Environmental Assessment

PrairieWinds – ND 1
Basin Electric Power Cooperative

Prepared for:

Rural Utilities Service

Prepared by:

Tetra Tech
4900 Pearl East Circle, Suite 300W
Boulder, CO 80301

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Table of Contents

List of Tables

List of Figures

Appendices

EXECUTIVE SUMMARY

Basin Electric Power Cooperative (Basin Electric) needs to develop additional electricity generating sources to serve the expected growth in demand on their member service providers. To meet mandated renewable energy requirements, Basin Electric has determined that within their member service area, wind energy is the most feasible source of renewable power. Basin Electric has submitted an application to the U.S. Department of Agriculture, Rural Utilities Service for a loan for construction, and has requested transmission capacity on an existing transmission line owned and operated by the U.S. Department of Energy, Western Area Power Administration. In accordance with the National Environmental Policy Act these federal agencies must consider and evaluate the potential environmental effects of their actions.

After considering many possible locations for wind energy development, two sites in North Dakota were identified that have a sufficient wind potential and are located near existing transmission lines. This Environmental Assessment (EA) was developed to assess the potential environmental impacts of the alternative sites under consideration. Two alternative sites – Site A (Proposed Action) and Site B - and the no-action alternative were considered in this EA.

Basin Electric is developing plans for a proposed wind-powered electricity generation facility with a nameplate rating of up to 115.5 megawatts (MW) with a design capacity factor of 39 percent, or a yearly average design of 45 MW, in Ward County, North Dakota. The proposed project (PrairieWinds - ND 1, Site A) is located approximately 15 miles south of Minot, North Dakota. From Minot, access to Site A is provided by US Highway 83 and several two-lane gravel county roads. Current plans for Site A include the installation of up to 77 1.5 MW wind turbines (produced by General Electric) within approximately 30,000 acres (47 square miles). Infrastructure to be constructed or installed includes a substation, temporary laydown yard, access roads, and buried collector lines. Power would be delivered to the grid via existing Western Area Power Administration transmission lines that run through or near Site A.

An alternate site has been identified approximately 10 miles southwest of Minot (Site B), also in Ward County. Either location would require construction of a new substation.

Based on the analyses, it was concluded that development of either site would have no effects on wetlands, floodplains, historic properties, most threatened or endangered species, soils, air quality, water quality, radio and television interference, human health and safety, social and economic conditions, and minority or low-income populations. The project would have effects on other resources, as described below.

- **Land Use** – Temporary disturbance during construction and permanent loss of agricultural lands would occur. In Site A, 984 acres would be temporarily disturbed during construction and 74 acres would be permanently disturbed. Site B would have a similar level of disturbance. There would be no disturbance under the No Action Alternative.
- **Whooping Crane** – Both Sites A and B occur in the migratory route corridor of the whooping cranes. Because of a potential reduction of migration habitat from project construction it was concluded that there is a “may effect” determination for whooping cranes.
- **Tawny and Arogos Skipper** - Potential habitat for the tawny skipper and the arogos skipper was not identified in Site A. Site B did have habitat identified but the level of disturbance that could occur within that habitat is unknown as the Site B project design has not been completed.
- **Fish and Wildlife Resources** - Effects on wildlife in general from the project would be due to disturbance similarly to the effects described under Vegetation below. The potential for

direct mortality is due to construction activities, vehicle traffic, and operation of the wind turbines.

- **Vegetation** – Reseeded grasslands and native vegetation would be disturbed. Construction would disturb 182 acres of seeded grasslands, and 172 acres of native vegetation (prairie, shrubland and woodlands), as presented in **Table 1**. Development would permanently disturb 14 acres of seeded grasslands and 11 acres of native vegetation from turbines and new access roads. Site B would have a similar effect. There would be no impacts on vegetation from the No Action Alternative.

Table 1
Summary of Disturbance Acres within Native Vegetation Types

	Temporary Disturbance				
Vegetation Community	**Turbines**	**Roads**	**Feeder Lines**	**Substation / Lay Down Area**	**Total Temporary**
Native Prairie	37.0	5.3	45.9	0.1	88.4
Native Shrubland	35.3	4.1	38.2	0.0	77.6
Native Woodland	3.2	0.9	2.2	0.0	6.2
Total	75.6	10.3	86.3	0.1	172.3
	Permanent Disturbance				
Vegetation Community	**Turbines**	**Roads**	**Feeder Lines**	**Substation / Lay Down Area**	**Total Permanent**
Native Prairie	0.3	5.3	0.0	0.1	5.7
Native Shrubland	0.2	4.1	0.0	0.0	4.3
Native Woodland	0.0	0.9	0.0	0.0	0.9
Total	0.5	10.3	0.0	0.0	10.9

- **Aesthetics** - Visual impacts from the turbines, lights, and roads would occur from the project during construction and operation. However, the sites would retain their rural setting and appearance.
- **Transportation** – There would be limited and short-term impacts from the use of existing roads during construction for the transport of equipment and construction materials. New access roads would not be available for public access so there would not be any permanent effects on transportation from the access roads.
- **Noise** - The maximum noise levels from heavy equipment would be 85 to 88 dBA at a distance of 50 feet. Given that the distance to residences from any turbine is expected to be greater than 1,000 feet, noise levels during operation are not expected to be increased enough to be a concern at Site A or Site B. During construction some noise creating activities will be closer to residences as heavy equipment for turbines are moved and as collector lines are buried. Given the distance from receptors of the turbines, there would be no effect on noise during operation at either site. There would be no effect on noise from the No Action Alternative.

1.0 PURPOSE AND NEED FOR PROPOSED ACTION

This section describes the proponent's purpose and need for the proposed project. Also discussed in this section are the involved Federal Agencies' needs for action and a description of the Federal environmental process.

1.1 Purpose and Need

Basin Electric was formed in 1961 by member cooperatives after the U.S. Department of the Interior announced that the Federal hydropower system would not be able to meet the additional energy requirements of consumers of the U.S. Bureau of Reclamation beyond the winter of 1965. Basin Electric was formed as a wholesale power supplier to plan, design, construct, and operate generating facilities necessary to meet the growing electrical demands of its member systems.

Basin Electric established renewable energy goals in 2005 to meet Basin Electric established internal Renewable Portfolio Standards (RPS). Wind is the most viable renewable technology based on availability and economics. Solar resources in the region are limited and 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 either restricted to limited or distant locations, available in only small quantities, or cause 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. A 115.5 MW wind project was determined to be the best available, least-cost renewable resource option to satisfy future load and RPS requirements.

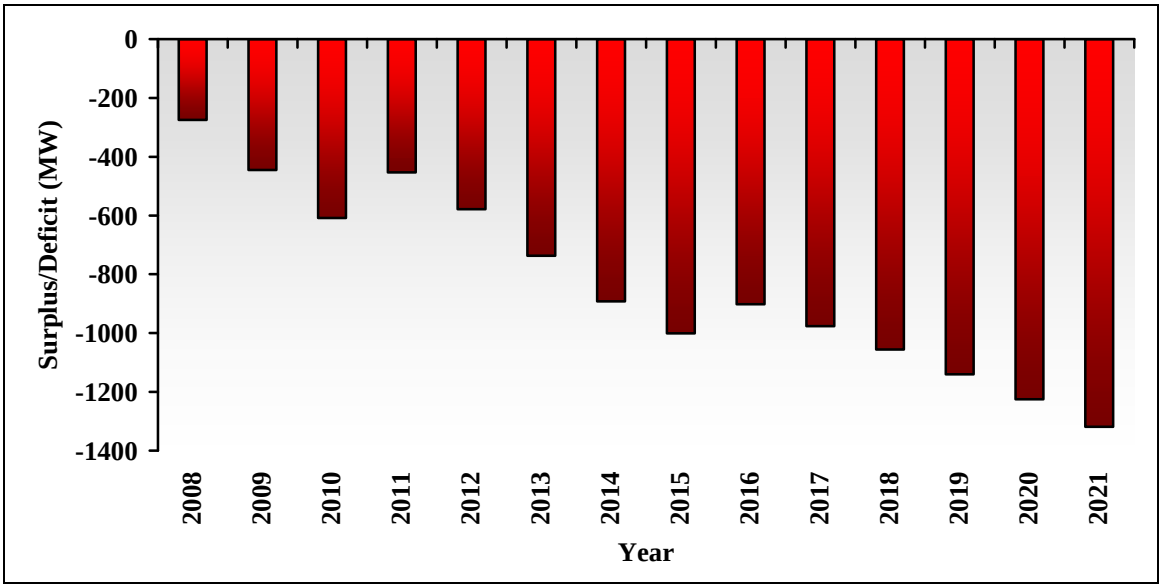
Many areas served by Basin Electric in the project region are experiencing population growth. Basin Electric is experiencing load growth throughout their system in every consumer class (residential, commercial, and industrial).

Between 1999 and 2006, Basin Electric's system peak demand increased 752 MW from 1,195 to 1,947 MW or approximately 107 MW per year. During the same period, Basin Electric 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 or approximately 122 MW per year. Basin Electric forecasts energy consumption on its system to grow by approximately 12 million MWh from 2006 through 2021 or approximately 800,000 MWh per year. The average expected increase in energy sales compared to the average expected increase in peak demand results in a 75 percent annual load factor for the forecasted load growth. Demand is forecasted to double in the next 15 years, with the 1,947 MW in 2006 projected to grow 1,834 MW by 2021, and 2006 energy usage at 11.8 million MWh forecasted to grow 12 million MWh by 2021. The load growth is driven mainly by commercial sector growth which includes energy-related development in the form of coal, and oil and gas development, and increased loads in the residential sector mainly located on the outskirts of larger cities (Basin Electric 2007).

The difference in the load forecast plus other obligations (such as sales, losses, and reserves less Basin Electric's system-wide load management), and existing and planned generating resources along with purchases, define the load and capability of the Basin Electric system which shows the amount of surplus capacity on the system. **Figure 1** shows Basin Electric's total system, summer season surplus/deficit capacity.

Basin Electric's total system deficit is 275 MW in 2008 and the deficit is forecasted to increase steadily. The two periods that do not produce additional deficits from one year to the next are when the Dry Fork Station in Wyoming is anticipated to go commercial in 2011 and when a long-term power supply obligation ends in early 2016 (Basin Electric 2008).

Figure 1. Total System Load and Capability During the Summer Season



Construction of PrairieWinds - ND 1 is required to meet the growing needs for power in Basin Electric's service territory. Basin Electric has established the need to add a renewable energy resource to serve projected member load growth. This project was established on the basis of an ongoing need to address reliability and to supply low cost power to Basin Electric members, including renewable energy sources.

Basin Electric is in the process of completing a detailed power supply analysis. The 2007 Power Supply Analysis (PSA) provides an in-depth look at Basin Electric's current operating system, future load growth and the framework for future expansion, including both supply-side and demand-side resource expansion. Twelve resource expansion portfolios were created to meet the anticipated needs of Basin Electric and were evaluated with respect to cost, performance, and risk. All portfolios included some component of wind energy development (Basin Electric 2007).

Of the twelve resource expansion portfolios analyzed in the PSA, the preferred portfolio included 300 MW of wind, 200 MW of peaking generation, 250 MW of intermediate generation and 600 MW of baseload coal generation. The PrairieWinds - ND 1 project is proposed to meet a portion of Basin Electric's projected wind generation requirement.

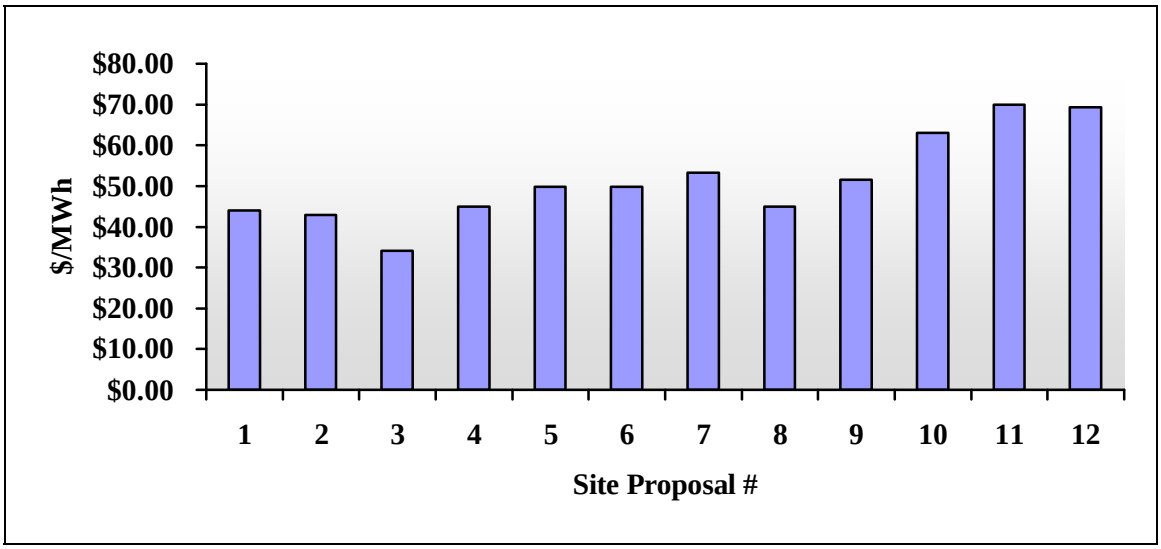
Basin Electric received 12 proposals from nine different entities for wind generation. These 12 wind proposals were located in North Dakota, South Dakota, Montana, and Wyoming. **Figure 2** shows the anticipated first-year cost of producing one MWh of each proposal. These costs typically include the cost of capital, debt service, operation and maintenance, and fuel. The renewable proposals were evaluated by Basin Electric staff.

Based on the anticipated capacity factors, installation locations, costs of production, and durations of the proposed agreements, Basin Electric determined building their own wind generation facility was the most economical.

Basin Electric's 2007 PSA Study (Basin Electric 2007) was prepared in accordance with RUS General and Pre-Loan Policies and Procedures Common to Electric Loans and Guarantees published in 7 Code of Federal Regulations (CFR) 1710 Subpart F. The purpose of the study was to determine the best capacity additions for Basin Electric's service area. The capacity alternative ultimately chosen must be one which would ensure safe, adequate, and reliable electricity for Basin

Electric and its members at the lowest reasonable cost. The preferred option identified by this study for Basin Electric to build its own facility is the anticipated lowest cost resource option compared to options including proposals received through a Basin Electric capacity solicitation process.

Figure 2. Renewable Proposals First-Year Costs to Produce 1 MWh



1.2 Purpose for Federal Agency Action

1.2.1 Rural Utilities Service

The purpose of the Electric Program of RUS is to provide reliable, affordable electricity to enhance the economic well-being and quality of life for all of the nation's rural residents. The Electric Programs provide leadership and capital to upgrade, expand, maintain, and replace America's vast rural electric infrastructure. Under the authority of the Rural Electrification Act of 1936, the Electric Programs make direct loans and loan guarantees to electric utilities to serve customers in rural areas.

The loans and loan guarantees finance the construction of electric distribution, transmission, and generation facilities, including system improvements and replacement 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. Loans are made to corporations, states, territories and subdivisions and agencies such as municipalities, people's utility districts, and cooperative, nonprofit, limited-dividend, or mutual associations that provide retail electric service needs to rural areas or supply the power needs of distribution borrowers in rural areas (http://www.usda.gov/rus/).

1.2.2 Western Area Power Administration

Western Area Power Administration (Western) is a Federal power-marketing agency under the Department of Energy (DOE) that operates and maintains transmission lines and associated facilities. Western's Open Access Transmission Service Tariff provides open access to entities such as Basin Electric to supply power to their customer load areas. Western provides this service through an interconnection if there is available capacity in the transmission system. Basin Electric asked Western for an interconnection of the PrairieWinds - ND 1 Project to Western's existing 115-kilovolt (kV) transmission line which runs through Basin Electric's proposed site.

1.2.3 United States Fish and Wildlife Service

The United States Fish and Wildlife Service (USFWS) is responsible for carrying out Federal laws and programs that conserve fish, wildlife and their habitats (USFWS 2008a). The proposed project is situated within the boundaries of the USFWS Audubon Wetland Management District (WMD). The purpose of the WMD is to manage the land to meet the needs of waterfowl and other migratory birds, threatened and endangered species, and resident wildlife (USFWS 2009).

The Proposed Action has 7,511 acres of USFWS grassland/wetland easements within its boundaries and Site B has 15,135 acres of USFWS grassland/wetland easements. These easements are legal agreements between landowners and the United States through the USFWS to permanently protect wetlands and grasslands. The landowner is compensated to maintain the wetland/grasslands in lieu of possible development. The purpose for these easements is to protect the habitats of migratory birds and other wildlife. A review of the proposed action and consideration of reasonable alternatives is necessary in order to consider how to reduce any negative wildlife impacts and prevent significant long-term impacts to wildlife and habitat resources.

1.3 Federal Environmental Process

Before RUS can provide funding or Western can agree to the interconnection, all relevant impacts must be examined, and an opportunity provided to the public for input, pursuant to the National Environmental Policy Act (NEPA). Additionally, RUS must abide by its Environmental Policies and Procedures (7 CFR part 1794), and Western by DOE's NEPA Implementing Procedures (10 CFR part 1021) to consider potential environmental impacts of its actions. This EA documents the consideration and evaluation of the potential environmental impact of the proposed project and will provide the public and other interested parties an opportunity to review and provide input. After a comment period, the EA will be used to support RUS's and Western's determination on whether or not to prepare an Environmental Impact Statement (EIS).

RUS and Western will evaluate the significance of the potential impacts posed by the proposed project. This evaluation will consider the environmental effects and subsequent public, agency, and tribal comments. If the agencies determine there are no significant impacts, they will issue Findings of No Significant Impact (FONSI). Publishing a FONSI will complete the assessment portion of the Federal environmental process. If it is determined that there are significant impacts, the agencies will publish a notice of intent to prepare an EIS in the Federal Register and distribute copies to the public. An EIS will then be developed using the results of the EA and other analyses, and issued for public comment. If an EIS is needed, the agencies will publish a Draft and Final EIS and a Record of Decision.

1.4 Public Participation

RUS and Basin Electric provided an early and open process for determining the scope of issues and concerns related to the project. Basin Electric notified Federal, state, and local agencies, tribes and affected landowners of the PrairieWinds - ND 1 Project and requested information on issues and concerns. RUS and Basin Electric conducted a public scoping meeting on April 3, 2008 in Minot, North Dakota.

1.5 Other Authorizations

Several Federal, state, and local agencies have jurisdiction over certain aspects of the project.

The agencies that have permitting authority or other responsibilities include:

- North Dakota Game and Fish Department (NDGFD) – Wildlife management areas (WMA).
- North Dakota Department of Transportation (NDOT) – Right-of-way authorization.

- North Dakota Public Service Commission - Regulates energy conversion and transmission.
- U.S. Army Corps of Engineers – Wetlands.
- U.S. Fish and Wildlife Service (USFWS) – Wetland and/or grassland easements, waterfowl production areas (WPAs), and Endangered Species Act consultations, under the Migratory Bird Treaty Act (16 USC 703 et seq.), the Bald and Golden Eagle Protection Act (16 USC 668-668d, 54 Stat. 250), Executive Order 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds, the Endangered Species Act (16 USC 1531 et seq.), The National Wildlife Refuge System Improvement Act of 1997 (public Law 105-57), and the NEPA (Public Law 91-190, 42 USC 4321-4347, as amended by Public Law 94-52, Public Law 94-83, and Public Law 97-258).
- State Historic Preservation Office – Properties listed (or eligible for listing) on the National Register of Historic Places.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This section describes the alternatives that were considered for further evaluation, and explains the reasons alternatives were dismissed from further review. It also describes the No Action Alternative.

2.1 Development of Alternatives

An initial screening process involved: (1) identification of potential transmission interconnection points, (2) delineation of the boundaries of the project area, and (3) examination of photographs, maps of existing and future land uses, transportation and utility maps, and maps that show environmental features including floodplains, wetlands, and soils. Basin Electric conducted a systematic evaluation that included:

- Reviewing wind maps available from the US DOE, National Renewable Energy Laboratory, and the database available from the Energy & Environmental Research Center to determine areas with good, excellent, or outstanding wind power within its member service territory; and
- Identifying existing electric transmission lines and substations with potentially adequate capacity (existing substations were desirable but not a necessary attribute for potential sites) within its member service territory and within the Western electrical grid.

Once locations were identified meeting these criteria, Basin Electric proceeded by:

- Studying the area using aerial photographs, maps, and existing land use databases.
- Screening the area to identify restricted and potentially incompatible areas, including conflicting land uses, existing structures or developments, and environmental features.
- Completing field surveys by a multidisciplinary team including a project engineer, environmental compliance specialist, and land use planner.
- Identifying potential costs associated with development of viable options.
- Conducting a comparative assessment of viable alternatives using criteria on reliability/dependability for energy supply, distance from existing transmission line capacity, cost (capital, operating, and maintenance), and environmental considerations.
- Minimizing the number of homes and buildings adjacent to the project area.
- Minimizing the number of landowners' impacted.
- Minimizing potential impacts to known wetlands and other waters of the U.S, threatened and endangered species, sensitive habitats, and other environmental resources.
- Minimizing the costs associated with acquisition, construction, and operation and maintenance.

2.1.1 Site Alternatives Considered

Using the locating process discussed above, possible areas identified for the wind power project that met the criteria of having enough wind, close enough to existing transmission lines, within Basin Electric's member service territory, and within Western's grid area were:

- Forbes/Edgeley area
- Wishek/Napoleon area
- Kenmare area

- PrairieWinds - ND 1 Site A
- PrairieWinds - ND 1 Site B

2.1.2 Evaluating Alternatives

The next step in determining locations to examine in detail was to review the availability of capacity on the nearby transmission lines.

The Forbes/Edgeley area was not considered further because:

- The local 115-kV line was indicated as already fully loaded as is the 230-kV line in the area. These lines were identified as unlikely to have adequate available transmission capacity to handle the power generated by the wind development.
- The potential site would have required construction of a minimum of 25 miles of interconnection lines for an interconnection with the 115 kV line. This interconnection would have also required the installation of a substation at the 115 kV interconnection.
- The remaining transmission line is a high voltage 345-kV transmission line, which would have involved an extremely expensive interconnection substation and a number of miles of costly 345-kV transmission line from the project to the interconnection line. The cost of the substation was estimated at roughly $9 million to $10 million, while the interconnection line was estimated at roughly $3 million to $5 million. Recent estimates have increased the cost of the substation to over $12 Million.
- The transmission queue in the area appeared to be full, causing serious concern that access to transmission would be limited, or even impossible. Adding a substation interconnection to a large line, reduces the reliability of that line, discouraging the system operator from allowing interconnection.
- The investigation of this area revealed that a large wind project was already planned in this area and several other prime locations in this area were already leased, indicating that Basin Electric would have difficulty in obtaining leases or easements to property for wind development.

Wishek/Napoleon was not considered further because:

- The only available transmission line was the 345-kV line described above. The estimated costs were expected to be similar to the Forbes/Edgeley 345-kV scenario, which caused this site to be poorly ranked.
- As with Forbes/Edgeley, the transmission queue in the area appeared to be full.
- The investigation of this area also revealed that a large wind project was already planned and several other prime locations were already leased.

The Kenmare area site was not considered further because the 115-kV line in the Kenmare area has transmission limitation due to load growth in the region and export and import transmission reservations to Saskatchewan. An additional 100 MW could not be accommodated on that line.

