WESSINGTON SPRINGS WIND PROJECT

Environmental Assessment for Pre-Approval Review

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Western Area Power Administration

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ES.1 Proposed Action

Babcock & Brown Renewable Holdings, Inc. (Babcock & Brown) proposes to construct, operate and maintain a wind turbine electrical generation facility in south-central Jerauld County, South Dakota. The proposed wind farm would be 2 miles south of the city of Wessington Springs. The Wessington Springs Wind Project (WSWP), as proposed, would consist of a 51-megawatt (MW) wind energy development with 34 wind turbine generators, new and improved roads, an operations and maintenance (O&M) building, a 34.5-kilovolt (kV) underground collection system, a collector substation, an interconnect substation next to an existing Western Area Power Administration (Western) 230kV transmission line, and a fiber optic communication system connecting the interconnect substation to an existing communications tower. Babcock & Brown proposes to have the WSWP in commercial operation by November, 2008. The wind farm would be on approximately 3,560 acres of private land leased to Babcock & Brown. The interconnect substation and the fiber optic line would be owned and operated by Western.

ES.2 Environmental Review Process

Review of the potential environmental impacts associated with the proposed project is required by the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4332). Western is the lead Federal agency because it is responsible for entering into an interconnection agreement with Babcock & Brown that would allow access to the electric grid. The U.S. Fish and Wildlife Service (USFWS) is a cooperating Federal agency because it has acquired grassland and wetland easements on private land within the proposed project boundaries.

ES.3 Proposed Facilities

The Proposed Action would encompass approximately 3,560 acres of leased private land. Within the 3,560 acres, seven property owners have current lease agreements. The leased land would include 1,950 acres of land managed under USFWS grassland or wetland easements. Approximately 210 acres have only grassland easements, 840 acres have only wetland easements, and 900 have both grassland and wetland easements.

The WSWP would install and operate 34 General Electric (GE) 1.5sle three-bladed 1.5 MW wind turbines. The total height of each wind turbine would be 389 feet with a blade in the vertical position, and the hub height would be 262 feet. The tower would be a tubular conical steel structure approximately 15 feet in diameter at the base.

During construction, a work area/staging area at each turbine would include the crane pad and rotor assembly area. This area would measure about 180 feet by 185 feet.

It is anticipated that mat foundations (inverted-T foundations) would be used for the turbines. The area excavated for a turbine foundation would typically be no more than 70 feet by 70 feet. Pad-mounted transformers would be placed next to each turbine. In some cases, for step-and-touch voltage compliance, a 17-foot area around a turbine may have to be covered in 4 inches of gravel. The need for a gravel layer would be determined on a case-by-case basis for each turbine.

The wind farm's electrical system would have two key elements: 1) a collection system, which would collect energy from each wind turbine, and step it up to 34.5kV; and 2) a collector substation, which would step up the power from 34.5kV to 230kV. The underground collection system would be

placed in one trench or two parallel trenches that would generally follow the internal road network. The current design has a total trench length (including parallel trenches) of 85,616 feet (16.2 miles).

The collector substation would transform the electricity from 34.5kV to 230kV for transmission along the existing Fort Thompson-to-Sioux Falls 230kV transmission line. The proposed collector substation would be below the escarpment in the valley of Firesteel Creek. The fenced area would occupy up to 2 acres. Access to the collector substation would be provided by a new 30-foot-wide access road running north from 236th Street.

A new interconnect substation would provide the interconnection between the proposed wind farm and the 230kV transmission line. The substation would be designed, owned, and operated by Western. The interconnection substation would have a fenced area of about 9 acres.

The fiber optic line would run from the interconnect substation to an existing radio tower 4.2 miles to the north. It is proposed that the line would be buried, either in the trenches used for the underground collection system or within the rights-of-way of existing County and Township roads.

It is anticipated that the 5,000-square-foot O&M building would be at the southern edge of the project area near 236th Street and about 2,000 feet from the proposed collector and interconnect substations. However, the precise location of the O&M building has not been finalized.

Primary access to the wind project area would be along one or more of the existing gravel or paved County roads. Township and section-line roads that are required for access to the wind project would be upgraded and maintained by Babcock & Brown. In some cases, temporary construction at sharp corners might be necessary to accommodate the construction crane and trucks hauling turbine components. The route selected would depend in part on the results of environmental studies and the requirements of the hauling contractor.

Turbines and other wind farm facilities would be accessed by an internal network of 16-to-20-foot-wide graveled roads. Some existing private roads would be improved and some new roads would be built. An additional 7.5 to 9.5 feet of land on each side of these roads would be temporarily disturbed during construction, but this area would be restored and reseeded. The internal road network as currently proposed would be 65,441 feet (12.4 miles) long.

At an estimated seven locations, a 180-foot-diameter (0.6-acre) turnaround area would be needed for large trucks and trailers hauling turbine components. After construction, these areas would be restored and reseeded with native mix.

One permanent unguyed, 80-meter meteorological (MET) tower would be placed near the wind turbines to assess turbine performance.

ES.4 Alternatives to the Proposed Action

This EA evaluates one alternative to the Proposed Action in detail: the No Action Alternative. Other alternatives for wind energy development were considered and eliminated.

ES.5 Affected Environment and Environmental Consequences

The proposed wind farm would encompass approximately 3,560 acres in an area of rolling grassland known as the Wessington Hills. The wind farm would sit above an escarpment overlooking the valley of Firesteel Creek. With the exception of Wessington Springs, the surrounding area is entirely rural.

Land Use

Of the land within the WSWP boundary, 73 percent is grassland and 13 percent is used for cultivation. The remainder consists of wetlands and deciduous woodland. Cattle grazing is the predominant land use. No occupied residences exist with the proposed WSWP boundary, 16 occupied residences are within 1.5 mile, and 50 are within 4 miles.

There are no formal recreation areas within the wind farm boundaries and only a few in the general vicinity. Dispersed recreation in the wind farm area primarily includes hunting and wildlife viewing. Cady Lake Waterfowl Production Area (WPA), owned by the USFWS, would be 0.3 mile from the wind farm boundary.

Wind farm construction would alter approximately 129 acres (up to 42 acres permanently), interfering only a small degree with existing grazing operations. Areas temporarily disturbed (up to 94acres) would be restored to their original condition. Landowner-permitted hunting could continue during operation of the WSWP.

Of the 1,950 acres of land managed under USFWS grassland or wetland easements, about 20 acres would be permanently lost from wind farm development. Babcock & Brown would work with USFWS to identify how to mitigate this loss.

Transportation

South Dakota State Highway 34 (SD 34) is about 2.5 miles north of the WSWP area, and U.S. Highway 281 passes 6 miles east of Wessington Springs. Access to the WSWP area from SD 34 is along several existing paved and gravel County roads. Unpaved roads maintained by Townships provide access to parts of the project area.

It is estimated that during construction, each wind turbine generator would require 10 to 11 truck shipments of components, some of which could be oversized or overweight. Some County and Township roads may need to be modified to ensure safe movement of these vehicles. During operations, sites may be attended during business hours by a small maintenance crew of about three individuals. Transportation activities would be limited to a small number of daily trips.

No rail facility crosses the WSWP area.

Airports identified in the vicinity of the WSWP include Wessington Springs Airport, 2.4 miles to the northeast, and the Huron Regional Airport, 28 miles northeast of the project area.

A Military Training Route (MTR) (VR 510) passes over the WSWP area. This MTR is controlled by the 114th Wing of the South Dakota Air National Guard (SDANG) in Sioux Falls. It has a floor of 100 feet above ground level (AGL). A Class E Federal airway, V 120, passes about 1 mile south of the wind project area. The floor of this airway is 1,200 feet AGL.

The Federal Aviation Administration (FAA) has issued a Determination of No Hazard to Air Navigation for the proposed wind turbines. The South Dakota Aeronautics Commission has issued a single Aeronautical Hazard Permit for the 34 proposed turbines. According to the Airspace Manager of the 114th Wing, raising the floor of VR 510 near Wessington Springs to 500 feet AGL would likely not be a problem. The Proposed Action would not interfere with aircraft operations in V 120, the Class E Federal airway.

Visual Resources

Three landscape character types were identified within 10 miles of the WSWP: Eastern Agricultural Plains (dominated by agricultural lands, rolling hills and natural grasslands with cattle); Western Wessington Hills Rangeland (characterized by dissected rolling hills dominated by natural grassland), and Rural Townscape (Wessington Springs and Lane). Most of the project area has common Scenic Quality/Visual Integrity, and a few locations have above average Scenic Quality/Visual Integrity.

Viewpoints in the study area include some of the 50 occupied residences within 4 miles, several locations along U.S. 281 and SD 34, a scenic overview next to Wessington Springs, a few local parks in Wessington Springs and Lane, and several South Dakota Department of Game, Fish, and Parks (SDGFP) Game Production Areas. These viewpoints have moderate to high visual sensitivity.

Visual impacts of the WSWP would result from: 1) turbines, because of structure dominance, reflected light and glare, FAA-required lighting, and overlapping blade rotation; 2) crane pads, access roads, collector and interconnect substation sites, and the O&M building; 3) trenching for the underground collection system; 4) the temporary presence of construction equipment and vehicles; and 5) soil exposure and dust.

The Proposed Action would have visual impacts to some nearby residences, some travelers along SD34, and some recreational users. Mitigation measures would reduce these impacts to acceptable levels.

Socioeconomics and Public Services

The Wessington Springs area is rural, with an economy focused on agriculture, ranching, and recreation.

Construction of the wind farm would likely begin in spring 2008 and would be completed in 8 to 10 months. An average of about 40 FTE workers is expected to be involved. Peak employment is expected to be 70 employees for about one month. It is assumed that half the labor force would be hired locally. When construction is completed in late 2008, operation and maintenance would begin, requiring five permanent employees, including one manager and four technicians.

All of the WSWP except for the interconnect substation would be located on private land leased by Babcock & Brown. Leasing of private land would provide additional income to seven property owners with current lease agreements.

Wind turbines are taxed as property on a leased site; land values would not be affected for tax purposes. The wind turbine generators and ancillary buildings would be subject to property tax, with the payment made by Babcock & Brown.

All local service providers (e.g., medical services, education, public safety, utilities) have indicated that they would be able to accommodate the construction and operation and maintenance phases of the WSWP.

Environmental Justice

According to poverty statistics for 2000, 12.7 percent of the total South Dakota population was low-income, 20.2 percent of the population of Jerauld County was low-income, and about 3.4 percent of Wessington Springs' population was low-income. Also, census data indicate that about 1 percent of the population of Jerauld County is minority, of which most individuals are American Indian.

No minority or low-income populations would be disproportionately affected from construction or operation of the WSWP.

Biological Resources

The project area contains rolling hills intermixed with wetlands, mixed-grass prairie, patches of deciduous trees, and cropland. Mixed short and tall grasses occur primarily on the rolling hills throughout the central and eastern portion of the WSWP and comprise 70 percent of the project area. The escarpment runs north-south along the eastern edge of the proposed project area and provides approximately 100 feet of relief. Drainages along the escarpment are populated with deciduous woodland comprising 7 percent of the project area. Wetlands make up 7 percent of the project area and are found primarily in the central and western portions of the WSWP. Cultivated fields are generally located along the western boundary and comprise 13 percent of the project area. Additional fields can be found along the eastern edge below the escarpment. Cattle grazing is found throughout the project area.

South Dakota has 27 invasive species designated by administrative rules, nine of which are documented in Jerauld County. The distribution of invasive species within the project area is unknown at this time.

Mammals occurring in the project vicinity include game species, such as white-trailed deer, mule deer, and pronghorn; rabbits; shrews; voles; mice; and gophers. There are 12 species of bats documented in South Dakota, seven of which have the potential to occur in the project area. Bat call surveys in summer and fall 2007 recorded six of these species, but the number of recorded calls was very low.

Avian surveys were conducted in 2007. Fixed point count migratory bird surveys were conducted in March and April 2007. Transect surveys for breeding birds were conducted in May, June, and July 2007. Collectively, a total of 5,162 birds representing over 60 species were recorded. During fixed point surveys, the most frequently observed species were snow geese, sandhill cranes, and mallards. Red-tailed hawks and northern harriers were the most abundant raptors observed. Several groups of sandhill cranes were observed. The most common species observed during transect surveys were bobolink, blue-winged teal, red-winged blackbird, western meadowlark, and grasshopper sparrow. Red-tailed hawks and great-horned owls were the most abundant raptors.

Federal special status species with potential to occur in the project area include the whooping crane and the bald eagle. The bald eagle was delisted as an endangered species in August 2007. State species of concern that are known to occur or may occur in the WSWP area include greater prairie chicken, sharp-tailed grouse, Le Conte's sparrow, chestnut-collared longspur, American bittern, northern harrier, upland sandpiper, marbled godwit, Wilson's phalarope, grasshopper sparrow, western meadowlark, and regal fritillary butterfly.

Construction activities could affect avian species through mortality, habitat alteration or loss, and disturbance. The potential for mortality is associated with destruction of eggs or abandonment of active nests due to disturbance.

Operation and maintenance of the wind farm could affect avian species through direct mortality, disturbance and displacement, and habitat fragmentation. Based on data from other wind energy projects, the 34 turbines of the WSWP could result in an estimated annual mortality of 62 to 74 passerines and 1 raptor. Using data from other wind farms, 34 turbines could result in an estimated annual mortality of 46 bats from collisions. However, the results of the bat call survey suggest that bat density in the WSWP area may be lower than at other wind farms.

The Proposed Action would result in the permanent loss of about 33 acres of grassland, 5 acres of deciduous woodland, and probably 0 acres of wetlands. For State species of concern, the wind farm would reduce habitat for wetland and grassland birds and for regal fritillary butterflies.

Given the location of the proposed WSWP within the whooping crane migratory corridor, documented occurrence of whooping cranes in neighboring counties (but not in Jerauld County), and the presence of roosting and foraging habitat in the project area, the proposed wind farm could result in impacts to the whooping crane. The USFWS is completing a Biological Opinion (BO) addressing impacts to the whooping crane and possible minimization measures.

Traffic, noise, and human presence during construction and maintenance of the wind farm could displace individual foraging bald eagles, but the proposed wind farm is not likely to result in bald eagle mortality.

Water Resources and Wetlands

The WSWP area is located within the Firesteel Creek watershed, which drains to the James River. The National Wetlands Inventory (NWI) identifies one lacustrine wetland onsite that is 32 acres in size. Palustrine wetlands are more common in the project area and cover 199 acres.

During geotechnical drilling, groundwater was predominantly encountered between 25 to 30 feet below grade; however, groundwater was encountered 12 to 15 feet below grade in 20 percent of the boreholes. Groundwater was encountered as shallow as 4 feet below grade east of the escarpment.

WSWP components have been laid out to avoid jurisdictional wetlands. A delineation was performed of 19 small wetlands and possible wetlands crossed by proposed roads. The Corps of Engineers (COE) reviewed the results of the delineation and determined that none of the wetlands that would be affected by the Proposed Action were jurisdictional.

Construction of the turbines, roads, underground collection system, and other components of the WSWP would disturb more than one acre and would require coverage under a General Permit for Storm Water Discharges and development of a Storm Water Pollution Prevention Plan (SWPPP). Babcock & Brown would implement erosion and sediment controls throughout construction, including stabilization measures for disturbed areas and structural controls to divert runoff and remove sediment. Implementation of best management practices (BMPs) would minimize impacts to receiving waters.

During operations and maintenance, some oil would be stored at the O&M building during periodic maintenance of the turbines. However, the amount stored on-site would be phased, and aggregate storage capacity would remain below the legal threshold of 1,320 gallons. Therefore, a Spill Prevention Control and Countermeasure (SPCC) plan would not be necessary.

Geology

The WSWP site is along the eastern edge of the Coteau du Missouri division of the Great Plains physiographic province. The dominant geologic feature is the escarpment, known locally as the Wessington Hills, forming the edge of the Coteau du Missouri.

During geotechnical drilling, all boreholes were drilled to 50 feet. In no case did a borehole above the escarpment extend below glacial till. Below the escarpment near the proposed interconnect substation site, a 50-foot borehole did not extend beneath colluvium or alluvium that had been derived from glacial till.

The most significant direct impact to geologic resources would possibly be large-scale erosion brought on by slope failure. This impact is not likely for the WSWP because onsite geotechnical surveys have been performed, and a preliminary layout of the turbines, internal road network, and underground collection system has been developed by project engineers with access to the geotechnical data.

The WSWP site is not considered susceptible to liquefaction

Soils

Within the boundaries of the WSWP, soil associations in order of abundance are the Ethan-Betts Association, Ethan-Houdek-Eakin Association, and Beadle-Dudley Association.

Soil resource impacts would be minimized by the implementation of erosion and sediment control BMPs as part of the SWPPP required for projects disturbing more than one acre. Various measures are proposed to avoid or minimize impacts as part of the WSWP design, such as revegetation of all areas of temporary disturbance using an approved native seed mix.

Paleontology

Important fossils have been found in Tertiary deposits west of Wessington Springs. However, glacial deposits, such as those in the WSWP area, are generally unlikely to contain fossils. Geotechnical drilling in the WSWP area indicated that none of the project components would extend below glacial till. Also, a reconnaissance along the escarpment forming the eastern boundary of the proposed wind farm identified few exposures, all of which revealed only glacial deposits.

Cultural Resources

Cultural resource surveys of portions of the WSWP area were performed in spring 2007. Approximately 475 acres were inventoried. Monitoring of geotechnical drilling by archaeologists was performed in summer 2007. A total of 13 cultural resources were identified. All are archaeological sites; none have been evaluated for National Register of Historic Places (NRHP) eligibility because they would all be avoided. The remainder of the Area of Potential Effect (APE) would be inventoried for cultural resources prior to construction. The additional inventory would include buildings within 1 mile of the WSWP.

In August 2007, a meeting was held at the WSWP site at the request of representatives of the Lower Sioux Indian Community, Santee Sioux Nation, Sisseton-Wahpeton Oyate, and Fort Peck Tribes to discuss cultural resources in and near the project area. Western's Section 106 consultation process with Native American groups will continue.

Avoidance has been and would continue to be the preferred option for the protection of NRHP-eligible cultural resources. If avoidance is not feasible, other measures, including data recovery, may mitigate impacts.

Health and Safety

There are few existing hazards at the WSWP site. Ranching, farming, and hunting are the primary activities in the area; there are few residences nearby; and there are no industrial uses. Fire is the primary existing health and safety risk, because much of the WSWP area is rangeland.

Emergency service providers in Wessington Springs and Jerauld County would have the capacity to provide service to the WSWP. Because all land within the WSWP boundary is privately owned,

public access can be restricted. With limited public access and with design guidelines and appropriate safety measures during construction, operation, and maintenance, there would be few risks to human health and safety.

Noise

No background noise measurements have been made in the WSWP area, but measurements from other locations suggest that the background noise levels could typically range from 38 to 48 dB(A). Noise levels generated by farm machinery, wildlife, and the wind can sometimes reach 55 dB(A). Few roads cross the project area and these have relatively little traffic.

There are no noise sensitive receptors (e.g., residences, schools, hospitals, or offices) within the proposed project boundaries, although occupied residences are located within 0.25 mile of the wind farm. The nearest schools and hospitals are in Wessington Springs, more than 2 miles from the proposed wind project.

Construction at the wind farm would occur in an 8-to-10-month period. Construction activities would be intermittent and would occur during normal day-time working hours. Construction noise would be within acceptable Occupational Safety and Health Administration (OSHA) standards. Also, based on the typical attenuation of sound over distance, construction noise would be reduced to acceptable levels 1,000 to 2,500 feet from the construction equipment.

During operations, the noise level at the base of each turbine would be about 55dB. The noise level at the nearest occupied residence would be about 40dB, equivalent to typical background noise levels in a rural environment.

Air Quality

The WSWP area is rural, and there are few residences within 1 mile of the proposed wind farm. Because there are no industrial activities in the vicinity, agriculture and vehicles using unpaved roads in the WSWP area may be the primary sources of fugitive dust. In the proposed wind farm area, farm and ranching equipment may contribute to priority pollutants.

All of South Dakota is currently in attainment for all criteria pollutants

Construction of the WSWP would create dust from vehicles, road construction, clearing and removal of vegetation, equipment laydown, grading, and trenching. Construction equipment and vehicles would create vehicle exhaust. A concrete batch plant would create particulates, and on-site diesel generators for the batch plant would add to priority pollutants. Construction equipment would be required for up to 10 months, but the total number of pieces of equipment present at the construction site on a given day would be less. Emissions from construction would be confined to day-time activity for the duration of the construction period.

Because the WSWP area is rural, there are no requirements for fugitive dust control other than taking standard and reasonable precautions and implementing proper dust control measures to ensure opacity limits are not exceeded. Based on EPA guidance, approximate emission factors are estimated at 1.2 tons/acre/month for total suspended particulate (TSP) concentrations from construction activities scattered throughout an area. Dust emissions would be lower. Implementation of BMPs and other measures (e.g., water spraying, revegetation) would reduce fugitive dust.

A wind farm is not considered a combustion source, and wind turbines do not produce direct emissions.

Cumulative Impacts

There are few past, present, and reasonably foreseeable future actions within the Wessington Springs area or in Jerauld County. Possible projects in Jerauld County that have been identified include: possible future wind energy development by Babcock & Brown, a possible future wind energy development by Clipper Windpower, a transmission line being proposed as part of the NextGen coal energy facility, and a few small local projects developed recently. Environmental data are not available for any of these possible projects, but it is anticipated that cumulative impacts could include: conversion of rural lands in Jerauld County to commercial utility-related uses; an increase in the number of tall man-made structures in a rural landscape; increased employment in the county; loss of native grassland; wildlife habitat fragmentation; wildlife disturbance and displacement; increases in avian and bat mortality from collisions with tall structures; and adverse impacts to special status species, such as the whooping crane.

Mitigation Measures

Committed mitigation measures are presented in Appendix A. Based on commitments adopted in the Decision Notice, Western would issue a Mitigation Action Plan (MAP) concerning the WSWP.

CHAPTER 1 PURPOSE AND NEED

1.1 Introduction

Babcock & Brown Renewable Holdings, Inc. (Babcock & Brown) proposes to construct, operate and maintain a wind turbine electrical generation facility in south-central Jerauld County, South Dakota. The proposed wind farm and ancillary facilities would be 2 miles south of the city of Wessington Springs (Figure 1.1-1). The Wessington Springs Wind Project (WSWP), as proposed, would consist of a 51 megawatt (MW) wind energy development with 34 General Electric (GE) wind turbine generators of 1.5MW each, new and improved roads, an operations and maintenance (O&M) building, a 34.5 kilovolt (kV) underground collection system, a collector substation, and an interconnect substation next to an existing Western Area Power Administration (Western) 230kV transmission line. Babcock & Brown proposes to have the WSWP in commercial operation by November 2008. The wind farm would be on approximately 3,560 acres of private land leased to Babcock & Brown. The interconnect substation would be owned by Western, as would a fiber optic line connecting the interconnect substation to an existing communications tower.

Review of the potential environmental impacts associated with the proposed project is required by the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4332). This environmental assessment (EA) addresses the potential impacts of the proposal and No Action Alternative and is a stand-alone environmental review document. Western is the lead Federal agency because it is responsible for entering into an interconnection agreement with Babcock & Brown that would allow access to the electric grid. The U.S. Fish and Wildlife Service (USFWS) is a cooperating Federal agency because it has acquired grassland and wetland easements on private land within the project boundaries.

Babcock & Brown is currently monitoring and testing the wind resource in the project area. Two temporary meteorological (MET) towers that measure wind speed, wind direction, and other variables are located in the project area, both on private land. NEPA compliance was not required prior to the installation of the two MET towers.

1.2 Purpose and Need of the Proposed Action

1.2.1 Purpose and Need for Action by Western

Western is a Federal power-marketing agency in the Department of Energy (DOE) that sells and delivers Federal electric power to municipalities, public utilities, Federal and state agencies, and Native American tribes in 15 western and central states. The proposed WSWP would be located within Western's Upper Great Plains Region, which operates and maintains nearly 90 substations and more than 8,000 miles of Federal transmission lines in Minnesota, South Dakota, North Dakota, Montana, Nebraska, and Iowa.

Western offers capacity on its transmission system to deliver electricity when such capacity is available under Western's Open Access Transmission Tariff (Tariff). The Tariff has been approved by the Federal Energy Regulatory Commission as being consistent with the Commission's Final Order Nos. 888, 888A, 888B, and 888C, which are intended to ensure non-discriminatory transmission system access.

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North Dakota
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Montana
Bismarck
Fargo
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29
Missouri River
South Dakota
Wind Project Vicinity
Pierre
Wessington Springs
Rapid City
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Sioux Falls
Wyoming
Sioux City
Iowa
Nebraska
Council Bluffs
Omaha
80
Lincoln
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76
Colorado
Kansas
70
Wessington Springs Wind Project
Location
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BABCOCK & BROWN
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Western has received a Generation Interconnection Request from Babcock & Brown to connect the proposed WSWP to Western's existing Ft. Thompson–to–Sioux Falls 230kV transmission line. The interconnection with Western's transmission line would require modification to the existing Western facility, including the construction of a new Western interconnect substation. According to DOE's NEPA Implementing Procedures (10 CFR Part 1021), this action requires environmental review.

In responding to the need for agency action, Western must abide by the following:

- **Addressing Interconnection Requests.** Western's *General Guidelines for Interconnection* establishes a process for addressing applications for interconnection. The process dictates that Western respond to the applications as presented.

- **Protecting Transmission System Reliability and Service to Existing Customers.** Western's purpose and need is to ensure that existing reliability and service is not degraded. Western's *General Guidelines for Interconnection* provides for transmission and system studies to ensure that system reliability and service to existing customers is not adversely affected. If the existing power system cannot accommodate the applicant's request without modifications or upgrades, the applicant may be responsible for funding the necessary work unless the changes would provide overall system benefits.

- **Consideration of the Applicant's Objectives.** Because the statement of Purpose and Need affects the extent to which alternatives are considered reasonable, it is important to understand both Western's Purpose and Need and that of the applicant.

More information about these requirements is available on Western's web site at www.wapa.gov.

1.2.2 Purpose and Need for Action by USFWS

The USFWS is the Federal agency whose primary responsibility is working with others to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. The proposed WSWP would be located within the administrative boundaries of the USFWS's Huron Wetland Management District (WMD). The Huron WMD is responsible for administering and managing the lands on which the Service has acquired a property interest and for addressing potential impacts to USFWS interests within the proposed project area.

The 3,560 acres of leased private land within the proposed wind farm include 1,950 acres of land managed under USFWS grassland or wetland easements. These conservation easements are a minimally restrictive instrument that grants the USFWS the ability to protect grassland and wetland habitat on the properties where these easements are recorded. Easements are administered as part of the National Wildlife Refuge System. Easements are acquired as an alternative to fee-title acquisition and are intended to perpetually protect grasslands and wetlands to benefit migratory birds and other wildlife. Potential long-term impacts to wildlife and habitat resources can be significant without careful review of proposed actions and consideration of reasonable alternatives. Project proponents need to carefully consider how to reduce negative wildlife impacts through the review process.

1.2.3 Applicant's Purpose and Need

Babcock & Brown's purpose for the WSWP is to use wind energy to operate a new renewable electrical generation facility that would help meet growing demands for electricity in the United States.

Recent national and regional electrical demand forecasts predict that the growing consumption of electrical energy will continue to increase into the foreseeable future and will require development of new resources to satisfy this demand. The DOE Energy Information Administration (EIA) is forecasting 41 percent growth in electricity sales by 2030 (EIA 2007), including a projected increase of 39 percent in the residential sector, 63 percent in the commercial sector, and 17 percent in the industrial sector. This growth will require an increase in generating capacity of 347 gigawatts (347,000MW) nationwide over the next 25 years.

On August 8, 2005, the President signed into law the Energy Policy Act of 2005 (Public Law [PL] 109-58). This law establishes a National Energy Policy that promotes alternative and renewable energy sources, including wind energy. The law also extends the wind energy Production Tax Credit (PTC), which is used to finance new wind farms. The PTC is scheduled to expire on December 31, 2008.

Deregulation of the electric industry and current energy supply issues have emphasized the need for new and diverse energy sources in the region.

South Dakota has some of the best wind resource in the nation, but has little operational wind power generation due to limited local demand and transmission constraints that limit access to other energy markets. South Dakota ranks fourth in the nation in wind energy potential (American Wind Energy Association [AWEA] 2007), yet there are currently only 44MW of installed capacity and 140MW under construction, much less than in most neighboring states (Table 1.2-1).

