40 | 58 |
| Willet | <i>Catoptrophorus semipalmatus</i> | 1 | 1 |
| Rails/Coots | | 1 | 1 |
| American Coot | <i>Fulica americana</i> | 1 | 1 |
| Raptors | | 12 | 12 |
| <i>Northern Harrier</i> | | 11 | 11 |
| Northern Harrier | <i>Circus cyaneus</i> | 11 | 11 |
| <i>Owls</i> | | 1 | 1 |
| Great Horned Owl | <i>Bubo virginianus</i> | 1 | 1 |
| Upland Gamebirds | | 86 | 118 |
| Greater Prairie-Chicken | <i>Tympanuchus cupido</i> | 12 | 23 |
| Ring-necked Pheasant | <i>Phasianus colchicus</i> | 72 | 93 |
| Sharp-tailed Grouse | <i>Tympanuchus phasianellus</i> | 2 | 2 |
| Doves/Pigeons | | 26 | 41 |
| Mourning Dove | <i>Zenaida macroura</i> | 25 | 38 |
| Tock Pigeon | <i>Columba livia</i> | 1 | 3 |
| Passerines | | 1,636 | 2,417 |
| <i>Passerines</i> | | 9 | 11 |
| unidentified passerine | | 9 | 11 |
| <i>Blackbirds/Orioles</i> | | 910 | 1,509 |
| Brown-headed Cowbird | <i>Molothrus ater</i> | 273 | 544 |
| Bobolink | <i>Dolichonyx oryzivorus</i> | 70 | 83 |
| Brewer's Blackbird | <i>Euphagus cyanocephalus</i> | 1 | 1 |
| Common Grackle | <i>Quiscalus quiscula</i> | 23 | 37 |
| European Starling | <i>Sturnus vulgaris</i> | 2 | 36 |
| Great-tailed Grackle | <i>Quiscalus mexicanus</i> | 3 | 3 |
| Orchard Oriole | <i>Icterus spurius</i> | 1 | 1 |
| Red-winged Blackbird | <i>Agelaius phoeniceus</i> | 120 | 225 |
| Western Meadowlark | <i>Sturnella neglecta</i> | 396 | 535 |
| Yellow-headed Blackbird | <i>Xanthocephalus xanthocephalus</i> | 21 | 44 |
| <i>Finches</i> | | 6 | 7 |

Table C-3 Total number of groups and individuals for each bird type and species observed during transect bird use surveys at the PrairieWinds SD1 Crow Lake Wind Resource Area, June 2 – July 7, 2009

| Species/Type | Scientific Name | # grps | # obs |
|----------------------------|-----------------------------------|---------------|--------------|
| American Goldfinch | <i>Carduelis tristis</i> | 6 | 7 |
| <u>Flycatchers</u> | | 42 | 54 |
| Eastern Kingbird | <i>Tyrannus tyrannus</i> | 32 | 41 |
| Western Kingbird | <i>Tyrannus verticalis</i> | 10 | 13 |
| <u>Grassland/Sparrows</u> | | 585 | 669 |
| Chestnut-collared Longspur | <i>Calcarius ornatus</i> | 70 | 83 |
| Clay-colored Sparrow | <i>Spizella pallid</i> | 12 | 13 |
| Chipping Sparrow | <i>Spizella passerine</i> | 16 | 17 |
| Dickcissel | <i>Spiza Americana</i> | 23 | 26 |
| Field Sparrow | <i>Spizella pusilla</i> | 8 | 8 |
| Grasshopper Sparrow | <i>Ammodramus savannarum</i> | 282 | 340 |
| Horned Lark | <i>Eremophila alpestris</i> | 2 | 2 |
| McCown's Longspur | <i>Calcarius mccownii</i> | 1 | 1 |
| Savannah Sparrow | <i>Passerculus sandwichensis</i> | 123 | 123 |
| Song Sparrow | <i>Melospiza melodia</i> | 1 | 2 |
| unidentified sparrow | | 43 | 50 |
| Vesper Sparrow | <i>Pooecetes gramineus</i> | 4 | 4 |
| <u>Swallows</u> | | 75 | 158 |
| Bank Swallow | <i>Riparia riparia</i> | 10 | 12 |
| Barn Swallow | <i>Hirundo rustica</i> | 55 | 128 |
| Cliff Swallow | <i>Petrochelidon pyrrhonota</i> | 5 | 8 |
| N. Rough-winged Swallow | <i>Stelgidopteryx serripennis</i> | 2 | 5 |
| unidentified swallow | | 3 | 5 |
| <u>Thrushes</u> | | 4 | 4 |
| American Robin | <i>Turdus migratorius</i> | 3 | 3 |
| unidentified bluebird | | 1 | 1 |
| <u>Warblers</u> | | 3 | 3 |
| Common Yellowthroat | <i>Geothlypis trichas</i> | 1 | 1 |
| Yellow Warbler | <i>Dendroica petechia</i> | 2 | 2 |
| <u>Wrens</u> | | 2 | 2 |
| House Wren | <i>Troglodytes aedon</i> | 1 | 1 |
| Marsh Wren | <i>Cistothorus palustris</i> | 1 | 1 |
| Other Birds | | 1 | 1 |
| <u>Woodpeckers</u> | | 1 | 1 |
| Northern Flicker | <i>Colaptes auratus</i> | 1 | 1 |
| Unidentified Birds | | 1 | 1 |
| unidentified bird | | 1 | 1 |
| Overall | | 1,885 | 2,824 |