In analyzing the transmission lines around Minot, it became apparent that the 115-kV transmission line running north and south near Site A offered a stronger system for interconnection and the 230-kV transmission line running east and west near Site B offered a stronger system for interconnection (Basin Electric Siting Study). The Forbes/Edgeley area, Wishek/Napoleon area, and Kenmare area sites lacked transmission capacity, leaving the PraireWinds - ND 1 Site A and PraireWinds - ND 1 Site B as reasonable alternatives to be considered in detail.

2.1.2.1 Potential Impact Index (PII)

The PII process is a means of indexing wildlife use of a site as part of the USFWS's Interim Voluntary Guidelines. The PII process was completed for Site A, Site B, and the Edgeley/Forbes area site with the objective of determining potential impacts.

The PII has three components designed to evaluate potential impacts on wildlife within a site as a whole (**Table 2**). A higher number indicates the potential for more adverse impacts, a lower score would indicate less potential for adverse impacts. The first checklist examines the site's physical attributes including topographic and meteorological characteristics, site size, migratory corridor potential and wind direction. The second component is a series of checklists that deal with the occurrence and status of bat and bird species of conservation concern. The third component addresses the ecological attractiveness of a site by looking at any special, unique, or extraordinary habitats or conditions that may attract wildlife.

Table 2
Potential Impact Index Scores

Reference Site	Site A	Site B	Edgeley/Forbes Area
277[1]	252	257	257

[1] Audubon National Wildlife Refuge

The similarity between the Site A and Site B scores (including the relation to species occurrence) is likely due to the similar amount of actively managed agricultural lands with pockets of wetland and native grassland habitat within the potential project areas. The close geographical proximity of the sites contributes to their similar topography and subsequent similar species diversity that is characteristic of the Prairie Pothole Region. In addition, the entire area is within the Central Flyway, which is known as a major migration corridor for numerous avian species.

The difference between the scores can be attributed to the greater ecological attractiveness of the reference site as compared to the project areas. The reference site is part of a lotic system and offers a concentrated food source in the form of planted wildlife food plots. The three potential project areas lack these particular physical attributes. The Edgeley/Forbes Site was included in the PII but subsequently eliminated as an alternative (see section 2.1.2).

2.1.3 Proposed Action

Basin Electric continued to evaluate biological and physical features of the sites to assess which alternative they would put forward as their Proposed Action. Site A and Site B are similar in most aspects reviewed. The one biggest difference is that Site B would require an additional seven to eight miles of transmission line to be constructed to reach the 230-kV line nearest the site. Because transmission lines are expensive to construct ($400,000 per mile) and pose a risk to birds, Basin Electric decided that Site A would be their Proposed Action.

2.2 Description of Site A Project (Proposed Action)

Site A (**Figure 3**) would consist of a wind-powered electricity generation facility with a nameplate rating of up to 115.5 MW, or a yearly average of 45 MW. Site A is located approximately 15 miles south of Minot, North Dakota. From Minot, access to Site A is provided by North Dakota State Highway 83 and several two-lane gravel county and section roads. Proposed plans for Site A include the installation of up to 77 GE 1.5 MW wind turbines within an area of approximately 30,000 acres (47 square miles). Infrastructure to be constructed or installed includes a substation, a temporary laydown yard, access roads (approximately 6 miles of improvements and additional 19

miles), and buried collector lines (approximately 45 miles). Power will be delivered to the grid via an existing Western transmission line near Site A.

Exact turbine models are subject to change to ensure selection of a turbine that is both cost effective and optimizes land and wind resources. Basin Electric is proposing to use 77 1.5 MW turbines. This analysis uses GE 1.5 MW machines, model 1.5sle, as a representative turbine for the 1.5 MW Class (GE 2005). Basin Electric may elect to select turbines by other turbine vendors.

The GE Wind Energy 1.5-MW utility-grade wind turbine, model 1.5sle, has a nominal nameplate rating of 1,500 kilowatts (kW). Each turbine will have an 80-meter (262-foot) hub height and a rotor diameter (RD) of 77 meters (253) feet. The GE 1.5-MW turbine has a minimum operational wind speed of 7.8 miles per hour (mph), and reaches its rated capacity (1,500 kW) at a wind speed of 31.3 mph. The cutout wind speed is approximately 56 mph.

Each tower will be anchor-bolted to an underground spread footing or concrete shell design. The base would be up to 40 feet in diameter underground with up to 20 feet in diameter of concrete exposed at the surface. The foundation thickness depends on the geologic conditions. During construction, a minimum of a 135-foot radius from the tower foundation would be required for the crane pad, rotor lay down and construction area, and various construction related activities. A control panel inside the base of each turbine tower houses communication and electronic circuitry. Each turbine is equipped with a wind speed and direction sensor that communicates to the turbine's control system to signal when sufficient winds are present for operation. These turbines feature variable-speed control and independent active blade pitch control to ensure maximum power output.

The electricity is collected by a system of underground power collection lines. Both power collection lines and communication cables will be direct-buried on private property or public rights-of-way. Typically, this infrastructure would be adjacent to the access roads or along public rights-of-way or easements. In cases where such infrastructure must be sited on property that is not governed by the existing wind easement and land lease options, Basin Electric will obtain easements for the necessary property.

Each wind turbine will be accessible via all-weather aggregate-surfaced roads up to 20 feet wide providing access to the turbines via public roads. Road width during construction will be wider to allow movement of cranes. The additional width would be reclaimed after construction. In some areas of the Project, it is more efficient to move the turbine erection crane cross-country, from turbine to turbine, on a route that is not a road. These routes are referred to as "crane walks." Similar to the routes for access roads and underground collector lines, crane walks would be routed to avoid wetlands and cultural resource sites.

The feeder system distributes power to the substation. At the substation, the power will be transformed to 115-kV and transmitted to an existing overhead 115-kV transmission line.

2.2.1 Site Layout

The site layout would be designed to optimize the wind resource while minimizing the impact on resources and any potentially sensitive areas. Wind-powered electric generation is entirely dependent on the availability of the wind resource at a specific location. A doubling of the wind speed will increase the available energy by a factor of eight times. The turbine array and collection system would be designed to minimize energy loss due to wind turbine wakes and turbulence and electrical line losses.

Ward County has established setbacks of the maximum tower height for wind towers from road rights-of-way, and occupied residences. Basin Electric proposes setbacks of 0.25 miles from USFWS WPAs, 500 feet from any large (greater than 50 acre) wetland complex, the height of the

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AUG 29, 2008

FIGURE 3

Legend

- City
- Existing Transmission Line
- Potential Project Sites
  - Preferred Site A
  - Alternative Site B

Miles

0 4

PROJECT AREAS
Environmental Report
PrairieWinds - ND 1 Project
Ward County, North Dakota
11

wind turbine from any developed road or transmission line; and 1,000 feet from occupied residences. The distances used with these setbacks are the same as those used in other wind farm projects. The towers are multi-coated conical tubular steel with a hub height of 80 meters (262 feet).

Infrastructure to be constructed or installed includes a substation, access roads, operations and maintenance building, meteorological tower, and buried collector and communication lines. Power will be delivered to the grid via existing Western transmission lines that run through or near the site

Substation

A new substation would be constructed on approximately 1.8 acres. Access to the proposed substation is from existing county roads. The substation would be adjacent to the existing Western 115-kV transmission line. Initial construction would include site grading and construction of a soil pad.

The substation would consist of concrete foundations, steel structures, electrical insulators, and outdoor electrical equipment such as transformers, switches, and circuit breakers. The site would be secured with fencing and access would be limited. Associated with the substation would be an approximate 6,500 square foot maintenance building

Construction

Several activities must be completed prior to the proposed commercial operation date. The majority of the activity relates to equipment ordering lead time and design and construction of the facility. Below is a progression of activities during construction. Pre-construction, construction, and post-construction activities include:

- Order necessary components including towers, nacelles, blades, foundations, cable, substation material, and transformers;
- Finalize turbine locations;
- Complete survey to finalize locations of structures and roadways;
- Soil borings (drilling), testing and analysis for proper foundation design and materials;
- Complete construction of access roads for construction and maintenance;
- Construct underground feeder lines;
- Design and construct substation;
- Install tower foundations;
- Install underground cables;
- Install towers and wind turbine;
- Complete acceptance testing of facility; and
- Commence commercial production.

Private turbine access roads will be built adjacent to the towers. The specific turbine placement will determine the amount of private roadway needed.

During the construction phase, several types of light-, medium-, and heavy-duty construction vehicles and private vehicles will use the access roads. Basin Electric estimates that there will be approximately 50 vehicle trips per day during peak construction periods. That volume will occur during the peak time when the road construction, foundation, and tower assembly are taking place.

Construction Management

A contractor will be primarily responsible for construction management. The contractor will use the services of local contractors, where possible. Construction management will 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; and
- Forecasting project labor requirements and budgeting.

The project will 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 erection; and
- System testing.

Throughout the construction phase, ongoing coordination occurs between the project development and the construction teams. The on-site project construction manager helps to coordinate all aspects of the project, including ongoing communication with local officials, citizens groups, and landowners.

Project Operation and Maintenance

Each wind turbine will communicate directly with the supervisory control and data acquisition (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 project will be operated and maintained by Basin Electric or a third party contractor.

Basin Electric and the appropriate supplier will control, monitor, operate, and maintain the project by means of a SCADA computer software program. In addition to regularly scheduled on-site visits, the wind project may be monitored via computer.

The SCADA system offers access to wind turbine generation or production data, availability, meteorological, and communications data, as well as alarms and communication error information. Performance data and parameters for each machine (generator speed, wind speed, power output, etc.) can also be viewed, and machine status can be changed. There is also a “snapshot” facility that collects frames of operating data to aid in diagnostics and troubleshooting of problems. The primary functions of the SCADA system are to:

- Monitor wind project status;
- Allow for autonomous turbine operation;
- Alert operations personnel to wind project conditions requiring resolution;
- Provide a user/operator interface for controlling and monitoring wind turbines;
- Collect meteorological performance data from turbines;

- Monitor field communications;
- Provide diagnostic capabilities of wind turbine performance for operators and maintenance personnel;
- Collect wind turbine and wind project material and labor resource information;
- Provide information archive capabilities;
- Provide inventory control capabilities; and
- Provide information reporting on a regular basis.

Decommissioning and Restoration

Basin Electric has a contractual obligation to the landowners to remove the wind facilities, including foundations to a depth of four feet, when the wind easement expires. Basin Electric also reserves 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.

2.3 Alternatives to Site A

Using the evaluation criteria (see Section 2.1.2), Basin Electric determined that Site B was possibly a reasonable alternative to Site A.

2.3.1 Site B

The Site B wind project is located approximately 10 miles southwest of Minot, in Ward County, North Dakota (**Figure 3**) and its configuration would be similar to Site A. Site B is located over relatively level terrain near a Western 115-kV transmission line. There is no substation at this alternative location and a new substation would be constructed as part of the project for this site. As in Site A, Site B would consist of installation of up to 77 GE 1.5 MW wind turbines within an area of approximately 36,500 acres (57 square miles). Infrastructure to be constructed or installed includes a substation, temporary laydown yard, access roads, meteorological tower, and buried collector and communication lines. A site layout and turbine array has not been developed, however, the length of road and collector lines needed is expected to be similar to that described for Site A. Power will be delivered to the grid via existing Western transmission lines near the site. Development, construction, operation, and decommissioning of Site B would be the same as described under Site A.

2.3.2 No Action Alternative

Under the No Action Alternative, RUS would forego funding the wind project and associated facilities, and Western would not allow interconnection into their 115-kV transmission line. Basin Electric could decide to construct the project without RUS funding, but Western deciding not to allow an interconnection could halt the project. Basin Electric has a transmission line in the area, but interconnecting to it would be expensive (upwards of $3,000,000) and require about 4 miles of overhead transmission line. Therefore, for the purposes of this analysis, it is assumed that selection of the No Action Alternative would result in elimination of the PrairieWinds - ND 1 project.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter provides a description of the affected environment and environmental consequences of constructing the project at Site A or Site B.

The Council on Environmental Quality's (CEQ) regulations (40 CFR 1500-1508) and DOE guidance indicate that the amount of analysis should correspond to the importance of the issues: significant issues should be discussed more thoroughly than less significant issues. The level of detail and the amount of analysis presented in each section of Chapter 3 correspond to the issues raised about the project during the scoping process and agency consultation (Appendix A).

3.1 Land Use

3.1.1 Affected Environment

3.1.1.1 Site A

General Land Use

Site A is primarily agricultural with scattered farmstead residences. None of Ward County's zoning regulations apply to Site A. A conditional use permit will be required. Site A is not within the Minot city limits or within a known military installation. For safety, wind turbines are to be placed so that they be placed at least as far from any occupied residences or public road as they are tall (their total height).

Based on a review of aerial photographs, USFWS, National Wetlands Inventory (NWI), and Natural Resource Conservation Service (NRCS) databases, and field studies, the majority of the land area is crop land. **Table 3** identifies current land use in Site A.

Table 3
Major Land Uses in Site A

Land Use	Site A
NLCD Native cover	9,060 acres (30%)
NLCD Cropland cover	16,093 acres (53%)
NLCD Developed lands	67 acres (<1%)
State lands	64 acres (<1%)
USFWS wetland easement	6,477acres (21%)
USFWS wetland & grassland easement	878 acres (3%)
USFWS WPA	156 acres (<1%)
Number of Significant Ecological Communities (SECs) within site	Three
All NWI wetlands	3,446 acres (11%)
All WUS	116,152 feet
Estimated jurisdictional wetland WUS	368 acres
FSA CRP contracted lands	all or portions of 23 sections

NLCD = National Land Cover Dataset
NWI = National Wetlands Inventory
WUS = Waters of the US
FSA = Farm Service Agency
CRP = Conservation Reserve Program

Important Farmland, Prime Forestland, and Prime Rangeland

Congress enacted the Farmland Protection Policy Act (FPPA) to implement programs and policies to protect farmland and combat urban sprawl and the waste of energy and resources that accompanies sprawling development. This act resulted in creating a farmland use classification system which includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a federal agency. The FPPA does not authorize the Federal Government to regulate the use of private or nonfederal land or, in any way, affect the property rights of owners.

The NRCS Soil Survey Geographic (SSURGO) Database (NRCS 2008) shows 1,986 acres of prime farmland (7 percent of Site A) and 14,032 acres of farmland of statewide importance (48 percent of Site A). No prime forestland or prime rangeland is located within Site A.

Formally Classified Lands

According to RUS Bulletin 1794A-601 (USDA 1998), formally classified lands may include:

- National Parks and Monuments;
- National Natural Landmarks;
- National Battlefield Park Sites;
- National Historic Sites and Parks;
- Wilderness Areas;
- Wild and Scenic and Recreational Rivers;
- Wildlife Refuges;
- National Seashores, Lake Shores, and Trails;
- State Parks;
- Bureau of Land Management (BLM) Administered Lands;
- National Forests and Grasslands; and
- Native American Owned Lands and Leases Administered by the Bureau of Indian Affairs.

Formally classified areas will be avoided, and will not be discussed further.

Other Lands

Within Site A, classified lands include state lands (64 acres), USFWS wetland easements (6,477 acres), USFWS wetland and grassland easements (878 acres), USFWS WPAs (156 acres), and CRP land (all or portions of 23 sections) (**Table 3**).

3.1.1.2 Site B

General Land Use

General land use in Site B is the same as Site A.

Based on a review of aerial photographs, USFWS, NWI, and NRCS database information, and field studies in Site B, the majority of the land area at the site is agricultural use (**Table 4**).

Table 4 Major Land Uses in Site B	
Land Use	**Site B**
Native cover	13,408 acres (37%)
Cropland cover	17,136 acres (47%)
Developed lands	400 acres (1%)
State lands	655 acres (2%)
USFWS wetland easement	13,352 (37%)
USFWS grassland easement	1,528 acres (4%)
USFWS WPA	255 acres (0.7%)
Number of Species of Concern within site	One
Number of SECs within site	None
All NWI wetlands	3,534 acres (10%)
All WUS	67,702 feet
Estimated jurisdictional wetland WUS	192 acres (0.5%)
FSA CRP contracted lands	all or portions of 13 sections

Important Farmland, Prime Forestland, and Prime Rangeland

The NRCS SSURGO Database (NRCS 2008) shows 1,723 acres of prime farmland (5 percent) and 16,603 acres of farmland of statewide importance (46 percent). No prime forestland or prime rangeland is located within the project area.

Formally Classified Lands

Lands that may formally be classified according to RUS Bulletin 1794A-601 (USDA 1998) were identified in the previous subsection under land use for Site A. Formally classified areas will be avoided, and therefore not affected and will not be discussed further.

Other Lands

Within Site B, classified lands include state lands (655 acres), USFWS wetland easements (13,352 acres), USFWS grassland easements (1,528 acres), USFWS WPAs (255 acres), and CRP land (all or portions of 13 sections) (**Table 4**).

3.1.2 Direct and Indirect Effects

Development of either site will not displace any residences or existing or planned industrial facilities. Wind turbines will be sited a minimum of 1,000 feet from occupied residences.

3.1.2.1 Site A

General Land Use

The area will retain the rural sense and remote characteristics of the vicinity. Wind turbines will be sited a minimum of 1,000 feet from occupied residences and will not displace any residences or existing or planned industrial facilities. At other wind developments in the upper Midwest, landowners frequently plant crops and/or graze livestock to the edge of the access roads and turbine pads. The access roads are up to 20 feet wide and low profile, so they are easily crossed while farming. Basin Electric will work closely with the landowners in locating access roads to minimize land use disruptions to the extent possible. Consideration will be taken in locating access roads to minimize impact on current or future row crop agriculture and environmentally sensitive

areas. During the construction of the wind power facilities, additional areas may be temporarily disturbed for contractor staging areas and underground power lines. These areas will be graded to original contour and reseeded with appropriate vegetation.

Installation would result in the permanent conversion (longer than 30 years) to wind facilities of up to four acres of cropland and rangeland due to turbine construction, up to five acres of cropland and rangeland for the substation and laydown areas, and approximately 64.6 acres of access roads for a total of 74 acres of permanent disturbance. **Table 5** shows the acres disturbed (temporary and permanent).

Table 5
Disturbed Acres- Land Use

Type	Temporary Disturbance (Acres)	Permanent Disturbance (Acres)
USFWS Grassland Easement	32.7	1.1
USFWS Wetland Easement	0	0
State Land	9.4	0.2
Waterfowl Production Area	1.1	0.3
Privately Owned Lands	940.7	72.4
Total	984.0	74.0

Formally Classified Lands

Formally classified lands would be avoided, therefore, there would be no impacts.

Other Lands

Temporary and permanent disturbance of easements and other ownership was calculated based on the preliminary site layout for Site A **(Table 5)**. Unavoidable impacts to USFWS interests as described in **Table 5** will be replaced by Basin Electric through the protection of equivalent habitat permanently protected by USFWS easement. Basin Electric will partner with the USFWS to implement this habitat exchange and provide funding to purchase this habitat.

3.1.2.2 Site B

Development of Site B would not displace any residences or existing or planned industrial facilities. Wind turbines would be sited a minimum of 1,000 feet from occupied residences.

Formally Classified Lands

Formally classified lands would be avoided, therefore, there would be no impacts.

Other Lands

A preliminary site layout has not been developed for Site B, however, given the conditions of Site B, it is assumed that effects on easements and other lands would be similar in extent to Site A.

3.1.2.3 No Action Alternative

Under the No Action Alternative, no impacts to land use would occur.

3.2 Wetlands and Floodplains

3.2.1 Affected Environment

According to the Ward County Department of Tax Equalization (Siebert 2008), neither Site A nor Site B have floodplains mapped by the Federal Emergency Management Agency (FEMA). As a result, potential floodplains have not been determined. However, no major drainages exist within Site A or Site B and no direct or indirect effects on floodplains and floodplains are likely.

3.2.1.1 Site A

Precipitation averages 17.5 inches per year and provides sufficient annual recharge of the abundant isolated depressional wetlands.

The NWI (USFWS 1977) database indicated 20 wetland classification types (**Table 6**), covering approximately 3,447 acres (11 percent), mapped in Site A based on the hydrogeomorphic system.

Table 6
Summary of NWI Wetland Occurrence and Extent by Classification in Site A

Hydrogeomorphic Wetland Classification	Acres	Percent
Lacustrine, Littoral, Aquatic Bed, Intermittently Exposed	461.1	1.5
Palustrine, Aquatic Bed /Emergent, Semipermanently Flooded	61.0	0.2
Palustrine, Aquatic Bed /Emergent, Semipermanently Flooded, Partially Drained/Ditched	7.4	<0.1
Palustrine, Aquatic Bed, Semipermanently Flooded	429.6	1.4
Palustrine, Aquatic Bed, Semipermanently Flooded, Partially Drained/Ditched	1.3	<0.1
Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	1.9	<0.1
Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated	20.1	0.1
Palustrine, Emergent/Aquatic Bed, Semipermanently Flooded	587.0	2.0
Palustrine, Emergent / Aquatic Bed, Semipermanently Flooded, Partially Drained/Ditched	19.2	0.1
Palustrine, Emergent, Temporarily Flooded	438.2	1.5
Palustrine, Emergent, Temporarily Flooded, Partially Drained/Ditched	54.8	0.2
Palustrine, Emergent, Temporarily Flooded, Excavated	0.5	<0.1
Palustrine, Emergent, Seasonally Flooded	1,109.2	3.7
Palustrine, Emergent, Seasonally Flooded, Partially Drained/Ditched	72.5	0.2
Palustrine, Emergent, Seasonally Flooded, Excavated	3.6	<0.1
Palustrine, Emergent, Semipermanently Flooded	162.4	0.5
Palustrine, Emergent, Semipermanently Flooded, Partially Drained/Ditched	11.0	<0.1
Palustrine, Forested, Temporarily Flooded, Partially Drained/Ditched	0.3	<0.1
Palustrine, Forested, Seasonally Flooded	2.3	<0.1
Palustrine, Scrub-Shrub /Emergent, Seasonally Flooded	1.2	<0.1
Palustrine, Unconsolidated Bottom, Intermittently Exposed, Excavated	2.2	<0.1
TOTAL	3,446.8	11.4

All waters of the United States (WUS) are considered jurisdictional under Section 404 of the Clean Water Act (CWA). WUS are those waters that are hydrologically connected to a traditionally

navigable waterway. In the case of Site A, the Souris River serves as the traditionally navigable waterway. Only wetlands considered to exhibit a "significant nexus" to WUS are subject to US Army Corps of Engineers (USACE) regulation, as opposed to isolated wetlands, which do not exhibit a "significant nexus." Therefore, water features fall into one of three categories: wetland WUS (jurisdictional), non-wetland WUS (jurisdictional), and non-jurisdictional wetlands.

The occurrence of USACE jurisdictional features across Site A was estimated by overlaying the NWI (USFWS 1977) and National Hydrography Dataset (NHD) (USGS date unknown) layers, as illustrated in **Figure 4**. The NHD provides geographical data for perennial and intermittent drainages, which for the purposes of this analysis were assumed to represent all of the WUS in Site A. The NHD data indicate that Site A contains a total of 116,152 linear feet of jurisdictional WUS (**Table 3**). It was then assumed that each NWI (USFWS 1977) wetland that intersects NHD drainage represents a hydrologically connected wetland exhibiting a "significant nexus," thus identifying the subset that may qualify as jurisdictional wetland WUS. Predominantly, the wetlands of Site A are recognized as prairie potholes, which are classified as isolated wetlands that are not hydrologically connected to WUS. The NHD data identified 42,202 linear feet of WUS that intersect NWI wetlands resulting in an estimated acres (one percent of the project area) that may be considered jurisdictional wetland WUS (**Table 7**).