Table 1.2-1 Wind Energy Installed Capacity in South Dakota and Neighboring States[1]

State	Wind Energy (MW)
South Dakota	44
North Dakota	178
Minnesota	897
Iowa	967
Nebraska	73
Wyoming	288
Montana	146

[1]As of September 30, 2007
Source: AWEA 2007

A renewable portfolio standard (RPS) is a State policy that requires electricity providers to obtain a minimum percentage of their power from renewable energy resources by a certain date. As of 2007, 20 states plus the District of Columbia had RPS policies in place (AWEA n.d.). The State of South Dakota does not have an RPS, but the State recognizes the importance of renewable energy.

The purchaser for the electricity generated by the WSWP would be Heartland Consumers Power District (Heartland) of Madison, South Dakota. Heartland has entered into a Renewable Energy Purchase Agreement with Babcock & Brown under which it would purchase all of the renewable

energy produced by the WSWP. In addition, on May 23, 2007, Heartland and the State of South Dakota signed an updated Memorandum of Understanding (MOU) in which Heartland agreed to meet the energy demand of South Dakota State University (SDSU) and the University of South Dakota (USD) that exceeds the universities' power allocation from Western. The MOU also states that the power will come from South Dakota-based wind industry.

Babcock & Brown believes that the benefits of wind energy in general and of the proposed WSWP in particular would include the following:

- Wind energy is an inexhaustible and infinitely renewable energy source that will be available for future generations.
- Wind energy is economically competitive with today's rising coal and natural gas prices.
- Use of wind energy can reduce demand for other energy sources.
- Wind energy is a domestic resource.
- Wind energy is considered a reliable energy resource. There is a need to maintain spinning and regulating reserves, the unused capacity required to meet a rapid increase in electricity demand. Wind energy is non-firm because the wind does not blow 100 percent of the time and because wind farms cannot increase electricity output on demand. However, the electric grid is designed to have more generation sources than are needed at one time because no power plant is 100 percent reliable. The grid operator matches electricity generation to electricity use, and wind energy's variability is just one more variable in the mix.
- Wind energy produces no air pollutants or greenhouse gases.
- Wind energy is a source of revenue for property owners leasing land to wind developers, local residents hired for construction and maintenance jobs, and governments receiving tax payments from wind developers.

The proposed WSWP will provide a source of clean, renewable power and will offset energy that would otherwise be produced using other forms of power generation, such as coal-fired power plants. Table 1.2-2 summarizes estimated benefits and emission offsets from 51MW of wind energy.

1.3 Relationship to Federal, State and Local Policies, Plans and Programs

1.3.1 Transmission Interconnection

Under the 1998 Notice of Final Open Access Transmission Service Tariff and Section 211 of the Federal Power Act, Western provides transmission system interconnection access to new generation projects (see Section 1.2.1). The proposed wind farm would interconnect with Western's Fort Thompson-to-Sioux Falls 230kV transmission line, which crosses the southernmost part of the proposed wind farm. Babcock & Brown filed an interconnection request with Western proposing interconnection with the 230kV line in March 2006. A draft System Impact Study was completed by Western in August 2007 and will be finalized by the end of 2007. The System Impact Study evaluates the capability of the transmission system to support the requested interconnection of the wind farm. The new transmission interconnection facilities located at the project site that would connect the WSWP to the transmission system are addressed in this EA. If the final System Impact Study determines that additional upgrades or new facilities at other locations in the Western transmission system are required, Western would ensure that these enhancements are appropriately reviewed for environmental impacts under NEPA. In November 2007, Western completed a draft Facilities Study for the proposed interconnect substation, known as the Wessington Springs Switchyard, which

Table 1.2-2 Estimated Benefits and Emissions Offsets, 51MW of Wind Power[1]

Power Equivalence	
Households Powered per Year[2]	17,498 homes/year
Emissions Offsets[3]	
Compared to Electric Generation from Coal	
CO_2	230,085 tons/year
CO_2 Emission Equivalent	36,814 cars and trucks/year
SO_2	1,092 tons/year
NO_x	360 tons/year
Compared to Electric Generation from Petroleum	
CO_2	219,031 tons/year
CO_2 Emission Equivalent	35,045 cars and trucks/year
SO_2	1,110 tons/year
NO_x	418 tons/year
Compared to Electric Generation from Natural Gas	
CO_2	116,627 tons/year
CO_2 Emission Equivalent	18,660 cars and trucks/year
SO_2	0.63 tons/year
NO_x	117 tons/year

[1]Assumes monthly electric usage of 1,000 kilowatt hours (kWh) per household.
[2]Assumes annual net generation and an equivalent amount of power from fossil fuel generation (Source: Energy Information Administration [www.eia.doe.gov)])
[3]Assumes 0.16 passenger cars and light trucks produce 1 ton of CO_2 per year (Source: US Climate Technology Gateway)

determined the requirements that would be necessary to maintain safe and reliable interconnection with the power system. This may require supplemental review or a separate environmental document.

1.3.2 Easements

The 3,560 acres of leased private land within the proposed wind farm include 1,950 acres of land managed under USFWS grassland or wetland easements. Of this total, 840 acres have wetland easements only, 210 acres have grassland easements only, and 900 acres have both grassland and wetland easements. Forty acres nearby (part of Cady Lake) are owned by the USFWS, but this tract falls outside the project boundaries. Because of the easements, the USFWS has decided to be a cooperating Federal agency for this EA (see Section 1.2.2).

Any impacts to the tracts of land protected by USFWS easement will be evaluated under the terms of the National Wildlife Refuge Administration Act. At the present time, several options for addressing impacts are being pursued through ongoing consultations between Babcock & Brown and the USFWS Huron WMD. Once a final course of action is chosen by the USFWS, all impacts will be addressed.

1.3.3 Other Plans and Procedures

The USFWS has developed interim guidelines to assist the wind industry in avoiding or minimizing impacts on wildlife by wind energy development (USFWS 2003). Babcock & Brown has worked with USFWS staff to identify measures to avoid or minimize impacts.

An electrical generating facility greater than 100MW must obtain siting approval under the South Dakota Energy Facility Permit Act (Administrative Rules of South Dakota [ARSD] 20:10:22, Energy Facility Siting Rules). Because the WSWP would generate 51MW, a State permit is not required.

There are no state environmental regulations that directly apply to the siting of wind turbines. The South Dakota Bat Working Group (SDBWG), in cooperation with the South Dakota Department of Game, Fish, and Parks (SDGFP), has issued Siting Guidelines for Wind Power Projects in South Dakota (SDBWG and SDGFP n.d.). While these guidelines are neither mandates nor regulations, Babcock & Brown has worked to site turbines to avoid or minimize impacts on wildlife, consistent with the siting guidelines.

The WSWP would be consistent with and supported by goals and objectives set forth in the Jerauld County Comprehensive Plan (Jerauld County 1998). In addition, the Jerauld County Zoning Ordinance, adopted in 1998 and rewritten in 2005, states that among the conditional uses that the County's Board of Adjustment may permit in Agricultural Districts are, "utility substations, television, radio, telephone relay stations, towers, water towers, and wind generators (Jerauld County 2005)." A conditional use permit (CUP) from Jerauld County would be required for the WSWP.

1.4 Authorizations, Permits, Reviews and Approvals

The WSWP would conform to all relevant Federal, State and local statutes and regulations. Table 1.4-1 lists the anticipated authorizations, permits, reviews, and approvals.

1.5 Scoping Process

Western initiated the NEPA scoping process in April 2007 and invited public and agency comment on the issues that should be addressed in the environmental analysis and review process. The scoping process began with the development of a mailing list of Federal, State, and local agencies; landowners; Native American tribes; non-governmental organizations; environmental groups; and other interested parties.

The WSWP scoping period was for 44 days from April 17, 2007, to May 31, 2007. More than 93 letters, each with an attached comment form, fact sheet, and project area map, were mailed on April 17, 2007, one month prior to the public scoping meeting. The letter and fact sheet provided information about the WSWP; announced the time and location of the public scoping meeting; and invited the public, agencies and interest groups to provide information and guidance, suggest issues that should be examined and express their concerns.

Western held one public scoping meeting in Wessington Springs the evening of May 17, 2007. Western issued a news release on May 8, 2007, to several newspapers and local radio stations to announce the meeting. Copies of the fact sheet, comment form and project area map were available at the meeting. The scoping meeting was held in the 4-H Agricultural Building in Wessington Springs with 45 individuals attending. The meeting was held in an open house format with several stations (i.e., tables and displays) providing information about the WSWP, the NEPA process, and other topics. The information was presented by representatives from Western, Babcock & Brown, Heartland, and POWER Engineers. All of the representatives were available to discuss the project,

answer questions, and take comments. Comment forms were available for written comments; verbal comments received during the meeting were recorded on flip charts and posted during the meeting.

Topics mentioned in written comments included:

- Birds and wildlife
- Cultural resources
- Water quality, including discharge of fill into waters of the U.S.
- Soils
- Aircraft safety and structures over 200 feet tall
- Whether electricity from the wind project would be used in South Dakota.
- Effects on tax revenues and property values.

Written comments are summarized in Table 5.2-1, and additional information about the scoping process is presented in Chapter 5 of this EA.

Table 1.4-1 Authorizations, Permits, Reviews, and Approvals

Action	Permit/Approval	Accepting Authority/ Approving Agency	Statutory Reference
FEDERAL			
Western Interconnection Agreement	Environmental Assessment (EA)	Western	National Environmental Policy Act (NEPA), 40 CFR Part 1500 et seq., 43 CFR Part 2800; Department of Energy (DOE) NEPA Implementing Regulations, 10 CFR 1021
Interconnection by Western	Biological Opinion (BO)	USFWS	Endangered Species Act (ESA), Section 7
Interconnection by Western	Compliance with Section 106 of the National Historic Preservation Act (NHPA)	Western, USFWS, South Dakota State Historic Preservation Office (SHPO)	National Historic Preservation Act (NHPA) of 1966; 36 CFR Part 800; 16 USC 47
Wind turbine location and height relative to migratory birds		USFWS	Migratory Bird Treaty Act (MBTA) (16 USC 703-712); Executive Order (E.O.) 13186, Responsibilities of Federal Agencies to Protect Migratory Birds
Wind turbine location and height relative to air traffic corridors	Notice of Proposed Construction or Alteration (FAA Form 7460-1)	Federal Aviation Administration (FAA)	49 USC 1501; 13 CFR 77, Objects Affecting Navigable Airspace
Development in a floodplain or new construction in a wetland	Floodplain or Wetland Assessment and Statement of Findings; Adoption of the EA	Western	10 CFR Part 1022, Compliance with Floodplain and Wetland Environment Review Requirements
Exemptions to grassland and wetland easement restrictions	Environmental Assessment (EA)	USFWS	National Environmental Policy Act (NEPA), 40 CFR Part 1500 et seq., 43 CFR Part 2800

Table 1.4-1 Authorizations, Permits, Reviews, and Approvals (Continued)

Action	Permit/Approval	Accepting Authority/ Approving Agency	Statutory Reference
FEDERAL			
Fill in waters of the U.S. and wetlands	Clean Water Act (CWA)	U.S. Army Corps of Engineers (COE)	Clean Water Act (CWA), Section 404; 33 CFR Parts 320-330
Construction on grassland easements	Permit issued under 16 USC Section 668dd (d)(1)	USFWS	National Wildlife Refuge Administration Act. (16 USC Section 668dd), as amended.

Table 1.4-1 Authorizations, Permits, Reviews, and Approvals (Continued)

Action	Permit/Approval	Accepting Authority/Approving Agency	Statutory Reference
STATE OF SOUTH DAKOTA			
Review of potential adverse water quality impacts associated with discharges of dredged or fill materials in wetlands and other waters of the U.S.	Section 401, Water Quality Certification	South Dakota Department of Environment and Natural Resources (DENR)	Section 401 of the CWA
Storm water discharges to surface waters of the state associated with construction activities	General Permit for Storm Water Discharges from Construction Activities	South Dakota DENR	South Dakota Water Pollution Control Act (ARSD 74:52:01 through 74:52:11)
Consult with project applicants and state agencies regarding impacts on cultural resources that are listed in the National Register of Historic Places (NRHP) or the State Register of Historic Places	Compliance with Section 106 of the NHPA	South Dakota SHPO	Preservation of Historic Property (SDCL 1-19A-11.1); Standards for Case Report (ARSD 24:52:07"03)
Reduction of fugitive dust at construction site	General Application, Title V (Part 70) Operating Permit	South Dakota DENR	Clean Air Act (CAA); ARSD 34 A-1, Air Pollution Control; SDCL 74:36, Air Pollution Control Program
Transportation of turbine components along State Highway 34	Large Load Transport Permit, Single Trip Permit	South Dakota Highway Patrol	SDCL 32-22, Weight, Size, and Load Restrictions
Tower location and height relative to air traffic corridors	Permit issued following review of Application for Location of Aeronautical Hazard (SD EForm-0941 VI	South Dakota Aeronautics Commission	SDCL 50-9-7, Permit for erection exceeding 200 feet in height required

Table 1.4-1 Authorizations, Permits, Reviews, and Approvals (Continued)

Action	Permit/Approval	Accepting Authority/Approving Agency	Statutory Reference
JERAULD COUNTY			
Modifications to existing County and Township roads.		Jerauld County Commissioners; Jerauld County Highway Superintendent; Township Boards of Supervisors for Anina, Viola, Media, and Wessington Springs Townships	SDCL 31-12-01 through 31-12-47, County Highway Systems; SDCL 31-13-01 through 31-13-58, Township Roads
Construction of wind turbines on land zoned for agricultural use	Conditional Use Permit (CUP)	Jerauld County	Jerauld County Zoning Ordinance

CHAPTER 2 PROPOSED ACTION AND ALTERNATIVES

2.1 Introduction

The following sections are included in this chapter:

- Descriptions of the Proposed Action and the No Action Alternative (Section 2.2).
- The process used to evaluate alternative wind farm technologies, locations, and configurations (Section 2.3).
- A comparison of alternatives (Section 2.4).
- A brief description of Western's mitigation requirements (Section 2.5).

2.2 Alternatives Analyzed in Detail

This EA evaluates two project alternatives in detail. These are the Proposed Action (Section 2.2.1) and the No Action Alternative (Section 2.2.2).

2.2.1 Proposed Action

The Proposed Action, known as the Wessington Springs Wind Project (WSWP), would consist of the construction, operation, maintenance, and decommissioning of a 51MW wind energy development with 34 wind turbines of 1.5MW each, primary access roads, an internal road network, a new MET tower, an O&M building, a 34.5kV underground collection system, a collector substation, an interconnect substation, a fiber optic communication system, and interconnection with Western's existing Fort Thompson-to-Sioux Falls 230kV transmission line. Most project components would be built on private land leased to Babcock & Brown (Figure 2.2-1); the interconnect substation and the fiber optic line would be owned and operated by Western. Various aspects of the proposed wind energy development are described below.

Babcock & Brown previously proposed that a 99MW wind project be built in two phases on 6,000 acres of leased land in the Wessington Springs area (see Section 2.3.3.1). This proposal would have been constructed in two phases. Phase I would have had 34 turbines; Phase II would have had 32 turbines. Babcock & Brown decided to downsize the wind project proposal by eliminating 32 turbines on about 3,200 acres of land because of the magnitude of potential impacts on waterfowl and other wildlife. The Proposed Action would be similar in size and location to Phase I of the 99MW proposal.

2.2.1.1 Project Boundaries

The Proposed Action encompasses approximately 3,560 acres of private land leased by Babcock & Brown in the Wessington Springs area. The exact amount of land leased for the duration of the Proposed Action would depend on the final design of the wind farm and associated components. The currently proposed boundaries are illustrated in Figure 2.2-1. Within the 3,560-acre Proposed Action, seven property owners have current lease agreements.

The nearly 3,560 acres of leased land within the proposed wind farm include 1,950 acres of land managed under USFWS grassland or wetland easements. Approximately 210 acres have only grassland easements, 840 acres have only wetland easements, and 900 acres have both grassland and wetland easements (Figure 2.2-2). Forty acres nearby (including part of Cady Lake) are owned by the

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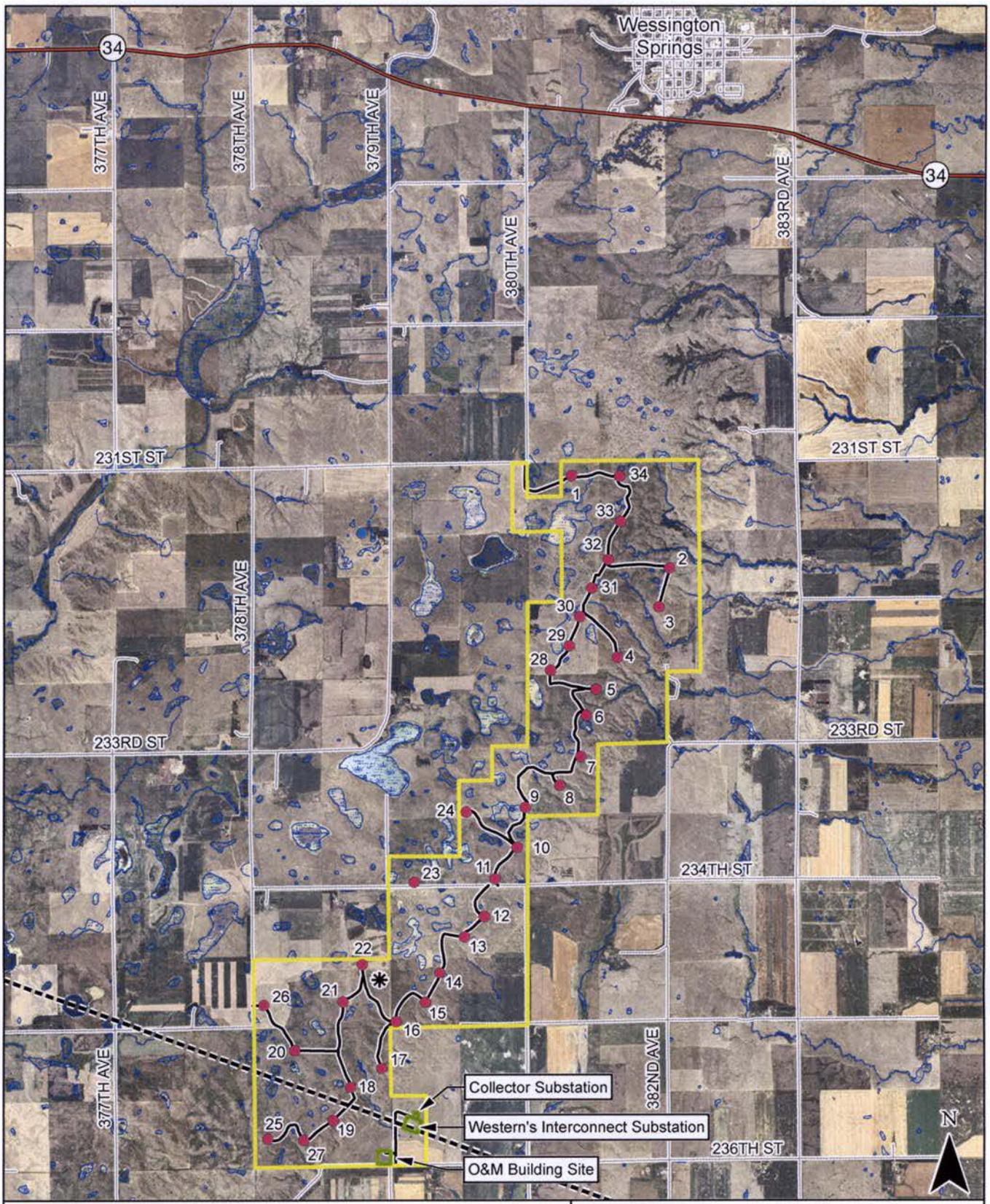

Legend

- Turbine
- Permanent MET Tower (Proposed Location)
- Western's Existing Communications Tower
- Lease Boundary
- Proposed Facilities
- New Access Road
- Major Highway
- Existing Road
- Western's Existing 230kV Transmission Line

Wessington Springs Wind Project

Proposed Action

Figure 2.2-1

0 0.5 1 1.5 2 Miles

POWER ENGINEERS

BABCOCK & BROWN

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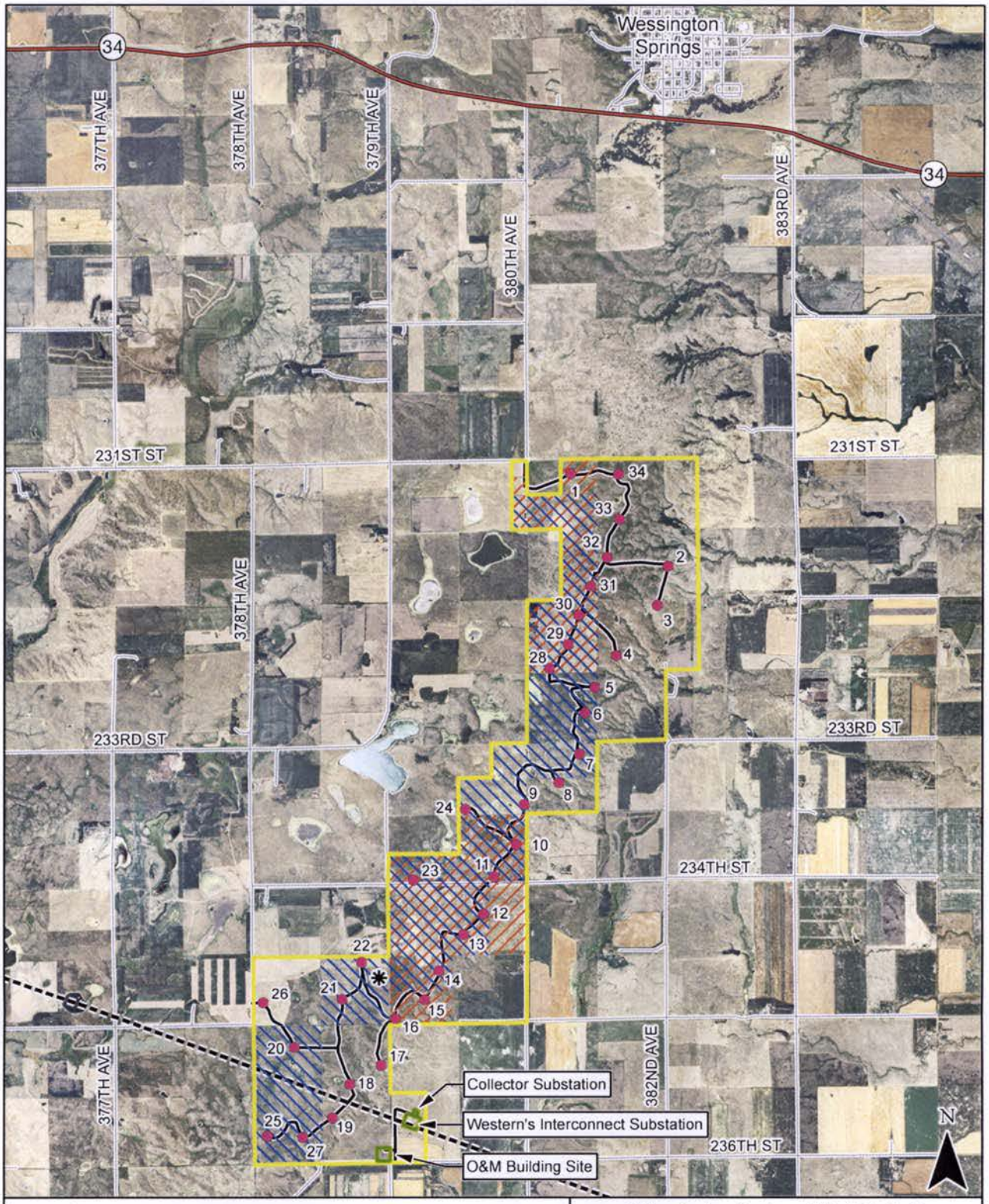

Legend

- Proposed Turbine
- Permanent MET Tower (Proposed Location)
- Grassland Easement
- Wetland Easement
- Wetland and Grassland Easement
- Proposed Facilities
- Lease Boundary
- New Access Road
- Major Highway
- Existing Road
- Western's Existing 230kV Transmission Line

Wessington Springs Wind Project

US Fish and Wildlife Service Easements

Figure 2.2-2

0 0.5 1 1.5 2 Miles

POWER ENGINEERS

BABCOCK & BROWN

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USFWS and managed as a waterfowl production area (WPA), but this tract falls outside the project boundaries. The USFWS easements were acquired under the Small Wetlands Acquisition Program (SWAP). Because of the grassland and wetland easements, the USFWS decided to be a cooperating agency for the NEPA process (see Section 1.2.2).

2.2.1.2 Wind Turbine Generators

The WSWP would install and operate 34 GE 1.5sle three-bladed 1.5 MW wind turbines.

Wind turbines consist of three main components: the turbine tower, nacelle (machine house) and rotor blades. Figure 2.2-3 illustrates a typical modern three-blade upwind turbine generator (see also Section 2.3.1 and Table 2.3-1). The 1.5MW wind turbine that would be used for this project has design features summarized in Table 2.2-1.

Towers would be 262 feet tall at the turbine hub (referred to as the "hub height"). With the nacelle and blades mounted, the total height of the wind turbine ("tip height") would be 389 feet with a blade in the vertical position. The tower would be a tubular conical steel structure approximately 15 feet in diameter at the base. A service platform at the top of each section would allow access to the tower's connecting bolts for routine inspection. A ladder inside the structure would provide access to the nacelle for turbine maintenance. There would be interior lighting and a safety cable next to the ladder.

The nacelle is the portion of the wind turbine mounted at the top of the tower. The nacelle houses the main mechanical components of the wind turbine generator—the drive train, gearbox, and generator. The nacelle would also be equipped with an anemometer and a wind vane that signal wind speed and direction to an electronic controller. Electric motors would rotate (yaw) the nacelle and rotor to keep the turbine pointed into the wind to maximize energy capture. An enclosed steel-reinforced fiberglass shell would house the nacelle to protect internal machinery from the elements and to dampen noise.

Each blade would be 100 to 115 feet long; the diameter of the circle swept by the blades would be 200 to 230 feet. The blades would turn 10 to 23 revolutions per minute (RPM). Given the range of diameters and the range of RPMs, the turning speed of a blade at its tip could vary from approximately 70 to 190 miles per hour (mph). Generally, larger wind turbine generators have slower rotating blades than smaller turbines, but the specific RPM values depend on aerodynamic design and vary across machines. Rotor blades are typically made from glass-reinforced polyester composite.

The tower would be fabricated and erected in two to three sections. Each turbine tower section would be transported to the WSWP site on trailers that carry one tower section each. Tower sections would be delivered to a staging area and then to each tower location. Towers would be erected using a large construction crane. During construction, a work area at each turbine would include the crane pad and rotor assembly area. The work area would measure about 180 feet by 185 feet.

Based on geotechnical studies performed at each proposed turbine location in 2007, it is anticipated that mat foundations (also known as inverted-T foundations) would be used for the turbines. These would typically be no more than 50 feet square with an additional 5 to 10 feet on each side (depending on Occupational Safety and Health Administration [OSHA] requirements) to construct forms. The base of the mat foundation would be approximately 8 feet.