Table C-4 Wildlife Species Observed in the Winner Alternative (2008-2009 Field Surveys)

| Common Name | Scientific Name | Common Name | Scientific Name |
|----------------------------|------------------------------|--------------------------|-----------------------------------|
| Birds | | | |
| Cooper's Hawk | <i>Accipiter cooperii</i> | Common snipe | <i>Gallinago gallinago</i> |
| Red-winged Blackbird | <i>Agelaius phoeniceus</i> | Common yellowthroat | <i>Geothlypis trichas</i> |
| Wood Duck | <i>Aix sponsa</i> | Sandhill crane | <i>Grus canadensis</i> |
| Grasshopper Sparrow | <i>Ammodramus savannarum</i> | Bald eagle | <i>Haliaeetus leucocephalus</i> |
| Northern Pintail | <i>Anas acuta</i> | Barn swallow | <i>Hirundo rustica</i> |
| American Widgeon | <i>Anas Americana</i> | Orchard oriole | <i>Icterus spurius</i> |
| Green-winged Teal | <i>Anas carolinensis</i> | Dark-eyed junco | <i>Junco hyemalis</i> |
| Northern Shoveler | <i>Anas clypeata</i> | Northern shrike | <i>Lanius excubitor</i> |
| Blue-winged Teal | <i>Anas discors</i> | Loggerhead shrike | <i>Lanius ludovicianus</i> |
| Mallard | <i>Anas platyrhynchos</i> | Marbled godwit | <i>Limosa fedoa</i> |
| Teal species | <i>Anas spp</i> | Red-headed woodpecker | <i>Melanerpes erythrocephalus</i> |
| Gadwall | <i>Anas strepera</i> | Wild turkey | <i>Meleagris gallopavo</i> |
| Great Blue Heron | <i>Ardea herodias</i> | Song sparrow | <i>Melospiza melodia</i> |
| Burrowing Owl | <i>Athene cunicularia</i> | Black-and-white warbler | <i>Mniotilta varia</i> |
| Lesser Scaup | <i>Aythya affinis</i> | Brown-headed cowbird | <i>Molothrus ater</i> |
| Ring-necked Duck | <i>Aythya collaris</i> | Ruddy duck | <i>Oxyura jamaicensis</i> |
| Greater Scaup | <i>Aythya marila</i> | Osprey | <i>Pandion haliaetus</i> |
| Canvasback | <i>Aythya valisineria</i> | Savannah sparrow | <i>Passerculus sandwichensis</i> |
| Upland Sandpiper | <i>Bartramia longicauda</i> | American white pelican | <i>Pelecanus erythrorhynchos</i> |
| Canada Goose | <i>Branta canadensis</i> | Cliff swallow | <i>Petrochelidon pyrrhonota</i> |
| Great horned Owl | <i>Bubo virginianus</i> | Double-crested cormorant | <i>Phalacrocorax auritus</i> |
| Cattle Egret | <i>Bubulcus ibis</i> | Wilson's phalarope | <i>Phalaropus tricolor</i> |
| Bufflehead | <i>Bucephala albeola</i> | Ring-necked pheasant | <i>Phasianus colchicus</i> |
| Red-tailed Hawk | <i>Buteo jamaicensis</i> | Downy woodpecker | <i>Picoides pubescens</i> |
| Rough-legged Hawk | <i>Buteo lagopus</i> | Pied-billed grebe | <i>Podilymbus podiceps</i> |
| Ferruginous Hawk | <i>Buteo regalis</i> | Black-capped chickadee | <i>Poecile atricapillus</i> |
| Swainson's Hawk | <i>Buteo swainsoni</i> | Common grackle | <i>Quiscalus quiscula</i> |
| Chestnut-collared Longspur | <i>Calcarius ornatus</i> | Bank swallow | <i>Riparia riparia</i> |
| American Goldfinch | <i>Carduelis tristis</i> | Eastern bluebird | <i>Sialia sialis</i> |
| Turkey Vulture | <i>Cathartes aura</i> | White-breasted nuthatch | <i>Sitta carolinensis</i> |
| Belted Kingfisher | <i>Ceryle alcyon</i> | Dickcissel | <i>Spiza americana</i> |
| Killdeer | <i>Charadrius vociferous</i> | Clay-colored sparrow | <i>Spizella pallida</i> |
| Lark Sparrow | <i>Chondestes grammacus</i> | Chipping sparrow | <i>Spizella passerine</i> |
| Common Nighthawk | <i>Chordeiles minor</i> | Field sparrow | <i>Spizella pusilla</i> |
| Northern Harrier | <i>Circus cyaneus</i> | N. rough-winged swallow | <i>Stelgidopteryx serripennis</i> |
| Northern Flicker | <i>Colaptes auratus</i> | Western meadowlark | <i>Sturnella neglecta</i> |
| Northern Bobwhite | <i>Colinus virginianus</i> | European starling | <i>Sturnus vulgaris</i> |
| Rock Dove | <i>Columba livia</i> | Starling | <i>Sturnus vulgaris</i> |
| American Crow | <i>Corvus brachyrhynchos</i> | Tree swallow | <i>Tachycineta bicolor</i> |
| Blue Jay | <i>Cyanocitta cristata</i> | Brown thrasher | <i>Toxostoma rufum</i> |