Table 7
Summary of Jurisdictional Wetland WUS Occurrence and Extent by Classification in Site A

Hydrogeomorphic Wetland Classification	Acres	Percent
Lacustrine, Littoral, Aquatic Bed, Intermittently Exposed	119.7	0.4
Palustrine, Aquatic Bed, Semipermanently Flooded	99.7	0.3
Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	0.5	<0.1
Palustrine, Emergent/Aquatic Bed, Semipermanently Flooded	56.3	0.2
Palustrine, Emergent / Aquatic Bed, Semipermanently Flooded, Partially Drained/Ditched	4.2	<0.1
Palustrine, Emergent, Temporarily Flooded	60.2	0.2
Palustrine, Emergent, Temporarily Flooded, Partially Drained/Ditched	7.3	<0.1
Palustrine, Emergent, Seasonally Flooded	44.7	0.1
Palustrine, Emergent, Seasonally Flooded, Partially Drained/Ditched	15.9	0.1
Palustrine, Emergent, Semipermanently Flooded	31.6	0.1
TOTAL	440.1	1.4

Non-wetland WUS and wetland WUS are regulated by the Clean Water Act (CWA). The estimates of USACE jurisdictional features are based on assumptions, and therefore, warrant formal wetland delineations to confirm the determinations.

3.2.1.2 Site B

Precipitation averages 17.5 inches per year and provides sufficient annual recharge of the abundant isolated depressional wetlands.

Review of the NWI (USFWS 1977) database identified a total of 13 wetland classification types (**Table 8**), covering approximately 3,534 acres mapped across Site B (10 percent of Site B) based on the hydrogeomorphic system (**Figure 5**).

The NHD data indicate that Site B contains a total of 67,702 linear feet of jurisdictional WUS (**Table 9**). The NHD data also identified 20,322 linear feet of WUS that intersect NWI wetlands in Site B resulting in 192 acres (0.5 percent of Site B) that may be considered jurisdictional wetland WUS (**Table 9**).

National Wetlands Inventory

- Lacustrine, Littoral, Aquatic Bed, Intermittently Exposed
- Palustrine, Aquatic Bed /Emergent, Semipermanently Flooded
- Palustrine, Aquatic Bed /Emergent, Semipermanently Flooded, Partially Drained/Ditched
- Palustrine, Aquatic Bed
- Palustrine, Aquatic Bed, Semipermanently Flooded
- Palustrine, Aquatic Bed, Semipermanently Flooded, Partially Drained/Ditched
- Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded
- Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated
- Palustrine, Aquatic Bed, Intermittently Exposed, Excavated
- Palustrine, Emergent/Aquatic Bed, Semipermanently Flooded
- Palustrine, Emergent / Aquatic Bed, Semipermanently Flooded, Partially Drained/Ditched
- Palustrine, Emergent/Aquatic Bed, Semipermanently Flooded, Diked/Impounded
- Palustrine, Emergent /Forested, Seasonally Flooded
- Palustrine, Emergent, Temporarily Flooded
- Palustrine, Emergent, Temporarily Flooded, Partially Drained/Ditched
- Palustrine, Emergent, Temporarily Flooded, Excavated
- Palustrine, Emergent, Seasonally Flooded
- Palustrine, Emergent, Seasonally Flooded, Partially Drained/Ditched
- Palustrine, Emergent, Seasonally Flooded, Diked/Impounded
- Palustrine, Emergent, Seasonally Flooded, Excavated
- Palustrine,Emergent, Semipermanently Flooded
- Palustrine, Emergent, Semipermanently Flooded, Partially Drained/Ditched
- Palustrine, Forested / Emergent, Seasonally Flooded
- Palustrine, Forested, Temporarily Flooded
- Palustrine, Forested, Temporarily Flooded, Partially Drained/Ditched
- Palustrine, Forested, Seasonally Flooded
- Palustrine, Scrub-Shrub /Emergent, Temporarily Flooded
- Palustrine, Scrub-Shrub /Emergent, Seasonally Flooded
- Palustrine, Scrub-Shrub, Temporarily Flooded
- Palustrine, Unconsolidated Bottom, Semipermanently Flooded, Excavated
- Palustrine, Unconsolidated Bottom, Intermittently Exposed, Excavated
- Palustrine, Unconsolidated Shore, Seasonally Flooded, Diked/Impounded

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AUG 29, 2008

FIGURE 4

Legend

- Preferred Site A
- National Hydrography Dataset Stream or River
- Existing Transmission Line

N

Miles

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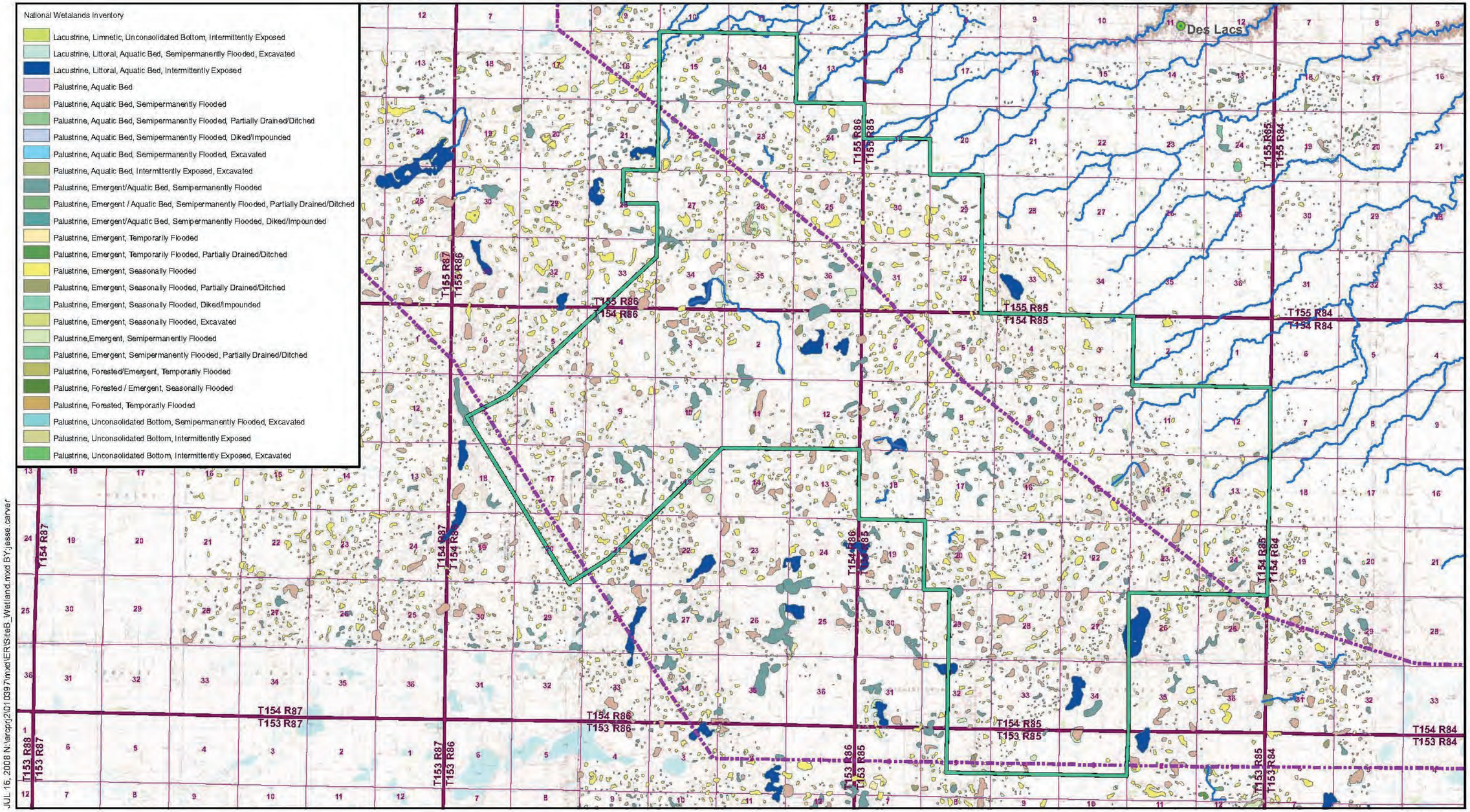
WETLANDS IN SITE A

Environmental Report
Prairie Winds - ND 1 Project
Ward County, North Dakota
23

National Wetalands Inventory

- Lacustrine, Limnetic, Unconsolidated Bottom, Intermittently Exposed
- Lacustrine, Littoral, Aquatic Bed, Semipermanently Flooded, Excavated
- Lacustrine, Littoral, Aquatic Bed, Intermittently Exposed
- Palustrine, Aquatic Bed
- Palustrine, Aquatic Bed, Semipermanently Flooded
- Palustrine, Aquatic Bed, Semipermanently Flooded, Partially Drained/Ditched
- Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded
- Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated
- Palustrine, Aquatic Bed, Intermittently Exposed, Excavated
- Palustrine, Emergent/Aquatic Bed, Semipermanently Flooded
- Palustrine, Emergent / Aquatic Bed, Semipermanently Flooded, Partially Drained/Ditched
- Palustrine, Emergent/Aquatic Bed, Semipermanently Flooded, Diked/Impounded
- Palustrine, Emergent, Temporarily Flooded
- Palustrine, Emergent, Temporarily Flooded, Partially Drained/Ditched
- Palustrine, Emergent, Seasonally Flooded
- Palustrine, Emergent, Seasonally Flooded, Partially Drained/Ditched
- Palustrine, Emergent, Seasonally Flooded, Diked/Impounded
- Palustrine, Emergent, Seasonally Flooded, Excavated
- Palustrine,Emergent, Semipermanently Flooded
- Palustrine, Emergent, Semipermanently Flooded, Partially Drained/Ditched
- Palustrine, Forested/Emergent, Temporarily Flooded
- Palustrine, Forested / Emergent, Seasonally Flooded
- Palustrine, Forested, Temporarily Flooded
- Palustrine, Unconsolidated Bottom, Semipermanently Flooded, Excavated
- Palustrine, Unconsolidated Bottom, Intermittently Exposed
- Palustrine, Unconsolidated Bottom, Intermittently Exposed, Excavated



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AUG 29, 2008

FIGURE 5

Legend

- Alternative Project Site B
- National Hydrography Dataset Stream or River
- Existing Transmission Line

N

Miles

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WETLANDS IN SITE B

Environmental Report
Prairie Winds - ND 1 Project
Ward County, North Dakota
25

Table 8
Summary of NWI Wetland Occurrence and Extent by Classification in Site B

Hydrogeomorphic Wetland Classification	Acres	Percent
Lacustrine, Littoral, Aquatic Bed, Intermittently Exposed	0.3	<0.1
Lacustrine, Littoral, Aquatic Bed, Intermittently Exposed	201.6	0.6
Palustrine, Aquatic Bed, Semipermanently Flooded	682.1	1.9
Palustrine, Aquatic Bed, Semipermanently Flooded, Partially Drained/Ditched	16.9	0.1
Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	3.2	<0.1
Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated	15.8	<0.1
Palustrine, Emergent/Aquatic Bed, Semipermanently Flooded	641.6	1.8
Palustrine, Emergent / Aquatic Bed, Semipermanently Flooded, Partially Drained/Ditched	8.5	<0.1
Palustrine, Emergent, Temporarily Flooded	116.2	0.3
Palustrine, Emergent, Temporarily Flooded, Partially Drained/Ditched	37.6	0.1
Palustrine, Emergent, Seasonally Flooded	1,553.8	4.3
Palustrine, Emergent, Seasonally Flooded, Partially Drained/Ditched	128.2	0.4
Palustrine, Emergent, Semipermanently Flooded	128.3	0.4
TOTAL	3,534.1	9.7

Table 9
Summary of Jurisdictional Wetland WUS Occurrence and Extent by Classification in Site B

Hydrogeomorphic Wetland Classification	Acres	Percent
Lacustrine, Littoral, Aquatic Bed, Intermittently Exposed	58.8	0.2
Palustrine, Aquatic Bed, Semipermanently Flooded	43.0	0.1
Palustrine, Aquatic Bed, Semipermanently Flooded, Partially Drained/Ditched	13.3	<0.1
Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	2.5	<0.1
Palustrine, Aquatic Bed, Semipermanently Flooded, Excavated	0.4	0
Palustrine, Emergent/Aquatic Bed, Semipermanently Flooded	4.5	<0.1
Palustrine, Emergent / Aquatic Bed, Semipermanently Flooded, Partially Drained/Ditched	4.7	<0.1
Palustrine, Emergent, Temporarily Flooded	2.9	<0.1
Palustrine, Emergent, Temporarily Flooded, Partially Drained/Ditched	2.6	<0.1
Palustrine, Emergent, Seasonally Flooded	27.5	0.1
Palustrine, Emergent, Seasonally Flooded, Partially Drained/Ditched	7.1	<0.1
Palustrine, Emergent, Semipermanently Flooded	24.6	0.1
TOTAL	191.9	0.5

3.2.2 Direct and Indirect Effects

3.2.2.1 Site A and Site B

Basin Electric has committed to avoiding all wetlands, therefore, there would be no direct or indirect effects on wetlands.

3.2.2.2 No Action Alternative

Under the No Action Alternative, no impacts to wetlands would occur.

3.3 Cultural Resources

Cultural resources are the locations of past human activity defined by artifacts, features or architectural structures. These sites allow us to develop a better understanding of the lifeways and behaviors of early societies. Some sites may contain information important for research, public interpretation, and use by future generations.

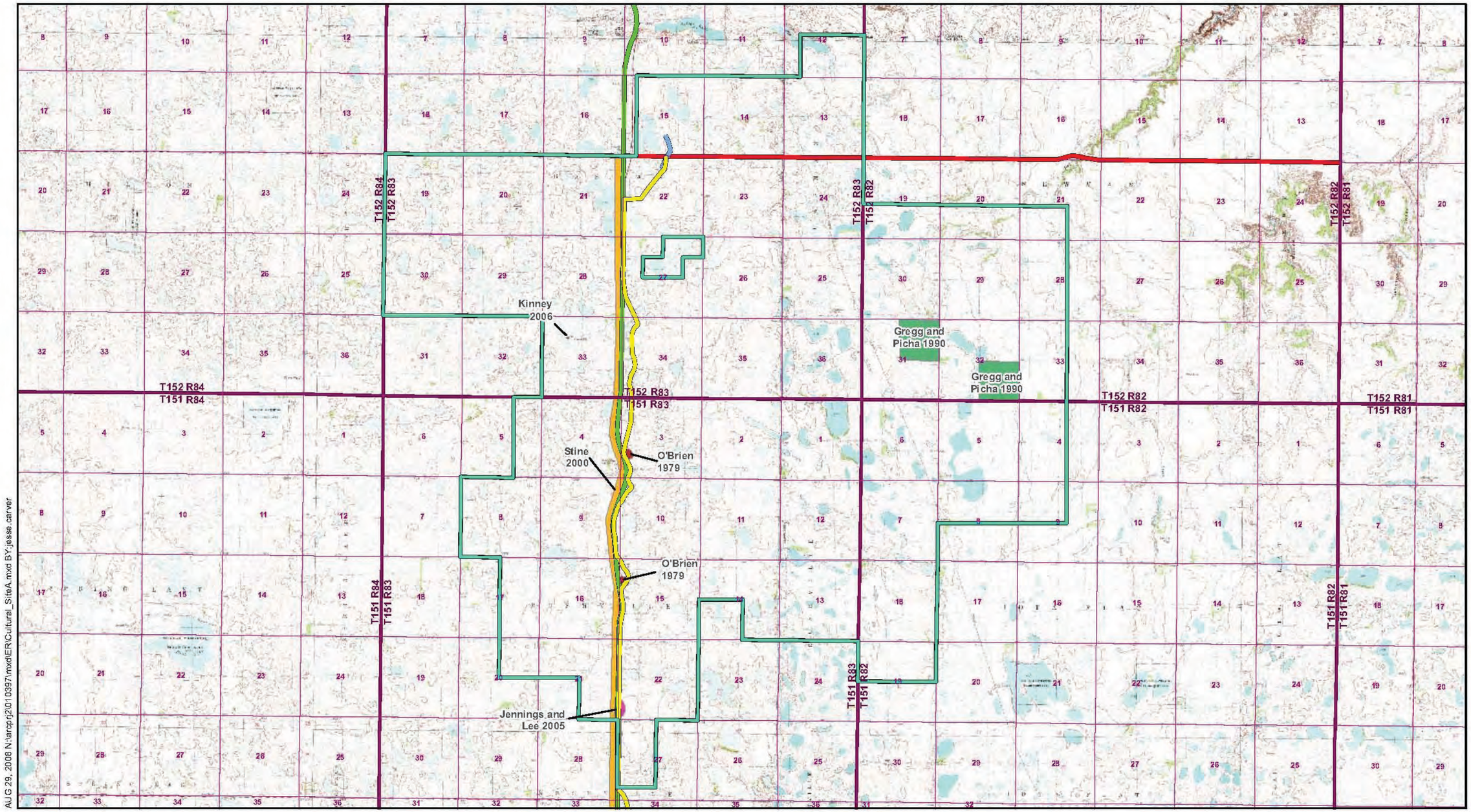
3.3.1 Affected Environment

3.3.1.1 Site A and Site B

In compliance with regulations established in the 1966 National Historic Preservation Act (NHPA), 36 CFR Part 800, 12 cultural resource surveys have been conducted in Site A (**Table 10**). These projects recorded eight sites and one isolate. Site types include stone rings, a lithic scatter, a road, a town hall, and homesteads and farmsteads. Of these sites, one is recommended eligible to the National Register of Historic Places (NRHP), three are potentially eligible, one is recommended as not eligible, and the eligibility of the remaining three sites is undetermined. The cultural and historical sites in Site A and Site B are presented in **Figure 6** and **Figure 7**,respectively.

Table 10
Cultural Resource Projects in Site A

Reference	Project Description and Location
Franke, N. 1976	Right-of-way from Stanton to Kenmare; Sec. 4, 9, T151N R82W and Sec. 21, 28, T152N R82W.
Snortland, J. 1978	Hwy 83 Survey; Sec. 3, 4, 9, 10, N1/2 of 15, S1/2 and S1/2N1/2 of 16, N1/2 of 21, S1/2 of 22, N1/2 of 27, T151N R83W; N1/2 of Sec. 22, 27, 28, 33, 34, T152N R83W.
O'Brien, L. 1979	Test Excavation at 32WD117 and 32WD119, Sec. 3, 15, T151N R83W.
Good, K. and J. Dahlberg, 1981	Mitigation Plan for Transmission Line; Sec. 3, T151N R83W.
Gregg, M. and P. Picha, 1990	Erosion Control Survey; NE1/4 of Sec. 31 and SE1/4 of Sec. 32, T152N R82W.
Blikre, L. and J. Borchert, 1991	Surfacing Survey of County Rd. No. 20; S edge of Sec. 13, 14, 15 and the N edge of Sec. 22, 23, 24, T152N R83W.
Stine, E., 2000	US Hwy 2 and 83 and ND Hwy 3 and 5 Survey; along those portions of Sec. 3, 4, 9, 10, N1/2 of 15, S1/2 and S1/2N1/2 of 16, N1/2 of 21, S1/2 of 22, N1/2 of 27, T151N R83W; N1/2 of Sec. 22, 27, 28, 33, 34, T152N R83W that the highways run. Survey corridor ranged from 33 to 75 ft on each side of the highway centerline.
Morrison, J. 2002	Water Pipeline Survey; Portions in S1/2 of Sec. 15 and the N1/2 of Sec. 22, T152N R83W.
Bluemle, W. 2003	Water Pipeline Survey; Portions in Sec. 22, 27, 34, T152N R83W; and Sec. 3, 9, 10, 15, 22, 27, T151N R83W.
Jennings, S. and J. Lee 2005	Evaluative Testing of 32WD1548; WSWSW of Sec. 22, T151N R83W.
Kinney, J. 2006	Survey of DOT Borrow Areas; SWNENW of Sec. 33, T152N R83W.
Fandrich, B. and L. Peterson, 2006	Hwy 23 Survey; S edge of Sec. 13, 14, 15, and the N edge of Sec. 23, 24, T152N R83W.



Legend

Preferred Site A

Previous Cultural Survey Corridors

- Blikre & Borchert 1991; Fandrich & Peterson 2006
- Bluemle 2003
- Morrison 2002
- Snortland 1978

Previous Cultural Survey Areas

- Gregg and Picha 1990
- Jennings and Lee 2005
- Kinney 2006
- O'Brien 1979
- Stine 2000

N

Miles

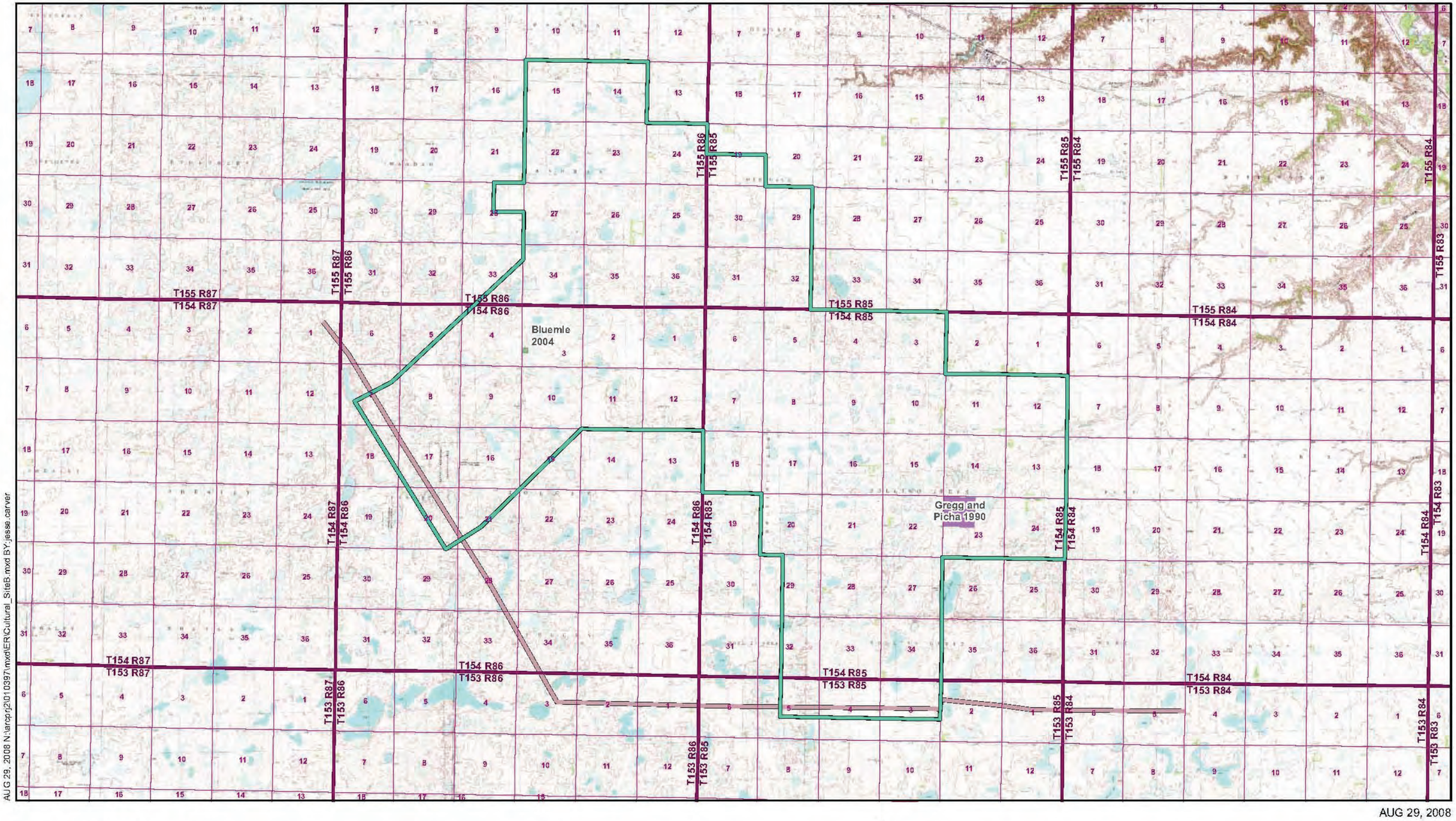
0 2

AUG 29, 2008

FIGURE 6

CULTURAL AND HISTORIC SURVEYS IN SITE A

Environmental Report
Prairie Winds - ND 1 Project
Ward County, North Dakota
29



AUG 29, 2008

FIGURE 7

Legend

Alternative Project Site B

Previous Cultural Survey Corridors

Fox 1980

Previous Cultural Survey Areas

Bluemle 2004

Gregg and Picha 1990

N

Miles

0 2

CULTURAL AND HISTORIC SURVEYS IN SITE B

Environmental Report
Prairie Winds - ND 1 Project
Ward County, North Dakota
31

A Class III cultural resource inventory (Ethnoscience 2008) was performed at Site A. A summary of the inventory is presented in **Table 11**. The inventory examined 83 turbine locations (including alternate locations), access roads and underground collector lines which totaled 1,484 acres. This inventory identified 31 sites and three isolated finds. Of the 31 sites, 19 are prehistoric sites, 11 are historic sites and one is a multi-component site. The prehistoric sites include 18 stone feature sites and one depression site. The historic sites include two architectural sites and nine archaeological sites. The multi-component sites consist of historic architectural features, historic archaeological remains and a prehistoric stone feature. The three isolated finds consist of two lithic tools and one lithic flake, all of which are made of Knife River Flint. Of these sites, one is recommended eligible to the NRHP, 10 are not recommended eligible and the eligibility of the remaining 20 sites is undetermined.