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Figure 2.2-3 Typical 1.5 MW Wind Turbine Dimensions

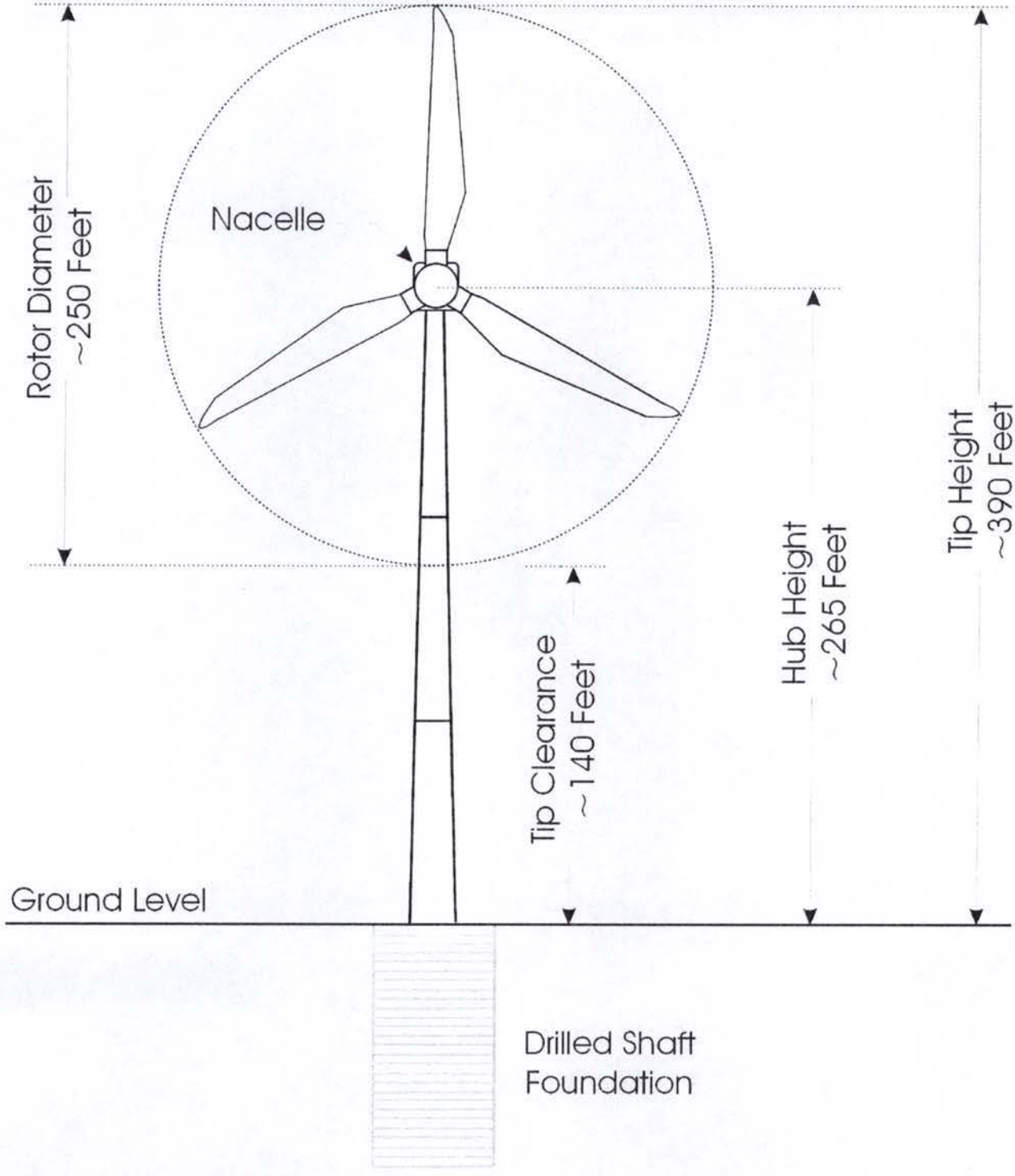

Table 2.2-1 Wind Turbine Features (GE 1.5sle)

Design Feature	Description
Turbine technology type	Three-bladed upwind wind turbine[1]
Rated output of turbine	1.5 MW
Axis	Horizontal
Rotor orientation	Upwind
Cut-in wind speed (Minimum wind speed for turbines to begin operating)	7 to 10 mph[2]
Cut-out wind speed (Maximum wind speed before turbines stop operating)	56 mph
Rotational speed	10 to 23 RPM
Number of blades	3
Rotor (blade) diameter	200 to 230 feet
Tower type	Tubular steel
Tower diameter at base	15 feet
Foundation dimensions	50 feet by 50 feet maximum
Foundation depth[4]	8 feet
Tower hub (nacelle) height	262 feet
Tower tip height (to top of vertical rotor)	389 feet
Nacelle	Fully enclosed steel or steel reinforced fiberglass

[1]Data for a GE 1.5sle wind turbine.
[2]Wind turbines rotate in winds as low as 2 to 3 mph, but generator cut in occurs at 7 to 10 mph

USFWS and managed as a waterfowl production area (WPA), but this tract falls outside the project boundaries. The USFWS easements were acquired under the Small Wetlands Acquisition Program (SWAP). Because of the grassland and wetland easements, the USFWS decided to be a cooperating agency for the NEPA process (see Section 1.2.2).

The 34 turbines were sited to avoid blockage of Federal agency radio frequency transmission and microwave signals (Nebbia 2007). Also, there would be no conflict between the turbines and existing non-Federal microwave telecom systems (Comsearch 2007).

2.2.1.3 Collection System

The wind farm's electrical system would have two key elements: 1) a collection system, which would collect energy from each wind turbine, and step it up (i.e., increase it) to 34.5kV; and 2) a collector

substation, which would step up the power from 34.5kV to 230kV for transmission along Western's existing 230kV line.

The collection system would collect energy between 575 and 690 volts from each wind turbine and step it up to 34.5kV at the pad-mounted transformer adjacent to each wind turbine. Junction boxes and pad-mounted switchgear panels would be installed to connect underground 34.5kV electrical lines coming from different directions and to allow for the isolation of particular turbine strings. A turbine string is a series of turbines in a line that are connected by 34.5kV cable.

The junction boxes would be either steel clad or fiberglass panel. The boxes would be mounted on pad foundations roughly 4 feet wide, 6 feet long and 6 feet high. The pad foundation would have an underground vault about 3 feet deep where the underground cables come in. The junction boxes would also have a buried grounding ring with grounding rods tied to the collection system and a common neutral. Current plans are that five junction boxes would be used at the WSWP site. Oil is not used in junction boxes.

The switch panels would be steel-clad enclosures mounted on pad foundations roughly 7 feet wide, 7 feet long and 5 feet high. Switches would allow particular collector lines and turbine strings to be turned off or isolated. This isolation would allow maintenance and repair to take place without shutting down the entire wind farm. The pad foundation would have an underground vault about 3 feet deep where the underground cables come in. Switch panels also would have a buried grounding ring with grounding rods tied to the collection system and a common neutral.

The underground collection system would be placed in one trench or two parallel trenches that would generally follow the internal road network (see Section 2.2.1.9). The cables for the underground collection system generate heat (140° to 176° F), so parallel trenches must be at least 10 feet apart to allow the heat to dissipate in the soil. The underground collection system would not follow the internal road network between Turbines 11 and 23, between Turbines 20 and 26, and between Turbine 17 and the collector substation. There is an existing road between Turbines 11 and 23, but the road passes through some wetlands. To avoid the wetlands, the trench would be routed slightly farther to the north. The best access to Turbine 26 is along an existing road rather than following a direct line from Turbine 20. There are currently no plans for a road between Turbine 17 and the collector substation. Where two trenches are needed, they have to be at least 10 feet apart, so they may be placed on opposite sides of a road. The current design has a total trench length (including parallel trenches) of 85,616 feet (16.2 miles).

It is possible that during construction, the contractor may propose other locations where the collection system trenches could deviate from the internal road network. These proposed deviations would be considered on a case-by-case basis and would be allowed only in areas where there would be no impacts on wetlands, sensitive wildlife, cultural resources, or other sensitive resources.

During operation of the wind project, if a fault in the collection system develops, fault indicators at junction boxes and substation metering would allow maintenance staff to identify the location of the fault. Typically, a repair would be made by digging up and removing a section of cable and splicing in new cable.

2.2.1.4 Collector Substation

The collector substation would transform the electricity from 34.5kV to 230kV for transmission along the existing Fort Thompson-to-Sioux Falls 230kV transmission line. The proposed collector substation would be located below the escarpment in the valley of West Branch Firesteel Creek on leased private land. It would be next to the interconnect substation. The fenced area would occupy up

to 2 acres. Access to the collector substation would be provided by a new 30-foot-wide access road running north for 1,900 feet along a section line from 236th Street, which is an existing gravel street. There would be fiber optic communications between the collector substation and Western's interconnect substation (see Section 2.2.1.6).

The only oil-filled equipment at the substation would be the transformers, which would most likely use mineral oil. Because of the oil, a secondary containment berm would be built in accordance with U.S. Environmental Protection Agency (EPA) requirements for oil pollution prevention and Spill Prevention Control and Countermeasure (SPCC) (40 CFR 112).

2.2.1.5 Interconnect Substation

A new substation would provide the interconnection between the proposed wind farm and the Fort Thompson-to-Sioux Falls 230kV transmission line. The substation would be designed and operated by Western. Interconnection to the Western transmission system requires an interconnection agreement between Western and Babcock & Brown.

It is anticipated that a three-breaker 230kV main and transfer bus substation would be required to provide a reliable interconnection. In the substation there would likely be 230kV bus work, circuit breakers, related substation equipment, control building, requisite control, protection and communication equipment, and transmission line approach spans and structures.

The Wessington Springs interconnect substation would include 230kV circuit breakers. Substation high-voltage equipment would be an air-insulated type requiring electrical bus, Sulfur hexafluoride (SF6) circuit breakers, disconnecting switches, insulators, and instrument transformers. Galvanized steel structures and reinforced concrete foundations would support all substation high-voltage equipment.

Other equipment at the new interconnect substation would include a 40-foot-by-40-foot single-story control building. The substation would have a fenced area of about 9 acres. The surface of the substation within the fenced area would be covered with approximately 6 inches of crushed rock, and there would be gravel drive areas. The access road would be the same as that used for the collector substation (see Section 2.2.1.4).

SF6 is a gas used to insulate circuit breakers, switches, and other electrical equipment. SF6 has been identified by the EPA as a potential greenhouse gas. Since 2000, Western has had an aggressive program to identify and repair leaks throughout the transmission system to reduce SF6 emissions.

The new substation site would require excavation, grading and other site improvements to accommodate the required equipment. Construction would be done in accordance with Western's standard environmental protection provisions (Standard 13, June 2003) (Appendix B).

2.2.1.6 Communication System

Western has determined that a fiber optic communication system may be required between the interconnect substation and an existing Western radio tower located 4.3 miles to the north in Section 34 west of 379th Avenue. The route of this fiber optic line has not been finalized, but the goal would be to avoid all sensitive resources and, where possible, to stay within disturbed ground along existing and proposed roads and trenches. Currently the plan is to follow the collection system trench from the interconnect station to 234th Street, and then run the line along the rights-of-way of existing County and Township roads to the radio tower, which is located northwest of the boundary of the proposed wind farm. The fiber optic line would be owned by Western.

To protect the fiber optic line, the buried cable would be placed in an innerduct or would be armored with a metal sheath.

2.2.1.7 Operations and Maintenance Building

One 5,000-square-foot O&M building would be constructed for the wind project. It is currently anticipated that the O&M building would be at the southern edge of the project area near 236th Street and about 2,000 feet from the proposed collector and interconnect substations (see Figure 2.2-1). However, the precise location of the O&M building is not yet certain. At this time, there are no plans for direct access between the O&M building and the internal road network for the wind farm. In the future, Babcock & Brown may determine that such access is needed (see Section 2.2.1.9).

2.2.1.8 Primary Access Roads

Primary access to the wind project area would be along one or more of the existing gravel or paved County roads and along Township roads described in Section 2.2.2.1. Township and section-line roads that are required for access to the wind project would be upgraded and maintained by Babcock & Brown. In some cases, temporary construction might be necessary to accommodate the width of the construction crane or the turning radii of trucks hauling turbine components.

The specific route has not yet been selected, but existing roads in four townships, Wessington Springs, Media, Anina, or Viola, might be affected by the Proposed Action. Currently, Babcock & Brown's preferred route for the crane and trucks would run south from SD 34 along 380th Avenue, west along 231st Street, south along 379th Avenue, west passed Cady Lake on 233rd Street, south along 378th Avenue, and east along 234th Street. However, the final route selected would depend in part on the results of environmental studies and on a future assessment of necessary road improvements.

2.2.1.9 Internal Road Network

Turbines and other wind farm facilities would be accessed by vehicles and equipment using an internal network of 16-to-20-foot-wide graveled roads. Some existing private roads would be improved and some new roads would be built. During construction, an additional 7.5 to 9.5 feet would be temporarily disturbed on either side of these roads to accommodate the 35-foot-wide tracks of the large construction crane used to install the turbines. The additional width would be reseeded with native seed mix after construction. The internal road network as currently proposed would be 65,441 feet (12.4 miles) long. In the future, Babcock & Brown may determine that an access road is necessary between the O&M building and the internal road network. This access road is not currently planned but may be approximately 2,000 feet long and 16 to 20 feet wide.

2.2.1.10 Turnaround Areas

At some locations, a 180-foot-diameter (0.6-acre) turnaround area would be needed for large trucks and trailers hauling turbine components. Turnaround areas would most likely be near Turbines 3, 4, 8, 17, 23, 24, and 25. After construction, these areas would be restored and reseeded with native seed mix. If turbine components needed to be replaced during the life of the project, specific turnaround areas might need to be rebuilt, but this would again be on a temporary basis.

2.2.1.11 Meteorological Tower

Babcock & Brown currently has two temporary MET towers in the wind farm area (see Section 2.2.2.1). The locations of these towers are shown on Figure 2.2-1. The two towers would be removed if the Proposed Action were built.

One permanent 80-meter (262-foot) MET tower would be placed near the wind turbines to assess turbine performance. The likely site of this tower would be near Turbine 22 but its final location has not been determined. The permanent tower would be unguyed to reduce potential impacts to wildlife. The tower would be lighted to meet Federal Aviation Administration (FAA) safety requirements for towers taller than 61 meters (200 feet).

2.2.1.12 Safety

The design, construction, operation, and maintenance of the WSWP would meet or exceed the requirements of the National Electric Safety Code (NESC), U.S. Department of Labor (DOL) Occupational Safety and Health Standards, and recognized requirements for safety and protection of landowners and their property.

Safety features and control systems at the WSWP would include: 1) remote control systems located at the O&M building that would constantly monitor each turbine for wind speed and direction, air and machine temperatures, electrical voltages, currents, vibrations, blade pitch and yaw; 2) two full independent braking systems on each turbine; 3) an internal fire detection system on each turbine; 4) a lightning protection system on each turbine; 5) lights that flash as required by the FAA; and 6) night-time and motion sensor lights at the collector substation and O&M building.

2.2.1.13 Temporary and Permanent Ground Disturbance

Table 2.2-2 summarizes the amount of temporary and permanent ground disturbance that is expected to occur as a result of the construction of the WSWP. For some resources (e.g., vegetation) the difference between permanent and temporary disturbance is important because reseeding would restore temporarily disturbed areas to pre-construction conditions. For non-renewable resources (e.g., archaeological sites) all physical disturbance is considered permanent because restoration to pre-construction conditions is not possible.

The assumptions used in calculating ground disturbance are presented below:

Wind Turbine Generators

- **Turbine Work Areas.** During construction, the work area/staging area at each turbine would include the crane pad and rotor assembly area. This temporarily disturbed area would measure about 180 feet by 185 feet (0.76 acre) per turbine. Any disturbance directly associated with the construction of a turbine would fall within the turbine work area.

- **Towers.** The base of each turbine tower would be 15 feet in diameter, or 177 square feet. This land would be permanently disturbed.

- **Turbine Foundations.** It is anticipated that mat foundations (inverted-T foundations) would be used for the turbines. These would typically be no more than 50 feet square with an additional 5 to 10 feet on each side to construct forms. Therefore, the area excavated for a turbine foundation could be as much as 70 feet by 70 feet (0.11 acre). At its perimeter, the foundation would be about 5 feet below the ground surface. This ground would be reseeded with native seed mix, so the area outside the turbine tower would have temporary disturbance. Permanent disturbance directly beneath the turbine base would still be 177 square feet; the additional disturbance (4,723 square feet) would be temporary and would still be within the turbine work area.

Table 2.2-2 Temporary and Permanent Ground Disturbance (Acres) by Wind Project Component

Number of Turbines		34	
Acres		ca. 3,560	
Power Generated (MW)		51	
	Temporary Ground Disturbance	**Permanent Ground Disturbance**	**Subtotal**
Turbine Work Areas/Material Staging	24.5-25.8 acres	0	24.5-25.8 acres
Turbine Foundations	0	0.2-1.5 acres	0.2-1.5 acres
Pad-Mounted Transformers	0	<0.1 acre	<0.1 acre
Collection System	27.8 acres	0	27.8 acres
Collector Substation	1 acre	2 acres	3 acres
Interconnect Substation	4 acres	6 acres	10 acres
Fiber Optic Communication System	0.7 acre	0	0.7 acre
Primary Access Roads	To be determined[1]	To be determined[1]	To be determined[1]
Internal Road Network	22.5-28.5 acres	24.0-30.0 acres	52.5 acres[2]
Turnaround Areas	4.1 acres	0	4.1 acres
O&M Building	2 acres	2 acres	4 acres
MET Tower	<0.1 acre	<0.1 acre	<0.1 acre
TOTAL	86.6-93.9 acres	34.2-41.5 acres	121.8-129.4 acres

Note: Assumptions made in calculating temporary and permanent ground disturbance are discussed in Section 2.2.1.13.
[1]Amount of ground disturbance required for the primary access roads would be determined by hauling contractor.
[2]Combined width of temporary and permanent disturbance from the internal road network would be no greater than 35 feet.

In some cases a 17-foot area around a turbine may have to be covered in 4 inches of gravel for IEEE step-and-touch voltage compliance. This would add another 1,709 square feet of permanent disturbance at a turbine location. However, the need for a gravel layer is determined on a case-by-case basis for each turbine shortly before construction (see Section 2.2.1.2).

- **Pad-Mounted Transformers.** Pad-mounted transformers would permanently disturb an area measuring 111 inches by 80 inches (61.7 square feet) next to each turbine.

In summary, for each turbine, there would be a total of 238 square feet of permanent disturbance and possibly as much as 1,886 square feet if a gravel safety area is required. With 34 turbines, there would be a minimum of 8,092 square feet (0.2 acre) and a maximum of 64,124 square feet (1.5 acres) of permanent disturbance. For each turbine there would be 31,414 to 33,062 square feet (0.72 to 0.76 acre) of temporary disturbance per turbine outside the area of permanent disturbance. For 34 turbines, there would be a minimum of 24.5 acres and a maximum of 25.8 acres of temporary disturbance.

Roads

- **Primary Access Roads.** Township and section-line roads that are required for access to the wind project would be upgraded and maintained by Babcock & Brown. In some cases, cut or fill might be necessary along some roads for the 35-foot wide construction crane or at sharp corners to accommodate the turning radii of trucks hauling turbine components. Some of these vehicles are up to 144 feet long. The specific locations of these areas of construction would be determined in the future and would depend partly on the requirements of the hauling contractor, which has not yet been identified.

- **Internal Road Network.** The internal road network at the wind farm would include both new roads and improved existing roads. These gravel roads would be 16 to 20 feet wide (permanent disturbance) with an additional 7.5 feet to 9.5 feet on each side to accommodate the 35-foot-wide tracks of the construction crane (temporary disturbance). The internal road network is estimated to be 65,441 feet (12.4 miles) long. Depending on the width of the gravel surface, there would be a total of 24.0 to 30.0 acres of permanent disturbance and 22.5 to 28.5 acres of temporary disturbance. With a maximum width of 35 feet, the total area of disturbance would be 52.5 acres.

- **Turnaround Areas.** At an estimated seven locations, a 180-foot-diameter (25,447-square foot; 0.6-acre) turnaround area (temporary disturbance) would be built for use by large trucks and trailers during construction. These would result in a total of 4.1 acres of temporary disturbance.

Electrical System

- **Collection System.** The underground collection system would be placed in one trench or two parallel trenches that would generally follow the internal road network, although in a few locations the trenches would extend away from the roads (i.e., from Turbine 11 to Turbine 23, from Turbine 20 to Turbine 26, and from Turbine 17 to the proposed collector substation). It is estimated that out of a total length of approximately 85,616 feet, 10,483 linear feet of trenches (12 percent) would not be located next to roads. Trenches would be 12 inches wide and the work area would be 10 feet on each side of the trench. If two parallel trenches are used, they need be at least 10 feet apart and, if possible, on opposite sides of the road to ensure that heat from each cable would dissipate in the soil and not affect the parallel cable. If trenches are next to a new road, it is assumed that 7.5 feet of the trench work area would overlap with temporarily disturbed land next to the roadways.

  It is currently estimated that a total of 27.8 acres of land would be disturbed by trenches and work areas. Because the entire surface over the collection system would be reseeded and revegetated, all disturbance would be temporary.

- **Collector Substation.** The collector substation would result in approximately 2 acres of permanent and 1 acre of temporary disturbance.

- **Interconnect Substation.** Construction of the interconnect substation would result in approximately 4 acres of temporary and 6 acres of permanent disturbance.

- **Fiber Optic Communication System.** Because the route of the proposed fiber optic cable has not been finalized, the amount of likely ground disturbance is unknown. One possibility is to place the cable in the collector system trench from the interconnect substation to 234th Street (11,062 feet) and then follow County and Township road rights-of-way to the radio tower (29,600 feet) for a total of 40,662 feet (7.7 miles). Wherever the collector system trench cannot be used, the trench for the fiber optic line would be no more than 12 inches wide, so additional disturbance form the trench would be less than 0.7 acre and would be temporary. The surface of the trench would be reseeded where appropriate. The fiber optic cable trench would be a minimum of 30 inches deep and deeper beneath road surfaces.

  It is possible that rather than using a trench within the road rights-of-way, the fiber optic cable would be installed by plowing. In that case, the width of the area of temporary disturbance would be a few feet less than that required for trenching.

O&M Building

- The O&M building would result in approximately 2 acres of temporary and 2 acres of permanent disturbance.

MET Tower

- The proposed permanent MET tower would cause little ground disturbance. The freestanding tower would have a concrete footing measuring 5 feet by 5 feet with a depth of 6 feet. Only 25 square feet would be permanently disturbed.

2.2.1.14 Construction

Wind Farm and Associated Facilities

Construction of the wind farm would include the following main activities: 1) grading for the field construction trailers, parking areas, batch plant, collector substation, and O&M building area; 2) constructing roads, turnaround areas, staging areas, and crane pads at each wind turbine location; 3) constructing turbine tower foundations and transformer pads; 4) installing the electrical collection system; 5) constructing and installing the collector substation; 6) transporting and assembling the wind turbines; 7) commissioning and energizing the plant; and 8) cleaning up and restoring the site.

Construction of the wind turbine foundations would require a temporary on-site concrete batch plant during the construction period. The specific location of the batch plant has not been determined, but it would be placed so as not to disturb sensitive wildlife, native vegetation, or cultural resources. Aggregate would be obtained from an approved off-site source and hauled to the wind farm area.

During construction of the wind farm, trucks, bulldozers, cranes, drill rigs, graders, backhoes, and other pieces of construction equipment would be required for two to eight months, although the total number of pieces of equipment present on a single day would be less.

It is estimated that a total of 40 full-time equivalent (FTE) workers would be required for wind project construction. It is likely that there would be fewer workers at the beginning and end of construction, and that peak employment for about one month would be 70.

During construction, water needed for dust suppression would be either trucked in or obtained from a landowner's well.

Interconnect Substation

Initial construction of the interconnect substation would include grubbing vegetation, if necessary, and grading a pad and access roadway. Grading would provide for adequate drainage and erosion control, and secondary containment berms may be built. Overall, very little cut and fill would be required to accommodate substation development on the relatively flat site. The grading plan could require installation of drainage ditches outside the fenced area to redirect runoff from the substation. Western's environmental protection standards would be enforced during construction of the interconnect substation (Appendix B).

Reinforced concrete foundations would be installed to support the electrical equipment and control facilities. Trenches would be dug for copper conductors for the station-grounding mat. After the grounding mat is in place, porcelain insulators, circuit breakers, disconnect switches, coupling capacitor voltage transformers, power circuit breakers, and power transformers would be installed.

The active construction schedule at the interconnect substation would run for approximately four to six months, from the start of the site work to final installation of the electrical equipment.

2.2.1.15 Operations and Maintenance

General project operations of the wind farm would require approximately five onsite staff, including one manager and four operating technicians.

For a wind farm, a typical operating plan includes a planned outage schedule that consists of wind turbine inspections and maintenance after the first three months of operation, a break-in diagnostic inspection, and subsequent services every six months. The six-month servicing would generally take a wind turbine off-line for one day. Although most wind farms operate 65 to 90 percent of the time, they typically run at less than full capacity. Unscheduled maintenance and forced outages are not predictable, but after a wind turbine is properly tuned, unplanned outages are rare and downtime is usually limited to the routine service schedule.

An Emergency Response Plan would be established for the project to ensure employee safety during emergencies.

The plant operations group would prepare a detailed security plan to protect the project and personnel. Public access to the internal road network would be determined by the individual property owners.

Interconnect substation monitoring and control functions would be performed remotely from Western's operations facilities. Maintenance activities include equipment testing, equipment monitoring and repair, and emergency and routine procedures for service continuity and preventive maintenance. Routine operations would require weekly visits to the substation; a major maintenance inspection would take place approximately once a year. Access to the interconnect substation would be controlled by fences, locked gates, and warning signs.

2.2.1.16 Decommissioning and Abandonment

The design life of turbines, transformers, substations and supporting infrastructure is at least 20 years. It is likely that after mechanical wear takes its toll, the project could be upgraded with more efficient equipment to have a useful life longer than 20 years.

At the end of the useful life of the proposed project, if the wind farm were no longer required, it would be abandoned under the terms of the lease agreements.

Site decommissioning typically would involve the reverse of site development. Turbine towers would be dismantled and either recycled, sold for scrap, or disposed of off site as solid waste. Concrete would be broken up to be recycled or disposed of as solid waste. Electronic equipment would be recycled or disposed of as either solid waste or, in some cases, as hazardous waste. Turbine foundations and below-ground cables would likely be left in place, although foundations may be removed to a depth of 3 feet to accommodate revegetation. Disturbed land (e.g., roads) would be restored to the original contour and reseeded or replanted, if requested by the property owner. No oil-filled equipment would be left in the ground or on-site.

2.2.2 No Action Alternative

Implementation of the No Action Alternative, required for consideration under NEPA and Council on Environmental Quality (CEQ) regulations, would mean that a wind farm and associated facilities would not be constructed by Babcock & Brown at the WSWP site. The environmental impacts and benefits described in this EA (see Chapter 4) would not occur. Under the No Action Alternative, Babcock & Brown could propose other wind development projects in Jerauld County, at other locations in South Dakota, and outside the state to meet the demand for renewable electrical generating facilities. Also, other project developers could propose wind energy development projects in the Wessington Springs area.

Under the No Action Alternative, there would be no ground disturbance or other environmental impacts from the construction and operation of the wind farm and interconnection facilities. Also, the financial costs and commitments associated with the construction and operation of the WSWP would be eliminated or transferred to a different location. WSWP-related increases in temporary and permanent jobs and tax revenues would not occur in Jerauld County and could be shifted to other states (see Section 4.5).

Also, in May, 2007 Heartland and the State of South Dakota entered into an MOU in which Heartland agreed to meet the energy needs of SDSU and USD using South Dakota-based wind energy. Babcock & Brown has a Renewable Energy Purchase Agreement with Heartland to provide 51MW of power from the WSWP. Under the No Action Alternative, Heartland would have to obtain this power from another source of wind energy in South Dakota.

2.2.2.1 Existing Facilities

Under the No Action Alternative, existing infrastructure in the Wessington Springs project area would remain (Figure 2.2-4). This includes roads, an existing transmission line, distribution lines, a radio tower owned by Western, and occupied residences. In addition, Babcock & Brown previously installed two meteorological (MET) towers in the WSWP area.

Roads

Access to the project area is along several existing paved and gravel County roads. These include 379th Avenue, which runs north-south from South Dakota State Highway 34 (SD 34) west of the

project area, and 383rd Avenue, which runs north-south from SD 34 east of the project area. Another road, 234th Street, runs from east to west through the southern portion of the proposed wind farm. Township roads, all unpaved, provide access to parts of the project area and include 382nd Avenue, 380th Avenue, 378th Avenue, 231st Street, 233rd Street, and 236th Street. These roads are maintained by the Townships (Anina, Wessington Springs, Media, or Viola). There are also section-line roads in various locations within the WSWP area. These unimproved roads are not regularly maintained by Townships; low areas are sometimes filled in, but the roads are never bladed. The locations of existing County and Township roads are illustrated in Figure 2.2-4. The County, Township, and section-line roads would not be modified under the No Action Alternative.

230kV Transmission Line

Western's Fort Thompson-to-Sioux Falls 230kV transmission line runs through the southernmost portion of the project area (Figure 2.2-4). The line connects to the Fort Thompson Substation, 40 miles to the west, and the Storla Substation, 15 miles to the southeast. Under the No Action Alternative, there would be no need for interconnection to this transmission line in the Wessington Springs area.