Table C-4 Wildlife Species Observed in the Winner Alternative (2008-2009 Field Surveys)

| Common Name | Scientific Name | Common Name | Scientific Name |
|--------------------------------|---------------------------------|-------------------------|--------------------------------------|
| Tundra Swan | <i>Cygnus columbianus</i> | Lesser yellowlegs | <i>Tringa flavipes</i> |
| Bell's Vireo | <i>Dendroica castanea</i> | House wren | <i>Troglodytes aedon</i> |
| Yellow-rumped Warbler | <i>Dendroica coronata</i> | American robin | <i>Turdus migratorius</i> |
| Yellow Warbler | <i>Dendroica petechia</i> | Greater prairie-chicken | <i>Tympanuchus cupido</i> |
| Bobolink | <i>Dolichonyx oryzivorus</i> | Sharp-tailed grouse | <i>Tympanuchus phasianellus</i> |
| Horned Lark | <i>Eremophila alpestris</i> | Eastern kingbird | <i>Tyrannus tyrannus</i> |
| Prairie Falcon | <i>Falco mexicanus</i> | Western kingbird | <i>Tyrannus verticalis</i> |
| American Kestrel | <i>Falco sparverius</i> | Yellow-headed blackbird | <i>Xanthocephalus xanthocephalus</i> |
| American Coot | <i>Fulica americana</i> | Mourning dove | <i>Zenaida macroura</i> |
| Mammals | | | |
| Black-tailed prairie dog | <i>Cynomys ludovicianus</i> | White-tailed deer | <i>Odocoileus virginianus</i> |
| Opossum | <i>Didelphis virginiana</i> | Muskrat | <i>Ondatra zibethicus</i> |
| Pocket gopher | <i>Geomys bursarius</i> | Raccoon | <i>Procyon lotor</i> |
| White-tailed jackrabbit | <i>Lepus townsendii</i> | Cottontail rabbit | <i>Sylvilagus floridanus</i> |
| Striped skunk | <i>Mephitis mephitis</i> | Badger | <i>Taxidea taxus</i> |
| Mule deer | <i>Odocoileus hemionus</i> | Red fox | <i>Vulpes vulpes</i> |
| Reptiles and Amphibians | | | |
| Painted turtle | <i>Chrysemys picta</i> | Spring peeper | <i>Pseudacris crucifer</i> |
| Bull snake | <i>Pituophis catenifer sayi</i> | Northern leopard frog | <i>Rana pipiens</i> |