Table 11
Class III Cultural Resource Inventory Summary

Site No.	Site Type	Site Components	NRHP Eligibility Recommendation
32WD1636	Prehistoric	1 ring	Undetermined under Criterion D
32WD1637	Historic	US Coast & Geodetic Survey Triangulation Station	Eligible Criteria A & C
32WD1638	Prehistoric	8 rings	Undetermined under Criterion D
32WD1639	Historic	school (2 features)	Not eligible
32WD1640	Historic	cultural material scatter	Not eligible
32WD1641	Prehistoric	1 cairn	Undetermined under Criterion D
32WD1642	Prehistoric	2 cairns	Undetermined under Criterion D
32WD1643	Prehistoric	1 ring	Undetermined under Criterion D
32WD1644	Prehistoric	1 ring & 4 cairns	Undetermined under Criterion D
32WD1645	Prehistoric	eleven stone features (2 cairns, 1 alignment, 1 arc and 7 rings)	Undetermined under Criterion D
32WD1646	Prehistoric	2 rings & 1 arc	Undetermined under Criterion D
32WD1647	Historic	cultural material scatter	Not eligible
32WD1648	Historic	cultural material scatter	Not eligible
32WD1649	Prehistoric	1 cairn	Undetermined under Criterion D
32WD1650	Prehistoric	1 ring	Undetermined under Criterion D
32WD1651	Prehistoric	6 rings & 4 cairns	Undetermined under Criterion D
32WD1652	Prehistoric	1 stone feature	Undetermined under Criterion D
32WD1653	Prehistoric	2 rings	Undetermined under Criterion D

Table 11 Class III Cultural Resource Inventory Summary (Continued)			
Site No.	**Site Type**	**Site Components**	**NRHP Eligibility Recommendation**
32WD1654	Prehistoric	1 ring & 1 cairn	Undetermined under Criterion D
32WD1655	Prehistoric	1 ring	Undetermined under Criterion D
32WD1656	Historic	cultural material scatter	Not eligible
32WD1657	Historic	farmstead (7 features)	Not eligible
32WD1658	Historic & Prehistoric	Historic component (21 features); Prehistoric component (1 feature)	Historic Component not eligible, Prehistoric component Undetermined under Criterion D
32WD1659	Prehistoric	1 depression	Undetermined under Criterion D
32WD1660	Historic	cultural material scatter	Not eligible
32WD1661	Historic	farmstead (11 features)	Not eligible
32WD1662	Historic	cultural material scatter	Not eligible
32WD1663	Historic	cultural material scatter	Not eligible
32WD1664	Prehistoric	1 ring	Undetermined under Criterion D
32WD1665	Prehistoric	1 ring	Undetermined under Criterion D
32WD1666	Prehistoric	1 cairn	Undetermined under Criterion D
32WDX726	Isolated Find	one Knife River Flint flake	Not eligible
32WDX727	Isolated Find	one biface midsection made from Knife River Flint	Not eligible
32WDX728	Isolated Find	one side scraper made from Knife River Flint	Not eligible

Cultural resource projects have been conducted in Site B (**Table 12**). These projects recorded four sites, one isolate and 10 site leads. Site types include stone rings, rock cairns, cultural material scatters and a farmstead. The eligibility for listing on the NRHP has not been determined for any of the four cultural resources in Site B.

3.3.2 Direct and Indirect Effects

To comply with Section 106 of the NHPA, an area of potential effect (APE) for cultural and historical resources must be defined that is specific to the proposed undertaking. Areas of direct effect would be associated with turbine and substation construction, laydown areas, access roads and underground collector lines. The APE is 984 acres (**Table 5**).

Table 12 Cultural Resource Projects in Site B	
Reference	**Project Description and Location**
Scheider, F. and F. Holland 1977	Sec. 27, T154N R85W; Sec. 30, 31, 32, T155N R85W; and Sec. 25, 34, 36, T155N R86W.
Fox, R. 1980	Saskatchewan Intertie Transmission Line Right-of-Way; East-West line across centers of Sec. 3, 4, 5, T153N R85W; Diagonal line through SE of Sec. 7; SW and SWNW of Sec. 17; NENE of Sec. 18; E1/2 of Sec. 20; SW of Sec. 21, T154N R86W.
Good, K. and J. Dahlberg 1981	Mitigation Plan; Portions of Sec. 17, 20, T154N R86W.
Gregg, M. and P. Picha 1990	Erosion Control Study; NW of Sec. 23, T154N R85W.
Bluemle, W. 2004	Berthold Microwave Site Survey; 300 square ft. block in SWNWSW of Sec. 3, T154N R86W.
Jackson, M. 2007	Water Pipeline Survey; Sec. 26, 27, 28, 35, 36, T155N R86W.

3.3.2.1 Site A

One National Register eligible property (32WD1637) is present in Site A. This site is recommended eligible based on Criteria A and C. Measures would be taken to ensure this site is avoided and protected during construction. The layout for Site A has been revised to avoid impacts on all cultural and historical features identified in the Class III survey; therefore, no effects would occur.

Twenty sites (32WD1636, 32WD1638, 32WD1641-32WD1646, 32WD1649-32WD1655, 32WD1658, 32WD1659, 32WD1664-32WD1666) located in Site A have not been evaluated for their eligibility for the NRHP. These sites also would be avoided and therefore there would be no impacts.

Cultural resources will not be obscured by the construction or operation of the project at Site A.

3.3.2.2 Site B

Four sites (32WD7, 32WD8, 32WD9 and 32WD77) located in Site B require additional review to determine eligibility for the NRHP. These sites also would be avoided and therefore there would be no impacts. A Class III inventory of turbine locations, access roads and underground collector lines has not been conducted for Site B. If Site B was selected, surveys for the presence of cultural resources would be needed, along with a determination of eligibility for the NRHP.

3.3.2.3 No Action Alternative

There would be no direct effect on NRHP eligible sites or any cultural resources under the No Action Alternative.

3.4 Special Status Species

This section discusses those species listed as threatened or endangered at the federal and state levels, and other species of concern that may be affected by the proposed project. Effects to federally-listed species are summarized here. Further detail on these species is found in the June 2009 final Biological Assessment (BA) that will be appended to the decision document.

3.4.1 Federally-Listed Species

Based on information received from the U.S. Fish and Wildlife Service North Dakota Field Office, four listed species may occur in Ward County: whooping crane (Grus americana, endangered); gray wolf (Canis lupus, endangered); piping plover (Charadrius melodus, threatened), and Dakota skipper (Hesperia dacotae, candidate). None of these species was observed during the October 2007 or June 2008 site visits, although intensive species-specific surveys were not conducted.

Whooping crane

The whooping crane was close to extinction in the late 1960's, and has been endangered since 1970. The Aransas-Wood Buffalo Population (AWBP) of the whooping crane is the only self-sustaining flock in the wild, and currently numbers around 250 birds (USFWS 2009); other captive birds and one additional migratory flock also exist. Although a host of historic and recent factors have contributed to the whooping crane's decline, loss of habitat, particularly in the migration corridor, has been a major cause. The alternative project locations are both in the 75th percentile band of the AWBP migration corridor. This band represents that portion of the corridor where the large majority of crane sightings have been recorded, and thus the area where they are most likely to occur during migration.

The proposed project could affect the whooping crane directly (through collision with a turbine or adjacent structure), indirectly (through denial of habitat if the birds avoid the site), and cumulatively (as contributing to ongoing and future development in the corridor). To avoid and minimize potential effects, a habitat compensation program will be implemented in collaboration with the North Dakota Natural Resources Trust, which will secure (through conservation easements) suitable lands to provide crane stopover habitat. Other measures include marking segments of an existing transmission line, development of an operations plan, and conducting post-construction monitoring.

Gray wolf

Currently, gray wolves are limited to two separate populations in the western Great Lakes (Minnesota, Wisconsin, Upper Peninsula of Michigan) and the greater Yellowstone ecosystem (extreme northwest Wyoming, western Montana, and northeast Idaho). There is also a recovery effort in portions of southeast Arizona and southwest New Mexico. In February 2009 the Service de-listed the gray wolf Western Great Lakes Distinct Population Segment; the area covered by this action includes approximately the eastern 3/5 of North Dakota. Currently, the gray wolf is listed as Endangered west of US Highway 83 and was recently delisted east of US Highway 83; this north-south highway splits Site A with approximately 1/5 west of the highway, and 4/5 east of the split. While transient animals could occur in North Dakota, presence in the proposed project area is highly unlikely due to the absence of suitable habitat.

In the unlikely event that a wolf or wolves were to pass through the project area, there is a chance of vehicle collision, though this would be minimized through the enforcement of a 30 mph speed limit. Otherwise, the facility itself, once constructed, would not adversely affect wolves either directly or indirectly through habitat loss or other disturbance.

Piping plover

The U.S. range of the Great Plains population includes New Mexico, Colorado, Wyoming, Montana, Iowa, Minnesota, North Dakota, South Dakota, and Nebraska (USFWS 1988), with most of the birds currently nesting in North Dakota, South Dakota, Montana, and Nebraska. Piping plovers winter primarily along the southern Gulf Coast and Pacific Ocean. The Great Plains population declined from the mid-1980's through the 1990's, attributed to reservoir and river operations, marina development, drought and other factors that impact the species' breeding and wintering habitats.

In 2002, the FWS designated critical habitat for the Great Plains population. In North Dakota, critical habitat includes the Missouri River from the Montana/North Dakota border to the North Dakota/South Dakota border as well as numerous basins in Divide, Williams, Eddy, Renville, Montrail, Burke, McLean, McHenry, Sheridan, Pierce, Benson, Burleigh, Kidder, Stutsman, Logan, McIntosh, and Ward Counties. The nearest designated critical habitat, Danielson Waterfowl Production Area, is located approximately 3.5 miles east of the proposed project area.

Potential direct effects to the piping plover are considered discountable as it is highly unlikely that plovers would be found in the specific area of the proposal. Plover nesting or feeding habitat, characterized primarily by alkaline wetlands, is not found at the project site, and the nearest designated critical habitat is about 3.5 miles away. For these reasons, there would not be any indirect effects. Marking of an existing Basin Electric transmission line, as described in the BA, would benefit piping plovers by reducing collision risk. It is determined that implementation of the proposal may affect, but is not likely to adversely affect the piping plover. The proposal also will not destroy or adversely modify piping plover critical habitat.

Dakota skipper

Determinations of effect are not required for candidate species. As a voluntary conservation measure, potential skipper habitat will be identified, marked, and avoided during construction and operation of the project.

3.4.2 State Species of Concern

North Dakota accounts and manages for species of concern through its Wildlife Action Plan in the Game and Fish Department and the Natural Heritage Programs in the Parks and Recreation Department. The Wildlife Action Plan (also called the Comprehensive Wildlife Conservation Strategy) (Hagen et al. 2005) focuses on rare and/or declining species, but promotes conservation of all species and their key habitats. The Plan also lists those species of highest conservation concern, further prioritized by the degree of conservation need. Characteristic species, habitat threats, and conservation actions are addressed according to major landscape type. **Table 13** provides definitions for Conservation Priority Levels I, II, and III. There are no programmatic requirements as such for impact assessment, since the Plan is presently considered primarily a strategic document. But cooperation with and by other agencies and organizations in species and habitat conservation is considered integral to the Plan, and coordinated conservation actions will be developed as more species information is obtained.

Table 14 lists the Species of Conservation Priority (SoCP) associated with the landscape component where the proposed wind facility would be located. About half of the species are considered 'Level I' and half 'Level II'. Despite considerable loss or degradation of native habitat due primarily to agriculture, this landscape still provides an important breeding and migratory area for waterfowl, shorebirds, and songbirds. The state conservation strategy also recognizes the efforts to maintain and restore habitat in the Coteau through conservation easements, and encourages continued cooperation to maintain these efforts.

The proposed PrairieWinds ND-1 facility would cause the additional loss of wetland and other habitats important to those species listed above. However, the habitat compensation plan as proposed and described further in the Biological Assessment will act to benefit state species of concern in addition to federally-listed species.

Table 13 **Species of Conservation Priority Level Definitions**
With limited funds and 100 Species of Conservation Priority (SoCP), there was a need to prioritize species according to conservation need. The following categories were developed to describe the conservation needs for North Dakota's SoCP. These definitions apply only for the purposes of State Wildlife Grant (SWG) planning.
Level I:
These are species that are in decline and presently receive little or no monetary support or conservation efforts. North Dakota Game and Fish Department has a clear obligation to use SWG funding to implement conservation actions that directly benefit these species. Level I species are those having a: • high level of conservation priority because of declining status either here or across their range *- or -* • high rate of occurrence in North Dakota, constituting the core of the species breeding range (i.e. "responsibility" species) but are at-risk range wide
Level II:
North Dakota Game and Fish Department will use SWG funding to implement conservation actions to benefit these species if SWG funding for Level I species is sufficient or conservation needs have been met. Level II species are those having a: • moderate level of conservation priority *- or -* • high level of conservation priority but a substantial level of non-SWG funding is available to them
Level III:
These are North Dakota's species having a moderate level of conservation priority but are believed to be peripheral or non-breeding in North Dakota

Table 14
Species of Conservation Priority, Mixed-grass Prairie (Missouri Coteau) Landscape Component (from ND Comprehensive Wildlife Conservation Strategy)

Birds	**Mammals**	**Reptiles/Amphibians**
American Bittern (I)	Richardson's Ground Squirrel (II)	Plains Spadefoot (I)
Northern Pintail (II)		Canadian Toad (I)
Northern Harrier (II)		Smooth Green Snake (I)
Swainson's Hawk (I)		Western Hognose Snake (I)
Ferruginous Hawk (I)		
Sharp-tailed Grouse (II)		
Willet (I)		
Upland Sandpiper (I)		
Marbled Godwit (I)		
Wilson's Phalarope (I)		
Short-eared Owl (II)		
Loggerhead Shrike (II)		
Sedge Wren (II)		
Sprague's Pipit (I)		
Lark Bunting (I)		
Grasshopper Sparrow (I)		
Baird's Sparrow (I)		
Le Conte's Sparrow (II)		
Nelson's Sharp-tailed Sparrow (I)		
Chestnut-collared Longspur (I)		
Dickcissel (II)		
Bobolink (II)		

The Natural Heritage Programs include designated Nature Preserves, a Natural Areas Registry, and a Natural Heritage Inventory (species and habitats) (NDPRD 2009). Works with other agencies, groups and individual landowners to set aside and increase protection for these resources. Again, while not requiring specific assessment of program components, coordination by project proponents is encouraged.

Correspondence from the North Dakota Game and Fish Department regarding the proposal expressed concern about disturbance to native prairie and wetlands. Project planning and turbine siting has attempted to avoid these habitats, and as such any impacts to state species of concern should be minimal.

3.5 Fish and Wildlife Resources

3.5.1 Affected Environment

3.5.1.1 Regulatory Background

Endangered Species Act

The Endangered Species Act (ESA) (7 U.S.C. 136; 16 U.S.C. 460 et seq.) enables the USFWS and National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) to officially classify plants, animals, and the habitats in which they are found as threatened or endangered. Section 7 of the ESA requires federal agencies to ensure that their actions (including permitting) do not jeopardize listed species or destroy or modify the habitats of the same.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703) states that no one may take, possess, import, export, transport, sell, purchase, barter, or offer to sell, purchase, or barter, any migratory bird or the nests, eggs, or parts of such bird, without a valid permit as issued by the USFWS.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) (16 CFR 668) provides the basis for illegal possession or the taking of Bald and Golden Eagles. The statute further imposes criminal and civil punishments and enhanced penalty provisions for subsequent offenses.

Clean Water Act

The purpose of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands.

National Wildlife Refuge System Improvement Act

The National Wildlife Refuge System Improvement Act amends and builds upon the National Wildlife Refuge System Administration Act of 1966 to ensure that the National Wildlife Refuge System is managed as a national system of related lands, waters, and interests for the protection and conservation of our Nation's wildlife resources.

3.5.1.2 Habitat

Four general types of habitat have been identified. They include: agricultural land, tame grass land, native prairie, and wetlands. Agricultural lands are identified as land planted to annual crops such as wheat and similar small grains. Tame grasslands are lands that are seeded with a mixture of native and non-native grass and forb species. Native prairie is defined as those areas that are not

currently used, or in the past were used, for agricultural or forage production, and are predominately comprised of native grass and forb species. A more thorough discussion of these vegetation communities within both sites is included within the **Vegetation Section 3.6.**

In addition to these vegetation communities, the project areas have high densities of wetlands which provide valuable habitat for a wide range of wildlife species, including many migratory birds. Wetland densities within Ward County, North Dakota commonly reach as high as 100-150 wetlands per square mile. This area is known as an important breeding ground for ducks and over 70 obligate wetland migratory bird species (NPWRC 2008).

The lands within both project areas are owned and/or managed by a variety of private parties and public agencies. With the exception of a few parcels of North Dakota state lands, most of the land within the sites is privately owned. However, many of these landowners have easements on their property that are managed by federal or state agencies. Most of these easements are administered by the USFWS for the perpetual protection of grassland and wetland habitat.

Site A

The dominant vegetation communities within Site A are agricultural lands and tame grasslands covering approximately 53 percent and 15 percent of the project area, respectively. These areas provide foraging and nesting habitat for a variety of wildlife species. Native prairie, shrubland and woodland habitats represent a much smaller percentage of the project area with a total of 14 percent. However, these habitats are important towards increasing the habitat diversity and providing the foraging and cover habitat required for many of the wildlife species within the area. Wetland habitats occupy approximately 16 percent of Site A and are habitat for many of the migratory birds that utilize the project area for breeding and nesting.

With respect to properties under easement, wetland easements administered by the USFWS are the most prevalent; accounting for approximately 21 percent in Site A. Wetland & grassland easements administered by USFWS are less prevalent with approximately 3 percent in Site A. Finally, USFWS managed WPAs account for approximately 156 acres (0.5 percent) in Site A (USFWS 2007b) (**Table 3**).

Site B

Similar to Site A, the dominant vegetation communities within Site B are agricultural lands and tame grasslands covering 47 percent and 15 percent of Site B, respectively. The native prairie, shrubland and woodland habitats are more prevalent within Site B than Site A with these habitats covering 24.2 percent of the area. As previously discussed, these areas are highly valuable to wildlife as they increase the habitat diversity of the area and provide additional forage and cover habitat for many species. Site B had less wetland habitat than Site A with 12.8 percent of the site providing wetland habitat.

The USFWS administered wetland easements are the most prevalent and occupy 37 percent of Site B. Grassland easements administered by USFWS are not as common and cover 4 percent in Site B. The USFWS administered WPAs occupy 0.7 percent within Site B (USFWS 2007b) (**Table 4**).

3.5.1.3 Mammals

The wildlife resources within and adjacent to the project area were described using a range of tools such as: literature review; queries of the NDNHI, USFWS database, NatureServe, NDGFD databases and USGS Gap Analysis Program (GAP) layers; October 2007 and June 2008 site visits;Habitat Assessment Report (Tetra Tech 2008a) and consultation of the Critical Issues Analysis Report (Tetra Tech 2007).

Limited information was available regarding the utilization of the project areas by mammals; however, the project areas are located approximately 10 miles north of the Audubon National Wildlife Refuge (ANWR). The ANWR's wildlife list was reviewed and cross referenced with the habitat available within and adjacent to the project areas in order to determine which species potentially occur within the project areas. **Table 15** shows the mammals that could occur in Site A or Site B, while **Table 16** indicates which mammals were observed at the sites.