Distribution Lines

Existing electrical distribution lines in the project area, most overhead but some buried, are owned by Central Electric Cooperative Association. The locations of distribution lines are shown in Figure 2.2-4. The distribution lines would remain in place under the No Action Alternative.

Occupied Residences

There are no occupied residences within the boundaries of the proposed wind farm; there are 12 occupied residences within 1.0 mile of the proposed wind farm boundary. Under the No Action Alternative, there would be no project-related changes of any sort to these buildings.

Meteorological Towers

MET towers are used to measure wind conditions, including speed, direction and temperature. Babcock & Brown currently has two temporary MET towers in the WSWP area (Figure 2.2-4). Each tower consists of a guyed tubular structure supported by a 4-foot-by-4-foot metal plate that rests on the ground surface. The towers are each supported by three to four sets of guy wires, with seven guys in each set, that extend 100 to 200 feet from the base of the tower.

Existing roads and overland access are used to access the towers. MET towers taller than 200 feet require lighting in compliance with Federal Aviation Administration (FAA) aircraft safety requirements. The primary ground disturbance related to these MET towers was associated with the installation of the guy wires. All disturbance associated with the existing MET towers is temporary. Under the No Action Alternative, the two temporary MET towers would be removed by Babcock & Brown when it is determined by the company that further data collection is no longer of value. Because the MET towers are temporary, removal would cause minimal ground disturbance.

Western owns and existing radio tower northwest of the project area and south of SD 34 on the west side of 379th Avenue (Figure 2.3-4).

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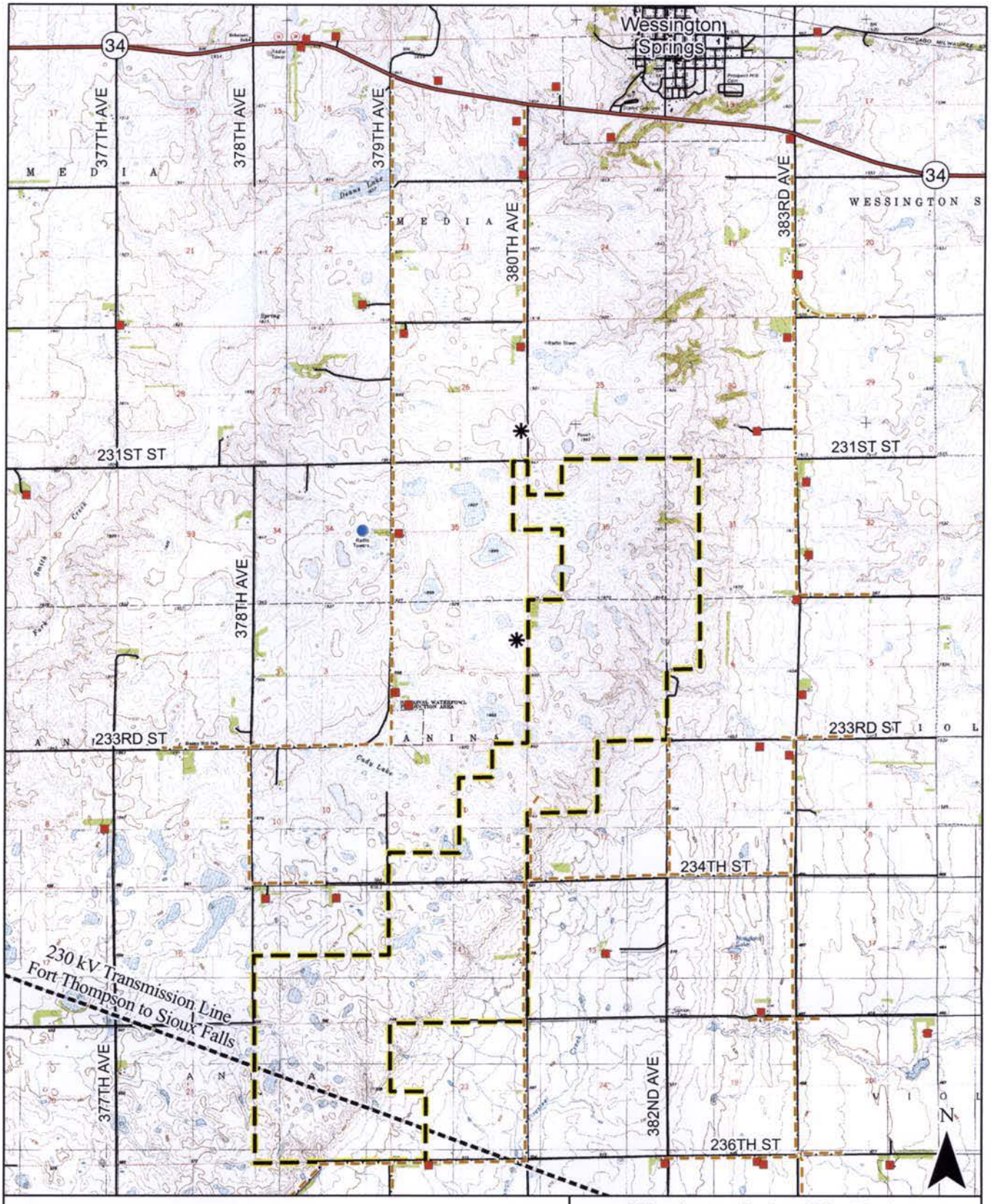

Legend

- Occupied Residence
- Temporary MET Tower
- Western's Existing Communications Tower
- Lease Boundary
- Central Electric Cooperative's Existing Distribution Line
- Western's Existing 230kV Transmission Line
- State Highway 34
- Existing County, Township, or Private Road

Wessington Springs Wind Project

Existing Facilities Map

Figure 2.2-4

0 0.5 1 1.5 2 Miles

POWER ENGINEERS

BABCOCK & BROWN

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2.3 Alternatives Considered and Eliminated

Various alternatives to the WSWP were considered but eliminated. These alternatives and the reasons for their elimination are summarized below.

2.3.1 Alternative Wind Farm Technologies

Babcock & Brown proposes to use General Electric (GE) 1.5sle wind turbines for the WSWP. Table 2.3-1 compares this technology type with other turbine technologies. Because the alternative technologies would not be as environmentally sound or economically viable as the three-bladed upwind wind turbine proposed for use at the WSWP, they are not considered reasonable alternatives.

2.3.2 Alternative Wind Farm Locations

The recently updated MOU between Heartland and the State of South Dakota, agreeing to meet the energy demand of SDSU and USD with wind power (see Section 1.2.3), is one of several factors that drives the development of the wind industry within South Dakota. Babcock & Brown has considered siting alternative wind developments in McPherson, Day, and Walworth counties to help meet this demand. Among the considerations in siting a wind project are the wind resource, transmission availability, land availability, economics, and environmental issues.

2.3.2.1 The Quality of the Wind Resource.

South Dakota has one of the best wind resources in the country, ranking fourth behind North Dakota, Texas, and Kansas (AWEA 2007). The National Renewable Energy Laboratory (NREL) has a wind resource map for the state of South Dakota that shows that for much of the state the wind resource potential (at 50 meters above ground level) is "good" (Class 4) to "excellent" (Class 5). Locations classified lower than Class 4 are usually unsuitable for wind energy development. Only a few locations in South Dakota are classified by NREL as "outstanding" (Class 6). These Class 6 areas are:

- The Black Hills and Rapid City area;
- Dewey County west of the Missouri River;
- McPherson County on the North Dakota border;
- Gregory, Tripp, and Todd counties west of the Missouri River near the Nebraska border;
- A few locations along the Missouri River north of Pierre;
- Roberts County in the northeast corner of the state; and
- Jerauld, Hyde, and Hand counties east and north of the Missouri River.

NREL's Wind Resource Assessment Model is a GIS-based model with 1-square-kilometer resolution. Factors that decrease or increase base wind power density include terrain blocking, relative and absolute elevation, wind direction, aspect, and vertical profiles of wind power (Heimiller and Haymes 2001). DOE's Office of Energy Efficiency and Renewable Energy (EERE) emphasizes that the wind resource at a micro level can vary significantly and recommends professional evaluation of a specific site (EERE 2007).

Table 2.3-1 Comparison of Wind Turbine Technologies

Technology Type	Typical Generator Size	Typical Height	Units Required for 51MW	Typical Rotation Speed[1]	Comment
Three-Bladed Upwind Wind Turbine	1.5MW	300 - 400 feet	34	10-23 RPM	Proposed WSWP technology. Carried forward for detailed analysis (see Section 2.3.2.2).
Smaller Three-Bladed Upwind Wind Turbine	500-750kw	240-300 feet	68-102	28-30 RPM	Less cost effective than proposed technology. Somewhat greater environmental impact from ground disturbance due to larger number of turbines.
Darrieus Rotor	50-100kw	100-150 feet	510-1020	50-70 RPM	Not considered to be commercially viable. Greater environmental impact than proposed technology from ground disturbance due to larger number of turbines.
Two-Bladed Downwind Wind Turbine	50-200kw	150-200 feet	255-1020	60-90 RPM	Not cost effective. Greater environmental impact than proposed WSWP technology from rotor noise and ground disturbance due to larger number of turbines.

[1] RPM = Revolutions per minute

Babcock & Brown installed two meteorological (MET) towers in the proposed WSWP project area, one in 2005 and the other in 2006, to evaluate the wind resource south of Wessington Springs. The data from the MET towers revealed that the quality of the wind resource was excellent on top of the ridge above the valley of Firesteel Creek. The ridge is known locally as the Wessington Hills and is the eastern edge of the Coteau du Missouri. The wind speeds on top of the ridge have proven that the location is a Class 6 wind resource site, which is considered outstanding. Alternative locations in McPherson, Day, and Walworth counties all ranked a Class 6 wind resource as well.

Wind does not blow constantly or at consistent speeds, so not all Class 6 wind resources are equal in terms of the potential for producing energy. This Class 6 rating of the WSWP site is due not only to low surface vegetation heights that provide little friction to the wind, but also to the topographic acceleration of the wind caused by the rise in elevation from the valley floor. Based on two years of onsite data and several years of reference wind speed data, the predicted long-term wind speed atop the ridge is unusually high. Babcock & Brown also installed another MET tower off the ridge, approximately 5 miles east of Wessington Springs. Wind data off the ridge has proven the wind speeds to be much lower there than on the ridge, measuring barely a Class 4 wind resource.

2.3.2.2 The Availability of Suitable Transmission

Wind energy projects must be located within a reasonable distance of an interconnection point on a transmission line with sufficient capacity to allow for the economic delivery of power to customers on the transmission grid. A reasonable distance is not an absolute number. Instead, reasonable distance is determined in part by the cost of transmission line construction, the amount of power generated, and the negotiated price the customer has agreed to pay for the power. The farther an interconnection point is from the project, the greater the likelihood a larger overhead line would need to be built to reduce line loss. In addition, the farther the project is from the interconnection point, the larger the project would have to be (in terms of energy produced) to justify the cost of building a new transmission line.

The town of Wessington Springs is 8 miles north of Western's existing 230kV Fort Thompson-to-Sioux Falls transmission line and this line has available transmission capacity. Babcock & Brown has determined that other transmission lines in the area have limited to no capacity. For this reason, siting a wind project a reasonable distance from the Fort Thompson-to-Sioux Falls transmission line is important. Babcock & Brown considered other sites; however, the McPherson County and Day County alternatives both lacked suitable transmission capacity. These two alternatives were dropped from further analysis.

2.3.2.3 The Availability of Land

A wind energy project can be built only where there are suitable public lands available for wind development or where private landowners are willing to negotiate lease agreements that allow for the installation of wind turbines and other facilities.

In the Wessington Springs vicinity, there was sufficient, contiguous private land available for leasing to build a wind farm. Babcock & Brown began contacting property owners in 2005 and found that many had not yet signed lease agreements with other developers. In the past few years, other wind project developers have negotiated agreements with property owners in and near Jerauld County and the amount of available land suitable for a wind energy project in the area has been reduced.

The Walworth County alternative also had sufficient, contiguous private land in the vicinity for lease, Babcock & Brown took lease options on 4,800 acres of land in order to help facilitate the development of a proposed wind project.

2.3.2.4 The Economics of the Wind Resource

One measure of the quality of the wind resource in a specific location is *capacity factor*. Capacity factor is a wind turbine's anticipated energy output for the year divided by the potential energy output if it were operated at its rated power for an entire year. A wind energy project may not be economically viable if it is to be located in an area with a low capacity factor.

- **Revenue.** A project's revenue assumptions are tied to a certain capacity factor and certain wind speeds for a designated site. If other variables are held constant, capacity factor – and potential revenue -- would generally decrease from an on-the-ridge to an off-the-ridge location because wind speeds would tend to be lower.

- **Construction Financing.** The construction financing for a wind project is based partly on a capacity factor that results from identified wind speeds on site. If a project's capacity factor proves to be to low to make the project economical, then the project would not be financed. The minimum acceptable capacity factor for financing a project would depend on other economic factors.

- **Equity Investment.** Babcock & Brown has received approval from its investment committee and third party investors for investment into a project based on a specific rate of return and capacity factor. If Babcock & Brown failed to meet this rate of return, the project would lose its equity investment capital.

Babcock & Brown determined that the WSWP site achieved their economic needs while the Walworth County alternative did not meet its needs. The construction financing was too cost prohibitive (due to the small size of the proposed wind project and the cost of turbines) to allow the alternative to move forward and it was dropped from further analysis. Babcock & Brown subsequently relinquished the Walworth County lease options in early 2007.

2.3.2.5 Environmental Constraints

Determining a suitable location for a wind energy project requires consideration of environmental constraints that affect the siting of wind turbines, roads, transmission lines, and other facilities. The Wessington Springs area has relatively few environmental constraints compared to the other locations in South Dakota considered by Babcock & Brown. The two primary environmental constraints state-wide are wetlands and the whooping crane.

Wetlands

Waterfowl use wetland basins in South Dakota for nesting, foraging, and migratory stopover. Wetlands are common in the project area, but the density of wetlands within the current project boundaries (41.5 acres of wetlands/square mile) is much lower than the density within the entire Prairie Pothole Region of South Dakota (67.5 acres of wetlands/square mile) (Johnson and Higgins 1997). Relocating the WSWP to another location in the vicinity could result in impacts to jurisdictional wetlands, as well as impacting waterfowl using these wetlands.

Whooping Cranes

The proposed WSWP is within the 200-mile-wide migratory corridor for the Aransas-Wood Buffalo National Park population of whooping cranes (see Section 3.7.5 Special Status Species for additional information). The USFWS has defined the 200-mile corridor based on the distribution of 94 percent of the 214 whooping crane sightings in South Dakota between 1943 and 2007 (Stehn 2007). While Jerauld County is within the 200-mile corridor defined by the USFWS, it is approximately 30 miles from the eastern edge of the corridor. Crane sightings are more common near the Missouri River and near the middle of the corridor and drop off in frequency toward the edge of the corridor, a distribution similar to a bell curve. The pattern may be affected by the distribution of suitable habitat (e.g., wetlands, grassland, agricultural fields).

Of the eight areas of Class 6, outstanding, wind resource in South Dakota (see Section 2.3.2.1), the 200-mile migratory corridor includes:

- Dewey County west of the Missouri River;
- McPherson County on the North Dakota border;
- Gregory, Tripp, and Todd counties west of the Missouri River near the Nebraska border;
- A few locations along the Missouri River north of Pierre;
- Jerauld, Hyde, and Hand counties east and north of the Missouri River.

The corridor also includes the majority of Class 5 (excellent) wind resource areas in the state.

2.3.3 Alternative Wind Farm Configuration

2.3.3.1 Phased 99MW Wind Farm Development

Until spring 2007, Babcock & Brown had proposed that a 99MW wind project be built on 6,000 acres of leased private land in the Wessington Springs area. This proposal would have been constructed in two phases. Phase I (similar to the Proposed Action analyzed in this EA) would have consisted of 34 turbines. Phase II would have had 32 turbines on leased private land west of Phase I.

Following discussions with staff of Western and USFWS, it was determined that turbines planned for Phase II of the 99MW proposal may have had considerable impacts on waterfowl because of the proximity of the turbines to a mosaic of wetlands. For this reason, Babcock & Brown decided to downsize the proposal to the Proposed Action analyzed in this EA.

The phased 99MW wind farm development is no longer considered a reasonable alternative to the Proposed Action at this time. Should the Proposed Action be implemented, Babcock & Brown would perform post-construction monitoring for up to 3 years to assess impacts on whooping cranes, raptors, waterfowl, and other wildlife. If post-construction monitoring were to demonstrate that effects of the 51MW Proposed Action on birds and wildlife are within acceptable levels, then Babcock & Brown may propose additional wind energy development on lands west of the WSWP in the vicinity of Phase II. The possible size and configuration of such a wind project are not known. Babcock & Brown's interconnection filing with Western is for a capacity of 100MW, but the company does not currently have a customer for more than 51MW.

2.4 Comparison of Alternatives

The only alternative to the Proposed Action considered in this EA is the No Action Alternative. Table 2.4-1 summarizes the impacts described in detail in Chapter 4 for the Proposed Action and the No Action Alternative.

2.4.1 Proposed Action

The wind energy development described in Section 2.2.1 would be approved under this alternative. The Proposed Action was developed by Babcock & Brown and modified in consultation with landowners, Western, USFWS, other State and Federal agencies, consultants employed by Babcock & Brown, and others.

Issues of particular concern that are addressed in Chapter 4 include the visual impacts of the wind turbines, the protection of archaeological sites, protection of wetlands, fragmentation of wildlife habitat, avian and bat mortality, and potential effects on the whooping crane and other species. Mitigation measures presented in Appendix A have been developed in consultation with Western and USFWS to reduce potential impacts to acceptable levels.

2.4.2 No Action Alternative

Under the No Action Alternative (see Section 2.2.2), there would be no impacts from the construction and operation of the wind farm and interconnection facilities. Also, there would be no WSWP-related leases with landowners of Jerauld County, and there would be no increase in temporary and permanent jobs and tax revenues to Jerauld County and the State of South Dakota.

Table 2.4-1 Comparison of Alternatives

	Proposed Action	No Action Alternative
Acres	3,560	Not Applicable
Number of Turbines	34	0
Energy Produce	51MW	0
Ground Disturbance	Temporary – 93.9 acres Permanent – 41.5 acres	0
Land Ownership/Jurisdiction	Private 1,950 acres USFWS wetland or grassland easements	Private 1,950 acres USFWS wetland or grassland easements
Disturbance on USFWS Easements	Temporary – 56.8 acres Permanent – 20.4 acres	0
Transportation	12.4 miles of new access roads; some improvements to existing roads	0
Employment	Construction: 40 FTE Operations: 5 FTE	0
Occupied Residences within 1.5 Mile	16	Not Applicable
Visual Resources	Visibility from Wessington Springs very limited. Intrusive feature on landscape in a few locations.	None
Wildlife Resources	Estimated Annual Mortality: 62-74 passerines, 1 raptor, 46 bats Habitat fragmentation; displacement effects May impact whooping cranes. May impact bald eagles. May impact regal fritillary butterfly	None

Table 2.4-1 Comparison of Alternatives (continued)

	Proposed Action	No Action Alternative
Disturbance to Vegetation	Temporary – 69.3 acres grassland, 9.7 acres woodland Permanent – 32.7 grassland, 3.0 acres woodland	None
Wetlands	All jurisdictional wetlands would be avoided.	None
Surface and Groundwater	None with implementation of SWPPP	None
Geology	Low	None
Soils	Low	None
Paleontology	Low	None
Cultural Resources	All known cultural resources avoided	None
Health and Safety	Low	None
Noise	Low	None
Air Quality	Low	None

2.5 Mitigation and Monitoring

Western requires that a Mitigation Action Plan (MAP) support the EA and final Finding of No Significant Impact (FONSI). The purpose of the MAP would be to facilitate the implementation of mitigation actions that must be performed under Western's NEPA jurisdiction, and disclose other actions that would be monitored by Western and other agencies to mitigate impacts. Babcock & Brown's Committed Mitigation Measures are listed in Appendix A.

CHAPTER 3 AFFECTED ENVIRONMENT

3.1 Introduction

This chapter provides a description of the affected environment in the WSWP area. Specific resources are addressed in Sections 3.2 through 3.15. The resources addressed in Chapter 3 fall into two broad categories:

- Human Environment
  - Land Use (Section 3.2)
  - Transportation (Section 3.3)
  - Visual Resources (Section 3.4)
  - Socioeconomics and Public Services (Section 3.5)
  - Environmental Justice (Section 3.6)
  - Cultural Resources (Section 3.12)
  - Health and Safety (Section 3.13)
  - Noise (Section 3.14)
- Natural Environment
  - Biological Resources (Section 3.7)
  - Wetlands and Water Resources (Section 3.8)
  - Geology (Section 3.9)
  - Soils (Section 3.10)
  - Paleontology (Section 3.11)
  - Air Quality (Section 3.15)

CEQ regulations and DOE guidance indicate that the amount of analysis in an EA should correspond to the importance of the issues: significant issues should be discussed more thoroughly than less significant issues. In this EA, the level of detail and the amount of analysis presented in each section of Chapter 3 correspond to the issues raised about the WSWP during the scoping process and agency consultation (see Chapter 5).

3.2 Land Use

This section provides a description of the land jurisdiction and ownership and of land uses that occur within the vicinity of the proposed wind project.

The land use inventory for the WSWP area was compiled by reviewing, refining and updating existing data. Interpretation was undertaken of 1:24,000 U.S. Geological Survey (USGS) topographic maps and 2006 National Agriculture Imagery Program (NAIP) digital ortho imagery aerial photographs with 1-meter resolution. The mapped information was verified by ground reconnaissance by various technical specialists between April and June 2007. In addition, Federal, State, and local agencies and organizations were contacted by telephone and letter to update information and to solicit further input.

Land use data was compiled for the area within the proposed wind farm boundaries and, in support of the visual resource analysis (Section 3.4), up to 4 miles from the boundaries of the wind farm.

3.2.1 Land Jurisdiction and Ownership

The proposed wind farm would be located in south-central Jerauld County 2 miles south of the city of Wessington Springs. The wind farm would encompass a total of 3,560 acres and would include only private lands leased by Babcock & Brown for project development. No current State or Federal lands would be included within the project boundaries. While the land is privately owned, the 3,560 acres include 1,950 acres of land managed under USFWS grassland or wetland easements. Of this total, 210 acres have only grassland easements, 840 acres have only wetland easements, and 900 acres have both grassland and wetland easements.

The USFWS easements were acquired under the Small Wetlands Acquisition Program (SWAP), which was authorized by Congress in 1958 by an amendment to the Migratory Bird Hunting Conservation Stamp Act. The purpose of the SWAP is to ensure the long-term protection of waterfowl and other migratory bird breeding habitat located primarily in the Prairie Pothole Region. In 1991, the Migratory Bird Conservation Commission approved a proposal from USFWS, Region 6 for the purchase of easements designed to protect grassland habitat, while minimally affecting farming and ranching operations.

3.2.2 Existing and Planned Land Use

3.2.2.1 Existing Land Use

The project vicinity is in a rural part of South Dakota. The 2000 census showed that Jerauld County had a total population of 2,295 and that Wessington Springs, the largest town in the county, had a total population of 1,011. The U.S. Census Bureau estimates the 2006 population for Jerauld County as 2,071, a decrease of nearly 10 percent.

The project area is characterized by a rural landscape of rolling plains and tablelands. Livestock grazing is the principal land use. Of the land within the WSWP boundary, 73 percent is grassland and 13 percent is used for cultivation. The remainder consists of wetlands and deciduous woodland (see Section 4.7.2). Important Farmland, as defined by the Natural Resources Conservation Service (NRCS) and the Conservation Preserve Program (CRP), exists in the vicinity but not within the WSWP boundary.

No occupied residences exist with the proposed WSWP boundary; 16 occupied residences are within 1.5 miles of the project area, and 50 are located within 4 miles. Development in the region is scattered, with the highest concentration occurring in the incorporated area of Wessington Springs just north of the project area.

3.2.2.2 Planned Land Use

There are currently no major changes in land use planned for the WSWP area other than the Proposed Action.

3.2.3 Parks, Recreation, and Preservation Areas

There is a roadside park just north of State Highway 34 (SD 34) near Wessington Springs that contains two historic markers, a shelter, and a picnic table. It is about 2 miles north of the project area. Wessington Hills Park (David Jost Field) is located in the southern part of Wessington Springs about 3 miles north of the project area. It includes ball fields, picnic areas, and a swimming facility. Trojan Park is a small park with a picnic table, grill, and shade trees on the southeast side of Lane about 8 miles from the project area.

Dispersed recreation opportunities exist within the wind farm area and primarily consist of hunting and wildlife viewing. Hunting in the area is primarily for waterfowl, ringneck pheasant, sharp-tailed grouse, and Hungarian partridge.

Within Jerauld County there are 1,391 acres of state Game Production Areas (GPA) (owned by South Dakota Department of Game, Fish, and Parks [SDGFP]) and 1,798 acres of federal Waterfowl Production Areas (WPA) (owned by USFWS), both of which are open to public hunting (SDGFP n.d.). Forty acres near the project area (part of Cady Lake) are owned by the USFWS and managed as a WPA. At its closest point, this tract is 0.3 mile northwest of the proposed project boundaries. Crow Lake GPA and Horseshoe Lake GPA, southwest of the project area, also provide public fishing access.

3.3 Transportation

This section describes existing traffic and transportation issues in the WSWP vicinity.

3.3.1 Roads and Highways

The roadway network that may be affected by the WSWP includes highways and roads. Four classifications, listed below, were used in order to describe the highways and roads in the WSWP area:

- Federal and State Highways
- Paved Roads
- Improved Roads
- Unimproved Roads

South Dakota State Highway 34 (SD 34), a Rural Minor Arterial, runs from east to west about 2.5 miles north of the WSWP area. U.S. Highway 281, a Rural Principal Arterial, runs from north to south and passes through eastern Jerauld County 6 miles east of Wessington Springs. U.S. 281 leads 25 miles south to Interstate 90.

Access to the WSWP area from SD 34 is along several existing paved and gravel County roads. These include 379th Avenue, which runs north-south from SD 34 west of the project area, and 383rd Avenue, which runs north-south from SD 34 east of the project area. Another road, 234th Street, runs from east to west through the southern portion of the proposed wind farm. Township roads, all unpaved, provide access to parts of the project area and include 380th Avenue, 378th Avenue, 231st Street, 233rd Street, and 236th Street. These roads are maintained by the Townships (Anina, Wessington Springs, Media, or Viola). There are also section-line roads in various locations within the WSWP area. These unimproved roads are not regularly maintained by Townships; low areas are sometimes filled in, but the roads are never bladed. The locations of existing County and Township roads are illustrated in Figure 2.3-1.

Jerauld County has no weight restrictions on County roads. Large loads currently carried on County roads are primarily hay and cattle. Highways in the vicinity of the WSWP area are subject to width and length restrictions, as well as weight limitations. Annual permits are needed for large load transport on SD 34 (exceedence of 8.5-foot width and 75-foot length). Loads that exceed the permitted lengths require single-trip permits from the South Dakota Highway Patrol.

3.3.2 Rail Facilities

No rail facility crosses the WSWP area. A rail line operated by Burlington Northern and Santa Fe (BNSF) services the northeastern part of Jerauld County, including the town of Alpena, and the town of Woonsocket in nearby Sanborn County. The railroad is about 12 miles from Wessington Springs.

3.3.3 Air Facilities

Air facilities include public and private airports identified by the FAA. Private airstrips were not documented in the WSWP area, although unidentified private airstrips may exist as part of ranching and farming operations. Airports identified within the vicinity of the WSWP include the public-use Huron Regional Airport in Huron, 28 miles northeast of the project area, and the Wessington Springs Airport. The Wessington Springs Airport is a paved landing strip that is 3,600 feet long and 60 feet wide. The landing strip is used mainly by crop sprayers and hunters. It is located south of SD 34 2.4 miles northeast of the WSWP area. Other public-use airports found within 50 miles of the WSWP area are at Mitchell, Highmore, Kimball, Chamberlain, Miller, Platte, and Corsica.

Ellsworth Air Force Base is located near Rapid City over 250 miles west of Wessington Springs. The South Dakota Air National Guard (SDANG) is based at Joe Foss Field in Sioux Falls, 90 miles east of Wessington Springs.

A military operations area (MOA) is airspace designated for military training activities, including aerobatics, air combat tactics, formation training, and other activities. A military training route (MTR) is a series of linked segments of airspace within which various training activities are conducted. Although not required to, military aircraft typically fly an MTR along a defined centerline that governs the plane's height and course. The floor and ceiling for both MOAs and MTRs are defined and the floor may extend down to the earth's surface.