Table C-5 Summary of individual and group observations for fixed-point use surveys at the PrairieWinds SD1 Winner Wind Resource Area, April 6 – May 26, 2009.

| Species | Scientific Name | Spring | |
|--------------------------|----------------------------------|------------|------------|
| | | # grps | # obs |
| Waterbirds | | 8 | 115 |
| American White Pelican | <i>Pelecanus erythrorhynchos</i> | 1 | 2 |
| Cattle Egret | <i>Bubulcus ibis</i> | 1 | 1 |
| Double-crested Cormorant | <i>Phalacrocorax auritus</i> | 3 | 109 |
| Great blue Heron | <i>Ardea herodias</i> | 2 | 2 |
| Sandhill Crane | <i>Grus canadensis</i> | 1 | 1 |
| Waterfowl | | 50 | 90 |
| Blue-winged Teal | <i>Anas discors</i> | 5 | 10 |
| Canada Goose | <i>Branta canadensis</i> | 7 | 11 |
| Gadwall | <i>Anas strepera</i> | 1 | 2 |
| Lesser Scaup | <i>Aythya affinis</i> | 1 | 2 |
| Mallard | <i>Anas platyrhynchos</i> | 29 | 52 |
| Northern Pintail | <i>Anas acuta</i> | 3 | 4 |
| Northern Shoveler | <i>Anas clypeata</i> | 1 | 1 |
| Ring-necked Duck | <i>Aythya collaris</i> | 1 | 4 |
| unidentified duck | | 1 | 3 |
| Wood Duck | <i>Aix sponsa</i> | 1 | 1 |
| Shorebirds | | 71 | 75 |
| Common Snipe | <i>Gallinago gallinago</i> | 11 | 11 |
| Killdeer | <i>Charadrius vociferus</i> | 24 | 24 |
| Lesser Yellowlegs | <i>Tringa flavipes</i> | 3 | 7 |
| Marbled Godwit | <i>Limosa fedoa</i> | 1 | 1 |
| Upland Sandpiper | <i>Bartramia longicauda</i> | 32 | 32 |
| Raptors | | 27 | 30 |
| American Kestrel | <i>Falco sparverius</i> | 4 | 5 |
| Ferruginous Hawk | <i>Buteo regalis</i> | 1 | 1 |
| Great horned Owl | <i>Bubo virginianus</i> | 1 | 1 |
| Northern Harrier | <i>Circus cyaneus</i> | 7 | 7 |
| Red-tailed Hawk | <i>Buteo jamaicensis</i> | 4 | 4 |
| Rough-legged Hawk | <i>Buteo lagopus</i> | 1 | 2 |
| Swainson's Hawk | <i>Buteo swainsoni</i> | 4 | 4 |
| unidentified buteo | | 5 | 6 |
| Vultures | | 7 | 12 |
| turkey vulture | <i>Cathartes aura</i> | 7 | 12 |
| Upland Gamebirds | | 131 | 230 |
| Greater Prairie-Chicken | <i>Tympanuchus cupido</i> | 7 | 35 |
| Ring-necked Pheasant | <i>Phasianus colchicus</i> | 112 | 132 |
| Sharp-tailed Grouse | <i>Tympanuchus phasianellus</i> | 3 | 6 |
| Wild turkey | <i>Meleagris gallopavo</i> | 9 | 57 |
| Doves/Pigeons | | 55 | 78 |
| Mourning Dove | <i>Zenaida macroura</i> | 54 | 76 |
| Rock Pigeon | <i>Columba livia</i> | 1 | 2 |
| Large Corvids | | 11 | 13 |
| American Crow | <i>Corvus brachyrhynchos</i> | 11 | 13 |
| Passerines | | 315 | 552 |
| American Robin | <i>Turdus migratorius</i> | 22 | 24 |
| Baltimore Oriole | <i>Icterus galbula</i> | 3 | 3 |
| Barn Swallow | <i>Hirundo rustica</i> | 4 | 4 |
| Blue Jay | <i>Cyanocitta cristata</i> | 2 | 2 |

Table C-5 Summary of individual and group observations for fixed-point use surveys at the PrairieWinds SD1 Winner Wind Resource Area, April 6 – May 26, 2009.