Table 15
Mammals with the Potential to Occur within Site A and Site B

Common Name	Scientific Name	Common Name	Scientific Name
Badger	*Taxidea taxus*	Deer Mouse	*Peromyscus maniculatus*
Beaver	*Castor Canadensis*	Northern Grasshopper Mouse	*Onychomys leucogaster*
Raccoon	*Procyon lotor*	Meadow Vole	*Microtus pennsylvanicus*
Coyote	*Canis latrans*	Prairie Vole	*Microtus ochrogaster*
White-tailed Deer	*Odocoileus virginianus*	Muskrat	*Ondatra zibethicus*
Muskrat	*Ondatra zibethica*	Norway Rat	*Rattus norvegicus*
Pronghorn Antelope	*Antilocapra americana*	House Mouse	*Mus musculus*
Masked Shrew	*Sorex cinereus*	Meadow Jumping Mouse	*Zapus hudsonius*
Little Brown Myotis	*Myotis lucifugus*	Red Fox	*Vulpes vulpes*
Silver-haired Bat	*Lasionycteris noctivagans*	Long-tailed Weasel	*Mustela frenata*
Big Brown Bat	*Eptesicus fuscus*	Short-tailed Weasel	*Mustela erminea*
Eastern Cottontail	*Sylvilagus floridanus*	Least Weasel	*Mustela nivalis*
White-tailed Jackrabbit	*Lepus townsendii*	Striped Skunk	*Mephitis mephitis*
Richardson's Ground Squirrel	*Spermophilus richardsonii*	Moose	*Alces alces*
Thirteen-lined Ground Squirrel	*Spermophilus tridecemlineatus*	Fox Squirrel	*Sciurus niger*
Franklin's Ground Squirrel	*Spermophilus franklinii*		

Source: USFWS. 2001. Audubon National Wildlife Refuge Wildlife List

Table 16
Mammals Observed within Site A and Site B

Common Name	Scientific Name	Comments
Badger	*Taxidea taxus*	observed den only
Beaver	*Castor canadensis*	den, forage evidence
Raccoon	*Procyon lotor*	road kill
Coyote	*Canis latrans*	numerous scat /visual
White-tailed Deer	*Odocoileus virginianus*	Visual
Muskrat	*Ondatra zibethica*	lodge only
Pronghorn Antelope	*Antilocapra americana*	Visual

Source: Tetra Tech 2007

Bats

There are no bat species federally listed as threatened or endangered in Ward County, North Dakota (USFWS 2007c). Although there are three bat species of moderate conservation concern for the state, they are believed to be peripheral and not breeding in North Dakota (NDGFD 2004).

These include the western small-footed myotis (*Myotis ciliolabrum*), long-eared myotis (*Myotis evotis*), and the long-legged myotis (*Myotis volans*). Small areas of potential bat habitat were observed within the project areas that may provide habitat for many of the common North American bats. The NDGFD is not monitoring any bats or bat colonies in Ward County (Tetra Tech 2007).

Bats typically use farm buildings and dead/dying trees with cavities and loose bark as roosting and maternity habitats. The few farm buildings that may provide suitable habitat for roosting bats are widely dispersed throughout the project areas, as are the shelterbelts containing suitable trees. Snag density near the project sites is low and offers minimal roosting opportunities for bats. Bats typically use riparian corridors and wetlands as feeding habitats because of higher nocturnal insect densities in these areas. These habitats were present in the vicinity of the project sites.

Site A

Potential bat roosting and foraging habitat was observed during the 2008 habitat assessment surveys. Potential habitat noted included a snag-filled pond/swamp area along the eastern edge of Site A that may provide roosting and foraging habitat for bats. Although no bat species were observed during the June 2008 visit, this was likely due to cold dusk temperatures (45º F) with little to no insect activity (Tetra Tech 2008b).

Site B

Bat habitat characteristics such as farm buildings and dead/dying trees for roosting and riparian corridors and wetlands for foraging habitat exists in both sites.

3.5.1.4 Avian Species including Migratory Birds

Both project areas fall into two Bird Conservation Regions in North Dakota: Region 11 and Region 17 (USFWS 2002a). Between these two regions there are 55 bird species of special conservation concern. There is also a list of 100 species of conservation priority for the state of North Dakota which contains 45 bird species across three priority levels (NDGFD 2004). Of the 55 species of conservation concern, 11 were observed within the project area during the field visits. It is likely that additional avian species migrate through the project areas including raptors, waterfowl, shorebirds and grassland birds. Species diversity and composition within the sites are also likely to fluctuate depending on the time of year and weather conditions.

Table 17 lists waterfowl and shorebirds that may occur in the project areas and their corresponding North Dakota Comprehensive Wildlife Conservation Strategy designation level (NDGFD 2004).

3.5.1.5 Raptors

There are eight raptor species of conservation concern for the project areas (USFWS 2002). Only three of these species were observed during site visits on Site A: ferruginous hawk (*Buteo regalis*), prairie falcon (*Falco mexicanus*) and northern harrier (*Circus cyaneus*), although all eight of these species have the potential to occur within the project areas. **Table 18** lists the raptor species that may be present in the project area and their respective North Dakota Comprehensive Wildlife Conservation Strategy designation level (NDGFD 2004). **Table 19** lists the avian species that were observed at Site A during a 2008 site visit.

Table 17 Waterfowl and Shorebirds Potentially Present at Sites			
Common Name	**Scientific Name**	**Obs.***	**North Dakota Comprehensive Wildlife Conservation Strategy Designation Level****
Horned grebe	*Podiceps auritus*	No	I
Yellow rail	*Coturnicops noveboracensis*	No	I
Willet	*Catoptrophorus semipalmatus*	No	I
Upland sandpiper	*Bartramia longicauda*	No	I
Long-billed Curlew	*Numenius americanus*	No	I
Marbled godwit	*Limosa fedoa*	No	I
Wilson's phalarope	*Phalaropus tricolor*	No	I
Franklin's gull	*Larus pipixcan*	No	I
Black tern	*Chlidonias niger*	No	I
Northern pintail	*Anas acuta*	Yes	II
Canvasback	*Aythya valisineria*	No	II
Redhead	*Aythya americana*	No	II
Piping plover	*Charadrius melodus*	No	II
American avocet	*Recurvirostra americana*	No	II
Least tern	*Sterna antillarum*	No	II
Whooping crane	*Grus americana*	No	III

*Obseerved during 2007 site visit
**Source: NDGFD2004: See Table 14

Table 18 Raptors Potentially Present at Sites			
Common Name	**Scientific Name**	**Obs.***	**North Dakota Comprehensive Wildlife Conservation Strategy Designation Level****
Swainson's hawk	*Buteo swainsoni*	No	I
Ferruginous hawk	*Buteo regalis*	Yes	I
Northern harrier	*Circus cyaneus*	Yes	II
Golden eagle	*Aquila chrysaetos*	No	II
Bald eagle	*Haliaeetus leucocephalus*	No	II
Prairie falcon	*Falco mexicanus*	Yes	II
Short-eared owl	*Asio flammeus*	No	II
Burrowing owl	*Athene cunicularia*	No	II
Peregrine falcon	*Falco peregrinus*	No	III

*Observed during the 2007 and 2008 site visit
**Source: NDGFD 2004: See Table 14

Several raptor nests were mapped during the October 2007 site visit. Individual species use and level of activity for each nest was not determined, as the time of year was not conducive to nesting behavior observation. Stick nest sites that were observed during the October 2007 visit were revisited during the June 2008 visit to determine species and activity. Three active stick nests were observed: two Red-tailed Hawk (*Buteo jamaicensis*) nests and one Great Horned Owl (*Bubo virginianus*) nest.

Table 19 Avian Species Observed during the 2008 Site Visit			
Common Name	**Scientific Name**	**Common Name**	**Scientific Name**
American white pelican	*Pelecanus erythrorhynchos*	Gray partridge	*Perdix perdix*
American avocet	*Recurvirostra Americana*	Great horned owl	*Bubo virginianus*
American coot	*Fulica Americana*	Horned lark	*Eremophila alpestris*
American crow	*Corvus brachyrhynchos*	Killdeer	*Charadrius vociferous*
American goldfinch	*Carduelis tristis*	Lesser scaup	*Aythya affinis*
American robin	*Turdus migratorious*	Mallard	*Anas platyrhynchos*
American wigeon	*Anas Americana*	Mourning dove	*Zenaida macroura*
Barn swallow	*Hirundo rustica*	Northern harrier	*Circus cyaneus*
Black-crowned night-heron	*Nycticorax nycticorax*	Northern pintail	*Anas acuta*
Blue-winged Teal	*Anas dicors*	Northern shoveler	*Anas clypeata*
Bobolink	*Dolichonyx oryzivorus*	Red-tailed hawk	*Buteo jamaicensis*
Brewer's blackbird	*Euphagus cyanocephalus*	Red-winged blackbird	*Agelaius phoeniceus*
Brewer's sparrow	*Spizella breweri*	Ring-billed gull	*Larus delawarensis*
Brown-headed cowbird	*Molothrus ater*	Ring-necked pheasant	*Phasianus colchicus*
Bullock's oriole	*Icterus bullockii*	Rock dove	*Columba livia*
California gull	*Larus californicus*	Ruddy duck	*Oxyura jamaicensis*
Canvasback	*Aythya valisineria*	Savannah sparrow	*Passerculus sandwichensis*
Chestnut-sided warbler	*Dendroica pensylvanica*	Sharp-tailed grouse	*Tympanuchus phasianellus*
Chipping sparrow	*Spizella passerine*	Song sparrow	*Melospiza melodia*
Clay-colored sparrow	*Spizella pallida*	Tree swallow	*Tachycineta bicolor*
Common grackle	*Quiscalus quiscula*	Upland sandpiper	*Bartramia longicauda*
Common tern	*Sterna hirundo*	Vesper sparrow	*Pooecetes gramineus*
Common yellowthroat	*Geothlypis trichas*	Western kingbird	*Tyrannus verticalus*
Double-crested cormorant	*Phalacrocorax auritis*	Western meadowlark	*Sturnella neglecta*
Eastern kingbird	*Tyrannus tyrannus*	Wild turkey	*Meleagris gallopavo*
Ferruginous hawk	*Buteo regalis*	Willet	*Tringa semipalmata*
Franklin's gull	*Larus pipixcan*	Yellow warbler	*Dendroica petechia*
Gadwall	*Ana strepera*	Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Gray catbird	*Dumetella carolinensis*		

3.5.2 Direct and Indirect Effects

3.5.2.1 Site A

Construction activities associated with Site A would result in both short term and long term impacts to wildlife species. In addition, activities such as road construction and minimal tree clearing can destroy or disrupt habitats and allow for the introduction of unwanted invasive plants. Installation of buried collector lines would result in a temporary loss of wildlife habitat. Displaced wildlife would likely relocate to nearby unaffected areas within the project area until construction activities have

been completed. Temporarily disturbed habitat would be reseeded. The overall impacts on wildlife of the construction and operation and maintenance of Site A are summarized below in **Table 20**.

Table 20
Impacts on Wildlife Associated with Site A

Project Activity	Potential Impacts	Duration and Extent of Impact
Impacts Associated with Construction		
Site clearing and grading; construction of foundations and turbine and tower installation; access road and utility corridor construction; vehicle travel,	Habitat disturbance; reduction or alteration of on-site habitat	Long-term habitat reduction within tower, building, and access road footprints;
	Invasive vegetation; Reduced habitat quality	Short-term as implementation of the Weed Control Plan would control weeds within the disturbance areas.
	Direct injury or mortality associated with equipment or vehicle collisions. Would have greatest impact on wildlife with limited mobility such as amphibians, reptiles, ground dwelling birds, and burrowing mammals	Short-term as impacts would cease upon completion of construction.
	Erosion and runoff; reduced reproductive success of amphibians using on-site surface waters; drinking water supplies may be affected.	Short-term; may extend beyond site boundaries.
	Fugitive dust generation; respiratory impairment	Short-term.
	Noise; Disturbance of foraging and reproductive behaviors; habitat avoidance.	Short-term.
	Interference with behavioral activities such as foraging, migration or reproductive behaviors; disturbance and avoidance of migratory movements.	Short-term.
Accidental spill during equipment refueling; accidental release of stored fuel or hazardous materials.	Exposure to contaminants; exposure may affect survival, reproduction, development, or growth.	Short-term and localized to spill area
Impacts Associated with Operation and Maintenance		
Turbine operation, support machinery, motorized vehicles, and mowing equipment.	Noise; possible disturbance of foraging and reproductive behaviors; habitat avoidance,	Short and long-term; greatest effect in highest noise areas
	Collision with turbines and towers; injury or mortality of birds and bats,	Long-term for many species; could potentially impact populations.
Mowing at support building and turbine locations,	Mowing; Injury and/or mortality of less mobile wildlife such as reptiles, small mammals, ground- nesting birds.	Short-term.
Accidental spill or release of herbicides, fuel, oil, or hazardous materials	Exposure to contaminants; Exposure may affect survival, reproduction, development, or growth.	Short- or long-term, localized to spill locations,
Routine human and vehicle activities	Disturbance of nearby wildlife and bird and mammal behavior; habitat avoidance,	Short- or long-term and localized.

Table 20 Impacts on Wildlife Associated with Site A (Continued)		
Duration and Extent of Impact	**Duration and Extent of Impact**	**Duration and Extent of Impact**
Erosion and runoff from poorly stabilized surface soils.	Decreased aquatic habitat quality; reduced reproductive success of amphibians; wildlife drinking water supplies may be affected.	Short-or long-term and localized.
Access to surrounding areas by visitors, including unauthorized vehicles, along facility access roads.	Disturbance to wildlife habitats by foot and vehicle traffic; potential disturbance of foraging and reproductive behaviors.	Short- or long-term, in areas adjacent to the wind facility, access roads.
	Legal and illegal take of wildlife; potential disturbance of foraging and reproductive behaviors and/or reduced distribution of some wildlife,	Short- or long-term, depending on species affected and magnitude of take.
	Invasive weeds; establishment and spread of invasive plant species by visitors, including unauthorized vehicles, and along facility access roads.	Short-term as implementation of the Weed Control Plan would control weeds within the disturbance areas.
	Fire; potential ignition by visitors, including unauthorized vehicles along facility access roads	Short-term or long-term reduction in habitat quality depending on the loss of native vegetation and introduction and establishment of invasive vegetation.

Mammals

The greatest impacts to mammal species would be temporary and associated with the construction phases. Project implementation would temporarily and permanently remove habitat. Approximately 984 acres of habitat would be temporarily disturbed, while 74 acres would become permanently unavailable. The areas of temporary disturbance would be reclaimed and reseeded with an approved seed mix. It would likely take two growing seasons before these areas are restored. The acres of habitat permanently disturbed represent a relatively small amount 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.

The noise, habitat destruction and other forms of disturbance related to the construction phase would likely temporarily displace wildlife species within or adjacent to the disturbed areas. While the initial construction of the Proposed Action may displace wildlife species to adjacent areas, the displacement would be temporary. Upon completion of construction, wildlife species would become accustomed to operation and maintenance activities and would be expected to resume utilization of the project area.

The potential 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).

Bats

Assessing the full range of impacts to bats is challenging given the limited research indicating how bats respond to disturbances within their habitat. Mortality is the easiest response to monitor and

there is growing research indicating that wind energy projects can result in increased mortality of bats. A number of monitoring studies have been completed over recent years resulting in bat mortality estimates for wind energy projects (TRC 2008; Erickson et al. 2002, 2003a,b; Johnson et al. 2003a; Strickland et al. 2001a,b; Young et al. 2003a,b). Collision mortality appears to be most significant for tree-dwelling migratory bat species, based on studies done thus far (Kuvlesky, Jr. et al. 2007). The Buffalo Ridge wind energy project since it is closest in vicinity and habitat to Site A. Bat annual mortality estimated for PrairieWinds - ND 1 based on monitoring data from the Buffalo Ridge project indicate a potential bat mortality of 5 to 179 per year.

As previously mentioned, impacts to bats associated with the project would mainly be related to collisions. While some disturbance and displacement would likely occur as a result of the wind project activity, the displacement to adjacent habitat would not have a long-term impact. Since there is a wide range of annual bat mortality rates that have been documented at the various wind energy projects, it is difficult to know what the mortality rates would be for the project and what impact that mortality would have on the regional populations.

Birds

Temporary impacts to birds would occur due to implementation and construction activities. These impacts would entail temporary habitat loss, noise and dust disturbance, and an increase in injury and mortality due to vehicle collisions. These impacts would be temporary and would not reduce the viability of the regional populations.

The project would result in similar impacts to birds that utilize the project area; however, the degree of the impacts would vary depending on habitat use and flight behavior. Impacts related to collisions are a concern and pose a threat to most birds that utilize the project area. Fatality monitoring has been completed at many wind energy projects within the country and **Table 21** summarizes the fatality estimate observed at those wind energy projects.

Using the annual avian fatality rates, the project could potentially result in 46 to 347 bird fatalities each year. Bird-turbine interactions are determined by visibility and weather, with increased bird-turbine interactions occurring at night and in inclement weather. Inclement weather and low cloud ceilings force migrating birds to fly at reduced altitudes, thereby putting them at greater risk for adverse interactions with turbines, turbine towers, and support infrastructure (NWCC 2004). Compared with other avian species studied to date throughout the United States, raptors, including hawks, eagles, falcons, and owls, appear to be at higher risk of collisions with wind turbines. The reason for this higher frequency of collisions, relative to other species, is not fully understood (NWCC 2004).

The Proposed Action could potentially impact nesting birds by temporarily and permanently removing nesting habitat. The Proposed Action would permanently remove approximately 20 acres of native prairie and tame grassland nesting habitat commonly used by ground nesting birds. In addition, approximately 5 acres of native shrub and woodland habitat would be permanently impacted thereby reducing nesting and foraging for a variety of other bird species that utilize Site A. Proposed turbine site # 9, is the site of a sharp tailed grouse dancing site, also known as a lek, where male grouse gather and display their courtship dance. The turbine site is proposed for development on tame grassland habitat. Basin Electric has decided to relocate turbine # 9. While there would be habitat loss, it would not reduce the viability of local populations as the amount of permanent habitat loss would be relatively low in comparison to amount of available habitat. Other mitigation measures to protect birds include designing the project so no new overhead powerlines would be constructed and conducting surveys for nesting birds during the breeding season. If active nests are located or other evidence of nesting observed, appropriate protection measures will be taken. Also, mowing activities will occur outside of the nesting season for ground nesting birds to avoid any bird mortality. A complete list of mitigation measure to protect birds is in section 5.5.

Table 21
Avian Fatality Estimates Reported at Monitored Wind Projects

Wind Resource Area	State	Turbines	Annual Average Avian Fatality per Turbine
Altamont Pass	CA	5,400 7,340	0.3 to 0.9 0.05 to 0.1
Buffalo Ridge	MN	354	2.8
Buffalo Ridge Phase 1	MN	73	0.3 to 0.7, 1.0
Buffalo Ridge Phase 2	MN	143	2.3
Buffalo Ridge Phase 3	MN	138	4.5
Foote Creek Rim	WY	69	1.5, 1.8
Green Mountain (Searsburg)	VT	11	<1
IDWGP (Algona)	IA	3	<1
Judith Gap	MT	90	4.5
Klondike	OR	161.4	1.4
Mountaineer	WV	44	4
Nine Canyon	WA	37	3.6
Princeton	MA	8	<1
San Gorgonio	CA	2,900	2.3
Somerset County	PA	8	<1
Stateline	OR/ WA	454	1.7
Vansycle	OR	38	0.6
Wisconsin	WI	31	2.8

Multiple values were included if there were results from more than one study.
Sources: TRC 2008 : Curry and Kerlinger (2004a,b); Erickson et al. (2001, 2002, 2003a,b); Johnson et al. (2002, 2003a); Kerns and Kerlinger (2004); Osborn et al. (2000); Smallwood and Thelander 2004; Strickland et al., (2001a,b); Thelander and Rugge (2001); Young et al. (2003a).

3.5.2.2 Site B

Site B would entail the same number of turbines and impact the same number of acres in relatively similar habitat. Impacts for Site B would be the same as with the project. For a more detailed discussion of impacts, see the project discussion above.

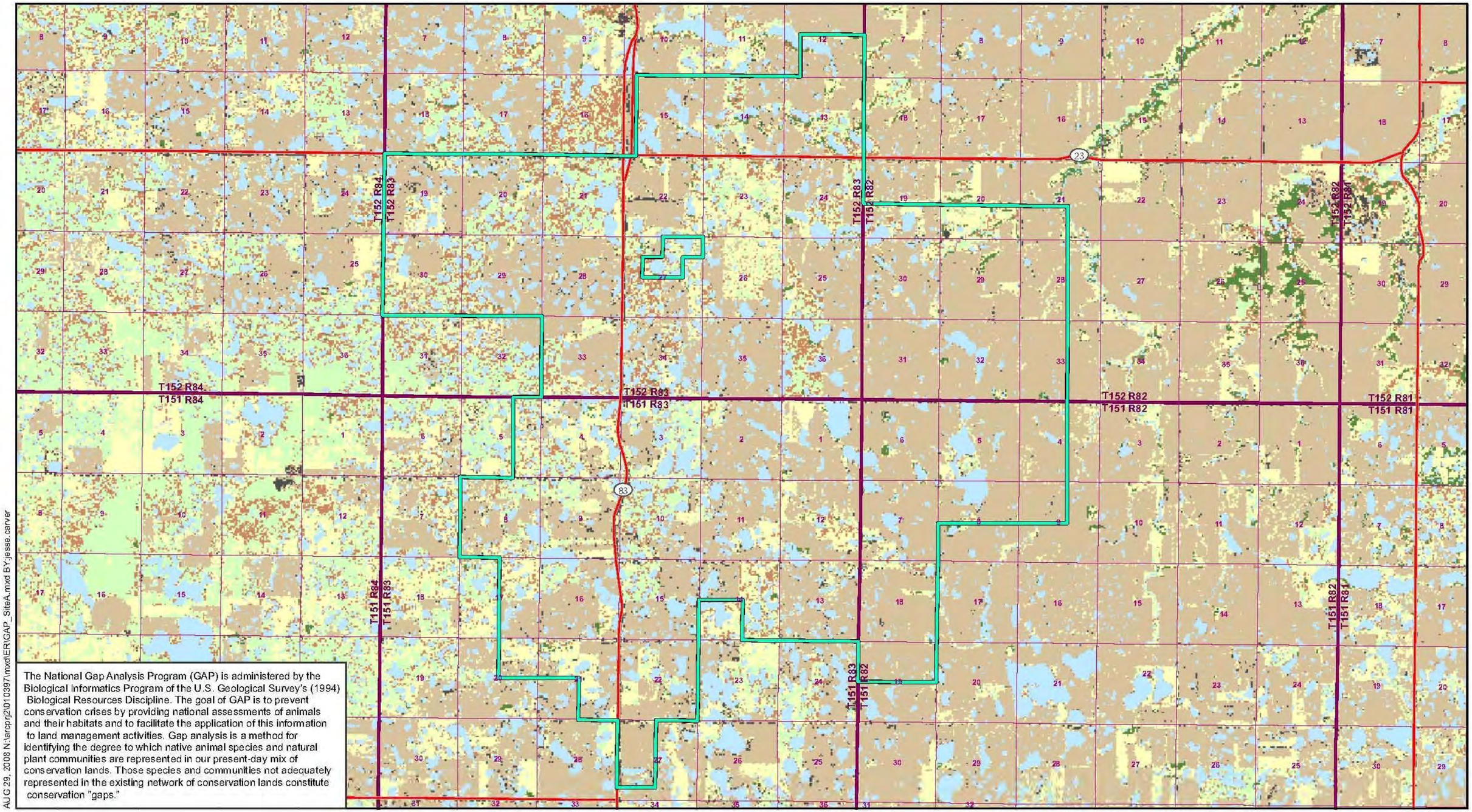
3.5.2.3 No Action Alternative

The No Action Alternative would not have any impacts on wildlife or wildlife habitat. No development or disturbance would occur and wildlife would continue to utilize the project area as they currently do.

3.6 Vegetation

3.6.1 Affected Environment

Both Site A and Site B (**Figure 8** and **Figure 9)** occur within the Missouri Coteau which is a relatively narrow, elevated escarpment where the Wisconsinan glacier stalled and melted slowly, depositing the glacial moraines that characterize much of the area's soils and provide for the associated productive upland grass communities (Bryce et al. 1998). The region's native vegetation is classified as the Northern Wheatgrass – Needlegrass Plains (Johnson and Larson 1999).