The nearest MOA to the WSWP area is the Lake Andes MOA, located 24 miles to the south. An MTR (VR 510) passes over the WSWP area. This MTR is controlled by the 114th Wing of the SDANG in Sioux Falls. In the WSWP area the MTR has a width of 16 nautical miles and a floor of 100 feet above ground level (AGL). The 114th Wing typically flies this MTR no lower than 500 feet because of F-16 regulations, but other aircraft may go lower (E. Gerber, personal communication, 2007).

A Class E Federal airway, V 120, passes about 1 mile south of the wind project area. The floor of this airway is 1,200 feet AGL.

3.4 Visual Resources

3.4.1 Study Methods

The analysis of the affected environment for visual resources in the WSWP area consisted of:

- Digital modeling to determine the Area of Potential Visibility (APV) and the study area;
- An inventory of existing regional landforms, vegetation and water features, and an evaluation of scenic quality;
- A Visual Sensitivity Analysis; and
- A determination of Zones of Visual Influence (ZVIs).

Visual resources in the study area can be assigned to two general categories: 1) scenic quality, and 2) visual sensitivity. Scenic quality is based on elements that make up the landscape, such as water

features, topography, vegetation form and color, rock formations and outcropping, and physiographic and regional geomorphic features. Visual sensitivity is determined primarily from land uses, such as residential areas, parks, and travel corridors, and is based on viewing duration, viewers' attitudes toward change in the landscape, and the number of users of a particular viewpoint or corridor.

Existing aerial photography and USGS topographic maps where initially used to inventory visual resources in the study area. The study area was determined by buffering the project (based on preliminary turbine layout) to 10 miles (see NAS 2007). ArcView Geographic Information System (GIS) software and a 10-meter resolution digital terrain model were utilized to determine the Area of Potential Visibility (APV) within the 10-mile buffer. The model assumed a viewer height of 5.5 feet and blade-tip height of 350 feet, and was used to focus the area of detailed study.

The WSWP area was visited on May 31 and June 1, 2007, to assess scenic quality and identify potential sensitive receptors. Viewpoints and existing scenic quality within the APV were identified, evaluated and documented. Field reconnaissance and aerial photographs were used to identify parks, recreation areas, travel corridors and special viewpoints. Local planning documents were also reviewed for potential visual resource and aesthetic management goals and policies. Occupied houses (outside the incorporated area of Wessington Springs) were identified within 4 miles of the WSWP boundary.

Zones of Visual Influence (ZVIs) within the APV were established based upon previous wind farm and other visual resource studies (Sinclair 2001; Jones and Jones 1976). These zones are based on perception thresholds, the scale and nature of objects being viewed, and the viewing environment. The perception of form, texture, color and other visual elements in the landscape is a function of changing distance from a viewpoint. In general, landscape elements tend to become less obvious and less detailed at greater distances. Elements of form and line become more dominant than color or texture at longer viewing distances. A review of previous studies in similar geographical, topographical, and ecological settings was performed, and relevant visibility thresholds were established for project components and environments.

3.4.2 Study Area Overview

The WSWP visual resource study area is located in Jerauld County and a portion of northern Aurora County at the interface of the glaciated and unglaciated sections of the Interior Great Plains. The study area is at the border between the Missouri Plateau Section of the Great Plains Physiographic Province on the west, and the Western Lake Section of the Central Lowlands Physiographic Province on the east (Fenneman 1931).

The area is characterized by generally undulating topography in an agriculture dominated landscape, with a significant amount of native mixed-grass rangeland. The study area is generally split by the Wessington Hills, a geographic feature that forms the extent of the last glacial advance ending about 10,000 years ago. The WSWP would be located above an escarpment at the edge of these hills. Topography is more dramatic and varied on the west side of this boundary, and flatter and gently undulating on the east. The landscape is generally vast and open, with abundant expansive views, especially on the east side.

There are numerous wetlands and open water features in the study area, and groves of trees are occasionally present, especially in draws draining the Wessington Hills. Water features and wetlands are concentrated on the western side of the immediate project area.

Development is scattered, with the highest concentrations occurring in the incorporated municipalities of Wessington Springs to the north and Lane to the east. The main travel corridor, U.S. 281, runs

north-south, and is located 6 miles east of Wessington Springs. On the north side of the study area, SD 34 runs east-west, and is a Minor Arterial. The results of the APV study indicated that views of the wind farm may occur from most locations within the 10-mile buffer except for downtown Wessington Springs and some locations north of the town from where views of the WSWP area are masked by terrain (refer to Figure 3.4-5).

3.4.3 Landscape Character Types

Three landscape character types were identified within the WSWP study area: Eastern Agricultural Plains, Western Wessington Hills Rangeland, and Rural Townscape.

3.4.3.1 Eastern Agricultural Plains

The Eastern Agricultural Plains landscape is located on the eastern side of the study area, and is dominated by gently agricultural lands, rolling hills and grasslands with cattle. The landscape is a mix of rangeland and cropland, and is very uniform in color and texture (Figure 3.4-1). Barbed wire fences, gravel roads, and water tanks are the most common development features. Views from this landscape are often expansive, with little topographic and vegetation variation. Woodlots occasionally provide vertical relief and contrasting colors.

3.4.3.2 Western Wessington Hills Rangeland

The Western Wessington Hills Rangeland landscape dominates the portion of the study area west of the Wessington Hills escarpment, and is characterized by rolling hills dominated by grasslands. The landscape is more dissected than others in the study area, with vegetated drainages containing open water features and rocky fields. The landscape typically has less cultivated cropland than the Eastern Agricultural Plains. Topography is more dramatic and varied than to the east. These variations in visual elements lead to a visually diverse landscape (Figure 3.4-2).

3.4.3.3 Rural Townscape

The Rural Townscape landscape limited to the urbanized areas of the communities of Lane and Wessington Springs. Moderate to high density commercial, industrial, and residential development typifies this landscape. Architectural styles vary greatly and are diverse in material and color (Figure 3.4-3).

3.4.4 Scenic Quality and Visual Integrity

Within the landscape character types, similar contiguous landscape units were evaluated to assess scenic quality and visual integrity. Scenic quality was evaluated in natural landscapes, and visual integrity was evaluated in developed landscapes. The landscape units identified within specific landscape character types were assigned to a Scenic Quality/Visual Integrity class based on landform, water, vegetation and structure form, line color and texture. All units in the WSWP study area are assigned either to Scenic Quality/Visual Integrity Class B (above average) or to Class C (common). There are no Scenic Quality/Visual Integrity Class A (unique) landscapes in the study area. Most of the study area is classified as Class C (common). Class B (above average) landscapes are typically located in the Wessington Hills where topography and water features combined with boulder-dotted grasslands form an uncommon landscape that is visually interesting (Figure 3.4-4).

Figure 3.4-1. Eastern Agricultural Plain Landscape Character Type

Figure 3.4-2. Western Wessington Hills Rangeland Landscape Character Type

Figure 3.4-3. Rural Townscape Landscape Character Type

3.4.5 Visual Sensitivity

The following viewpoints were identified within the 10-mile study area:

- **All Occupied Residences.** Residences are clustered in and around Wessington Springs and Lane. Much of Wessington Springs would not have the project area in view due to topographic screening. The Wessington Hills border the town of Wessington Springs on the southwest, and the town is set below the hills by 150 to 175 feet. An inventory of all occupied residences was performed within 4 miles of the WSWP, but outside Wessington Springs from where there would be no views (refer to Figure 3.4-5).

- **U.S. Highway 281 (US 281).** This Rural Principal Arterial highway serves as the only north-south highway in the study area, and is the main route to Interstate 90 to the south (SDDOT 2007a). Views from the highway to the wind farm would be to the west. The wind farm would be a higher elevation than the highway, and the land generally gently slopes toward the road from the toe of the Wessington Hills to an elevation of approximately 1,375 feet, about 525 feet below the wind farm.

- **South Dakota State Highway 34 (SD 34).** This Rural Minor Arterial highway is the only east-west highway in the study area, and connects Wessington Springs to Woonsocket and Lane to the east and Fort Thompson to the west. West of Wessington Springs, SD 34 is at about the same elevation as the proposed WSWP. The road drops to almost 400 feet below the project area east of Wessington Springs. Views to the project area would be from various angles and elevations along SD 34.

Figure 3.4-4. Above Average Regional Scenery (Class B)

- **Historical Markers Scenic Overview.** This roadside park is located on the north side of SD 34 just west of the intersection with South Dakota Avenue in Wessington Springs. Two plaques on the site commemorate the founding of Wessington Springs and Governor Vessey, an early resident. The park also contains a shelter and picnic table. It overlooks Wessington Springs and the valley to the north and east.

- **Wessington Hills Park (David Jost Field).** This park, located on South Dakota Avenue on the south side of Wessington Springs, includes ball fields, picnic areas, a swimming facility, and "The Fieldhouse", a property listed in the National Register of Historic Places (see Section 3.12).

- **Trojan Park.** This small park is located on the southeast side of Lane, and contains a picnic table, a grill, shade trees and turfgrass. There are no ball fields or other active recreation areas.

Outside the incorporated boundaries of Wessington Springs and Lane, recreational activities in the study area are typically limited to hunting, fishing, and bird watching. Fishing access points include:

- **Wilmarth Lake Game Production Area (GPA).** This 103-acre reservoir, managed by SDGFP, is 8 miles southeast of the proposed wind project.

- **Crow Lake GPA.** This 488-acre lake, managed by SDGFP, is 4 miles west of the proposed project boundaries.

- **Horseshoe Lake GPA.** This 225-acre lake, managed by SDGFP, is just east of Crow Lake GPA and is 3.5 miles west of the proposed project.

Table 3.4-1 summarizes the visual sensitivities of the identified viewpoints based on expected use levels, viewer attitudes towards change, and viewing duration.

Table 3.4-1 Visual Sensitivities in WSWP Visual Resource Study Area

Viewpoints	Visual Sensitivity
All Occupied Residences	High
U.S. 281	Moderate
SD 34	Moderate
Historical Markers Scenic Overview	High
Trojan Park, Wessington Hills Park	High
Wilmarth Lake GS, Crow Lake GPA, Horseshoe Lake GPA	Moderate

3.4.6 Zones of Visual Influence/Distance Zones

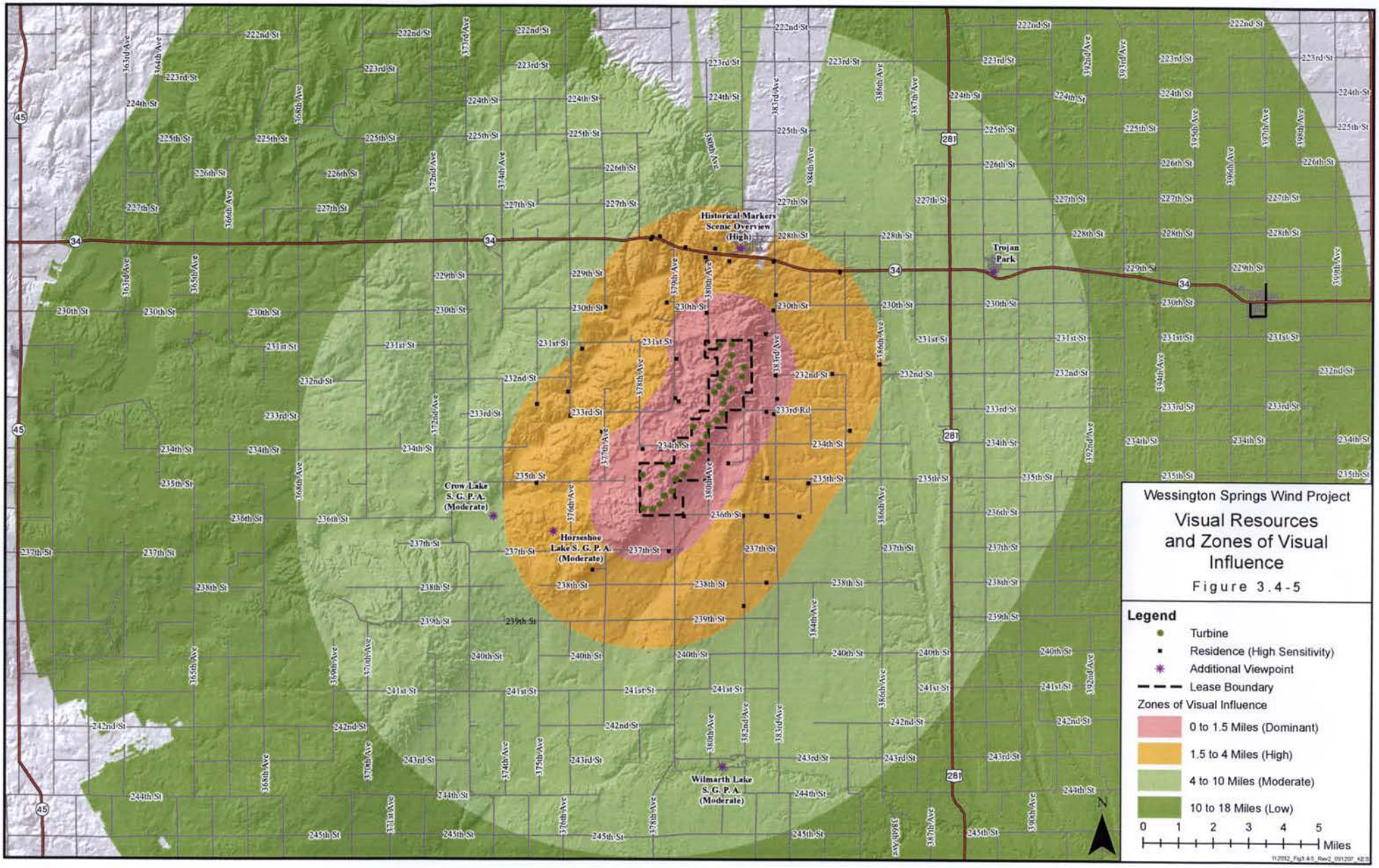
The difference between Distance Zones and ZVIs is that Distance Zones are based on an individual viewpoint *to* the proposed turbines, while ZVIs are modeled *from* the turbines outward across the landscape, showing the locations within the study area where topography would permit views of the turbines. The ZVI model is useful to show where individual viewpoints would be located relative to the proposed wind farm. The five ZVI's (and corresponding Distance Zones) used for the project are shown in Table 3.4-1 and Figure 3.4-5.

3.4.7 Jerauld County Comprehensive Plan

The proposed project would be located in an area under the jurisdiction of Jerauld County. The Jerauld County Comprehensive Plan (1998) guides development in the county, and has stated goals, objectives and policies to conserve and protect environmental resources. The plan was reviewed for goals policies and objectives intended to preserve visual or aesthetic resources within the county. This plan does not address visual resource development, preservation or enhancement.

Table 3.4-2 Zones of Visual Influence (ZVIs) and Distance Zones

Zone of Visual Influence	Distance Zone (From Sensitive Viewers)	Distance From/To Turbines
Dominant Visibility	Immediate Foreground	0 – 1.5 miles
High Visibility (Prominent Landscape Feature)	Foreground	1.5 - 4.0 miles
Moderate Visibility (Distinct Landscape Feature)	Middleground	4.0 - 10.0 miles
Low Visibility (Noticeable)	Background	10.0 - 18.0 miles
Indistinct/Negligible	Seldom Seen	Beyond 18.0 miles


Historical Markers Scenic Overview (High)
Trojan Park
Crow Lake S. G. P. A. (Moderate)
Horseshoe Lake S. G. P. A. (Moderate)
Wilmarth Lake S. G. P. A. (Moderate)
Wessington Springs Wind Project
Visual Resources and Zones of Visual Influence
Figure 3.4-5
Legend
Turbine
Residence (High Sensitivity)
Additional Viewpoint
Lease Boundary
Zones of Visual Influence
0 to 1.5 Miles (Dominant)
1.5 to 4 Miles (High)
4 to 10 Miles (Moderate)
10 to 18 Miles (Low)
0 1 2 3 4 5
Miles
N

3.5 Socioeconomics and Public Services

This section presents a demographic profile of population, employment, income and housing in Jerauld County and the city of Wessington Springs. Demographic and economic conditions in South Dakota are provided for comparison. The data was obtained from the U.S. Census Bureau (USCB 2007).

Wessington Springs is a rural community. The city of Wessington Springs, with an estimated 2005 population of less than 1,000 (Table 3.5-1), has an economy focused on agriculture, ranching, and recreation. The city has one motel, more than seven hunting lodges and guesthouses, two recreational vehicle (RV) parks, and a 9-hole golf course. Facilities also include the Wessington Springs Airport (see Section 3.3) and the 25-bed Avera Weskota Memorial Medical Center. The City has identified a location for future industrial development.

The City of Wessington Springs, using local wells and springs, is the water supplier to city residents. It has a capacity of 500,000 gallons/day and its usage is currently at 30 percent of capacity. The city has a local rubble site north of town, and a 40-acre regional landfill (Tri-County Landfill) is located near Pukwana, 35 miles to the southwest in Brule County.

The Wessington Springs School District includes all of Jerauld County. The three schools in the District are Wessington Springs High School (enrollment of 93), Wessington Springs Middle/Elementary School (enrollment of 140), and Spring Valley Colony School (enrollment 34). The Spring Valley Colony School supports a Hutterite colony about 15 miles west of Wessington Springs.

Tables 3.5-1 through 3.5-5 summarize various characteristics of population, employment, income, and housing in Wessington Springs, Jerauld County and the state of South Dakota.

3.6 Environmental Justice

Executive Order (E.O.) 12898 requires Federal agencies to address disproportionately high and adverse human health and environmental effects of their actions, programs, and policies on minority and low-income populations. The three primary steps in this assessment are to determine: 1) the geographic distribution of low-income and minority populations; 2) whether any impacts would be high and adverse; and 3) whether these impacts would disproportionately affect the low-income and minority populations.

Data on income for South Dakota, Jerauld County, and Wessington Springs are summarized in Tables 3.5-3 and 3.5-4. According to poverty statistics for 2000, the state of South Dakota had a low-income population of 95,900, or 12.7 percent of the total state population, while Jerauld County had a low-income population of 464, or 20.2 percent of the total county population. About 3.4 percent of Wessington Springs' population lived below the poverty level in 2000.

Information on the racial background of Jerauld County's population is presented in Table 3.6-1. Census data indicate that about 1 percent of the population of Jerauld County is minority, of which most individuals are American Indian.

Table 3.5-1 South Dakota, Jerauld County, and Wessington Springs Population

Area	1990	2000	Percentage Change	2005 Estimate
Wessington Springs	1,083	1,011	-6.6%	926
Jerauld County	2,425	2,295	-5.4%	2,136
South Dakota	696,004	754,844	8.5%	746,033

Source: U.S. Census Bureau 2007

Table 3.5-2 Jerauld County Employment by Industry

Sector	1990	2000	Percentage Change
Agriculture	302	253	-16.0%
Construction	53	73	37.7%
Manufacturing	46	108	134.8%
Wholesale trade	57	31	-45.6%
Retail Trade	138	150	8.7%
Transportation and utilities	56	62	10.7%
Information	0	5	500.0%
Finance, insurance and real estate	50	24	-52.0%
Professional and personal	57	32	-44.0%
Educational, health and social services	203	216	6.4%
Entertainment, and recreation	3	58	1833.3%
Other services	43	54	25.6%
Public administration	37	43	16.2%
Total	1,045	1,109	6.0%

Source: U.S. Census Bureau 2007

Table 3.5-3 Jerauld County, Wessington Springs, and South Dakota Median Household Income

Area	1990	2000	Percentage Change
Wessington Springs	$17,286	$31,736	83.6%
Jerauld County	$18,588	$30,690	65.0%
South Dakota	$24,120	$35,282	46.3%

Source: Office of Social and Economic Trend Analysis, U.S. Census Bureau 2007

Table 3.5-4 1990 to 2000 Jerauld County Household Income Distribution

Income Range	1990 Households	2000 Households	Percentage Change
Under $10,000	132	59	-55.3%
$10,000 – $19,999	148	93	-37.2%
$20,000 - $29,999	121	86	-29.0%
$30,000 - $39,999	51	79	55.0%
$40,000 - $49,999	31	52	67.7%
$50,000 - $59,999	8	43	437.5%
$60,000 - $74,999	0	40	4,000.0%
$75,000 - $99,999	2	18	800.0%
$100,000 - $149,999	2	17	750.0%
Over $150,000	3	14	366.7%
Total	498	501	0.6%

Source: Office of Social and Economic Trend Analysis, U.S. Census Bureau 2007

Table 3.5-5 1990 to 2000 Wessington Springs and Jerauld County Housing Characteristics

Housing Characteristics	1990	2000	Percentage Change
Wessington Springs			
Total Housing Units	569	580	2.0%
Occupied Units (Households)	496	505	1.8%
Owner-Occupied	363	362	0.3%
Renter Occupied	133	143	7.5%
Vacant Units	73	66	-9.6%
Seasonal Units	1	9	800.0%
Jerauld County			
Total Housing Units	1,182	1,167	-1.3%
Occupied Units (Households)	966	987	2.2%
Owner-Occupied	703	713	1.4%
Renter-Occupied	263	274	4.2%
Vacant Units	216	149	-31.0%
Seasonal Units	15	31	106.7%

Source: U.S. Census Bureau 2007

Table 3.6-1 Jerauld County Population by Race and Hispanic Origin

	1990		2000	
Race	Number	Percentage	Number	Percentage
White	2,414	99.5%	2,272	98.7%
Black	0	0.0%	0	0.0%
Indian	5	0.3%	13	0.6%
Asian	7	0.3%	3	0.1%
Other	0	0.0%	7	0.3%
Total	2,427	100.0%	2,302	100.0%
Hispanic Origin[1]	1	<0.1%	7	0.3%

[1]The U.S. Census Bureau treats Hispanic Origin as a separate category because Hispanic groups include people of different races.
Source: U.S. Census Bureau 2007

3.7 Biological Resources

3.7.1 Regulatory Framework

3.7.1.1 Federal Statutes

Endangered Species Act

The Endangered Species Act (ESA) (7 U.S.C. 136; 16 U.S.C. 460 et seq.) provides for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The Act is implemented by two Federal agencies, the USFWS and National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries), which have the ability to officially list plant and animal species as endangered or threatened. Section 7 of the ESA imposes an affirmative duty on Federal agencies to ensure that their actions (including permitting) are not likely to jeopardize the continued existence of a listed species or result in the destruction or modification of its habitat.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703) makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird, except under the terms of a valid permit issued by the USFWS.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) (16 CFR 668) prohibits any form of possession or taking of either bald or golden eagles. The statute imposes criminal and civil sanctions as well as an enhanced penalty provision for subsequent offenses.

3.7.1.2 State Statutes

South Dakota Wildlife Diversity Program

South Dakota does not have a formal biodiversity program. The South Dakota Wildlife Diversity Program (SDCL 34A-2-1, 38-7-1) protects species and habitats that comprise the biological diversity

of the state "in a manner that meets the needs and desires of the citizens of the state." Statutory policies are geared toward the conservation of water and soils to help preserve wildlife. SDGFP maintains an interagency program, South Dakota Natural Heritage, to track species lists for the state.

South Dakota Endangered Species Law

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

3.7.2 Study Methods

The area of impact for biological resources was defined as the immediate WSWP area as well as adjacent lands utilized by wildlife, such as migration corridors. Biological data were collected from literature searches; agency personnel and reports from USFWS, SDGFP and South Dakota Natural Heritage; ecological reports and databases (e.g., NatureServe, GAP analysis); and field investigations. Biologists from USFWS, SDGFP, Western EcoSystems Technology, Inc. (WEST), and POWER Engineers, Inc. (POWER) provided regional and site-specific information for biological resources. Information for Federal-listed species was requested from the USFWS in early May 2007 and provided on May 8, 2007 (Appendix C).

Field investigations were conducted for site characterization in April and June 2007 by POWER biologists. Avian and bat call surveys were conducted between the spring and fall of 2007 by WEST. Three types of surveys have been completed by WEST: fixed point count surveys to identify migratory birds, transect surveys to identify breeding birds, and bat call surveys to identify bats in the project area. In addition to the avian and bat surveys, a Potential Impact Index (PII) study was completed to evaluate potential impacts to biological resources in accordance with USFWS guidelines.

3.7.3 Vegetation

3.7.3.1 Regional Overview

The WSWP is located within the Northern Glaciated Plains ecoregion, Southern Missouri Coteau sub-region (Omernik 2005). Similarly, Bailey et al. (1995) describe this area as the Great Plains Steppe Province, and the South Dakota Wildlife Action Plan (SDGFP 2006) identifies the area as Eastern Prairie ecoregion, mixed-grass subregion. This region is characterized by elevation ranges of 300 feet to 2,500 feet mean sea level (m.s.l.). The area is mesic with average annual precipitation in excess of 20 inches. Mixed grasses dominate the native vegetation. Species of wheatgrass (*Agropyron* spp.), needlegrass (*Stipa* spp.), and grama (*Bouteloua* spp.) are common, while woody vegetation is rare and generally limited to drainages. Cropland is also common and consists primarily of corn, small grains, and alfalfa. Wetlands and prairie potholes are scattered across the landscape. Wetland basin densities in the prairie pothole region (PPR) are some of the highest in the country with densities as high as 83 wetland basins per square mile.

3.7.3.2 Project Area

The project area is a composition of rolling hills intermixed with wetlands, mixed-grass prairie, patches of deciduous trees, and cropland. Project area elevation ranges from 1,692 feet m.s.l. in the bottomlands to 1,965 feet m.s.l. along the eastern boundary escarpment. Mixed short and tall grasses occur primarily on the rolling hills throughout the central and eastern portion and comprise approximately 70 percent of the project area (Figures 2.3-2 and 3.7-1). Mixed grasslands are

dominated by grama (*Bouteloua* spp.), bluestem (*Schizachrium* spp.), needle-and-thread grass (*Stipa comata*), and wheatgrass (*Agropyron* spp.).

Figure 3.7-1. Rolling Hills and Mixed-Grass Prairie within the WSWP Area, June 2007

The eastern escarpment is positioned in a generally north-south direction and provides approximately 100 feet of relief. Drainages are scattered along the escarpment and are populated with deciduous woodland comprising approximately 7 percent of the project area. Woody species include cottonwood (*Populus* spp.), willow (*Salix* spp.), burr oak (*Quercus macrocarpa*), and ash (*Fraxinus* spp.). Patches of trees are also found around some of the larger pothole lakes and in shelter belts adjacent to cultivated fields.

Wetlands make up approximately 7 percent of the project area and are found primarily in the central and western portions of the project area (Figure 3.7-2). Regional climatic patterns determine the mixture of seasonal and perennial lentic basins. Wetland density for Jerauld County and the project area are 23 and 21 wetland basins per square mile, respectively. Wetland vegetation includes both emergent and submergent species. Common emergent vegetation includes sedges (*Carex* spp.), rushes (*Juncus* spp.), cattail (*Typha* spp.), bulrush (*Schoenoplectus* spp.), and arrowhead (*Sagittaria* spp.). Common submergent vegetation species include sago pondweed (*Stuckenia pectinata*) and duckweed (*Lemna* spp.). Further detail regarding wetlands can be found in Section 3.8.

Agricultural lands within the project area are primarily corn, alfalfa, wheat, and hay. Cultivated fields are generally located along the western boundary and comprise approximately 13 percent of the project area. Additional fields can be found adjacent to the project boundary along the eastern edge below the escarpment. Cattle grazing is found throughout the project area and is more concentrated in the south.

Figure 3.7-2. Pothole Lakes and Wetland Habitat in the Wessington Springs Wind Project Area, June 2007.

3.7.3.3 Invasive Plant Species

In South Dakota, an invasive species is defined as: 1) a declared pest (which is a species sufficiently detrimental to the state to warrant enforcement of control measures); or 2) a noxious weed which the South Dakota Weed and Pest Control Commission has designated as sufficiently detrimental to the state to warrant enforcement of control measures [AR 12.62.02]. South Dakota has 27 documented invasive species designated by administrative rules. Table 3.7-1 presents the invasive species currently documented in Jerauld County. The distribution of invasive species within the project area is unknown at this time.

3.7.4 Fish and Wildlife

Site-specific information on aquatic and terrestrial fauna is limited for the project area. Avian nesting and presence surveys as well as bat call surveys were conducted during 2007. No site-specific survey data are available for invertebrates, fish, amphibians, reptiles, or mammals other than bats.