| Species | Scientific Name | Spring | |
|-------------------------|-----------------------------------|------------|--------------|
| | | # grps | # obs |
| Bobolink | <i>Dolichonyx oryzivorus</i> | 4 | 5 |
| Brown-headed Cowbird | <i>Molothrus ater</i> | 15 | 30 |
| Chipping Sparrow | <i>Spizella passerina</i> | 2 | 25 |
| Cliff Swallow | <i>Petrochelidon pyrrhonota</i> | 1 | 5 |
| Common Grackle | <i>Quiscalus quiscula</i> | 16 | 43 |
| Dark-eyed Junco | <i>Junco hyemalis</i> | 2 | 5 |
| Eastern Bluebird | <i>Sialia sialis</i> | 2 | 2 |
| Eastern Kingbird | <i>Tyrannus tyrannus</i> | 4 | 6 |
| European Starling | <i>Sturnus vulgaris</i> | 9 | 23 |
| Horned Lark | <i>Eremophila alpestris</i> | 6 | 6 |
| Loggerhead Shrike | <i>Lanius ludovicianus</i> | 2 | 3 |
| Red-winged Blackbird | <i>Agelaius phoeniceus</i> | 59 | 199 |
| Savannah Sparrow | <i>Passerculus sandwichensis</i> | 2 | 2 |
| Song Sparrow | <i>Melospiza melodia</i> | 1 | 1 |
| Western Kingbird | <i>Tyrannus verticalis</i> | 1 | 1 |
| Western Meadowlark | <i>Sturnella neglecta</i> | 157 | 162 |
| Yellow-rumped Warbler | <i>Dendroica coronata</i> | 1 | 1 |
| Other Birds | | 28 | 28 |
| Downy Woodpecker | <i>Picoides pubescens</i> | 1 | 1 |
| Northern Flicker | <i>Colaptes auratus</i> | 23 | 23 |
| Ted-headed Woodpecker | <i>Melanerpes erythrocephalus</i> | 1 | 1 |
| unidentified woodpecker | | 3 | 3 |
| Overall | | 703 | 1,223 |

Table C-6 Total number of groups and individuals for each bird type and species observed during breeding bird transect surveys at the PrairieWinds SD1 Winner Wind Resource Area, June 12 – July 10, 2009

| Species/Type | Scientific Name | # grps | # obs |
|----------------------------|--------------------------------------|---------------|--------------|
| Waterbirds | | 14 | 14 |
| Great Blue Heron | <i>Ardea herodias</i> | 14 | 14 |
| Waterfowl | | 21 | 50 |
| Blue-winged Teal | <i>Anas discors</i> | 2 | 11 |
| Canvasback | <i>Aythya valisineria</i> | 1 | 1 |
| Mallard | <i>Anas platyrhynchos</i> | 18 | 38 |
| Shorebirds | | 192 | 225 |
| Common Snipe | <i>Gallinago gallinago</i> | 18 | 18 |
| Killdeer | <i>Charadrius vociferus</i> | 36 | 46 |
| Upland Sandpiper | <i>Bartramia longicauda</i> | 135 | 156 |
| Wilson's Phalarope | <i>Phalaropus tricolor</i> | 3 | 5 |
| Raptors | | 12 | 12 |
| <u>Buteos</u> | | 9 | 9 |
| Red-tailed Hawk | <i>Buteo jamaicensis</i> | 7 | 7 |
| unidentified buteo | | 2 | 2 |
| <u>Falcons</u> | | 1 | 1 |
| Prairie Falcon | <i>Falco mexicanus</i> | 1 | 1 |
| <u>Owls</u> | | 1 | 1 |
| Great Horned Owl | <i>Bubo virginianus</i> | 1 | 1 |
| <u>Other Raptors</u> | | 1 | 1 |
| unidentified raptor | | 1 | 1 |
| Upland Gamebirds | | 30 | 34 |
| Greater Prairie-Chicken | <i>Tympanuchus cupido</i> | 3 | 6 |
| Northern Bobwhite | <i>Colinus virginianus</i> | 1 | 1 |
| Ring-necked Pheasant | <i>Phasianus colchicus</i> | 24 | 25 |
| Sharp-tailed Grouse | <i>Tympanuchus phasianellus</i> | 1 | 1 |
| Wild Turkey | <i>Meleagris gallopavo</i> | 1 | 1 |
| Doves/Pigeons | | 69 | 92 |
| Mourning Dove | <i>Zenaida macroura</i> | 69 | 92 |
| Passerines | | 1,390 | 1,787 |
| <u>Blackbirds/Orioles</u> | | 736 | 1,096 |
| Brown-headed Cowbird | <i>Molothrus ater</i> | 73 | 134 |
| Bobolink | <i>Dolichonyx oryzivorus</i> | 115 | 139 |
| Common Grackle | <i>Quiscalus quiscula</i> | 11 | 99 |
| Orchard Oriole | <i>Icterus spurius</i> | 1 | 1 |
| Red-winged Blackbird | <i>Agelaius phoeniceus</i> | 116 | 262 |
| Western Meadowlark | <i>Sturnella neglecta</i> | 417 | 456 |
| Yellow-headed Blackbird | <i>Xanthocephalus xanthocephalus</i> | 3 | 5 |
| <u>Creepers/Nuthatches</u> | | 1 | 1 |
| White-breasted Nuthatch | <i>Sitta carolinensis</i> | 1 | 1 |
| <u>Finches</u> | | 5 | 5 |
| American Goldfinch | <i>Carduelis tristis</i> | 5 | 5 |
| <u>Flycatchers</u> | | 13 | 14 |
| Eastern Kingbird | <i>Tyrannus tyrannus</i> | 7 | 8 |
| Western Kingbird | <i>Tyrannus verticalis</i> | 6 | 6 |
| <u>Grassland/Sparrows</u> | | 570 | 578 |
| Chestnut-collared Longspur | <i>Calcarius ornatus</i> | 11 | 12 |
| Dickcissel | <i>Spiza americana</i> | 108 | 109 |
| Field Sparrow | <i>Spizella pusilla</i> | 5 | 5 |