AUG 29, 2008

Figure 8

ND GAP VEGETATIVE COMMUNITIES OF SITE A

Environmental Report
Prairie Winds - ND 1 Project
Ward County, North Dakota

Des Lacs

T155 R87
T154 R87
T155 R86
T154 R86
T155 R85
T154 R85
T155 R84
T154 R84
T155 R83
T154 R83
T153 R86
T153 R85
T153 R84
T153 R83

The National Gap Analysis Program (GAP) is administered by the Biological Informatics Program of the U.S. Geological Survey's (1994) Biological Resources Discipline. The goal of GAP is to prevent conservation crises by providing national assessments of animals and their habitats and to facilitate the application of this information to land management activities. Gap analysis is a method for identifying the degree to which native animal species and natural plant communities are represented in our present-day mix of conservation lands. Those species and communities not adequately represented in the existing network of conservation lands constitute conservation "gaps."

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AUG 29, 2008

Figure 9

Legend

- Alternative Project Site B
- Barren or Developed Land
- Agricultural
- Tame Grassland
- Native Prairie
- Native Shrubland
- Sparse Vegetation
- Wetland
- Native Woodland

N

Miles

0 2

ND GAP VEGETATIVE COMMUNITIES OF SITE B

Environmental Report
Prairie Winds - ND 1 Project
Ward County, North Dakota

Agropyron sp. and *Hesperostipa* sp. are the most common indicators of the vegetative classification of the region. Dominant plant species include western wheatgrass (*Pascopyrum [Agropyron] smithii)*, thickspike wheatgrass *(Elymus lanceolatus* [*Agropyron dasystachyum*]), needle and thread grass (*Hesperostipa [Stipa] comata)*, green needle grass (*Hesperostipa [Stipa] viridula*), bluebunch wheatgrass (*Psuedoroegneria spicata [Agropyron spicatum*]), blue grama (*Bouteloua gracilis)*, and threadleaf sedge (*Carex filifolia)* (Johnson and Larson 1999).

The relatively short growing season and high productivity of these grasslands has kept much more of the native rangeland intact compared with more southern areas in the northern Great Plains (Johnson and Larson 1999). However, most of the relict rangeland is intensively grazed by livestock, and the natural fire regime has been absent for decades, causing a strong shift in historical vegetative composition. Areas with more favorable soils have been converted to agricultural lands for cropping, pastureland, or hayground (USDA 1974).

3.6.1.1 Plant Communities

The North Dakota GAP (USGS 2004) data and data collected during two field visits were used to evaluate existing vegetation communities within the sites. These vegetation communities are illustrated in (**Figure 8** and **Figure 9**) for Site A and Site B, respectively. The composition of the vegetation communities is similar for Site B as Site A. The composition is summarized below.

Plant Community Classifications

Agricultural Land

Agricultural cropland refers to land converted to planted crops and managed for agricultural purposes. **Table 22** lists the most common planted crops in Ward County, North Dakota (NDSU Extension Services 2008). **Figure 10** shows an example of a typical agricultural site.

Table 22
Common Agricultural Crops in Ward County, ND

Winter Rye	Alfalfa	Barley	Buckwheat	Canary	Canola
Winter Spelt	Chickpea	Corn	Crambe	Dry bean	Durum
Winter Wheat	Field pea	Flax	Forages	Spring Wheat	Lentil
White Wheat	Lupin	Millet	Mustard	Oats	Safflower
Potato	Soybean	Specialty Crops	Sunflower Non Oil	Sunflower Oil	Triticale

Tame Grassland

Tame grassland vegetation refers to communities of planted perennial herbaceous species. These areas have been replanted after extensive agricultural use with the objective of increasing their desirability as wildlife cover and to re-establish natural ecological functions (Tetra Tech 2008a). Alfalfa (*Medicago sativa*) and tall wheatgrass (*Thinopyrum ponticum*), intermediate wheatgrass (*Thinopyrum intermedium*), and crested wheatgrass are the predominant perennials in these habitats. Smooth brome (*Bromus inermis)* and the occasional weed species such as: milkweed (*Asclepias spp.),* pigweed *(Chenopodium spp.)* and dandelion (*Taraxacum spp.)* are also found in these areas (**Figure 8** and **Figure 9**). **Figure 11** shows an example of a typical tame grassland site.

These areas were originally planted under the United States Department of Agriculture (USDA), NRCS's CRP. The CRP is designed to aid land owners in the conversion of highly erodible agricultural land into areas of tame or native grasses that will encourage wildlife, reduce soil erosion and sedimentation in streams and lakes, and improve water quality (NRCS 2008). Many

Figure 10. Typical Agricultural Site

Figure 11. Typical Tame Grassland Site

landowners have placed easements on the properties they have converted from agricultural land to tame grass habitat. These easements are managed by federal agencies and are typically associated with land use and/or access limitations that in some cases are based on a limited or perpetual contract (Tetra Tech 2007). All of the easements associated with Site A are administered by the USFWS and fall into two categories: wetland easement or grassland easements. These areas provide valuable cover for nesting and breeding for many different species of ground nesting birds in the area (Tetra Tech 2008a).

Native Prairie

Grassland within this region of the country is mixed-grass prairie (**Figure 12**).

In mixed-grass prairies there are two layers of grasses, one reaching about 12 inches above the ground surface, and the other about 48 inches. Both bunch and sod-forming grasses are present, as well as many forbs. Typical grasses of the mixed-grass prairie are little bluestem (*Schizachyruim scoparium*), green needle grass (*Stipa viridula)* and prairie dropseed (*Sporobolus heterolepsis)*. Roots extend to depths of about 5 feet (NRCS 2008). These areas provide valuable habitat for native wildlife. Historically, much of this native grassland has been converted to farmland.

Native prairie communities also have a shrubland and woodland component. Common shrubland species include skunkbush (Rhus trilobata) and chokecherry (Prunus virginiana). Common woodland species include oak (Quercus spp.) and ash (Fraxinus spp.).

Figure 12. Typical Native Mixed Grass Prairie Site

Plant Community Occurrence

A summary of the vegetative community occurrence at both sites is presented in **Table 23**. The plant species observed at both Site A and Site B during the October 2007 and June 2008 site visits are presented in **Table 24**.

Table 23
Summary of Vegetative Community Occurrence

Vegetative Community	Site A		Site B	
	Acres	Percent	Acres	Percent
Agricultural land	16093.2	53.3	17,147.2	47.1
Planted herbaceous perennials	4526.4	15.0	5,438.3	15.0
Barren land	451.8	1.5	395.9	1.1
Developed - high intensity residential	0.2	<0.1	0.2	<0.1
Developed - low intensity residential	0.9	<0.1	0	0
Developed - commercial/industrial/transportation	61.4	0.2	0	0
Developed - urban grasslands	4.3	<0.1	1.1	<0.1
Native cover types				
Prairie - mesic tall and mixed grass	90.8	0.3	192.6	0.5
Prairie - bluestem-needlegrass-wheatgrass	278.2	0.9	1,622.3	4.5
Prairie - wheatgrass prairie	994.5	3.3	3,098.8	8.5
Prairie - needlegrass prairie	309.1	1.0	530.9	1.5
Prairie - little bluestem	4.8	<0.1	18.0	0.1
Prairie - sand	242.7	0.8	568.7	1.6
Prairie - saline	259.8	0.9	254.9	0.7
Shrubland - upland deciduous	1870.8	6.2	2,334.2	6.4
Shrubland - lowland deciduous	2.0	<0.1	1.1	<0.1
Woodland - floodplain	3.9	<0.1	0	0
Woodland - deciduous	274.6	0.9	150.1	0.4
Wetland - lacustrine	476.0	1.6	204.2	0.6
Wetland - palustrine temporary	494.6	1.6	176.8	0.5
Wetland - palustrine seasonal	1312.5	4.3	1,928.8	5.3
Wetland - palustrine semipermanent	1383.5	4.6	1,590.8	4.4
Wetland - water	1062.6	3.5	727.4	2.0
Total	30,198.6	100.0	36,382	100.0

Source: North Dakota GAP (USGS 2004)

Site A

According to the GAP (USGS 2004) data, the most abundant land cover type in Site A is agricultural land, covering 53 percent (**Figure 8**). An additional 15 percent is characterized as tame grassland (USGS 2004). In addition, Site A contains 2 percent that is barren or developed. The remaining land within Site A is native cover types such as: native prairie, shrublands, woodlands, and wetlands. Site A contains 30 percent of native cover types. Native prairie cover includes grasslands, shrublands, woodlands, and wetlands. Based on the observations and data collected during the October 2007 and June 2008 field surveys, the condition of many of these native communities appeared to have been degraded as a result of long-term, heavy livestock grazing pressure.

Site B

The GAP (USGS 2004) data indicates that the most abundant land cover type within Site B is agricultural land, with 47 percent. Approximately 15 percent is tame grass (planted herbaceous

Table 24
Plant Species Observed During Site Visits

Species Name*	Common Name	Duration, Habit and Nativity**	Wetland Indicator Status***
Acer negundo	Boxelder	ptn	FAC
Acroptilon repens	Hardheads	pfi	NO
Andropogon gerardii	Big bluestem	pgn	FACU
Agropyron cristatum	Crested wheatgrass	pgi	NO
Agrostis stolonifera	Creeping bentgrass	pgn	FAC+
Ambrosia artemisiifolia	Annual ragweed	afn	FACU
Arnica fulgens	Foothill arnica	pfn	NO
Artemisia dracunculus	Tarragon	psn	NO
Artemisia frigida	Prairie sagewort	psn	NO
Asclepias speciosa	Showy milkweed	pfn	FAC
Astragulus spp.	Milkvetch	NA	NA
Bromus inermis	Smooth brome	pgi	NO
Carex filifolia	Threadleaf sedge	pgn	NO
Carex nebrascensis	Nebraska sedge	pgn	OBL
Carex praegracilis	Clustered field sedge	pgn	FACW
Celtis reticulata	Netleaf hackberry	ptn	NO
Ericameria nauseosa	Rubber rabbitbrush	psn	NO
Cirsium arvense	Canada thistle	pfi	FACU
Cornus sericea	Redosier dogwood	ptn	FACW
Crataegus rotundifolia	Fireberry hawthorn	psn	NO
Dactylis glomerata	Orchard grass	pgi	FACU
Distichlis spicata	Saltgrass	pgn	FACW
Echinochloa muricata	Rough barnyard grass	agn	OBL
Elaeagnus angustifolia	Russian olive	pti	FAC-
Elaeagnus commutata	Silverberry	psn	NI
Elymus lanceolatus	Thickspike wheatgrass	pgn	FAC
Elytrigia intermedia	Intermediate wheatgrass	pgi	NO
Elytrigia repens	Quackgrass	pgi	FAC
Fragaria virginiana	Virginia strawberry	pfn	FACU
Fraxinus pennsylvanica	Green ash	ptn	FAC
Geranium viscosissimum	Sticky purple geranium	pfn	FACU
Glycyrrhiza lepidota	American licorice	pfn	FACU
Helianthus annuus	Common sunflower	afn	FACU
Hordeum jubatum	Foxtail barley	pgn	FACW
Juncus articus ssp. littoralis	Baltic rush	pgn	NO
Linum lewisii	Lewis flax	pfn	NO
Lonicera tatarica	Tatarian honeysuckle	psi	NI
Madia glomerata	Mountain tarweed	afn	FACU
Pascopyrum smithii	Western wheatgrass	pgn	FACU

Table 24
Plant Species Observed During Site Visits (Continued)

Species Name*	Common Name	Duration, Habit and Nativity**	Wetland Indicator Status***
Phalaris arundinacea	*Reed canarygrass*	*pgn*	*FACW+*
Phleum pratense	Timothy	pgi	FACU
Phragmites australis	Common reed	pgn	FACW
Picea sp.	Spruce	NA	NA
Poa pratensis	Kentucky bluegrass	pgn	FACU
Populus deltoides	Eastern cottonwood	ptn	FAC
Populus tremuloides	Quaking aspen	ptn	NO
Argentina anserina	Silverweed cinquefoil	pfn	OBL
Prunus virginiana	Chokecherry	psn	FACU-
Pseudoroegneria spicata	Bluebunch wheatgrass	pgn	FACU-
Ribes aureum	Golden currant	psn	NO
Rosa arkansana	Prairie rose	psn	NI
Rubus occidentalis	Black raspberry	psn	NO
Salix exigua	Narrowleaf willow	psn	FACW+
Salix amygdaloides	Peachleaf willow	ptn	FACW
Schoenoplectus acutus	Hardstem bulrush	pgn	OBL
Scirpus microcarpus	Panicled bulrush	pgn	OBL
Scirpus pallidus	Cloaked bulrush	pgn	OBL
Shepherdia argentea	Silver buffaloberry	psn	NO
Solidago missouriensis	Missouri goldenrod	pfn	NO
Stipa viridula	Green needlegrass	pgn	NO
Symphoricarpos occidentalis	Western snowberry	psn	NO
Tragopogon dubius	Yellow salsify	pfi	NO
Typha angustifolia	Narrowleaf cattail	pfn	OBL
Typha latifolia	Broadleaf cattail	pfn	OBL
Ulmus americana	American elm	ptn	FAC
Urtica dioica	Stinging nettle	pfn	FACW

*Taxonomic nomenclature consistent with NRCS (2007a) PLANTS database.
**a = annual; p = perennial; g = graminoid; f = forb; s = shrub; t = tree; n = native; i = introduced.
***OBL= obligate wetland: occurs in wetlands more than 99% of the time; FACW = facultative wetland: occurs in wetlands 67 - 99% of the time; FAC = facultative: equally likely to occur in wetlands or uplands; occurs in wetlands 34 - 67% of the time; FACU = facultative upland: usually occurs in uplands, but occasionally occurs in wetlands (1 - 33% of the time); UPL = upland: occurs almost always in uplands (less than 1% probability in wetlands); NI = no information; insufficient data to determine an indicator status; NO = no indicator status was provided, indicating the species only occurs in uplands; NA = Not Applicable; not identified to species.

perennials) (USGS 2004) (**Figure 9**). Site B also contains 1 percent barren or developed land and 37 percent native cover types (i.e. prairie grasslands, shrublands, woodlands, and wetlands).

3.6.1.2 Sensitive Plants and Communities

The NDNHI data (NDPRD 2007) provide the locations of occurrences of Plant Species of Concern within and in proximity to Site A and Site B. The NDNHI (NDPRD 2007) data and NatureServe's

(2007) website provide the global and state sensitivity ranking and the federal status for each Plant Species of Concern.

Site A

No Plant Species of Concern were identified as occurring within or near Site A (NDPRD 2007).

Site B

The only Plant Species of Concern identified by the NDNHI (NDPRD 2007) as occurring within the boundaries of Site B is Columbian watermeal (Wolffia columbiana), which was recorded along the northeastern boundary of Site B. Rarely observed flowering, this perennial aquatic herb is characterized as mesotrophic to eutrophic, occurring in quiet waters from temperate to subtropical regions throughout the Americas (FNA 2007). This species' occurrence in Site B was not confirmed during the October 2007 field visits. **Figure 13** provides a roadside view of the wetland where the occurrence is believed to have been identified. The Columbian watermeal is assigned a global ranking of G5, indicating that globally, the species is secure because it is common, widespread, and abundant (NDPRD 2007). This species' state rank is S2, indicating that it is imperiled and endangered in the state because of rarity or because of other factors making it very vulnerable to extirpation from the state (NDPRD 2007). This species is not designated as a federal threatened, endangered, proposed, or candidate species under the ESA (NDPRD 2007, USFWS 2007a).

Figure 13. Roadside View of Potential Columbian Watermeal Occurrence

3.6.2 Direct and Indirect Effects

3.6.2.1 Site A

Site A would result in both temporary and permanent impacts to vegetation (**Table 25**). These impacts would be associated with clearing, grading, and other associated construction activities.

Table 25
Summary of Disturbance Acres within Vegetation Communities

	Temporary Disturbance				
Community	**Turbines**	**Roads**	**Feeder Lines**	**Substation / Lay Down Area**	**Total Temp.**
Agricultural Land	332.0	40.9	320.4	0.0	693.3
Tame Grassland	76.9	12.0	91.6	1.6	182.2
Native Prairie	37.0	5.3	45.9	0.1	88.4
Native Shrubland	35.3	4.1	38.2	0.0	77.6
Native Woodland	3.2	0.9	2.2	0.0	6.2
Barren or Developed	5.0	1.4	7.1	0.0	13.4
Total	489.4	64.6	505.3	1.8	1061.2
	Permanent Disturbance				
Community	**Turbines**	**Roads**	**Feeder Lines**	**Substation / Lay Down Area**	**Total Perm.**
Agricultural Land	2.4	40.9	0.0	0.0	43.3
Tame Grassland	0.5	12.0	0.0	1.6	14.2
Native Prairie	0.3	5.3	0.0	0.1	5.7
Native Shrubland	0.2	4.1	0.0	0.0	4.3
Native Woodland	0.0	0.9	0.0	0.0	0.9
Barren or Developed	0.0	1.4	0.0	0.0	1.4
Total	3.4	64.6	0.0	1.7	69.8

Temporary disturbance and removal of vegetation would have the greatest impact. Temporary impacts would be most significant within agricultural land and tame grassland as the temporary disturbance within these two communities represents approximately 82 percent of the entire temporary disturbance within the project area. All areas temporarily disturbed would be reclaimed and reseeded. These areas would be expected to be recovered to their pre-disturbance condition within two growing seasons. These areas would be more susceptible to occupation of invasive weed species; however, weed treatment following reclamation would reduce the risk of weed invasion within the project area.

The extent of permanent vegetation loss within Site A is relatively small given the size of the project area. Approximately 0.2 percent of Site A would be permanently impacted as a result of the development of Site A. The vegetation communities that would experience the greatest loss as a result of project implementation would be agricultural land and the tame grassland community. Agricultural land would comprise 62 percent of the permanently impacted acres while tame grassland would represent 20 percent. Some permanent loss in native communities would occur, a total of 5.7 acres of native prairie, 4.3 acres of native shrubland and 0.9 acres of native woodland would be permanently lost due to structures and roads.

Development of Site A would avoid impacts on Plant Species of Concern. Based on the available information on known distribution, the project would not affect these resources.

3.6.2.2 Site B

A preliminary site lay out for the Site B has not yet been completed; consequently, specific disturbance acres within the vegetation communities are not available. However, the size of the wind development project would be the same as Site A; therefore, based on the percent disturbed, it can be assumed that implementation of Site B would result in temporary removal of approximately 984 acres of vegetation and approximately 74 acres of permanent removal. Because the vegetation community's distribution and composition are relatively the same between Site A and Site B, it can be assumed that the distribution of disturbance acres would be relatively the same within the vegetation communities for both alternatives. Therefore, approximately 74 acres would be permanently disturbed within Site B, the majority of the permanent vegetation loss would occur within the agricultural land and tame grassland communities. In addition, there would be some loss within native vegetation communities such as native prairie, native shrubland, and native woodland, but those losses would be relatively small given the regional distribution of these communities.

All areas temporarily disturbed would be reclaimed and reseeded. These areas would be expected to be recovered to their pre-disturbance condition within two growing seasons. These areas would be more susceptible to occupation of invasive weed species; however, weed treatment following reclamation would reduce the risk of weed invasion within the project area.

3.6.2.3 No Action Alternative

Under the No Action Alternative, there would not be development of a wind energy facility and there would be no disturbances; therefore, vegetation, including plant species of concern would not be affected by the No Action Alternative.

3.7 Soils

3.7.1 Affected Environment

The Missouri Coteau is characterized by a hummocky, glaciated landscape that resulted from collapse of superglacial sediment. The landscape of the Missouri Coteau formed when glaciers were forced to advance up a steep escarpment before they flowed onto the uplands. As glaciers advanced over the escarpment, sediment from the base of the glacier was forced up to the surface. When the climate moderated and the glaciers stagnated, sediment melting out of the ice accumulated at the surface, insulating the ice so that it took several thousand years to melt completely. As it melted, sediment slumped and slid, forming the hummocky topography. The result is poorly integrated stream drainage and numerous prairie pothole wetlands between mounds of glacial till (Bryce et al. 1998).

3.7.1.1 Site A

Soils within Site A consist of the Zahl-Williams-Vida-Bowbells, Williams-Bowbells, and Williams-Nutley associations (NRCS 2006). The Zahl-Williams-Vida-Bowbells association comprises approximately 16,653 acres (55 percent), and the Williams-Bowbells association comprises approximately 12,362 acres (41 percent). Finally, the Williams-Nutley association encompasses the remaining approximately 1,184 acres (4 percent).

The soils occurring in Site A formed in glacial till deposits and are generally well drained, loamy soils (NRCS 2006). Topography is generally level to undulating with local relief ranging from 25 to 200 feet and slopes ranging from three to 60 percent (NRCS 2006).

3.7.1.2 Site B

Soils within Site B consist of the Zahl-Williams-Vida-Bowbells, Williams-Bowbells, William-Nutley, and Wabek-Manning associations (NRCS 2006). The Zahl-Williams-Vida-Bowbells association

comprises the majority of Site B, with approximately 24,443 acres (67 percent), and the Williams-Bowbells association comprises approximately 8,370 acres (23 percent) of Site B. The Williams-Nutley association covers approximately 3,297 acres (nine percent) of Site B, and the Wabek-Manning association covers approximately 272 acres (one percent) of Site B.

Soils occurring within Site B were formed in glacial till deposits and are well-drained loamy soils (NCRS 2006). Topography is generally level to rolling with relief ranging from 25 to 200 feet and slopes ranging from 10 to 25 percent (NCRS 2006).

3.7.2 Direct and Indirect Effects

3.7.2.1 Site A

Impacts common to the Proposed Action on soil resources occur in two separate stages; during, and after turbine and ancillary equipment construction. Short term impacts resulting from the initial construction activities include increased soil compaction and soil structure destruction. Additional potentially longer term impacts can result from mixing of surface and subsurface soil horizons and wind and water erosion. Although visual impacts to soil are greater during construction activities, topsoil erosion during and after topsoil redistribution has a greater effect on final reclamation success.

Chemical changes would also result from mixing surface soil with subsoil during salvage activities. While the topsoil resource is generally high in organic matter and associated fertility, mixing surface and subsurface soils can effectively dilute the organic matter and nutrient content of the surface

soil. The mixing of surface and subsurface soils can also result in increases in the clay content, pH, and salt content of surface soils. Such impacts could result in reduced productivity and cause difficulty in revegetating some soils.

Impacts on physical characteristics of soil during salvage, stockpiling, and redistribution would include compaction, and destruction of soil structure as a result of soil handling and surface traffic. These impacts could impede root growth and result in decreased infiltration rates and permeability. Decreased infiltration rates and permeability would result in increased surface runoff and potentially more erosion from impacted sites. If conducted to adequate depth and spacing, additional tillage would eliminate the majority of subsoil compaction.

Short-term surface soil loss by wind erosion associated with the Proposed Actions would be greater than normal until vegetation becomes reestablished. Potential for loss of subsoil would be greatest between initial disturbance and redistribution of cover soil. The volume of soil loss due to wind erosion depends on wind velocity, size of disturbance area, condition of exposed area, and soil texture. Water erosion potential is influenced by the extent of disturbance, surface soil texture, soil cover, and steepness of slope and could be significant during heavy precipitation events.

Due to the relatively short construction period and prompt replacement of salvaged soils, reduction in soil biological activity is expected to be short-term. After soil redistribution, biological activity would increase and eventually reach pre-salvage levels.