3.7.4.1 Project Area

Terrestrial fauna within the project area are characteristic of mixed grasslands within the PPR. Fertile soils and high wetland basin density provide an abundance of forage and habitat cover for many species of small mammals, amphibians, reptiles, and birds. Natural organisms share the region with cattle and other livestock. Agricultural practices have reduced the amount and continuity of prairie and wetland habitat over the past 150 years. As a result, patches of habitat have become smaller and are often intermixed with woody species in tree rows and shelter belts.

Table 3.7-1 South Dakota Invasive Plant Species Documented in Jerauld County.

Common Name	Scientific Name
Leafy spurge	*Euphorbia esula*
Canada thistle	*Cirsium arvense*
Perennial sow thistle	*Sonchus arvensis*
Hoary cress	*Cardaria drab*
Russian knapweed	*Centaurea repen*
Salt Cedar	*Tamarix aphylla, T. chinensis, T. gallica, T. parviflora and T. ramosissima*
Absinth wormwood	*Artemisia absinthiu*
Musk thistle	*Carduus nutans*
Plumeless thistle	*Carduus acanthoides*

Source: South Dakota Department of Agriculture 2007

Common mammals occurring in the project vicinity include deer and rabbits. Small burrowing mammals, such as shrews, voles, mice, and gophers, use soft soils for denning and cover. Game species include pronghorn, mule and white-tail deer. White-tail deer are considered common in the vicinity (USFWS 2007a). Bat species both reside in and migrate through the general region. There are 12 species of bats documented in South Dakota, seven of which have the potential to occur in the project area (SDBMP 2004; SDGFP 2007a) (Table 3.7-2).

Specific information regarding roosting, breeding, foraging, and migration is unknown for bats in the project area. Areas adjacent to pothole lakes and wetlands are mesic and support cover and foraging habitat for mammal species. Peaks in insect hatches during warm season months provide a good prey base for many mammals, as well as bird, amphibian, and reptile species. Bat call surveys were performed during summer and fall 2007 (WEST 2007c). The surveys were performed using Anabat, a system to identify and survey bats by detecting and analyzing their echolocation calls. During 63 nights using Anabats, only 11 bat calls were recorded, indicating low bat activity in the WSWP area. The species distribution and recorded call frequencies indicate that six of the seven species listed in Table 3.7-2 as likely to occur in the area were identified.

There are three State-listed reptile species and one amphibian species listed in the Wildlife Action Plan (SDGFP 2006) that may potentially occur in the project area (SDGFP 2007b; USFWS 2007). Wetlands and woody patch habitat are preferred by these species. There are no known critical breeding or hibernation habitats for amphibian and reptile species within or adjacent to the project area.

Bird species utilize the central plains of South Dakota extensively. Mixed grasslands and the PPR intersect many migratory routes and also provide breeding grounds for other species. Wetland basins are highly productive and provide birds with ample resources for reproduction. Waterfowl and song birds frequently utilize prairie potholes and mixed-grass prairie for breeding. Bird species likely to occur in the project area are listed in Appendix D.

Table 3.7-2 Bat Species That May Occur Within the WSWP Area.

Common Name	Scientific Name	Type of Residency	Ranking	Recorded During 2007 Bat Call Surveys*
Northern myotis	*Myotis septentrionalis*	Year-round	Apparently secure/rare or local range (G4/S3)	Yes
Silver-haired bat	*Lasionycteris noctivagans*	Summer	Secure/apparentl y secure (G5/S4)	Yes
Little brown myotis	*Myotis lucifugus*	Year-round	Secure (G5/S5)	Yes
Western small-footed myotis	*Myotis ciliolabrum*	Year-round	Secure (G5/S5)	No
Big brown bat	*Eptesicus Fuscus*	Year-round	Secure (G5/S5)	Yes
Eastern red bat	*Lasiurus borealis*	Summer	Secure (G5/S5)	Yes
Hoary bat	*Lasiurus cinereus*	Summer	Secure (G5/S5)	Yes

Source: SDGFP 2004, 2007
Ranks: G5/S5-Demonstrably secure, though it may be quite rare in parts of its range
G4/S4-Apparently secure, though it may be quite rare in parts of its range
S3-Either very rare and local throughout its range, or found locally
*Based on species distribution and recorded call frequency (C. Derby, personal communication 2007)

Upland game bird species known to occur in the study area include ring-necked pheasant, greater prairie chicken, and sharp-tailed grouse. Ring-necked pheasant habitat within the project area is primarily mixed grasses and cropland. The intact native grasslands in the project area also provide high quality habitat for sharp-tailed grouse and prairie chicken. Sharp-tailed grouse and prairie chicken were documented during spring and summer avian surveys. No grouse or prairie chicken leks were seen in the project area during the avian surveys, but surveys designed specifically to identify leks in the WSWP area have not been conducted.

Waterfowl utilize the wetland basins in the study area for nesting, foraging, and migratory stopover. Cady Lake WPA is 0.5 mile west of the west-central border of the project area. WPAs are USFWS preserves of quality habitat often utilized by waterfowl species. WPAs and wetlands in the project vicinity also provide nesting, foraging, and cover habitat for several shorebird species, such as Wilson's phalarope, Wilson's snipe, and sandpiper. Primary habitats for these species include mesic grasslands and wetlands in the northern portion of the study area.

Intact native mixed-grass prairie in the project area provides suitable habitat for many residential and migratory bird species. Avian surveys were conducted in 2007 to estimate the temporal and spatial distributions of birds in the WSWP area. Fixed point count migratory bird surveys were conducted in March and April 2007. Transect surveys for breeding birds were conducted in May, June, and July 2007. Collectively, field surveys recorded 5,162 individual birds representing over 60 species.

Preliminary results indicate a total of 4,324 birds representing 35 species were recorded during fixed point surveys (WEST 2007a). The most frequently observed species were snow geese, sandhill cranes, and mallards. Additionally, there were four other species with at least 40 individuals recorded: American crow, Brewer's blackbird, double-crested cormorant, and western meadowlark. Red-tailed hawks and northern harriers were the most abundant raptors observed. Several groups of sandhill cranes were observed in a variety of habitats (wetland, agricultural, grassland) in the project area. Sandhill cranes are sometimes used by biologists as a surrogate for whooping cranes because the former are more abundant and often utilize similar habitats. Care must be taken in using surrogates, however, because there are reasons, often unknown to humans, why one species is more abundant than another even though they use similar habitats.

Preliminary results indicate a total of 838 individuals representing 42 species were recorded during line transect surveys. The most common species observed were bobolink, blue-winged teal, red-winged blackbird, western meadowlark, and grasshopper sparrow. Other species observed with 30 or more individuals included mallard, American crow, and redhead duck (WEST 2007a). Red-tailed hawks and great-horned owls were the most abundant raptors observed.

Topographic relief in the project area is primarily associated with the escarpment located on the eastern edge of the project. This landform runs in a north-south direction. The escarpment may provide a source of updrafts that could be used by soaring raptors. Concentrated prey sources, specifically waterfowl, fluctuate seasonally with waterfowl migrations. Concentrations of waterfowl are generally expected to be higher in the spring and fall, so raptor populations may increase during these times. Roosting trees are limited in the area and the use of these trees for nesting by raptors is not known. No stick n ests or raptor breeding were recorded during field visits or surveys in 2007. Overall raptor use in the WSWP area is expected to be similar in all seasons and similar to raptor use in adjacent areas (West 2007b).

3.7.5 Special Status Species

A list of species designated as Federally threatened, endangered, or candidate was obtained from the USFWS (USFWS 2007). A list of South Dakota species of special concern was obtained from the SDGFP (SDGFP 2007a; Kempema personal communication 2007). SDGFP identifies 31 species of invertebrates, fish, reptiles, amphibians, mammals, birds, and plants that warrant special protection. One of these species, the whooping crane, is also protected under the ESA. Table 3.7-3 identifies the Federal and State-listed sensitive species that may occur in the study area, summarizes the habitat associations, and lists the status of these species. Of the 31 special status species, two species were identified as likely to occur in the project area and are included in Table 3.7-3. The remaining 29 species (of the original 31) were screened out based on habitat associations and lack of specific habitat in the project area. One species in Table 3.7-4, Topeka shiner, does not occur in the area.

3.7.5.1 Federal-Listed Species

Whooping Crane (Federal Endangered, State Endangered)

Legal Status. The whooping crane was initially listed as threatened on May 11, 1967 (32 FR 4001), and reclassified as endangered on June 2, 1970 (35 FR 8495). Critical habitat was designated for the whooping crane on May 15, 1978 (43 FR 20938). Critical habitat is designated in Colorado, Idaho, Kansas, Nebraska, New Mexico, Oklahoma, and Texas. A species recovery plan was completed in 2005 and revised in 2007 (Canadian Wildlife Service and USFWS 2005), with a contingency plan published in 2005 and revised in 2006 (USFWS 2006).

Table 3.7-3 Federal and State-listed Species That May Occur Within the WSWP Area.

Common Name	Scientific Name	Habitat Association	Special Status[1]	Potential for Occurrence
Whooping crane	*Grus americana*	Aquatic/wetland| Cropland	E, SE	May occur
Bald eagle	*Haliaeetus leucocephalus*	Aquatic/wetland	ST	May occur

[1]Status codes: T = USFWS threatened, E = USFWS endangered, ST = state threatened, SE = state endangered
Sources: SDGFP 2007; USFWS 2007, 2006; USDOI 2007; Smith et al. 2001; NatureServe 2006

Species Ecology. The whooping crane currently occurs at three locations in the wild and at seven captive sites (Canadian Wildlife Service and USFWS 2005). The only self-sustaining wild population is the Aransas-Wood Buffalo National Park Population (AWBP), which migrates between summer nesting grounds in Wood Buffalo National Park (WBNP) in Canada and winter habitat in the coastal marshes of the Aransas National Wildlife Refuge (ANWR) in Texas. Spring migration to WBNP begins in late March to early April and is completed within two to four weeks of departure (Austin and Richert 2001). Fall migration to ANWR begins mid-September to late October and is completed within two to four weeks of departure (Austin and Richert 2001). Migration is during the day, usually from 9:30 a.m. to 5:00 p.m., when air currents are favorable (Stehn 2007). The WBNP nesting habitat is characterized by wetlands interspersed with white spruce (*Picea alauca*) – black spruce (*Picea mariana*) – tamarack (*Larix laricina*) – willow (*Salix* spp.) forest. Nest sites are located in shallow potholes that contain bulrush (*Scirpus validus*) (Lewis 1995; Austin and Richert 2001; Stehn 2007). In the fall, the AWBP conducts a 2,600-mile migration through Alberta, Saskatchewan and eastern Manitoba, stopping in southern Saskatchewan for several weeks before continuing migration to ANWR. This migration route follows the Missouri River corridor through the midwestern U.S. The corridor span is approximately 200 miles wide. While whooping cranes use a variety of habitats during migration, they primarily roost in shallow, seasonally and semi-permanently flooded, palustrine wetlands and forage in subirrigated wet meadows and cultivated agricultural lands (Lewis 1995; Austin and Richert 2001; Stehn 2007). Most wetlands used for roosting are small (< 10 acres) and located within 0.5 mile of a suitable feeding site. Winter habitat consists of estuarine marshes, shallow bays, and tidal flats in the Gulf of Mexico, although some individuals occasionally utilize adjacent pastures and cropland (Lewis 1995; Austin and Richert 2001).

Local Distribution. The whooping crane does not breed or nest in South Dakota (SDGFP 2007), but stopover occurrence during migration is common throughout South Dakota. There were 214 observations of whooping cranes in South Dakota between the years of 1943 and 2007. The majority of sightings have occurred in the central portion of the state along the Missouri River corridor (Austin and Richert 2001). Whooping cranes have not been observed in Jerauld County. North of Jerauld County, there were one observation in Hyde County, seven observations in Hand County, and four observations in Beadle County.. Adjacent counties to the east and west (Sanborn and Buffalo, respectively) have no documented crane observations, although counties farther east and west do. South of Jerauld County, Brule and Aurora counties reported single fall observations, and Brule County also reported three spring sightings. Despite the lack of supporting observational data from

Jerauld County, the north-south county documentation suggests that cranes have flown over Jerauld County.

The project area is located within the 200-mile migration corridor. No whooping cranes were observed during the bird surveys conducted in the project area in 2007 (WEST 2007a). The WSWP area contains numerous small wetlands, prairie pothole lakes, mixed grasses, and cultivated fields. The wetlands generally contain submergent and emergent vegetation, and some wet meadow habitat is adjacent to pothole lakes. Cady Lake is the largest body of water in the project vicinity. A small northern finger of the lake, located outside the project area, is designated as a WPA by the USFWS. Emergent and submergent wetland vegetation is present in the lake. Wetland habitat represents approximately 7 percent of the project area and is whooping crane roosting habitat. The project area also contains some (approximately 13 percent) cultivated fields and is dominated by grasslands, both of which could be used as foraging habitat by whooping cranes. Although the project area is located near the edge of the 200-mile migratory corridor, previous sightings in adjacent counties suggest that whooping cranes may occasionally fly over the project area during seasonal migrations. Historical occurrence in adjacent counties; location of the project area within the 200-mile migration corridor; and the presence of suitable foraging, roosting, and stop over habitat indicate that whooping cranes may occur in the project area (Stehn 2007).

3.7.5.2 State-Listed Species

Whooping Crane (State Endangered)

The legal status, species ecology, and local distribution of whooping cranes are discussed in Section 3.7.5.1.

Bald Eagle (State Threatened)

Legal Status. In 1978, the bald eagle was designated as Federally endangered throughout the lower 48 States with the exception of Michigan, Minnesota, Wisconsin, Washington, and Oregon, where the species was designated as threatened (43 FR 6233). The species was subsequently downlisted to threatened throughout the lower 48 states in 1995 (60 FR 35999), and there were proposals to de-list the species entirely (64 FR 36453). In August 2007, the bald eagle was de-listed (USDOI 2007). The bald eagle remains protected under the Federal BGEPA (see Section 3.7.1.1). The bald eagle is also listed as threatened by SDGPP (2007).

Species Ecology. Bald eagle habitat consists of large trees, which are utilized for perching, roosting, and nesting, in proximity to water bodies that support fish populations (USFWS 1986; Groves et al. 1997). While fish represent the primary food source, bald eagles in the western United States also scavenge for carrion on big game winter range (USFWS 1986). Principal food items for bald eagles in South Dakota include fish, waterfowl, jackrabbits, and carrion (Groves et al. 1997). Bald eagles typically nest in tall trees or on cliffs within 0.5 mile of a permanent water body.

Local Distribution. In South Dakota, bald eagles are known to nest along the Missouri River in the central part of the state and along the James River in the southeast portion of the state (Aron 2005). Bald eagles winter near fish runs, waterfowl concentrations, and open water. Impoundments along the Missouri River in South Dakota often support wintering and migrating bald eagles. Bald eagles are generally present in this area between November and March. While there are no known nests or roost sites within the WSWP area, the bald eagle may occur as a transient within the project area during winter months.

3.7.5.3 State Species of Concern

Certain species are not protected as threatened, endangered or candidate species as in sections 3.7.5.1 and 3.7.5.2, but are identified as species fo concern under the authority of the South Dakota Wildlife Action Plan (SDGFP 2006). The Wildlife Action Plan identifies wildlife species meeting three criteria of conservation concern. The three criteria are: 1) Federal or State threatened or endangered listing; 2) South Dakota represents the majority of species range; and 3) the species depends on a declining or unique habitat in South Dakota. Species in the Eastern Prairie ecoregion mixed-grass subregion that may occur in the project area are listed in Table 3.7-4. In addition to those species listed in the Wildlife Action Plan, South Dakota maintains a list of Level 1 priority bird species (Table 3.7-4). Level 1 priority bird species are those with the highest conservation priority due to: 1) high maximum abundance of the species within its range; 2) South Dakota constitutes the core of the species breeding range; and 3) the species is showing population declines in South Dakota or across its range (Bakker 2005).

Greater Prairie Chicken

Status. Greater prairie chicken global and State status is G4/S4, apparently secure, uncommon but not rare. Prairie chicken populations continue to decline, especially in grassland habitat. Declining populations, due primarily to habitat loss, have triggered increased concerns for local populations, warranting South Dakota's species of concern status.

Species Ecology. Breeding begins in late April with male occupancy of leks and female visitation during courtship displays. Nesting occurs in May and June. Nests are built in relatively undisturbed grassland, tall grass prairie and pasturelands. The nest is a shallow scrape lined with grasses and other available vegetation. Prairie chicken clutch size is usually 8 to 14 eggs. Prairie chickens forage primarily on insects, especially grasshoppers, and may forage on fruit, leaves, flowers, shoots, seeds, and grain during non-summer months.

Local Distribution. Prairie chickens are year-round residents of central South Dakota. Breeding occurs throughout the state distribution; however, prairie chicken breeding has not been documented in Jerauld County (Huxoll 2005). Greater prairie chickens were observed in the project area during 2007 breeding bird surveys (WEST 2007a). It is unknown if any active leks are in the project area. No leks were observed during the breeding bird surveys, but these surveys were not designed to identify leks.

Sharp-tailed Grouse

Status. Sharp-tailed grouse global and State status is G4/S4, apparently secure, uncommon but not rare. Sharp-tailed grouse populations continue to decline, especially in grassland habitat. Declining populations, due primarily to habitat loss, have triggered increased concerns for local populations, warranting South Dakota's species of concern status.

Species Ecology. Breeding begins in late April to early May with male occupancy of leks and female visitation during courtship displays. Sharp-tailed grouse prefer a mosaic of dense grass and shrubs with a rich forb and insect forage base (Connelly et al. 1998). Nesting occurs in May and June. Re-nesting occurs in the event of failure (Connelly et al. 1998). Nests are built under or near shrubs or small trees if available, or under thick and taller residual cover. The nest is comprised of moss, grasses, sedges, ferns, herbaceous plants, and leaves of shrubs and trees, and is lined with grasses, sedges, and breast-feathers from the female. Sharp-tailed grouse clutch size is usually 11 to 12 eggs. Sharp-tailed grouse primarily feed on fruits, grain, acorns, buds, and catkins in the fall and winter. Insects, such as ants, beetles, and grasshoppers, are preferred in spring and summer months.

Table 3.7-4 South Dakota Species of Concern and Level 1 Bird Species occurring in the WSWP Area.

Common Name	Scientific Name	Ecosystem	Occurrence
Birds			
Greater prairie chicken	*Tympanuchus cupido*	Grass/shrub	Occurs
Sharp-tailed grouse	*Tympanuchus phasianellus*	Grass/shrub	Occurs
Le Conte's sparrow	*Ammodramus leconteii*	Riparian/wetland	May occur[1]
Chestnut-collared longspur	*Calcarius ornatus*	Grass/shrub	May occur[1]
American bittern	*Botauruslentiginosus*	Riparian/wetland	Occurs
Northern harrier	*Circus cyaneus*	Grassland	Occurs
Upland sandpiper	*Bartramia longicauda*	Grassland	Occurs
Marbled godwit	*Limosa fedoa*	Riparian/wetland/grassland	Occurs
Wilson's phalarope	*Phalaropus tricolor*	Riparian/wetland/grassland	Occurs
Grasshopper sparrow	*Ammodramus savannarum*	Grassland	Occurs
Western meadowlark	*Sturnella neglecta*	Grassland	Occurs
Invertebrates			
Regal fritillary	*Speyeria idalia*	Grass/shrub	May occur

Sources: SDGFP 2007; Kempema, personal communication 2007; USFWS 2007; NatureServe 2007
[1]Migratory occurrence is likely

Local Distribution. Sharp-tailed grouse are year-round residents in the western portion of South Dakota. Breeding occurs throughout the state distribution and has been documented in northwestern Jerauld County (Huxoll 2005). Sharp-tailed grouse were observed in the project area during 2007 breeding bird surveys (WEST 2007a). It is unknown if any active leks are in the project area. Leks were not observed during avian surveys in 2007, but these surveys were not designed specifically for lek identification.

Le Conte's Sparrow

Status. Le Conte's sparrow global status is G4, apparently secure, and the State status is S1, critically imperiled, at very high risk of extinction due to extreme rarity (often five or fewer populations), very steep declines. Le Conte's sparrows may be common within its range where suitable habitat is present. In South Dakota, declining populations, primarily due to habitat loss, have triggered increase concerns for local populations, warranting South Dakota's species of concern status.

Species Ecology. This species migrates north to breeding areas in Canada, Minnesota, Wisconsin, and North Dakota, usually in March and April. Breeding in South Dakota is limited. Non-breeding

habitat consists of old field and prairie habitats with dense cover of grass or sedge (Lowther 2005). Le Conte's sparrow is a ground forager, mainly eating seeds in winter and insects and spiders in summer. Breeding habitat consists of open, level uplands and lowlands with tall, thick herbaceous vegetation and thick litter.

Local Distribution. Le Conte's sparrows are migratory residents in central South Dakota and summer residents in the northeastern portion of the state. Breeding has not been documented in South Dakota or Jerauld County (South Dakota Birds 2007). Le Conte's sparrows were not observed in the project area during 2007 breeding bird surveys (WEST 2007a).

Chestnut-collared Longspur

Status. Chestnut-collared longspur global status is G5, secure, and the State status is S4, apparently secure. Chestnut-collared longspurs are common within their range where suitable habitat is present. Declining populations are generally local. Habitat loss is the prime cause for population declines and has triggered an increased concern for this species, warranting South Dakota's species of concern status.

Species Ecology. This species migrates north to breeding grounds in late March and early April. Males arrive approximately one to two weeks ahead of females (Hill and Gould 1997). Chestnut-collared longspurs produce one to two broods per season with three to five eggs. Nesting occurs in open native taller grass prairie devoid of heavy shrub cover. Nests are built on the ground and the nest in usually constructed entirely of grasses. Fall migration to winter grounds in the southern U.S. and Mexico occurs in September and October. Chestnut-collared longspurs forage primarily on seeds and insects.

Local Distribution. Chestnut-collared longspurs are summer residents in South Dakota. Breeding has been documented in northwest Jerauld County (South Dakota Birds 2007). Chestnut-collared longspurs were not observed in the project area during 2007 breeding bird surveys (WEST 2007a).

American Bittern

Status. American bittern global and State status is G4/S4, apparently secure, uncommon but not rare. American bittern populations continue to decline in wetland habitat especially in the southern portion of its range. Loss of habitat has triggered increased concerns for local populations, warranting South Dakota's species of concern status.

Species Ecology. American bitterns arrive in South Dakota primarily in April to breed. Bitterns prefer freshwater and (less often) brackish marshes, including lake and pond edges with abundant cattails, sedges, or bulrushes and patches of open water and aquatic-bed vegetation. Nests are built of reeds, sedges, and cattails among emergent vegetation over open water. American bittern produce one brood per season of one to two eggs. American bitters forage on a variety of species including insects, small fishes, crustaceans, amphibians, and small mammals. Southward migration occurs from September to October and November (Gibbs et al. 1992).

Local Distribution. American bitterns are summer residents in South Dakota. Breeding has not been documented in Jerauld County but it has been documented in northeastern South Dakota (South Dakota Birds 2007). American bitterns were observed in the project area during 2007 breeding bird surveys (WEST 2007a).

Northern Harrier

Status. Northern harrier global and State status is G5/S5, secure, common. Northern harrier populations continue to decline primarily due to loss of wetland habitat and pesticide use within its range. Habitat loss has triggered increased concerns for local populations, warranting South Dakota's species of concern status.

Species Ecology. Northern harriers are breeding residents in northern South Dakota and year-round residents in southern South Dakota (MacWhirter and Bildstein 1996). Northern harriers prefer a variety of year-round habitats: open wetlands, including marshy meadows; wet, lightly grazed pastures; old fields; freshwater and brackish marshes; dry uplands; upland prairies; mesic grasslands; drained marshlands; croplands; cold desert shrub-steppe; and riparian woodland. Breeding occurs in a variety of marsh and grassland habitats. Nests are built on the ground and consist of a platform built by the male, using reeds, grasses, forbs, weeds, and water plants for construction. Northern harriers produce one brood per season consisting of one to two eggs (MacWhirter and Bildstein 1996). Northern harriers forage on small- and medium-sized mammals, primarily rodents, passerines, small waterbirds, reptiles, and frogs.

Local Distribution. Northern harriers are summer residents of South Dakota and breed throughout the state. However, breeding has not been documented in Jerauld County (South Dakota Birds 2007). Northern harriers were observed in the project area during spring 2007 migratory bird surveys (WEST 2007a).

Upland Sandpiper

Status. Upland sandpiper global and State status is G5/S5, secure, common. Upland sandpiper populations continue to decline primarily due to loss of wetland habitat and pesticide use within its range. Habitat loss has triggered increased concerns for local populations and have warranted South Dakota's species of concern status.

Species Ecology. Upland sandpipers arrive in South Dakota in early May to breed. Sandpipers prefer dry grasslands with low to moderate forb cover, low woody cover, moderate grass cover, moderate to high litter cover, and little bare ground (Houston and Bowen 2001). Nests are built on the ground, consist of bare depression scraps and may have leaf and twig lining. Upland sandpipers produce one brood per season of three to five eggs. Upland sandpipers forage on a variety of invertebrates including grasshoppers, crickets, weevils, and beetles. Southward migration occurs around August and September in South Dakota (Houston and Bowen 2001).

Local Distribution. Upland sandpipers are summer residents of South Dakota and breed throughout the state. However, breeding has not been documented in Jerauld County (South Dakota Brids 2007). Upland sandpipers were observed in the project area during 2007 migratory bird surveys (WEST 2007a).

Marbled Godwit

Status. Marbled godwit global and State status is G5/S5, secure, common. Marbled godwit populations continue to decline from historic levels primarily due to historic hunting and loss of wetland habitat within its range. Declines have triggered increased concerns for local populations, warranting South Dakota's species of concern status.

Species Ecology. Marbled godwits arrive in South Dakota in early April to breed. Godwits prefer short, sparsely to moderately vegetated landscapes that include native grassland and wetland complexes with a variety of wetland classes. Tall, dense vegetative cover is avoided. Nests are

shallow cup depressions in the ground in unconcealed grasslands and are often lined sparsely with dead grasses. Godwits produce one brood per season, usually of four eggs. Marbled godwits forage on mollusks, crustaceans, worms, grasshoppers, tubers and seeds of pondweeds, sedges, and muskgrass. Southward migration occurs around August in South Dakota (Gratto-Trevor 2000).

Local Distribution. Marbled godwits are summer residents of South Dakota and breed throughout the state. However, breeding has not been documented in Jerauld County (South Dakota Birds 2007). Marbled godwits were observed in the project area during 2007 migration bird surveys (WEST 2007a).

Wilson's Phalarope

Status. Wilson's phalarope global status is G5, secure, common, and the State status is S4, apparently secure, uncommon but not rare. Wilson's phalarope populations continue to decline in local portions of its range due to loss of wetland habitat. Declines have triggered increased concerns for local populations, warranting South Dakota's species of concern status.

Species Ecology. Wilson's phalarope arrives in South Dakota in early May to breed. Phalaropes prefer wetlands and nest in sparse to dense vegetation of uplands and marshes. Nests are shallow grass lined depressions on the ground concealed in upland grasslands. Wilson's phalarope produce one to two broods per season depending on success. Clutch size is usually four eggs. Wilson's phalaropes forage on insects, primarily mosquitoes and crane flies. Wilson's phalarope begins southward migration in late June in South Dakota (Colwell and Jehl 1994).

Local Distribution. Wilson's phalaropes are summer residents of South Dakota and breed throughout the state. However, breeding has not been documented in Jerauld County (South Dakota Birds 2007). Wilson's phalarope was observed in the project area during 2007 migratory bird surveys (WEST 2007a).

Grasshopper Sparrow

Status. Grasshopper sparrow global status is G5, secure, common, and the State status is S4, apparently secure, uncommon but not rare. Grasshopper sparrow populations continue to decline in local portions of its range due to loss of grassland habitat. Declines have triggered increased concerns for local populations, warranting South Dakota's species of concern status.

Species Ecology. Grasshopper sparrows arrive in South Dakota in mid-May to breed. Grasshopper sparrows prefer open grasslands and prairies with patchy bare ground, and generally avoid grasslands with extensive shrub cover. Nests are cupped, domed with overhanging grasses, and have a side entrance concealed in upland grasslands. Grasshopper sparrows produce one brood per season and frequently re-nest three to four times per season in the event of nest failure. Clutch size is usually three to six eggs. Grasshopper sparrows forage on small invertebrates, grain, and seeds. Grasshopper sparrows begin southward migration in late June in South Dakota (Colwell and Jehl 1994).