Table C-6 Total number of groups and individuals for each bird type and species observed during breeding bird transect surveys at the PrairieWinds SD1 Winner Wind Resource Area, June 12 – July 10, 2009

| Species/Type | Scientific Name | # grps | # obs |
|---------------------------|-----------------------------------|---------------|--------------|
| Grasshopper Sparrow | <i>Ammodramus savannarum</i> | 58 | 58 |
| Horned Lark | <i>Eremophila alpestris</i> | 6 | 10 |
| Lark Sparrow | <i>Chondestes grammacus</i> | 2 | 2 |
| Savannah Sparrow | <i>Passerculus sandwichensis</i> | 361 | 361 |
| unidentified sparrow | | 19 | 21 |
| <u>Mimids</u> | | 1 | 1 |
| Brown Thrasher | <i>Toxostoma rufum</i> | 1 | 1 |
| <u>Swallows</u> | | 42 | 70 |
| Bank Swallow | <i>Riparia riparia</i> | 1 | 1 |
| Barn Swallow | <i>Hirundo rustica</i> | 17 | 22 |
| Cliff Swallow | <i>Petrochelidon pyrrhonota</i> | 7 | 9 |
| N. Rough-winged Swallow | <i>Stelgidopteryx serripennis</i> | 1 | 4 |
| Tree Swallow | <i>Tachycineta bicolor</i> | 13 | 29 |
| unidentified swallow | | 3 | 5 |
| <u>Thrushes</u> | | 7 | 7 |
| American Robin | <i>Turdus migratorius</i> | 2 | 2 |
| unidentified bluebird | | 5 | 5 |
| <u>Titmice/Chickadees</u> | | 1 | 1 |
| Black-capped Chickadee | <i>Poecile atricapillus</i> | 1 | 1 |
| <u>Vireos</u> | | 2 | 2 |
| Bell's Vireo | <i>Dendroica castanea</i> | 2 | 2 |
| <u>Warblers</u> | | 8 | 8 |
| Black-and-white Warbler | <i>Mniotilta varia</i> | 1 | 1 |
| Common Yellowthroat | <i>Geothlypis trichas</i> | 3 | 3 |
| Yellow Warbler | <i>Dendroica petechia</i> | 4 | 4 |
| <u>Wrens</u> | | 1 | 1 |
| House Wren | <i>Troglodytes aedon</i> | 1 | 1 |
| <u>Corvids</u> | | 3 | 3 |
| American Crow | <i>Corvus brachyrhynchos</i> | 3 | 3 |
| Other Birds | | 16 | 18 |
| <u>Woodpeckers</u> | | 9 | 11 |
| Northern Flicker | <i>Colaptes auratus</i> | 7 | 9 |
| Red-headed Woodpecker | <i>Melanerpes erythrocephalus</i> | 1 | 1 |
| unidentified woodpecker | | 1 | 1 |
| <u>Other Birds</u> | | 7 | 7 |
| Common Nighthawk | <i>Chordeiles minor</i> | 7 | 7 |
| Overall | | 1,744 | 2,232 |