Greatest risks for long term soil impacts include soil loss from wind and water erosion and decline in productivity as a result of mixing and compaction. This potential for continued soil loss occurs until vegetation is reestablished.

3.7.2.2 Site B

Direct and indirect effects as a result of development of Site B would be similar to those for Site A.

3.7.2.3 No Action Alternative

Under the No Action Alternative, no impacts to topsoil resources would occur.

3.8 Air Quality

3.8.1 Affected Environment

3.8.1.1 Site A and Site B

Particulate Matter (PM) as fugitive dust is likely the most prevalent air pollutant. Agriculture and vehicles using unpaved roads in the vicinity are likely the primary source of fugitive dust because there are no industrial activities in the vicinity. In addition, farming and ranching equipment may contribute to priority pollutants.

The affected environment for air quality is typically characterized in terms of existing concentrations of air pollutants. The EPA Office of Air Quality Planning and Standards (OAQPS) has set Ambient Air Quality Standards (AAQS) for six principal pollutants, which are called "criteria pollutants:" carbon monoxide (CO), sulfur dioxide (SO_2), PM, nitrogen dioxide (NO_2), ozone (O_3), and lead (Pb).

North Dakota's AAQS are codified in North Dakota Administrative Code (NDAC) Chapter 33-15-02-04. The North Dakota AAQS are identical to the national AAQS except for hydrogen sulfide (H_2S), PM of 10 microns or less (PM_{10}), PM of 2.5 microns or less ($PM_{2.5}$), and SO_2. There are no national AAQS for H_2S, only state regulations. EPA recently modified the national AAQS for PM by eliminating the annual standard for PM_{10}, keeping the 24-hour standard for PM_{10}, and modifying the standards for $PM_{2.5}$. The applicable AAQS must be maintained throughout construction of the wind project.

A search for air quality monitoring data near the Proposed Action did not uncover any available nearby published data. There are no known available monitoring stations within or in the immediate vicinity of Site A or Site B for the regulated criteria pollutants PM_{10}, $PM_{2.5}$, SO_2, H_2S, CO, O_3, NO_2, and Pb.

The semi-arid climate for the study area is characterized by very cold, dry winters and warm, moist summers. **Table 26** presents the monthly and annual average minimum and maximum temperatures for Minot, which is representative of the study area. The meteorological station in Minot has been collecting data over a 60-year period between 1947 and 2007.

3.8.2 Direct and Indirect Effects

3.8.2.1 Site A

Air quality concerns include PM in the form of fugitive dust from construction activities, and other minor levels of criteria pollutants, air toxics, and hazardous air pollutants fom sources such as construction equipment and vehicle exhaust emissions which are controlled by the EPA or the State of North Dakota.

The proposed project would have no significant impacts on air quality. Construction of the wind turbines, collector lines, roads, and substation would result in short-term emissions from operation of vehicles (tailpipe emissions) and generation of fugitive dust. These construction-related emissions would have minor short-term indirect and direct impacts on air quality. These impacts would be restricted to short periods of construction at relatively small individual wind turbine sites, along the proposed collector lines and roads, and at the substation. The impacts would diminish after construction ceases. Air quality permits would not be required for construction.

Table 26
Minot, North Dakota Monthly Temperature And Precipitation[1]

Time Period	Temperature (˚F)[2]		Precipitation (inches)	Snowfall (inches)
	Average Maximum	Average Minimum		
January	17.1	-0.2	0.64	8.7
February	23.5	6.2	0.51	5.7
March	34.7	17.0	0.82	7.1
April	52.9	31.2	1.51	5.1
May	66.0	42.7	2.43	0.9
June	74.8	52.4	3.34	0.0
July	81.5	57.5	2.45	0.0
August	80.6	55.1	1.96	0.0
September	68.7	45.0	1.55	0.1
October	55.6	34.2	0.99	2.1
November	36.2	19.3	0.70	6.3
December	23.6	7.0	0.56	6.7
ANNUAL	51.3	30.6	17.4	42.7

(1) Source: High Plains Regional Climate Center, Historical Climate Data Summaries, Minot FAA Airport, North Dakota, Period of Record: 7/2/1948 to 12/31/2007
(2) Degrees Fahrenheit = F

Emissions of nitrogen oxides (NO_X), volatile organic compounds (VOCs), CO, and SO_2 during construction would occur from the tailpipes of internal-combustion engines in construction equipment and from construction worker vehicles and supply trucks traveling to and from work sites.

Potential fugitive dust emissions (PM_{10} and $PM_{2.5}$ emissions) involve: (1) land disturbance emissions from construction of the Proposed Action, and (2) tailpipe emissions from construction vehicles. During construction, fugitive dust might be generated due to movement of construction vehicles at wind turbine sites, along collector lines and roads, and at the substation.

3.8.2.2 Site B

Effects would be the same as Site A.

3.8.2.3 No Action Alternative

If construction of the proposed wind project does not occur, management of air quality resources would remain as current. No wind turbines associated with this project would be constructed and no immediate direct or indirect effects to resources from the wind project would be expected.

3.9 Water Quality

3.9.1 Affected Environment

Site A and Site B are located within the Glaciated Missouri Plateau, Great Plains Province Physiographic Region. The sites are located approximately 25 miles north of the Missouri River in the ecoregion referred to as the Northwestern Glaciated Plains. The Northwestern Glaciated Plains Ecoregion is near the westernmost extent of continental glaciation. Within the ecoregion is the

Coteau du Missouri physiographic region of the Missouri River basin. The Coteau du Missouri region is characterized as a relatively youthful glacial moraine landscape with significant surface irregularity and, as a consequence, a moderately high concentration of semi-permanent and seasonal wetlands (Bryce et al. 1998). The Coteau du Missouri was formed during the last ice age as a stagnation moraine. The result of near surface groundwater, hummocky terrain, and poorly draining glacial till deposits has resulted in a region of numerous small lakes, wetlands and sloughs, referred locally as prairie potholes and the presence of shallow groundwater. The Coteau du Missouri highlands are underlain by a thick sequence of undifferentiated glacial drift (up to several hundred feet thick). In the project area, bedrock underlies glacial drift at depths ranging from 75 to greater than 350 feet below ground surface (bgs). Bedrock consists of Cretaceous-aged siltstone and shales of the Tongue River Member of the Fort Union Formation. Topographically, the praire potholes region are highlands, forming a surface water divide from the Souris River basin to the northeast and the Missouri River located approximately 25 miles to the southwest.

Site A is located on approximately 53 percent of cropland and 30 percent rangeland. Site B is located on 47 percent cropland and 37 percent rangeland. Portions of both potential project areas would be located in areas of numerous isolated wetlands as discussed in Section 3.2.

Surface Water

Both sites lie in the prairie pothole country of north central North Dakota and surface drainages are limited. Oak Creek, a tributary to the Souris River, flows north along the eastern portion of Site A. No other named surface water drainages are found within either project area. Lloyds, Gassman, and the South Branch Coulees approach the northeastern edge of pothole highlands near Site B, but do not extend into the pothole lakes region. These coulees are ephemeral drainages to the Des Lacs and Souris River. The Missouri River is located approximately 25 miles to the southwest of Site A and Site B; however surface topography slopes northeast towards the Souris River.

The dominant geomorphological features of either area are the numerous pothole lakes, wetland features, and ephemeral drainages (i.e., drainages that only flow for short periods of time during the year). These drainages typically maintain flows in the spring of the year or in response to precipitation events and are limited in length due to undulating topography in the project area. Open water is almost exclusively available within the project areas in the form of prairie potholes. Pothole lakes are present throughout both project areas and range in size up to a maximum of approximately 100 acres in size but are generally less than 1 acre. These features are further discussed in the wetlands section presented previously in Section 3.2. Wetlands are important because they perform hydrologic (e.g., flood attenuation, surface water, groundwater recharge) and water quality (sediment retention, pollution control) functions. Wetlands also provide valuable habitat for species of special interest (e.g., migratory birds) and special status (e.g., State or Federally listed endangered, threatened, proposed, and candidate species, or species of conservation concern).

Water quality in prairie potholes in North Dakota varies both temporally and spatially. The salinity of water in potholes is extremely varied, ranging from potholes in which the water is quite fresh to others containing brines that are several times more concentrated than sea water. Salinity is a measure of the quantity of total dissolved solids in water. Water is supplied to the potholes by precipitation on the water surface, basin runoff, and seepage inflow of groundwater. Depletion of pothole water results from evapotranspiration, overflow, and seepage outflow. Since potholes generally do not overflow, seepage outflow is the principal way in which dissolved salts can be removed. Salinity of pothole water is therefore a good indication of the seepage balance. Net seepage outflow results in fresh to brackish waters that constitute ephemeral to semipermanent ponds, whereas net seepage inflow results in brackish to saline waters that constitute semipermanent to permanent ponds (Sloan 1972).

A general observation concerning water quality on the Coteau du Missouri is that water in potholes in glacial till is fresher than groundwater in glacial till. In contrast, groundwater in glacial outwash is fresher than water in potholes in glacial outwash (Sloan 1972). These conditions result because, in general, salinity increases in the direction of water movement. This is substantive evidence that in topographically high glacial till the water moves from the potholes into the ground, whereas groundwater in topographically low glacial outwash discharges to the pothole. Potholes in glacial outwash generally occur at lower altitudes and are more saline than potholes in till.

Due to shallow depth and wind action, there is little stratification in ponds from temperature or salinity so that the water quality within a pothole is generally uniform throughout. Exceptions to this include zones of groundwater inflow and stratification that result from freezing and thawing processes within the pothole (Sloan 1972). The dissolved solids concentration in a pothole is increased by evapotranspiration. The rate of concentration is determined by the seepage balance. During the winter months, as water in the pothole freezes, dissolved salts are concentrated in the solution at the base of the ice. If freezing continues to the bottom of the pothole, this concentrated layer will exist in the unfrozen bottom sediments (Ficken 1967). Melting of pothole ice during the spring breakup and runoff from snowmelt usually occur simultaneously, so potholes are freshest in the early spring. Increasing salinity throughout the summer results from both evaporative concentration and diffusion into the pothole of the salts concentrated by freezing in the bottom muds (Ficken 1967).

Groundwater

Groundwater is the major source of drinking water in North Dakota. Sixty percent of the state's total population utilize groundwater to supply their drinking water needs, while 97 percent of the state's rural population use groundwater for drinking water purposes. Agriculture and industry in North Dakota also rely heavily on groundwater. http://www.health.state.nd.us/WQ/GW/pubs/GWT.HTM

Shallow groundwater is prevalent across much of the Coteau du Missouri due to the nature of the low permeability glacial till deposits. About 90 percent of the glacial drift on the Coteau du Missouri is glacial till, and the remainder is largely glacial outwash and lake sediments (Sloan 1972). Groundwater movement in glacial till is controlled by its lithology and structure. This till, being a poorly sorted, largely unstratified mixture of clay, silt, sand, and gravel, is not highly permeable, so groundwater moves most readily along the joints. Because joints in glacial till are most numerous near the land surface, the most active ground-water flow systems are shallow and localized in the vicinity of potholes.

The water table in the glacial deposits is continuous with the water surface in prairie potholes: therefore, the hydraulic gradient adjusts to the water surface elevation of the potholes. In cross section the water table is represented by a nearly straight line which connects potholes. The potentiometric surface of the water table around a pothole determines the direction of groundwater flow with respect to the pothole. Groundwater flows toward the pothole (gaining) if the adjacent water table is higher than the pothole water surface and flows away from the pothole (losing) if the adjacent water table is lower than the pothole water surface.

As mentioned previously, shallow groundwater is present at or near ground surface in the vicinity of pothole lakes and wetlands. Very few well logs are recorded within the vicinity of the project areas (NDSWC 2008). Based on information provided by a USGS observation well in Site A (T151N, R83W, Section 26), groundwater is present from 3 to 13 feet bgs and varies by as much as nine feet seasonally (NDSWC 2008). Information provided by a similar observation well (T155N, R86W, Section 24) in the Site B project area shows consistency with Site A. Groundwater is shallow (less than 15 feet) and can vary by nine feet or more over the course of a season. The first bedrock aquifer occurs within the Tongue River Member, Fort Union Formation at depths greater than 200 feet bgs. This deeper groundwater resource is contained within aquifers comprised of water-bearing

sandstone and lignite coal (Paulson 1983). Water quality from these aquifers is often poor, with high concentrations of total dissolved solids.

3.9.2 Direct and Indirect Effects

3.9.2.1 Site A

Due to the lack of flowing surface water or need for groundwater extraction in either site, there would be no impacts from construction and/or operation of Site A or Site B. Sediment and runoff during construction would be controlled, and, considering there is no surface water near the construction, there would be no impacts on surface water quality during construction.

3.9.2.2 Site B

Direct and indirect effects as a result of implementation of the Site B would be similar to those for Site A.

3.9.2.3 No Action Alternative

Under the No Action Alternative, no impacts to surface waters or groundwater would occur.

3.10 Aesthetics

3.10.1 Affected Environment

3.10.1.1 Site A

The visual setting of Site A is rural, with farming, livestock grazing, and some residential development. Common public observation points consist of significant travel corridors within and adjacent to Site A, including Highway 83, Highway 23/247th Avenue, 345th Avenue, Highway 53/359th Avenue, 62nd Street, 97th Street, 27th Street, 55th Street, 289th Street, and 317th Street (**Figure 14**).

The original prairie landscape exists in an altered agricultural state. Linear features of highways, paved roads, gravel roads, two-track roads, electric transmission lines, and fencing transect each project area.

The closest city to Site A is Max (population 287) located five miles south on Highway 83.

3.10.1.2 Site B

The visual setting of Site B is rural, with farming, livestock grazing, agricultural operations, and some residential development. The topography of the area is gently undulating to rolling, with numerous potholes. Common public observation points consist of significant travel corridors within and adjacent to Site B, including 254th Street, 240th Street, 226th Street, Prairie Trail, 54th Avenue, 37th Avenue, 20th Avenue, and 11th Avenue (**Figure 15**).

The closest cities to Site B are Berthold (population 450), located four miles north of Site B and Des Lacs (population 209), located four miles northeast of Site B.

3.10.2 Direct and Indirect Effects

3.10.2.1 Site A

Facilities within Site A would consist of wind turbines, collector lines, a substation, and access roads. The uppermost portion of the turbine blades would stand approximately 390 feet above the ground surface and would be visible for up to 10 miles. The visual character of the area would be altered from minimally developed agricultural land use to somewhat industrial. Some of the turbines

will require lights on top of the nacelle, for aircraft safety, potentially changing the view from nearby rural residences and roadways. Since the region does not contain highly distinctive or important landscape features and is not densely populated or used, visual impacts from development of Site A would be limited.

Flickering shadows could be cast by moving rotors. Flickering would be limited to daylight hours when the sun is shining and noticeable only in the immediate area, and vary throughout the day and by season.

3.10.2.2 Site B

Direct and indirect effects of implementation of Site B would be similar to those for Site A because the setting and population are similar for both locations.

3.10.2.3 No Action Alternative

Under the No Action Alternative, no impacts to visual resources (aesthetics) would occur.

3.11 Transportation

3.11.1 Affected Environment

3.11.1.1 Site A

County and township (section line) roads characterize the existing roadway infrastructure in and around Site A (**Figure 14**). There are two major highways within and adjacent to Site A: US Highway 83 runs through the eastern portion of Site A north to south, and ND State Highway 23 runs through the northern portion of Site A east to west. There are no airports, airstrips, or railroads within or near Site A.

According to the NDDOT, the functional capacity of a two-lane paved rural highway, such as Highway 23, is approximately 5,000 vehicles per day, also referred to as Average Daily Traffic (ADT). US Highway 83 is four lanes. Determining the specific capacity of any highway is a complex process and general estimates are used for planning purposes. In general, the NDDOT indicated that roads under 100 ADT are rarely counted.

The existing daily traffic levels for highways that pass within and adjacent to Site A are documented in **Table 27** (NDDOT 2006). Additional county and township roads run through Site A but have no count data available.

Table 27
Existing Daily Traffic Levels On Roads Within And Adjacent To Site A

Roadway Segment	Annual ADT/Commercial Truck Traffic
Highway 83 through eastern portion of Site A	4,250/650
Highway 23 through eastern portion of Site A	975/130

3.11.1.2 Site B

County and township roads characterize the existing roadway infrastructure in and around Site B. No state highways pass through or adjacent to Site B (**Figure 15**). The nearest highway is east to west trending US Highway 2, located four miles north of Site B. No count data is available for the roads that run within and adjacent to Site B as these roads are likely under 100 ADT.

There are no airports or airstrips within or near Site B.

OCT 08, 2008 N:\arcpri2\010397\mxd\ER\SiteA_Transportation_LandStatus.mxd BY:megan.wood

OCT 08, 2008

Figure 14

Legend

Preferred Site A

N

Miles

0 2

Transportation for Site A

ENVIRONMENTAL REPORT
PRAIRIE WINDS - ND 1 PROJECT
WARD COUNTY, NORTH DAKOTA
69

OCT 08, 2008 N:\arcprj\1010397\mxd\ERSiteB_Transportation_LandStatus.mxd BY:megan.wood

OCT 08, 2008
Figure 15

Legend
Alternative Project Site B

N

Miles
0 2

Transportation for Site B
Environmental Report
PriarieWinds - ND 1 - Project
Ward County, North Dakota
71

3.11.2 Direct and Indirect Effects

3.11.2.1 Site A

During operation of Site A, the access roads will be used by operations and maintenance crews while inspecting and servicing the wind turbines. The access roads will be between towers and from existing roads to turbines, offset as necessary to allow for adequate crane access during construction. The permanent access roads will be up to 20 feet wide and low profile to allow cross-travel for farm equipment.he estimated maximum construction workforce is expected to generate approximately 25 additional vehicle trips per day for workers coming and going. The foundation for each turbine is expected to require an average of 40 truck loads (80 one-way trips) of concrete, and each turbine would required 20 trucks (40 one-way trip) to reach the site. Additional traffic from these vehicles would be short term, occurring during the actual pouring of the foundation and installation of the turbines. Using a combination of state highways and county and township roads within and adjacent to Site A, the traffic impacts are considered negligible. Since many of the area roadways have minimal ADT currently, the additional vehicle trips represent a large percentage increase which would be noticeable to local residents, but will still be less than seasonal variations such as autumn harvest. The capacity of any route and level-of-service to the traveling public will not be impacted.

3.11.2.2 Site B

Impacts that may occur as a result of Site B are similar to those listed for Site A.

3.11.2.3 No Action Alternative

No impacts to transportation would occur under the No Action Alternative.

3.12 Noise

3.12.1 Affected Environment

Noise is measured in a number of ways and the relationship of tone, loudness, duration, etc. affect how sound is perceived. **Table 28** shows how noise measured by A-weighted decibels (dBA) are perceived.

Table 28
Perception of Noise

Noise Level (dBA)	Noise Source	Subjective Evaluation
70	Vacuum cleaner 10 feet away or outdoors in a commercial area	Loud
60	Normal speech 3 feet away	Moderate
50	Typical office activities or background noise in a conference room	Moderate
40	Library background noise, quiet suburban environment at night, or typical background noise in a residence	Faint
30	Whisper 3 feet away or quiet rural environment at night	Faint
21	Concert hall background noise	Very faint
10	Human breathing	Very faint
0	Threshold of hearing or audibility	Silent

3.12.1.1 Site A and B

Site A is located in a rural, predominantly agricultural area. As a result, sources of background noise to rural residents and occasional visitors to the area include wind, agricultural activity, recreation (primarily hunting), and vehicles traveling on Highways 83 and 23, county roads, and low-traffic gravel roads. Typical baseline noise levels in Site A likely range from approximately 38 to 48 dBA, which would be perceived as "faint" according to **Table 28**. Potential noise receptors in the vicinity include scattered rural residences.

3.12.2 Direct and Indirect Effects

3.12.2.1 Site A

A three dBA increase in noise is considered barely noticeable to humans, a five dBA increase would typically result in a noticeable community response, and a 10 dBA increase is considered a doubling of the sound and is generally considered to be substantial.

Noise generated by construction activities would occur intermittently over the construction period and would be generated by an increase in traffic on local roads, as well as heavy equipment operation. Available estimates from other wind project construction projects indicate that the maximum noise levels from heavy equipment would be 85 to 88 dBA at a distance of 50 feet (Western 2007). During construction some noise creating activities will be closer to residences as heavy equipment for turbines are moved and as collector lines are buried. Construction noise in any one location would be limited to working hours and for the short period that construction would occur in any one area (generally a week or less).

Given that the distance to residences from any turbine is expected to be greater than 1,000 feet, noise levels from turbines would not exceeded and noise issues are not expected to be a concern at Site A.

3.12.2.2 Site B

Direct and indirect effects on noise resulting from construction and operation of Site B are the same as Site A.

3.12.2.3 No Action Alternative

No impacts to noise will occur under the No Action Alternative.

3.13 Radio and Television Interference

Comsearch (2007a) identified off-air television stations within a 100-mile radius of the sites. Off-air television stations include broadcasters that transmit signals that can be received directly on a television receiver from terrestrially located broadcast facilities. Comsearch examined the coverage of off-air TV stations and the communities in the area that could potentially have degraded television reception as a result of the project (those within 40 miles). There are 19 registered stations within 40 miles. Of the 19 stations, 8 are presently licensed and operational (5 are full service analog stations, 2 are full service digital stations, and 1 is a low-power translator station). The other eleven stations are either in their license application, or construction phase, but not yet operational.

Degradation of AM broadcast coverage would occur if a wind turbine is located within 2 miles of an AM directive antenna or within half-mile of a non-directive antenna. FM stations would be affected by turbines within 0.5 miles of very low-power stations, 1.5 miles of the low-power stations, and 2.5 miles from the full-power stations (Comsearch 2007b)

Thirteen FM stations were identified within the search radius. Eight of the FM stations are full-power stations, two are low-power FM stations, and two are very low-power stations. The thirteenth station does not have a call sign nor is its transmitting power defined. All of the FM station antennas are located at distances greater than 6.27 miles of the center of the general project area.

3.13.1 Site A

Interference is expected to be limited, since interference generally occurs in older, overhead transmission lines with loose or dirty insulators and spark gaps. The underground collector lines would have no impacts to radio and television signals. In addition, transmission lines already exist in the project area.

In February 2009, all television signals will be transmitted digitally, which will eliminate the problem of potential interference with television. This change will occur before construction and operation of the wind turbine would begin.

There were no AM or FM antenna identified within 3 miles of any turbine, therefore, a project developed in Site A would not affect radio transmission.

3.13.2 Site B

Effects of developing Site B would be the same as Site A. There is one FM radio antenna, operating at a 99.9 MHz frequency, approximately 200 ft from the Site B boundary. Collector lines would be buried, minimizing any potential for radio interference is limited.

3.14 Human Health and Safety

3.14.1 Affected Environment

3.14.1.1 Site A

The predominant activities that occur within Site A include agriculture and vehicular travel. The safety regulations for these activities are defined and enforced by state and federal agencies. Four resources were analyzed for this section. These resources include air traffic, electromagnetic fields, hazardous materials and/or hazardous waste, and security.

Air Traffic

Minot International Airport is located approximately two miles north of the central business district of the City of Minot in Section 12, Township 155 North, Range 83 West. The airport is located 20 miles north of the center of Site A. There are two paved runways at an elevation of approximately 1,716 feet above mean sea level. This airport supports small commercial aircraft.