Local Distribution. Grasshopper sparrows are summer residents of South Dakota and breed throughout the state. Breeding has not been documented in Jerauld County (South Dakota Birds 2007). Grasshopper sparrows were observed in the project area during 2007 migratory bird surveys (WEST 2007).

Western Meadowlark

Status. Western meadowlark global and State status is G5/S5, secure, common. Western meadowlark populations are secure and considered abundant and widespread. Local populations are monitored due to declines in grassland habitat in South Dakota.

Species Ecology. Western meadowlarks arrive in South Dakota in mid-May to breed. Western meadowlarks prefer mixed-grass prairie with open, treeless areas with a few shrubs for song perches. Nests are built on dry ground and are large domed structures of woven grasses and ground vegetation. Western meadowlarks produce one brood per season followed by a second attempt upon a successful first. Clutch size is usually three to seven eggs. Western meadowlarks forage on grain and weed seeds and on insects, such as beetles, weevils, wireworms, cutworms, grasshoppers, and crickets (Lanyon 1994).

Local Distribution. Western meadowlarks are summer residents of South Dakota and breed throughout the state. However, breeding has not been documented in Jerauld County (South Dakota Birds 2007). Western meadowlarks were observed in the project area during 2007 migration bird surveys (WEST 2007a).

Regal Fritillary Butterfly

Status. Regal fritillary butterfly global and State status is G3/S3, vulnerable, at moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), and recent widespread declines.

Species Ecology. Regal fritillary butterflies prefer tallgrass prairie associated with marshes and non-degraded mixed-grass prairie with abundant violet species. Females lay from several hundred to a thousand eggs singly. Eggs are often placed near violets. Eggs are attached, but the substrate varies from the underside of pebbles to dead leaves. Adults are nectarivores preferring species of milkweed, thistle, ironweeds, and red clover. Late in the season *Aster* and *Solidago* species are often used as food sources. Juveniles are herbivores that feed solely on violet species.

Local Distribution. Regal fritillaries are distributed throughout the state and have been document in all counties except three (Buffalo, Aurora, and Miner). Regal fritillaries continue to do well in areas in and around Fort Pierre National Grassland in central South Dakota. Regal fritillaries were last documented in Jerauld County in 1992 (SDNH 2007). The presence of regal fritillary butterflies in the project area is unknown. No surveys are proposed at this time.

3.8 Water Resources and Wetlands

3.8.1 Surface Water

The WSWP area is located within the Firesteel Creek watershed, which drains to the James River approximately 35 miles southeast of the project area. Site elevations range from less than 1,700 feet to more than 1,950 feet. The eastern portion of the site drops off steeply in elevation, concentrating drainage to numerous tributaries flowing east and southeast to West Branch Firesteel Creek and Firesteel Creek. The tributaries to West Branch Firesteel Creek have perennial flow while the tributaries to Firesteel Creek have intermittent flow. Floodplain data are not available for Jerauld County from the Federal Emergency Management Agency (FEMA).

Approximately 32 miles of Firesteel Creek from West Branch Firesteel Creek to its mouth are 303(d) listed as impaired waters under the Clean Water Act by the South Dakota DENR due to non-support of overall use, warm water fish, and drinking water supply; and partial support of irrigation due to

levels of salinity, total dissolved solids, chlorides, and thermal modifications. Livestock operations and row crops are considered major pollution sources (DENR 2006).

Average annual precipitation ranges from 20 to 22 inches with most precipitation occurring from April through September. Annual snowfall is 29 inches per year. High stream flows occur as a result of snowmelt or heavy rainfall (Davison Conservation District 2006).

3.8.2 Wetlands

The project area is located in the glaciated PPR of South Dakota, which is primarily east and north of the Missouri River. The site has a dense concentration of seasonal and temporary prairie pothole wetlands (67.5 acres of wetlands per square mile [Johnson and Higgins 1997]). Prairie potholes are water-holding depressions of glacial origin that occur within 300,000 square miles of prairies in the north-central United States and south-central Canada. Prairie potholes were created by the melting of buried blocks of ice forming shallow depressions (Sloan 1972). The prairie pothole wetlands in the project area range from 32 acres to less than 1 acre in size and average 21 wetlands per square mile. There are 41.5 acres of wetlands per square mile within the proposed project boundaries.

Wetlands in the project area were initially inventoried using National Wetland Inventory (NWI) data from the USFWS. The NWI provides approximate locations of wetlands that may or may not be jurisdictional based on the 1987 Corps of Engineers Wetlands Delineation Manual.

The NWI identifies two wetland systems occurring within the project area: lacustrine and palustrine. The lacustrine system includes wetlands and deepwater habitats lacking vegetation with greater than 30 percent aerial coverage and total area greater than 20 acres. There is one lacustrine wetland (L2AB) onsite that is 32 acres in size (Table 3.8-1). The palustrine system includes all non-tidal wetlands dominated by vegetation and small, shallow, permanent or intermittent ponds. The palustrine wetlands are the most common in the project area and include palustrine emergent (PEM) and palustrine aquatic bed (PAB) wetlands or a combination thereof (Table 3.8-1). PEM wetlands are by far the most numerous and cover the greatest acreage in the project area. They are characterized by erect, rooted, herbaceous plants including sedges (*Carex* spp.), rushes (*Juncus* spp.), and cattails (*Typha* spp.).

Table 3.8-1 Inventory of NWI Wetland Types and Acreages in Project Area

Wetland Type	Total Number	Total Acres
L2AB	1	32
PAB/EM	1	7
PAB	28	31
PEM/AB	4	22
PEM	86	139
Total	120	231

Source: National Wetlands Inventory (NWI).

The water regimes of these wetlands are characterized as semi-permanently flooded, seasonally flooded, and temporarily flooded. Water is supplied to the wetlands by direct precipitation, watershed

runoff, and groundwater seepage. Some of these wetlands have been excavated, diked/impounded, partially drained, or ditched, altering their hydrology.

In August and September 2007, WEST, Inc. performed 19 wetland delineations in areas proposed for access road construction. According to the field delineators, most of the delineated wetlands within the project boundary are in swales. The delineators did not call these Waters of the U.S. as there was no defined channel (i.e., they were completely vegetated) and many simply flowed into prairie potholes with no outlet. The Corps of Engineers, Omaha District reviewed the results of the wetlands delineation and found that none of the wetlands was jurisdictional (Naylor 2007).

3.8.3 Groundwater

In July and August 2007, FMG, Inc. drilled exploratory borings in the project area to determine soil conditions for designing foundations for the proposed wind turbines. According to FMG:

> "Groundwater was encountered in a number of boreholes during drilling, and in a majority of boreholes during re-checks at least 24 hrs after completion of drilling. Groundwater was predominantly encountered between 25 to 30 feet below grade; however groundwater was encountered 12 to 15 feet below grade in approximately 20% of the boreholes (FMG 2007)."

Groundwater was encountered at depths as shallow as 4 feet below existing grades at the proposed interconnect substation site, which would be below the escarpment near West Branch Firesteel Creek. Following the geotechnical investigations, the proposed site of the collector and interconnect substations was shifted to somewhat higher ground to the northwest.

3.9 Geology

The proposed WSWP would be located along the eastern edge of the Coteau du Missouri division of the Great Plains physiographic province in south-central South Dakota. The dominant geologic feature in the area is the escarpment forming the edge of the Coteau du Missouri, known locally as the Wessington Hills. Below the 200-to-400-foot escarpment is the valley of Firesteel Creek, which is within the James Basin division of the Central Lowland physiographic province. There are numerous deep ravines along the escarpment draining into Firesteel Creek. Firesteel Creek flows to the James River.

The Coteau du Missouri is a highland with elevations reaching over 2,000 feet in Jerauld County. Local relief on the Coteau du Missouri is generally 50 to 100 feet, while relief in the James Basin is generally less than 50 feet.

Information on geology of the project vicinity comes primarily from Hedges (2001) and Steece (1967).

The Sioux Quartzite and older granitic rocks of Precambrian age underlie Jerauld County.

Mesozoic sediments in Jerauld County are all of late Cretaceous age. From oldest to youngest, they are the Dakota Formation, Graneros Shale, Greenhorn Limestone, Carlile Shale, Niobrara Formation, and the Pierre Shale. The Dakota Formation consists of alternating beds of siltstone, cemented sandstone, and shale. The Graneros Shale is a medium to dark gray, noncalcareous shale. The Greenhorn Limestone is gray marine marl and white speckled limestone dominated by the fossil *Inoceramus* (a bivalve). The Carlile Shale is a gray to black, noncalcareous, silty, marine shale. The Niobrara Formation is a medium to dark gray, speckled, calcareous, chalk-like material. The Pierre

Shale consists of light gray to black shale. In Jerauld County, the Pierre Shale outcrops along the escarpment of the Coteau du Missouri. No shale exposures were observed during a reconnaissance of several drainage along the escarpment in the WSWP area (A. Fisher, personal communication 2007).

Cenozoic sediments consist of Tertiary age continental deposits containing vertebrate fauna of probable Pliocene age; Quaternary age deposits of sand and gravel; pre-Wisconsin and late Wisconsin glacial deposits; and Holocene alluvium and colluvium. Isolated Tertiary outcrops are found along the Coteau du Missouri escarpment near Wessington Springs, but none were observed in the WSWP area (see section 3.11) (A. Fisher, personal communication 2007). The Tertiary sediments consist of massive-bedded silt and green conglomeratic sandstone. The silt contains vertebrate fossils, such as rodent and horse. Quaternary deposits together exceed 500 feet in thickness and comprise all surficial deposits in the county. South of Wessington Springs, the thickness of Quaternary deposits ranges from 18 to 152 feet. Plio-Pleistocene non-glacial alluvial deposits contain occasional fossil mammal bone. Pleistocene glacial deposits represent one pre-Wisconsin advance and two late Wisconsin advances. Pre-Wisconsin glacial till, outwash, and loess are located on the Coteau du Missouri in Jerauld County, and Late Wisconsin till, outwash, and lake deposits cover much of the county. Holocene deposits consist of colluvium on steeper slopes along the eastern escarpment of the Coteau du Missouri and alluvium in stream valleys.

Geotechnical drilling in the WSWP area was performed in July and August 2007 by FMG, Inc. All boreholes were drilled to 50 feet. There were no boreholes above the escarpment (drilled at each turbine location and some other locations) that extended below glacial till. Below the escarpment near the proposed substation site, a 50-foot borehole did not extend beneath colluvium or alluvium that had been derived from glacial till (FMG 2007).

According to FMG (2007), the WSWP site is not considered susceptible to liquefaction.

3.10 Soils

Soil data for the following discussion come primarily from the *Soil Survey of Jerauld County, South Dakota (*USDA 1994). Within the boundaries of the WSWP, soil associations in order of abundance are:

- **Ethan-Betts Association.** These are moderately sloping and gently rolling to steep, loamy soils on moraines. They make up 13 percent of Jerauld County and about 68 percent of the WSWP area. About 95 percent of the acreage in the county supports native grasses and is grazed. A few areas are used for hay. In general, the soils are too steep and stony for cultivated crops.

- **Ethan-Houdek-Eakin Association.** These soils are nearly level to moderately steep, loamy and silty soils on till plains and moraines. This association makes up 30 percent of the county and about 17 percent of land within the WSWP boundaries. About 50 percent of this association is cropland and much of the acreage supports native grasses.

- **Beadle-Dudley Association.** These soils are level to gently sloping, silty and clayey soils on till plains and fans. The soils are typically found on broad flats in the Firesteel Creek drainage. In the WSWP area, this association is found below the escarpment along the eastern edge of the project. This association makes up 10 percent of the county and about 15 percent of the land within the WSWP boundaries. About 60 percent of this association supports native grasses and is grazed or used for hay. The major soils in the association are suited for cultivated crops such as alfalfa, small grain, and sorghum.

3.11 Paleontology

Paleontological resources (i.e., fossils) are the remains, traces, or imprints of plants or animals that have been preserved in a geologic context and are more than 10,000 years old. No previously recorded fossil localities occur within the WSWP boundaries.

Mesozoic sediments in Jerauld County are all of late Cretaceous age. From oldest to youngest, they are the Dakota formation, Graneros Shale, Greenhorn Limestone, Carlile Shale, Niobrara Formation, and the Pierre Shale. The Greenhorn Limestone is gray marine marl and white speckled limestone dominated by the fossil *Inoceramus* (a bivalve). The Niobrara Formation is a calcareous, chalk-like material that contains fossil bivalves as well as fossils of fish and mosasaur, a marine reptile. The Pierre Shale is noteworthy for the number of mosasaur fossils found in South Dakota. While none of these mosasaur fossils are reported from the Wessington Springs area, they have been found in Pierre Shale along the Missouri River, and the Pierre Shale outcrops along the escarpment of the Coteau du Missouri. Elsewhere, the Pierre Shale is typically buried by glacial till.

Cenozoic sediments consist of Tertiary age continental deposits containing vertebrate fauna of probable Pliocene age; Quaternary age deposits of sand and gravel; pre-Wisconsin and late Wisconsin glacial deposits; and Holocene alluvium and colluvium. Isolated Tertiary outcrops are found along the Coteau du Missouri escarpment near Wessington Springs. The Tertiary sediments consist of massive-bedded silt and green conglomeratic sandstone. The silt contains vertebrate fossils, including Miocene specimens of *Monosaulax* sp. (a beaver-like rodent) and *Merychippus* sp. (a horse), which were found in an exposure along the escarpment less than a mile west of Wessington Springs in 1962 (Green 1965). The beds in which these fossils were found were overlain by glacial till.

While Plio-Pleistocene non-glacial alluvial deposits contain occasional fossil mammal bone, glacial deposits in the area are generally unlikely to contain fossils (R. Baker, personal communication 2007). FMG staff performed a brief reconnaissance of several drainages along the escarpment that forms the eastern boundary of the WSWP. The only exposures observed contained glacial till (A Fisher, personal communication 2007).

3.12 Cultural Resources

Cultural resources are districts, sites, buildings, structures, or objects considered to be important to a culture, subculture, or community for scientific, traditional, religious or other reasons. For this EA, cultural resources have been divided into three major categories: archaeological resources, the built environment, and traditional cultural properties (TCPs). Archaeological resources are locations where human activity has measurably altered the earth or left deposits of physical remains (e.g., tipi rings, stone tools, house foundations, bottles, cans). The built environment includes standing buildings (e.g., houses, barns, outbuildings, schools, churches) or intact structures (e.g., dams, canals, bridges). TCPs are resources that are important to a community's traditional practices and beliefs and for maintaining the community's cultural identity (Parker and King 1998). In South Dakota, it is expected that most TCPs would be associated with Native American cultures.

Several laws require that information about cultural resources be kept confidential to protect them from vandalism. For this reason, this section offers only limited descriptions of the characteristics and locations of cultural resources in the WSWP area. In addition, no information on TCPs will be shared with the public without permission from those providing the information.

Federal and State laws protect cultural resources or require their consideration in assessing the effects of a proposed undertaking. An undertaking is equivalent to the Proposed Action discussed in this EA.

The most relevant Federal historic preservation law for the WSWP is the National Historic Preservation Act of 1966 (NHPA). South Dakota laws include:

- **Preservation of Historic Property** (SDCL 1-19A-11.1). This law regulates state and local activities that could affect properties on the National Register of Historic Places (NRHP) or the South Dakota State Register of Historic Places (State Register).

- **Standards for Case Report** (Administrative Rules of South Dakota [ARSD] 24:52:07:02). This law gives reporting procedures for threats to a historic integrity of a property on the State Register

- **Disturbing Human Skeletal Remains or Funerary Objects as Felony** (SDCL 34-27-26). This law prohibits the disturbance of human skeletal remains or funerary objects unless authorized by the State Archaeologist or if other procedures are followed.

Section 106 of the NHPA and its implementing regulations (36 CFR 800) have procedures for considering the effects of proposed Federal undertakings on historic properties (i.e., cultural resources listed in or eligible for inclusion in the NRHP). Procedures are outlined for identifying resources; evaluating their significance; assessing effects; implementing measures to mitigate adverse effects; and consulting with the Advisory Council on Historic Preservation, State Historic Preservation Officers (SHPOs), Native American groups and other interested parties.

As required by Section 106, Western, USFWS, the South Dakota SHPO, several tribes, and Babcock & Brown would identify procedures and guidelines for the identification, evaluation, and treatment of cultural resources in the WSWP area. Western has the lead in the Section 106 process because of the proposed interconnection with the Fort Thompson-to-Sioux Falls transmission line. The USFWS has a role because of the grassland and wetland easements it holds on some of the lands within the proposed wind farm. The South Dakota SHPO has a critical role in consulting on Section 106 compliance. Section 106 also requires that tribes in South Dakota and neighboring states with traditional ties to the region be offered the opportunity to participate.

3.12.1 Data Sources

Data on cultural resources in the project area were compiled from several sources:

- A record search performed for Babcock & Brown by the South Dakota State Historical Society
- The National Register Information System (NRIS) of the NRHP.
- The National Historic Landmarks Survey of the National Park Service (NPS).
- The South Dakota State Register.
- An intensive Class III cultural resource survey in spring and summer 2007 of portions of the WSWP in advance of geotechnical investigations. The survey was completed by Metcalf Archaeological Consultants (Metcalf) and the report (Stine and Kulevsky 2007) is under review.
- Archaeological monitoring (by Metcalf and Western) during geotechnical drilling in July August, 2007.
- An on-site meeting on August 7, 2007 with representatives of Western, Babcock & Brown, POWER Engineers, Metcalf, Lower Sioux Indian Community, Santee Sioux Nation, Sisseton-Wahpeton Oyate, and Fort Peck Tribes.

3.12.2 Previous Investigations

Prior to 2007, very little land in the vicinity of the WSWP had been surveyed for cultural resources. Previous investigations in the WSWP vicinity have included Buechler (2001, 2002), Flemmer (1988), Sundstrom (2006), and Abbott, Ranney, and Whitten (1983).

None of the land within the 3,560-acre wind project has been systematically and intensively surveyed for cultural resources prior to the studies for the WSWP. Within 1.0 mile of the project boundaries, about 3 acres had been previously surveyed, all in linear corridors associated with water pipelines (Buechler 2001, 2002).

3.12.3 Cultural Resources in the WSWP Vicinity

The NRIS of the NRHP was examined on August 27, 2007. According to the NRIS, there are nine NRHP-listed properties in Jerauld County. These include:

- Jerauld County Courthouse
- Methodist Episcopal Church
- Municipal Field House
- Shakespeare Garden and Shay House (Anne Hathaway Cottage)
- Robert S. Vessey House
- Wessington Springs Carnegie Library
- Wessington Springs Opera House
- W.P. Hill House
- Archaeological Site 39JE10.

The buildings are all in Wessington Springs and more than 2 miles from the WSWP boundaries. Archaeological site 39JE10 is located approximately 500 meters (1,640 feet) from the wind farm boundary. This resource is described in more detail below.

The South Dakota State Register contains only one property in Jerauld County, "Big Spring/Wessington Spring", located adjacent to SD 34, more than 2 miles from the project boundary.

The NPS lists 15 National Historic Landmarks in South Dakota. None of these is located in Jerauld County.

The record search performed by the South Dakota State Historical Society identified three previously recorded cultural resources in the general project vicinity. These are:

- **39JE2.** This resource is located within the boundary of the WSWP (Table 3.12-1). It consists of a scatter of cultural material found within a ravine. It was assumed by the site recorder that the material had washed in from another location. This site was not revisited in 2007. Although the site is within the WSWP boundaries, it was located outside the area of proposed geotechnical investigations.

- **39JE10.** This resource contains a 200-foot linear arrangement of stones probably intended to represent a snake. The site also contains 10 stone mosaics, a mound with a rock-lined depression, and three stone circles. The property is listed in the NRHP (Sundstrom 2006;

Abbott, Ranney, and Whitten 1983). This site was not visited in 2007 because it is on private land outside the WSWP boundaries and was outside the area of proposed geotechnical investigations.

- **39JE18.** This resource, Happy Hill Historic District, is more than a mile west of the boundary of the WSWP. It consists of an abandoned school house built in the 1920s or 1930s, a privy, and the archaeological remains of another privy (Buechler 2002). Buechler (2002) recommended that the property be considered ineligible for inclusion in the NRHP. This resource was not visited in 2007.

A cultural resource survey was performed in the project area as part of an Interim Action Determination made by Western (Stine and Kulevsky 2007). The work was performed so that geotechnical investigations could proceed at proposed turbine locations and the drill rig could use proposed access routes. Cultural resource surveys of these portions of the WSWP area were performed in April and June 2007. Monitoring of geotechnical drilling by archaeologists from either Western or Metcalf was performed in July and August 2007. A total of 13 cultural resources were identified during the survey (Table 3.12-1). All are archaeological sites and none have been evaluated for NRHP eligibility because they would all be avoided by project components (see Section 4.12).

In all, approximately 475 acres were inventoried. None of the previously recorded cultural resources (39JE2, 39JE10, 39JE10) were revisited because they fell outside the area of proposed geotechnical studies.

Remaining portions of the Area of Potential Effects (APE) would be surveyed for cultural resources prior to construction of the proposed wind farm, in accordance with Section 106 of the NRHP. Future investigations would include the built environment up to 1 mile from proposed turbine locations to identify historic properties that might be sensitive to changes in visual setting.

On August 7, 2007, a meeting was held in the WSWP at the request of representatives of the Lower Sioux Indian Community, Santee Sioux Nation, Sisseton-Wahpeton Oyate, and Fort Peck Tribes. Various issues were discussed regarding cultural resources in and near the project area, including TCPs. Western's Section 106 consultation process with Native American groups will continue throughout the project.

3.13 Health and Safety

There are few existing hazards at the WSWP site. Ranching, farming, and hunting are the primary activities in the area; there are few residences nearby and no industrial uses.

Fire is the primary existing health and safety risk, because much of the WSWP area is rangeland with a predominant groundcover of grasses. Under existing conditions, fires can be started by lightning strike or human carelessness. The Wessington Springs Volunteer Fire Department currently serves unincorporated Jerauld County.

If needed, emergency medical services for all of Jerauld County are provided by the 25-bed Avera Weskota Memorial Medical Center in Wessington Springs. The emergency medical service is headquartered at the hospital.

Table 3.12-1 Cultural Resources within the WSWP Boundary

Resource Number	Description
39JE2	scatter of cultural material
39JE27	rock cairns
39JE28	stone circle
39JE29	rock cairn, rock wall
39JE30	stone circles
39JE31	stone circles, stone arc, rock-lined depression
39JE32	rock cairn
39JE33	rock cairn
39JE34	rock cairn
39JE35	stone circles
39JE36	stone circles, rock cairns, and rock-lined depression
39JE37	possible rock-lined depression
MAC WS-12	stone circle
MAC-WS-13	rock cairns

3.14 Noise

Noise is defined as unwanted sound. The unit used to describe the intensity of sound is the decibel (dB). The A-weight scale, or dB(A), approximates the range of human hearing by filtering out low frequency noises.

For a rural environment, background noise is typically about 40 to 50 dB(A) during the day and 30 dB(A) at night (BLM 2005). As a comparison, conversational speech is about 55 or 60 dB(A) and jet aircraft taking off can reach 120 dB(A). No background noise measurements have been made in the WSWP area, but measurements from other locations suggest that the background noise levels in such an area could typically range from 38 to 48 dB(A). Noise levels generated by farm machinery, wildlife, and the wind can sometimes reach 55 dB(A). Few roads cross the project area and these have relatively little traffic. The most notable non-natural noise source in the project vicinity would likely be ranching equipment.

There are no noise sensitive receptors (e.g., residences, schools, hospitals, offices) within the proposed project boundaries, although occupied residences are located within 0.25 mile of the wind farm (Section 3.4, Visual Resources). The nearest schools and hospitals are within Wessington Springs, north of SD 34 and more than 2 miles from the proposed wind project.

3.15 Air Quality

Central South Dakota is characterized by warm summers and cold winters. Annual precipitation is generally 21 to 23 inches, with thunderstorms producing a significant amount of the rainfall. Wind patterns are usually southerly with the average wind speed at 6 miles per hour (mph) and the average

gust at 17 mph. Visibility for the region is typically excellent at 10 miles, except during the occasional winter fog (SDSU 2007).

The WSWP area is rural, and there are few residences within 1 mile of the proposed wind farm. Agriculture and vehicles using unpaved roads in the WSWP area may be the primary sources of fugitive dust because there are no industrial activities in the vicinity. In the proposed wind farm area, farm and ranching equipment may contribute to priority pollutants.

The EPA Office of Air Quality Planning and Standards (OAQPS) has set National Ambient Air Quality Standards (NAAQS) for six principal pollutants, which are called "criteria" pollutants: carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter (PM), nitrogen dioxide ($N0_2$), ozone (0_3), and lead (Pb) (see Table 3.15-1). Areas where pollutant levels exceed NAAQS are called non-attainment areas and states must develop plans for attaining and maintaining the NAAQS. All of South Dakota is currently in attainment for all criteria pollutants (SD DENR 2007).

The affected environment for air quality is often characterized in terms of existing concentrations of criteria pollutants; however, there are no available data for calculating current or future air quality conditions in the WSWP area. The closest monitoring station is in Pierre (SD DENR 2007), 103 miles to the west.

The Clean Air Act (CAA) regulates haze for certain national parks, wilderness areas, and national memorials. These are called Class I areas. No Class I areas have been identified in the WSWP vicinity.

Table 3.15-1 National and State Ambient Air Quality Standards

Pollutant	NAAQS	Averaging Times	Secondary Standards
Carbon Monoxide	9 ppm (10 mg/m^3)	8-hour[a]	None
	35 ppm (40 mg/m^3)	1-hour[a]	None
Lead	1.5 µg/m^3	Quarterly Average	Same as Primary
Nitrogen Dioxide	0.053 ppm (100 µg/m^3)	Annual (Arithmetic Mean)	Same as Primary
Nitrogen Dioxide	- - -	Hourly	- - -
Particulate Matter (PM10)	Revoked 2006		Revoked 2006
	150 ug/m^3	24-hour[a]	Same as Primary
Particulate Matter (PM2.5)	15.0 µg/m^3	Annual[b] (Arithmetic Mean)	Same as Primary
	35 ug/m^3	24-hour[c]	
Settleable Particulate		30 day average	
Ozone	0.08 ppm	8-hour[d]	Same as Primary
	0.12 ppm	1-hour[e]	Same as Primary
Sulfur Oxides	0.03 ppm	Annual (Arithmetic. Mean)	-------
	0.14 ppm	24-hour[a]	-------
	-------	3-hour[a]	0.5 ppm (1300 ug/m^3)
Sulfur Oxides	-------	1- hour	-------
Visibility	-------	Annual Average	-------

[a]Not to be exceeded more than once per year.
[b] To attain this standard, the 3-year average of the annual arithmetic mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 ug/m^3.
[c] To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 65 ug/m^3.
[d] To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
[e] (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is <= 1, as determined by appendix H.
(b) The 1-hour NAAQS would no longer apply to an area one year after the effective date of the designation of that area for the 8-hour ozone NAAQS. The effective designation date for most areas is June 15, 2004. (40 CFR 50.9; see Federal Register of April 30, 2004 (69 FR 23996).)
Source: EPA 2006

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

This chapter provides a description of the environmental consequences, or impacts, that could result from the construction, operation, maintenance, and decommissioning of the WSWP. Specific resources are addressed in Sections 4.2 through 4.15 in the same order presented in Chapter 3. In these sections, environmental consequences are discussed for the Proposed Action, which includes the wind turbines, roads, underground collection system, substations, and other facilities, and the No Action Alternative.

Chapter 4 also discusses cumulative impacts (Section 4.16), irreversible and irretrievable commitment of resources (Section 4.17), and unavoidable adverse impacts (Section 4.18).

CEQ regulations and DOE guidance indicate that the amount of analysis in an EA should correspond to the importance of the issues: significant issues should be discussed more thoroughly than less significant issues. In this EA, the level of detail and the amount of analysis presented in each section of Chapter 4 correspond to the issues raised about the WSWP during the scoping process and agency consultation (see Chapter 5). Section 4.7, Biological Resources, is the longest and most detailed section in this chapter.

Impacts can be beneficial (positive) or adverse (negative), and can result from the WSWP action directly or indirectly. Impacts can be long-term or short-term. Long-term impacts are defined as those that would substantially remain for the life of the WSWP or beyond. Short-term impacts are defined as those changes to the environment during construction that generally would revert to pre-construction condition at, or within a few years of, the end of construction. Impacts can vary from no change or only slightly discernible change to a full modification of the environment.