Appendix D

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Appendix D

Cultural Resources

- Prehistoric Background/Information for the Proposed Project alternatives
- Rosebud correspondence dated September 3, 2009

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Prehistoric Periods

Information pertaining to both Proposed Project site alternatives has been compiled in this section to provide one discussion pertaining to the Prehistoric Period of the regional area. The two site alternatives are within the Great Plains Cultural Area, specifically between the Prairie Culture Area and Plains Culture Area according to Kroeber (1939) and Driver and Massey (1957). The Prairie Culture Area is approximately east of the Missouri River and the Plains Culture Area approximately west of the Missouri River. There are many similarities between the Prairie and Plains cultures, the most significant being hunting and use of bison. Some of the major differences between the two culture areas seen archaeologically are based on settlement patterns. The Plains Tribes resided year-round in tepees and were primarily nomadic, moving across the land, while the Prairie Tribes resided in permanent villages year-round, practiced horticulture, and used tepees when away hunting.

Not much is known about the cultural history of the Paleoindian Tradition in the United States because the Paleoindian Tradition is primarily based on a material culture. Material culture includes cultural remains, such as stone tools, ceramic pots, or ornaments that indicate the material expression of a people. Until very recently (late 2007) the Bering Strait “multiple waves” migration hypothesis put modern Native American Tribes in North America anywhere between 17,500 to 6,000 years ago. There had not been any definitive evidence to link the Paleoindian Tradition occupants to the later inhabitants of the Great Plains area. However, recent DNA evidence has added support for a single migration and population of North and South America as early as 30,000 years ago (PLoS 2007). The following is the established chronology for the Central Plains based on the material culture.

The prehistoric period in South Dakota is divided into the Paleoindian Tradition, ca. 12,000 to 6,000 years before present (B.P.); Plains Archaic Tradition, ca. 6,000 to 3,000 B.P.; Plains Woodland Tradition, ca. 3,000 to 1,200 B.P.; and Plains Village Tradition, ca. 1,200 to 300 B.P.

The northern Plains Paleoindian environment was primarily upland grasslands (Yansa 2007) and ideal habitat for roaming animals such as the extinct mastodon, as well as the American bison. The Paleoindian Tradition (ca. 12,000 to 6,000 B.P.) is characterized by small, nomadic, highly mobile groups that followed game across the landscape. Small and medium-sized animals, fish, and plant resources also supplemented their diet. The Paleoindian Tradition is divided into two phases: Clovis and Folsom, which are based on projectile point types and assumed to reflect changes in hunting technologies, presumably in response to the changing climate that grew successively warmer and drier.

The Plains Archaic Tradition (ca. 6,000 to 3,000 B.P.) reflects different sets of lithic tool and projectile point typologies, as well as ground stone tools. Archaeological evidence of the Plains Archaic Tradition in the Central Plains area includes semi-subterranean pithouses, evidence of wattle and daub structures, side-notched projectile points, and an increase in and more formalized grinding implements. These are likely due to changes in subsistence and settlement

patterns as a response to changing climatic conditions. Groups are now thought to have been more semi-nomadic and to have hunted and gathered in a seasonal pattern with a heavy reliance on communal bison hunts and plant resources.

The Plains Woodland Tradition (ca. 3,000 to 1,200 B.P.) is best seen along water sources. It is distinguished from previous traditions by the presence of ceramics, low circular or conical mounds that may or may not contain burials, and the development of horticultural practices. Bison, as well as a range of smaller mammals and fish, were a primary source of protein. Wild plants were gathered and during the Late Plains Woodland Tradition and corn was grown, as documented at the Arp Site 39BR101 and 39BR102. The practice of horticulture allowed for the establishment of permanent villages along water sources. Notable Plains Woodland village sites in central South Dakota include the La Roche Site (39ST9); the Arp Site (39BR101 and 39BR102); the Scalp Creek Site (39GR1); and White Swan Mound Site (39CH9).