Electromagnetic Fields

The term electromagnetic fields (EMF) refers to electric and magnetic fields that are present around any electrical device. Electric fields arise from the voltage or electrical charges and magnetic fields arise from the flow of electricity or current that travels along transmission lines, collector lines, substation transformers, house wiring, and electrical appliances. The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the current flow through the conductors (wire). EMF can occur indoors and outdoors. While the general consensus is that electric fields pose no risk to humans, the question of whether exposure to magnetic fields potentially can cause biological responses or even health effects continues to be the subject of research and debate.

Hazardous Materials and/or Hazardous Waste

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

Potentially hazardous materials associated with Site A include fluids found in association with turbines and substation/transformer equipment. There will be three types of fluids used in the operation of the wind turbines that are petroleum products: gear box oil, hydraulic fluid, and gear grease. These fluids are necessary for the operation of each turbine.

3.14.1.2 Site B

The predominant activities that occur within Site B include agriculture and vehicular travel. The safety regulations for these activities are defined and enforced by state and federal agencies. The four resources analyzed for Site B include air traffic, electromagnetic fields, hazardous materials and/or hazardous waste, and security. Results of the analysis show that the affected environment of Site B is similar to Site A. Refer to Section 3.15.1.1.

3.14.2 Direct and Indirect Effects

3.14.2.1 Site A

Air Traffic

The installation of wind turbines creates a potential for air traffic collision. However, power collector lines are expected to be buried, and the wind turbines themselves will be visible from a distance. The wind turbines would have lighting that complies with Federal Aviation Administration (FAA) requirements. In addition, the FAA's review did include evaluation of any potential interference with air traffic.

Electromagnetic Fields

Turbines will be no closer than 1,000 feet to occupied residences where EMF will be at background levels. Based on the most current research on EMF, and the distance between any turbines or collector lines and occupied residences, Site A will have no impact to public health and safety due to EMF.

Hazardous Materials and/or Hazardous Waste

The applicant does not anticipate generating any hazardous wastes.

3.14.2.2 Site B

Impacts that may occur as a result of Site B are similar to those listed for Site A.

3.14.2.3 No Action Alternative

Under the No Action Alternative, potential risks to health and safety would remain the same as they are currently.

3.15 Socioeconomic Conditions and Community Resources

3.15.1 Affected Environment

3.15.1.1 Site A

Site A is located in southeast Ward County, North Dakota in a primarily rural agricultural area located on either side of North Dakota Highway 83 and south of North Dakota Highway 52. With the

exception of the City of Minot, land within Ward County is primarily agricultural with scattered farmstead residences.

In 2006, Ward County had a population of 55,270, a decline of six percent from the 2000 census level (USCB 2006). Cities and small towns near Site A include Minot (36,567), Sawyer (population 196), Max (population 287), Ryder (population 92), Douglas (population 64), and Benedict (population 53) (USCB 2001).

The closest city with services is Max, located seven miles south of Site A. The community of Max has an economy focused on agriculture, ranching, and recreation. Max has a post office, two mini-marts, cafe, elevator, automotive repair, bank, insurance agency, realtor, car dealership, hair salons, museum, four churches, lounges, funeral chapel, gas station, bulk gas and fuel and a fertilizer plant, along with several types of construction businesses. Max is also considered the gateway to Lake Audubon and Lake Sakakawea, with only 15 miles to fishing and water sports. The nearest hospital is Trinity Hospital in Minot, North Dakota.

Schools in the vicinity are encompassed by the Max School District 50 (in Max city limits), School District 70 with South Prairie Elementary School located five miles north of Site A, and the Minot Public School District located within the city limits of Minot, North Dakota.

3.15.1.2 Site B

Site B is located in west-central Ward County, North Dakota in a primarily rural agricultural area with county and section roads passing within and near Site B. Cities and towns near Site B include Minot (population 36,567), Des Lacs (population 209), Burlington (population 1,096), and Berthold (population 450). The closest city with services is Berthold located approximately five miles north of Site B. Businesses in Berthold include auto body repair and painting, banking, beauty salons, grain elevators, gas station, bars and restaurants, fertilizer applicators, meat processing, plumbing and heating, and insurance sales. The nearest hospital is Trinity Hospital in Minot, North Dakota.

Schools in the vicinity are served by the Berthold Public School District 54 and the Lewis and Clark School District 161.

3.15.2 Direct and Indirect Effects

3.15.2.1 Site A

Overall, socioeconomic impacts of the construction of Site A would be slightly positive as a result of associated food, lodging and other expenditures, with an expected influx of temporary workers for several months during installation of the wind project.

During operation and maintenance of the facility (25 years or more), managerial staff and full time skilled technicians would be hired based on the skill set of the employee. Also, land on which facilities would be located is primarily leased private land. This would provide an extra income to landowners within Site A and would compensate for any potential farmland losses due to surface disturbance as a result of wind turbines and other infrastructure.

Basin Electric can expect to pay approximately $675,000 annually for property taxes associated with the wind project. This amount includes the property tax assessed to PrairieWinds - ND 1 and the additional gross receipts tax paid by Basin Electric on the sale of the energy purchased from PrairieWinds - ND 1.

3.15.2.2 Site B

Direct and indirect effects of Site B are similar to those expected for Site A.

3.15.2.3 No Action Alternative

Under the No Action Alternative, it is assumed no site would be built. The economic benefits and costs that would have come to Ward County would not occur. Financial costs and commitments associated with the construction and operation of the wind project would be eliminated or transferred to a different location. Project related increases in temporary and permanent jobs and tax revenues would not occur in the county. Basin Electric would not be able to supply power from this particular generation source and would have to look elsewhere to meet demand.

3.16 Environmental Justice

3.16.1 Affected Environment

3.16.1.1 Site A and Site B

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

Executive Order (EO) 12898 (*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*) is intended to ensure that adverse human health and environmental effects of agency actions would not disproportionately impact minority and low-income populations, including Native American Indian Tribes. **Table 29** shows minority populations in Ward County and North Dakota. For purposes of this section, minority and low-income populations are defined as follows:

- *Minority Populations* – People of Hispanic or Latino origin of any race, African Americans, American Indians or Alaska Natives, Asians, and Native Hawaiian and other Pacific Islanders.
- *Low-Income Populations* – People living below the national poverty level. In 2000, the weighted average poverty threshold for a family of four was $17,603 and $8,794 for an unrelated individual.

Table 29
Minority and Low-Income Populations

Location	Total Population	Percent Minority	Percent Below Poverty Level
Ward County	58,795	6.1	10.8
North Dakota	642,200	6.6	11.9

EO 13045 (*Protection of Children from Environmental Health Risks and Safety Risks*) is intended to ensure adverse human health and environmental effects of agency actions would not disproportionately impact child populations.

Estimates of two populations of concern (minority and low-income) were developed to determine if environmental justice populations exist in Ward County, North Dakota (USCB 2000).

The Three Affiliated Tribes – Hidatsa, Arikara, and Mandan (the Three Affiliated Tribes) is located approximately 30 miles west of Site A and 20 miles south of Site B. This reservation may represent the closest minority or low-income populations in the region.

3.16.2 Direct and Indirect Effects

3.16.2.1 Site A and Site B

The median family/household income for the region surrounding Site A and Site B is comparable to the statewide average. Consequently, income does not constitute a condition that warrants focus under EO 12898. The percentage of minority populations is also similar to the State, and therefore, there is no minority populations that would be disproportionately affected.

While children and sensitive receptors exist near Site A and Site B, their proximity does not constitute a condition that warrants focus under EO 13045.

3.16.2.2 No Action Alternative

Under the No Action Alternative, no impacts to environmental justice would occur.

4.0 CUMULATIVE EFFECTS

Cumulative effects are defined by the CEQ 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…"(40 CFR 1508.7). Based on this definition, 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.

Cumulative impacts from Site A and Site B are discussed together below due to the similarity of their direct and indirect effects. Because the No Action Alternative had no direct or indirect effects on any resources, it would have no cumulative impacts.

The cumulative effects analysis area for this EA would be Ward County which incorporates the areas covered by Site A and Site B. Ward County is approximately 2,056 square miles (1.3 million acres) with a population of 58,795 as of the 2000 US Census (USCB 2000). With over half the population of the county living in Minot, the county is considered to be rural consisting of farmlands and grazing lands.

Analyses focus on the cumulative impacts from present and reasonably foreseeable development with similar impacts as the Proposed Action or Alternative. The past and present development projects, as well as the reasonably foreseeable development in the cumulative effects analysis area, considered in this analysis are described below.

Minot Wind Project

The existing Minot Wind Project, a 2.6 MW facility consisting of two Nordex N60 wind turbines, is located 12 miles south of Minot.

Minot Wind 2

Minot Wind 2 is an expansion of the existing Minot Wind Project that was commissioned in 2003. The expansion would include the construction of three additional 1.5 MW turbines for a combined capacity of 4.5 MW. Construction of the project is scheduled for early summer 2009 and completion is anticipated by late 2009 or early 2010. The proposed expansion is located approximately 2 miles north of Site A.

4.1 Land Use

Temporary and permanent disturbance from the project (Site A or Site B) would add to the already disturbed areas within each site. Much of the land has already been disturbed from past activities, particularly farming, but also other developments such as roads, highways, and residences. Native prairie, native shrubland, and native woodlands would be the only areas where impacts from the project would be "new" as the others are a result of previous disturbance.

Cumulative impacts from the project would be insignificant because the proportion of the area permanently disturbed would be a small percentage of the total area (73.8 acres out of 1.3 million in the county).

4.2 Wetlands and Floodplains

There would be no impacts on wetlands or floodplains from the project and therefore, there would be no cumulative impacts.

4.3 Cultural Resources

There would be no impacts on cultural resources from the project and therefore, there would be no cumulative impacts.

4.4 Fish and Wildlife Resources

Past actions described elsewhere in this document, primarily agriculture and associated development, have resulted in loss of habitat. While project planning and avoid/minimize measures will limit somewhat the loss of native habitats, there would be an additional incremental loss due to project implementation. Likewise, the project would add to the existing and proposed future wind development in the state, thus contributing to cumulative effects to birds and bats as a result of collisions.

The effects just described would include federally-listed and other special status species, and the potential impacts would be somewhat greater due to the already limited numbers of these species. Proposed monitoring, mitigation and compensation measures would address these potential impacts, but quantifying the degree of 'offset' is not possible.

4.5 Vegetation

Most of the sites have already had disturbance of native vegetation and CRP in the form of agriculture and development. Additionally, grazing has affected the remaining native vegetation. Cumulative impacts to vegetation are the same as those described above under Land Use and would be insignificant.

4.6 Soils

Reclamation would avoid any impacts on soils from the project; therefore there would be no cumulative effects from the project.

4.7 Air Quality

Minimal air quality impacts limited to the construction period would not contribute cumulative effects to the good air quality at either site. There would be no cumulative effects on air quality.

4.8 Water Quality

There would be no impacts on surface or groundwater from the project and therefore, there would be no cumulative impacts.

4.9 Aesthetics

Visual impacts from the turbines, lights, and roads would occur from the project. This would add to the past impacts of agricultural, residential, and transportation development. However, the sites would retain their rural setting and appearance.

4.10 Transportation

The limited and short-term nature of the use of existing roads during construction will not contribute noticeably to the cumulative effects, particularly when no other activities that would result in the change in the use of roads was identified as occurring during the same time period. Turbine access roads will not be available for public access so there will not be any cumulative effects on transportation from the access roads.

4.11 Noise

Cumulative effects on noise are the same as those described for direct and indirect effects.

4.12 Radio and Television Interference

There would be no impacts on radio and television transmission from the project and therefore, there would be no cumulative impacts.

4.13 Human Health and Safety

There would be no impacts on human health and safety from the project and therefore, there would be no cumulative impacts.

4.14 Socioeconomic

There would be no impacts on social or economic conditions from the project and therefore, there would be no cumulative impacts.

4.15 Environmental Justice

There would be no impacts on minority or low-income populations from the project and therefore, there would be no cumulative impacts.

5.0 PROPOSED MITIGATION MEASURES

5.1 Land Use Mitigation Measures

Basin Electric will work closely with the landowners, the USFWS, and other agencies in locating wind turbines and access roads to minimize land use disruptions and impacts to environmentally sensitive areas to the extent possible.

For projects that have the potential to convert important farmland to non-farm use, the NRCS must be contacted. NRCS uses a land evaluation and site assessment system to establish a farmland conversion impact rating score for a proposed project, and this score is used as an indicator for the project sponsor to consider alternative sites if the potential adverse impacts on the farmland exceed the recommended allowable level (NRCS 2007b).

5.2 Wetlands Mitigation Measures

Wetlands will be avoided to the extent practicable during the construction phase of Site A. If impacts to USACE jurisdictional waters are unavoidable, then Basin Electric will seek coverage under a Section 404 USACE Nationwide Wetland Permit. Permanent impacts to jurisdictional waters will be mitigated according to USACE requirements.

Wetlands within USFWS easements on private property are under USFWS jurisdiction. If wetland impacts in USFWS easements cannot be avoided, Basin Electric will work with the USFWS to obtain permits for the impact and create required mitigation

Wind turbines will be located a minimum of 0.25 miles from all WPAs.

Basin Electric will use best management practices (BMPs) during construction and operation of Site A to protect topsoil and adjacent wetland resources and to minimize soil erosion. Practices may include containing excavated material, use of silt fences, protecting exposed soil, stabilizing restored material, and revegetating disturbed areas with native species.

5.3 Cultural Resource Mitigation Measures

The following mitigation measures are proposed to address impact to the APE of Site A:

- Encourage avoidance: Basin Electric shall make a reasonable effort to design the project in such a manner as to avoid National Register eligible properties.
- Address impacts to National Register properties located inside the APE: No surface disturbance shall occur within the boundary of National Register eligible property 32WD1637 prior to completion of the field phase of a data recovery plan that has been reviewed and approved by the State Historical Society of North Dakota.
- Address the eligibility of unevaluated sites inside the APE: No surface disturbance shall occur within the boundary of sites 32WD1636, 32WD1638, 32WD1641-32WD1646, 32WD1649-32WD1655, 32WD1658, 32WD1659, 32WD1664-32WD1666 until their National Register eligibility has been determined. If one or more of these sites is determined to be National Register eligible, no surface disturbance shall occur within the boundary of sites prior to completion of the field phase of a data recovery plan that has been reviewed and approved by the State Historical Society of North Dakota.
- Contact The Three Affiliated Tribes (Mandan, Hidatsa and Arikara Nation) if archaeological resources or other properties of Tribal interest are identified prior to or during construction: Contact Elgin Crows Breast, TCPO of the Three Affiliated Tribes (Phone: 701-627-4781).

- Contact the North Dakota Intertribal Reinternment Committee and the North Dakota State Historical Society if a burial site is encountered during construction: The Native American Graves Protection and Repatriation Act of 1990 allows Tribes to protect American Indian graves and to repatriate human remains. The proponent must comply with this act if a burial site is encountered as the aforementioned Act applies to all developments regardless of the funding source. Any burial site identified, including Tribal or pioneer, must be referred to the North Dakota Intertribal State Historical Society, North Dakota Reinternment Committee, Mr. Paul Picha, Chief Archeologist, 612 East Boulevard Avenue, P.O. Box 620 Bismarck, ND 58505-0830 Belcourt, ND 58301, ppicha@state.nd.us

5.4 Threatened and Endangered Species Measures

The following measures are described in greater detail in the PrairieWinds - ND 1 Biological Assessment. It is acknowledged that potential impacts to listed species cannot be 'mitigated' as such, but these measures are included in this section for logical document organization and for the benefit of those readers who may not access the BA or other related documents.

Monitoring Plan/Sightings:

- Monitoring and training procedures will be developed in coordination with the USFWS and documented in the project operations plan;
- Project personnel will be trained to identify whooping cranes in the field;
- Observations of whooping cranes by project personnel made as a result of monitoring or other incidental sightings in the project area and surrounding vicinity shall be immediately reported to the USFWS;
- During the construction phase, Basin Electric would require contractors to modify or curtail construction activities within one half-mile of the observation of a whooping crane, leaving birds undisturbed until they are no longer observed within the wind project boundaries to minimize the potential for disturbance, displacement, and harm of roosting and foraging whooping cranes.
- For three years post-construction, trained personnel acceptable to the USFWS will be on site during spring and fall migration seasons to observe whooping cranes (Spring: April 1 to May 15; Fall: September 10 to October 31). During that period, turbines located within one-half mile of the observation of a whooping crane will be shut down until such time as the whooping cranes are no longer observed in the area;
- During the construction phase and for three years post-construction, trained personnel acceptable to the USFWS will document avian migration use of the project area during the spring and fall migrations;
- At the end of the three year post-construction whooping crane monitoring period, if whooping cranes or sandhill cranes (surrogate species) have been observed utilizing habitats in the project area, the federal agencies and Basin Electric would determine the suitability for additional monitoring.

Monitoring Plan/Mortality:

- During the spring and fall whooping crane migration seasons, Basin Electric will conduct mortality monitoring to detect any whooping crane mortalities that may occur on the project area. Post-construction mortality monitoring will help to identify individual turbines that contribute to avian mortality. This information could be used to modify operating procedures

as necessary and provide valuable design and layout information for future wind development projects, aiding in the reduction of potential for avian mortality;

- Basin Electric will immediately report any whooping crane or sandhill crane mortality to the USFWS and RUS. In the event of a whooping crane mortality, temporary shut-down of all project turbines would occur. Turbine operations would resume in a manner and at a time agreed to by the USFWS, the agencies, and Basin Electric;
- The presence of a dead whooping crane at the project area would represent new information and, in this circumstance, RUS would request re-initiation of formal consultation with the USFWS;
- Monitoring procedures for whooping crane/sandhill crane mortality will be developed in coordination with the USFWS.

Habitat Compensation:

- Basin Electric will provide funds for the acquisition of conservation easements to provide compensatory stopover habitat for the whooping crane. With oversight by the agencies, acquisition, maintenance and management of suitable lands will be accomplished by the North Dakota Natural Resources Trust, a non-governmental organization with considerable experience in similar land acquisition activities. Compensation is based on the estimated suitable stopover habitat lost (denied) to cranes due to construction and operation of the project, with current Ward County, North Dakota cropland and pasture land values providing a proxy habitat value.

Annual Reports:

- For three years post-construction, Basin Electric will provide annual reports each year to RUS, the NDGFD and USFWS. Reports will address compliance with the whooping crane monitoring and other avian studies developed in coordination with USFWS.

5.5 Fish and Wildlife Measures

- Prior to surface disturbance activities during the breeding season (February through July), a qualified biologist would survey potentially 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 constrain periods, would be implemented until the young have fledged and dispersed from the nest area. These measures will be implemented on a site-specific and species-specific basis, in coordination with RUS and Western.
- If construction is to occur during the breeding season for raptors (January through August), prior to construction activities, raptor breeding surveys will be conducted by a qualified biologist through areas of suitable nesting habitat to identify any potentially active nest sites within 0.5 mile from the project area. If applicable, appropriate protection measures, including seasonal constraints and establishment of buffer areas will be implemented at active nest sites until the young have fledged and have dispersed from the nest area. These measures will be implemented on site-specific and species-specific basis, in coordination with RUS and Western.
- Basin Electric will develop bat mortality monitoring procedures in coordination with the USFWS.

- Basin Electric has designed the project to avoid the construction of new overhead power lines. All collector lines will be buried with the exception of the line that ascends from the substation.
- All temporary meteorological towers associated with the project will be removed as soon as construction begins. Any permanent meteorological tower will be freestanding and have no guy wires.
- Mowing activities will not occur during the breeding season for ground-nesting birds to avoid any bird mortality.

5.6 Vegetation Mitigation Measures

The following mitigation measures would be implemented to avoid and reduce impacts to vegetation and sensitive plants:

- 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 will be returned to their original use;
- Noxious weeds would be controlled using appropriate weed control measures;
- Annual post-construction monitoring and treatment for as long as determined by involved parties; and,
- Minimize dust emissions during clearing, grading, and other construction activities to avoid adversely affecting vegetation.
- Obtain native plant seed stock from seed sources within 250 miles of the project area to ensure success of revegetation effort.

5.7 Soils Mitigation Measures

Basin Electric will use BMPs during construction and operation to protect topsoil and adjacent wetland resources and to minimize soil erosion. Practices may include containing excavated material, use of silt fences, protecting exposed soil, stabilizing restored material, and revegetating disturbed areas.

5.8 Air Quality Mitigation Measures

Air quality effects caused by dust would be short-term, limited to the time of construction, and would not exceed the aforementioned AAQS particulate standards. It is unlikely that Site A or Site B would result in the exceedence of air quality standards. The limited duration of construction, along with implementation of the environmental protection measures presented in this document, is expected to mitigate air quality effects so that federal and state AAQS would not be exceeded. Complaints regarding fugitive dust emissions would be addressed in an efficient and effective manner.

5.9 Water Quality Mitigation Measures

Basin Electric will use BMPs during construction and operation to protect topsoil and adjacent pothole and wetland resources and to minimize soil erosion. Practices may include containing excavated material, use of silt fences, protecting exposed soil, stabilizing restored material, and revegetating disturbed areas.

5.10 Aesthetics Mitigation Measures

No mitigation is proposed.

5.11 Transportation Mitigation Measures

Basin Electric will work closely with landowners to site access roads to minimize land-use disruptions to the extent possible.

5.12 Noise Mitigation Measures

While there are no federal noise standards that directly regulate noise from the operation of wind turbines, EPA guidelines recommend a day-night average sound level (L_{dn}) of 55 dBA in typically quiet outdoor and residential areas. In order to achieve the recommended L_{dn}, wind turbines will be set back at least 1,000 feet from occupied residences.

Special conditions can occur which are difficult to predict such as periods of high wind shear events where there is little masking wind noise at surface level but at hub-height there is sufficient wind for energy generation. Residents in homes that are poorly insulated or highly exposed without any vegetation nearby may perceive a higher indoor noise level than those in a typical well insulated home. If a complaint is registered and sound is measured above the L_{dn} on more than a rare occasion, Basin Electric may provide improved insulation or landscaping to mitigate these unusual situations.

5.13 Health and Safety Mitigation Measures

Air Traffic

Basin Electric is coordinating with FAA on layout and lighting and will seek approval from FAA. Wind turbines and meteorological towers will have lighting and markings according to FAA requirements that minimize any potential for air traffic impacts.

Electric and Magnetic Fields

Basin Electric will continue to monitor EMF research, encourage utilities to work with customers in household EMF issues, and provide public education.

Hazardous Materials and/or Hazardous Waste

No mitigation is proposed at this time. All petroleum fluids will be contained within the wind turbines and electrical equipment. Any petroleum wastes generated will be handled and disposed of in accordance with local, state and federal regulations.

Security

Several security measures will be taken to reduce the chance of physical and property damage, as well as personal injury. First, the towers will be placed at least a fall distance, almost 400 feet from road RIGHT-OF-WAY and 1,000 feet from occupied residences unless county or township variance are 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. Next, security measures will 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 will sit on solid steel enclosed tubular towers in which all electrical equipment will be located, except for the pad-mounted transformer. Access to the tower is only through a solid steel door that will be locked when not in use.

Public Safety

Bore holes would be covered.

5.14 Social and Economic Conditions Mitigation Measures

No mitigation is proposed.

5.15 Environmental Justice Mitigation Measures

No mitigation is proposed.

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APPENDIX A
SCOPING REPORT