The Plains Village Tradition (ca. 1,200 to 300 B.P.) is thought to be a Plains variation of the Mississippian custom from the central United States. This cultural pattern appeared in the Mississippi River Valley ca. 1,100 to 1,000 B.P. and consisted of sedentary villages, river bottom agriculture, flat-top burial mounds, triangular projectile points, and advanced ceramic designs and decorations. However, villages were already established in the Central Plains area, horticulture was already underway, mounds were being built, and ceramics were already being produced. Villages during the Plains Village Tradition were permanent and sometimes fortified. During the Late Plains Village Tradition, the Siouan-speaking people from the northern Minnesota area entered Arikara territory in southeastern South Dakota and the cultural tribal boundaries began to change.

The Historic Period

Information pertaining to both of the Proposed Project site alternatives has been compiled in this section to provide a discussion pertaining to the Historic Period of the regional area. Early contact between Europeans and Central Plains tribes ranged from 1540 to 1700 and included:

Francisco Vásquez de Coronado's contact with the Plains tribes of west Texas and Kansas in 1540-1542

Active French voyageur-traders among the Pawnee before 1700 in the Central Plains

Explorers Pierre Esprit Radisson and Médard Chouart, sieur des Groseilliers' contact with the Santee Sioux in 1659

Louis Jolliet and Jacques Marquette's exploration of the Mississippi River in 1673

René-Robert Cavelier, sieur de la Salle's exploration of the Mississippi River in 1682 with additional explorations past the mouth of the Missouri by 1700

This early contact period coincides with the demographic changes occurring in the Central Plains. When the Europeans first met the tribes in the Central Plains they encountered some who had been in the area for a very long time as well as others who had recently occupied the region. The Historic Period (ca. 300 B.P. to present) is marked by a great deal of cultural change on the Great Plains. The earlier migration of the Sioux people had an effect on the Arikara who had previously occupied the region. The Sioux Tribes were nomadic people who followed the bison, and the Plains were an ideal environment for them. With the influx of European influence and acquisition of horses from the southwestern tribes, the Sioux Tribes were able to cross the Missouri River in 1760 and claim the entire Plains north of the Arkansas River as their hunting grounds.

Greater American presence on the Plains came in the following century. The Lewis and Clark Expedition (1803–1806), headed by Meriwether Lewis and William Clark, was the first American overland expedition to the Pacific coast and back. As directed by President Thomas Jefferson in a letter to Lewis, the object of their mission was to explore the Missouri River, by its course and communication with the waters of the Pacific Ocean and determine whether the Columbia, Oregon, Colorado or any other river would offer the most direct and practicable water communication across the continent for the purposes of commerce.

During the 1800s Americans generally thought that the Great Plains was better off with the Indians and was worth little for agricultural use. When gold was discovered in California in the 1840s, Americans wanted a quicker passage west and it is estimated that 12,000 wagons traveled cross country to Oregon and California from 1834 to 1867. In 1862, President Abraham Lincoln signed the Homestead Act that allotted 160-acre parcels to settlers of undeveloped land outside of the original 13 colonies. This Act became a tool for redistribution of Indian lands and had a great effect on the reservation system on the Plains. Treaties were signed for the establishment of Indian reservations beginning in the late 1850s with Yankton (1858), Lake Traverse (1867), and the Great Sioux Reservation (1868). The Great Sioux Reservation set aside the land in South Dakota west of the Missouri River, which consisted of some 25 million acres. The reservations would later be Crow Creek and Old Winnebago, Cheyenne River, Lower Brulé, Pine Ridge, and Rosebud.

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Molly Cresto

Subject: FW: Prairie Winds Appendix

Importance: High

From: Rosebud Sioux Tribe [mailto:rstthpo@yahoo.com]

Sent: Thu 9/3/2009 6:36 AM

To: Mitchell, Trish

Subject: RE: PrairieWinds Project info

Good Morning Trish,

Mary finished the record search for the Winner site. There are no Traditional Cultural Properties recorded in our data base within the proposed project this does not preclude the possibility of a site of heritage importance being located by an archaeologist. This project may proceed as planned. If sites are located by this undertaking please notify my office as soon as possible. Thank you.

Kathe Arcoren

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