The following criteria were used in the analysis of environmental consequences in this EA:

- **Resource Sensitivity.** The probable response of a particular resource to project-related activities.
- **Resource Quality.** The pre-project condition of the resource affected.
- **Resource Quantity.** The amount of the resource affected.
- **Duration of Impact.** The period of time over which the resource would be affected, measured as short-term (within a few years) or long-term (life of the WSWP and beyond).
- **Time of Year** The season or period of time in which the resource would be affected.

4.2 Land Use

This section discusses possible land use impacts that could occur as a result of the physical and operational effects of the WSWP. Where land use impacts were identified, an evaluation was conducted to determine if one or more mitigation measures would be effective in avoiding or reducing the intensity or duration of the possible impact. Mitigation measures are listed in Appendix A.

Inventoried land uses were evaluated to determine the types of possible direct and indirect impacts that could occur from the Proposed Action. Impacts on land uses were considered significant if the WSWP would:

- Displace, alter, or otherwise physically affect existing or planned residential, commercial, industrial, governmental or institutional use or activity.
- Result in a significant loss of prime or unique farmlands.
- Conflict with State or Federally established, designated, or reasonably foreseeable planned special use areas (e.g., recreation, wildlife management area, game management areas, WPAs, scientific and natural areas, wilderness areas).
- Conflict with applicable land use plans, policies, goals, or regulations.
- Conflict with the operation of line-of-site communication towers.

A significant impact on recreation would result if:

- The increased demand for recreation activities due to an influx of people during construction or operation of the WSWP would exceed capacity for that activity in the area (e.g., camping, hunting).
- There would be restriction of access to recreational opportunities.

4.2.1 Proposed Action

Direct impacts of the wind farm would include conversion of a portion of the rural lands near Wessington Springs to commercial utility-related uses and possible conflicts between the wind farm and onsite and offsite recreation activities. These impacts could be associated with construction, operation, maintenance, and decommissioning of any of the wind farm elements, including wind turbines, improved and new access roads, the underground collection system, the O&M building, the collector substation, and the interconnect substation. Indirect land use and recreation impacts are not anticipated because the wind farm is not expected to substantially induce regional growth to the extent that it would change offsite land uses or use of offsite resource-based recreation areas. Potential impacts on adjacent land uses from construction-related noise and dust are discussed in Section 4.14, Noise, and Section 4.15, Air Quality.

4.2.1.1 Construction

Temporary Land Use Conversion

All of the WSWP area is located on private land currently leased to Babcock & Brown. Construction activities would be coordinated with the landowners to minimize disturbance of ranch and farm operations.

Direct construction impacts would be temporary. Possible direct impacts from construction activities include road building, trenching, turbine installation, and other activities. These temporary disturbances would be added to the existing land use, which is primarily cattle grazing. Wind farm construction would alter up to 129 acres (up to 42 acres permanently) out of a total project area of 3,560 acres, interfering to a small degree with existing grazing operations. Areas temporarily disturbed (up to 94 acres) would be restored to their original condition. Cattle and other livestock would need to be removed from the most intensive construction areas, but livestock grazing, the primary land use in the area, could continue around wind farm facilities following completion of construction activities.

Parks, Recreation, and Preservation Areas

Private landowner-approved recreation use, including hunting and bird watching, would be temporarily displaced from some of the lands occupied by wind turbines and associated facilities, but

only during the construction period. Most current recreation activity within or near the wind farm boundaries, which consists of limited informal use, would be able to resume at current levels during operations and maintenance. There are no formal recreational facilities in the vicinity of the wind farm. Construction of the wind farm may encourage sightseeing, but the land is private and the number of possible visitors during construction is unknown.

4.2.1.2 Operations and Maintenance

Permanent Land Use Conversion

Permanent land use impacts are based on the amount of land that would be displaced by wind farm facilities, including the wind turbines, internal road network, collector substation, and O&M building, and by the compatibility of the wind farm and associated facilities with existing adjacent uses. The wind farm would permanently alter an estimated 42 acres of cropland or rangeland to commercial utility use (i.e., wind farm development). This would be an unavoidable impact of the wind farm. Permanently converted acreage would comprise only a small portion (about 1 percent) of the wind farm area. The 42-acre reduction would be for the life of the project (at least 20 years) and would represent a very small portion of the total amount of cropland and grassland in Jerauld County.

There would be no prime or unique farmlands or any CRP lands within the WSWP boundaries.

There are no WPAs or special use areas within the proposed project boundaries. All land within the WSWP boundaries is currently privately owned. Western would acquire the site of the interconnect substation, but otherwise the Proposed Action would not result in a change in land ownership.

The USFWS currently holds wetland easements on 1,740 acres within the wind farm boundaries and grassland easements on 1,110 acres. (The USFWS holds both grassland and wetland easements on 900 acres.) Possible permanent and temporary disturbance of these easements is summarized in Table 4.2-1. This EA serves as the USFWS assessment of the possible impacts of the Proposed Action on these easements under the terms of the National Wildlife Refuge Administration Act.

At the present time, several options are being pursued through ongoing consultations between Babcock & Brown and the USFWS Huron Wetland Management District. Once a final course of action is chosen by the USFWS, Babcock & Brown will work with USFWS to identify appropriate measures to mitigate the land disturbance within these easements

Private landowners would receive compensation for use of their property through lease agreements with Babcock & Brown.

The wind farm would be compatible with a wide variety of land uses and would not preclude wildlife habitat conservation, livestock grazing, or other activities that currently occur within the wind farm area. Potential impacts on wildlife in general and on specific species are discussed in Section 4.7.

While the potential exists for wind turbines to cause line-of-sight interference with communications towers, the proposed locations of WSWP turbines were analyzed and adjusted to avoid such interference (see Section 2.3.2.3) (Nebbia 2007; Comsearch 2007).

Parks, Recreation, and Preservation Areas

The presence of the wind project could affect the use and enjoyment of some recreational activities in the wind farm area. However, few, if any, additional restrictions on recreational activities are anticipated on private lands leased for wind energy use. Private landowner-approved recreational

Table 4.2-1 Impacts on USFWS Grassland and Wetland Easements in WSWP Area.

	Within WSWP Boundary (Acres)	Temporary Disturbance (Acres)	Permanent Disturbance (Acres)
Wetland Easements Only	840	23.3-25.2	7.8-9.7
Grassland Easements Only	210	5.9-6.3	1.9-2.4
Both Grassland and Wetland Easements	900	23.4-25.1	6.7-8.4
TOTAL	1,950	52.6-56.6	15.9-20.5

activities could occur during wind farm operations, depending on provisions of future lease agreements between Babcock & Brown and the private landowners. Longer-term impacts could arise from the visual intrusion of wind farm facilities across landscapes that provide little or no visual screening, allowing them to be seen by recreational visitors from certain perspectives (refer to Section 4.4 Visual Resources).

The operating workforce for the wind farm would range from 4 to 5 employees. Because of the small size of the work force, no substantial increase in the demand for recreational services and opportunities would occur in the Wessington Springs area.

The wind farm may cause a minor increase in the number of sightseers.

4.2.1.3 Decommissioning

Short-term impacts to land use would be anticipated if the WSWP were decommissioned. Temporary land disturbance of the type and magnitude described for project construction would be anticipated. Upon decommissioning, land use impacts would be largely reversible, and disturbed lands would be restored to their original condition through grading and planting. Once facilities were removed, acreage taken out of cropland and grazing could be returned to these prior uses. Livestock grazing would be abated during the period of decommissioning activities. Local landowners may decide to continue to use and maintain some of the access roads installed by the WSWP.

Potential recreational impacts from decommissioning, including possible minor interruption of hunting and a minor increase in sightseeing, would be temporary. Once the site is reclaimed to near pre-project conditions, recreational use in the affected area could resume.

4.2.2 No Action

Under the No Action Alternative, the WSWP would not be constructed and existing land uses in the WSWP area (primarily grazing, cultivation, and hunting) would continue without the influence of the proposed project.

4.3 Transportation

This section describes the anticipated direct impacts on transportation associated with No Action Alternative and the Proposed Action.

A significant impact on transportation would result if any of the following were to occur from construction or operation of the proposed project:

- Increases in traffic that exceed a level of service established by the local or state transportation management agency.
- Major traffic delays for a substantial number of motorists.
- Physical damage to roads that is not repaired to a level equal to what existed prior to construction.
- Interference with any existing or planned aviation facility or aviation travel-related activity.

4.3.1 Proposed Action

4.3.1.1 Project Access

Interstate 90, U.S. 281, SD 34, and a few County and Township roads would likely serve as equipment and materials transport routes to the WSWP. An internal road network would connect the individual turbines and would be among the first components of the WSWP constructed. Babcock & Brown would construct the internal road system and would be responsible for its maintenance.

The types of heavy equipment required to construct the project would include bulldozers, graders, excavators, front-end loaders, compactors, and dump trucks. Equipment would be moved to the site by flatbed combination truck and would remain onsite for the duration of construction activities. Construction materials hauled to the site would include gravel, sand, and water, which are available locally. Ready-mix concrete might also be transported to the wind farm site.

Some of the turbine components would be extremely long (e.g., blades) or heavy (e.g., the nacelle containing all drive-train components except the rotor). The size and weight of these components would dictate the specifications for required rights-of-way, turning radii, and fortified bridges of the primary access roads (see Sections 2.2.1.8 and 2.2.1.13).

Any public access to project facilities located on private lands leased by Babcock & Brown would be arranged in coordination with the property owners according to the terms of the lease agreements.

4.3.1.2 Traffic

It is estimated that during construction and decommissioning, each wind turbine generator would require between 10 and 11 truck shipments of components, some of which could be oversized or overweight. Typically, the transport company would develop a transportation plan based on specific object sizes, weights, origin, destination, and unique handling requirements. The transport company would be selected by General Electric, the manufacturer of the wind turbine generators that would be used for the WSWP.

During operations, sites may be attended during business hours by a small maintenance crew of three individuals or fewer. Transportation activities would be limited to a small number of daily trips by pickup trucks or medium-duty vehicles. Large components may be required for equipment replacement in the event of a major mechanical breakdown. However, such shipments are expected to

be infrequent. Traffic generated by the operation of the wind farm is not anticipated to affect the pattern on roadways that are part of the major transport routes for materials and equipment.

4.3.1.3 Physical Roadway Impacts

Direct transportation impacts include the potential for the project to exceed legal roadway load and weight limits, accident hazards, and degradation of roadway conditions. For the wind farm, the primary concern is the potential transportation-related impacts attributable to vehicle trips (both trucks and automobiles). These trips would be associated with construction, operations and maintenance, and decommissioning of the various project elements.

Overweight permits usually are issued with specific dates during which transport is prohibited. These dates are state-specific but tend to eliminate periods during the spring when frozen ground is thawing. Over-dimension permits are likely to have travel time limits in congested areas, limiting movement to non-rush-hour periods. Depending on the origin site, shipments of components and main cranes could be made by truck or rail. If rail is utilized, the cargo would require unloading at Alpena followed by overland transportation to the site by truck.

Because of the length of some of the flatbed trailers used to haul turbine components and the 35-foot width of the construction crane, some Township roads may need to be modified to ensure safe movement of these vehicles.

As mentioned in Section 2.2.1.8, Babcock & Brown's preferred route for construction vehicle access would run south from SD 34 along 380th Avenue, west along 231st Street, south along 379th Avenue, west on 233rd Street, south along 378th Avenue, and east along 234th Street. These roads are in Media and Anina townships, and modifications would be arranged with the Boards of Supervisors of those townships. The final route selected would depend in part on the results of the assessment of potential impacts of required construction along the roads.

4.3.1.4 Hazardous Materials Transport

Hazardous materials to be transported to the site during operation would include lubricating and mineral oils, cleaners, and herbicides in quantities below State and Federal regulatory thresholds. Transportation of these materials would be conducted in a manner that is protective of human health and the environment and in accordance with applicable Federal and SDDOT requirements.

No substantial quantities of industrial materials would be brought onto or removed from the wind farm site during project operations. A site-wide oil change would occur every three to five years and would require approximately 2,720 gallons of oil (80 gallons per turbine). The oil would be delivered to the O&M building. The only other materials that would be brought onto the site would be those related to maintenance or replacement of wind farm components or equipment (e.g., nacelle or turbine components, electrical equipment). The only materials or equipment that would be removed from project facilities would be that replaced during maintenance activities.

Site decommissioning typically would involve the reverse of site development, requiring short-term transportation of hazardous materials. Turbine towers would be dismantled and either recycled, sold for scrap, or disposed of off site as solid waste. Concrete would be broken up to be recycled or disposed of as solid waste. Electronic equipment would be recycled or disposed of as either solid waste or, in some cases, as hazardous waste.

4.3.1.5 Aviation Hazards

Because of the tall structures, wind farms have siting concerns related to the locations of airports, flight patterns, and airspace. The FAA and South Dakota Aeronautics Commission were contacted regarding the proposed construction of turbines because they would be more than 200 feet tall. On September 28, 2007, FAA issued a Determination of No Hazard to Air Navigation for the proposed WSWP. On October 22, 2007, the South Dakota Aeronautics Commission issued a single South Dakota Aeronautical Hazard Permit for the 34 proposed turbine locations. To provide adequate air traffic safety, the wind turbines and MET tower would meet FAA and State safety lighting requirements.

Navigation concerns also exist where wind farms are located in or near MOAs and MTRs because wind turbines can intrude upon these military airspaces. The Lake Andes MOA, the nearest MOA to the proposed wind farm, is 24 miles to the south, and the WSWP would have no impact on operations there. MTR VR 510, which has a floor of 100 feet AGL, passes over the WSWP area. When the FAA is notified of a proposed project in South Dakota, the agency automatically notifies the 114th Wing of the SDANG regarding any concerns the SDANG may have. According to the Airspace Manager of the 114th Wing (E. Gerber, personal communication 2007), raising the floor of VR 510 near Wessington Springs to 500 feet AGL would likely not be a problem: SDANG aircraft generally train above that level, and the 16-nautical mile width of the MTR would allow flexibility for military aircraft to fly around the wind project.

V 120, a Class E Federal airway, passes 1 mile south of the proposed wind farm. The floor of that airway is 1,200 feet AGL, well above the maximum tip height of the wind turbines.

4.3.2 No Action Alternative

Under the No Action Alternative, the project would not be constructed or operated, and the environmental impacts described in Section 4.3.1 would not occur. Transportation in the vicinity would continue without influence of the WSWP. Roads that would have been improved for the WSWP would be left unimproved, and the internal road network would not be built.

4.4 Visual Resources

A significant impact to visual resources would result if any of the following were to occur from construction or operation of the WSWP:

- Substantial degradation of the foreground character or scenic quality of a landscape with Class B (above average) or Class C (unique) Scenic Quality/Visual Integrity (see section 3.4.4).
- Substantial dominant visual changes in the landscape that are seen from highly sensitive viewer locations, such as parks, viewpoints, and historic markers, or locations with special scenic, historic, recreational, cultural, archaeological, or natural qualities that have been recognized as such through legislation or some other official declaration.
- Predicted air pollutant emissions causing a change in visibility that would exceed Class I standards.
- Conflict with a formal visual resources plan pr policy adopted by a Federal, State, or local agency having jurisdiction.

4.4.1 Proposed Action

Visual impacts would occur from construction of three primary components of the WSWP, the wind turbines, the internal road network, and the underground collector system, and from operation of the wind turbines. Visual impacts would result from:

- Turbines, as a result of structure dominance, reflected light and glare, direct light, (i.e., white day-time and flashing red night-time FAA lighting), and overlapping blade rotation casing disconcerting visual patterns.
- Crane pads, access roads, collector and interconnect substation sites, and the O&M building.
- Trenching for the underground collection system.
- The temporary presence of construction equipment, and vehicles.
- Soil exposure and dust.

During operations, night-time flashing red lights on turbines and the MET tower would cause impacts to viewers, when compared to the lack of existing lights in the wind farm area, because the lights would provide a high contrast to the night sky. Increased light levels produced by facility security lighting may also be a factor due to the contrast created against the night sky. Day-time glare produced by various surfaces used for the project may affect the visual environment depending on finishing material and surface treatment, and white day-time lights on turbines and the MET tower would cause impacts to some viewers.

Decommissioning impacts would be similar to construction impacts with the presence of equipment and associated traffic. Though the towers would be removed, portions of turbine foundations would remain in place and buried. Temporary landform contrasts would result until exposed soils and fill areas are established with vegetation.

Visibility of the WSWP from area residences would often be blocked by the woodlands that occur across the region and local topographic variability not expressed in the surface and ZVI model (see Section 3.4). Also, the wind farm would not be entirely out of character in the area's pastoral, agricultural landscape. However, high sensitivity viewers seeing a wind farm in the immediate foreground or foreground view (to about 4 miles) who are not inclined to accept such a dominant or prominent feature in the landscape may be adversely affected.

4.4.1.1 Impacts to Residences

A total of 50 occupied residences were surveyed within 4 miles of the Proposed Action but outside of the Wessington Springs incorporated boundaries. Sixteen (16) residences are located within 1.5 miles of the proposed project. All of the turbines would cause impacts to some residential viewers, because each of the 34 turbines would be within 1.5 miles of an occupied residence. Visibility of the turbines from residences in both Wessington Springs and Lane would be very limited.

Wessington Springs is located on the north and east slopes of the Wessington Hills about 165 feet lower in elevation than the WSWP's northern boundary. Views of the proposed project from Wessington Spring residences would occur primarily at the top of the hill on the southeast side of town at the intersection of South Dakota Avenue and SD 34. However, substantial screening would occur from the hillside trees located to the south, and only the blade tips of some turbines would likely be visible according to the visual influence model (worst-case) (Figure 4.4-6). Views from Lane would also be very limited. Some residences on the southwest side of Lane on 4th Avenue and

5th and 6th Streets may have views of the project at a distance of 7.7 miles to the southwest. The turbines would be apparent, but not a dominant feature in the landscape.

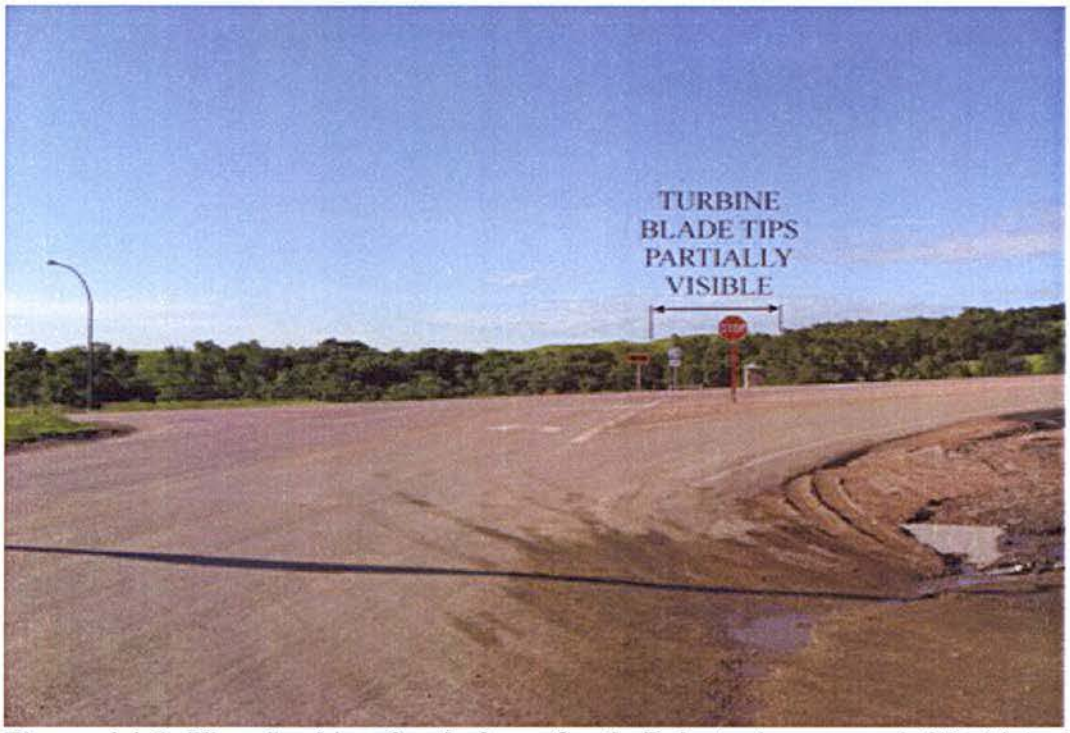


Figure 4.4-6. View Looking South from South Dakota Avenue and SD 34 in Wessington Springs. (Closest turbines would be between the parallel lines, but the blade tips would be just barely visible because of vegetation screening.)

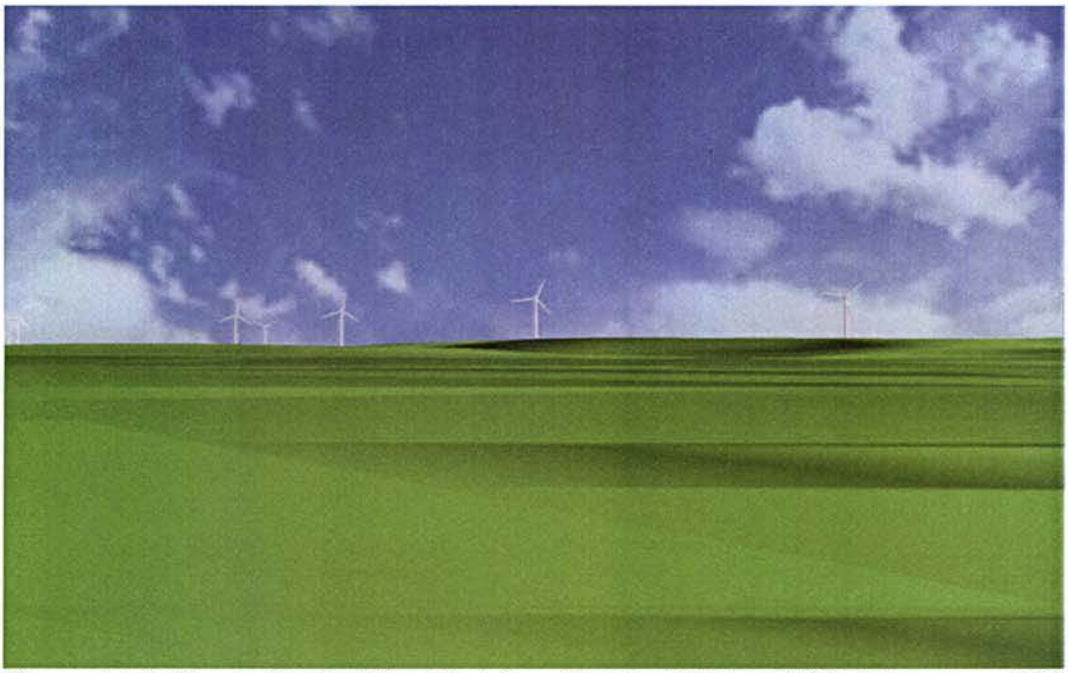


Figure 4.4-7. Simulation Looking West from Residential Area (383rd Avenue and 233rd Street)

Figure 4.4-8. Simulation Looking South from SD 34 0.3-mile East of 379th Avenue

Figure 4.4-9. View Looking Northeast from Historical Markers Scenic Overview along SD34 (Only tips of turbine blades would be visible).

From this distance, the primary impacts would be from flashing red night-time aviation warning lights.

The turbines would be an intrusive feature introduced into the landscape from residences located near the 378th Avenue and 234th Street intersection. Residences located along 383rd Avenue bordering the east side of the project view the Wessington Hills to the west, and would view the length of the turbine string (running generally north-south) skylined at a distance of less than 2 miles (Figure 4.4-7).

Temporary visual impacts would result from the trenching for the underground collection system. The impacts caused by the underground line would be short-term in duration, and would be the result of the presence of construction equipment and land surface scarring from trenching. Visual impacts would occur from the disturbed trench line until vegetation was re-established post-construction. The trench line would be especially prominent along the slopes of the Wessington Hills as viewed from residences located southeast of the project. If vegetation is not re-established before snowfall, the dark, earth-colored trench line would contrast against white snow covered vegetation due to faster melting rates under shallow snow depths.

Visual impacts from the internal road network would include temporary land surface scarring during construction and eventually the permanent view of gravel roads. Section-line roads and two-track roads are common in the WSWP vicinity, so it is not anticipated that the additional roads for the wind project would be visually intrusive to most viewers.

4.4.1.2 Impacts to Travelers

The Proposed Action would be visible from SD 34 toward the south. Views would be intermittent, with woodlots and local topographic variation breaking up potentially continuous views in the open landscape. The highway is within 2.5 miles of the project's northern-most turbine. At this closest point, intervening woodlands would screen views of the project. Moderately sensitive viewers approaching from either the east or the west would be no closer than about 3.5 miles with open views, and would see the turbine strings along the primary axis. To these viewers, the turbines would be prominent in the landscape, but visibility would be intermittent and of short duration (Figure 4.4-8).

Viewers using U.S. 281 would view the Proposed Action at about 6 miles at its nearest point. Traveling north, viewers would see the turbines across its longest axis. The towers would be skylined to the northwest for these viewers. The turbines would be a distinctive feature at this distance, but would not dominate views from U.S. 281. Casual viewers traveling south would have the project in their field of vision north of the SD 34 intersection, but at this distance (more than 7 miles) the project would not attract attention.

4.4.1.3 Impacts to Recreational Viewers

Of the six parks, recreation areas, or designated scenic viewpoints in the study area (i.e., Historical Marker Scenic Overview, Trojan Park, Wessington Hills Park, Wilmarth Lake GPS, Crow Lake GPA, and Horseshoe Lake GPA), the only site that would possibly have prominent or dominant views of the Proposed Action would be the Historical Markers Scenic Overview along SD 34 just west of Wessington Springs. Casual viewers at the scenic overview are currently oriented toward the expansive views over Wessington Springs and the valley to the northeast (Figure 4.4-9), not toward the south. The proposed project would be located behind the viewer and would generally be screened from view by vegetation and topography, although the rotating blade tips of some turbines may be visible. Views from Wessington Hills Park, Trojan Park and the State GPAs would be buffered from the project by distance, vegetation and topography.

4.4.1.4 Impacts to Scenic Quality

Most of the project area has common landscapes (Class C), and some of the project area is in above average (Class B) landscapes. The land within the WSWP boundaries typically coincides with higher quality landscapes where open water, trees and topographical variety contribute to visual quality. Scenic quality in these locations would be impacted by the presence of new roads, ancillary structures, and turbines.

4.4.1.5 Impacts to Historic Properties

A historic property listed in the National Register of Historic Places (NRHP) may be impacted by changes in visual setting, if visual setting is an important component of its historic significance. Nine NRHP-listed properties exist in Jerauld County (see section 3.12). Eight of these are buildings in Wessington Springs. Because of terrain, there would be no views of the turbines from these buildings. One property, archaeological site 9JE10, would be 500 meters (1640 feet) from the WSWP boundaries and would have views of some turbines. As required by Section 106 of the National Historic Preservation Act (NHPA), potential effects of the WSWP on the visual setting of 9JE10 would be addressed by Western prior to construction (see section 4.12).

4.4.1.6 Conflicts with Existing Plans or Policies

The Jerauld County Comprehensive Plan (1998) does not address visual resource development, preservation, or enhancement. The Proposed Action would not conflict with the comprehensive plan.

4.4.1.7 Mitigation

Mitigation measures would be implemented where high visual impacts are expected to reduce them to acceptable levels. Mitigation measures are listed in Appendix A.

4.4.2 No Action

Under the No Action Alternative, the visual setting in the WSWP vicinity would continue without influence of the proposed wind turbines, roads, underground collection system, substations, or other components of the wind farm.

4.5 Socioeconomics and Public Services

This section evaluates the impacts of the construction, operation, maintenance, and decommissioning of the WSWP on the local economy and on the current level of existing public services, including law enforcement, fire protection, water and sewer, solid waste, education, hospital services, and emergency medical services.

A significant impact on socioeconomics and public services would result if any of the following were to occur from implementation of the Proposed Action:

- An increase in population that would create shortages of housing and place an excessive burden on local services.
- Permanent displacement of an existing residence or business.
- Long-term loss of economic viability of a farm or other business.
- Permanent and irreversible loss of work for a major sector of a community.
- Physical division of an established community.

- Substantial economic benefit.

4.5.1 Proposed Action

4.5.1.1 Socioeconomics

Construction

The total project cost for the WSWP is estimated to be approximately $87 million.

Construction and installation of 34 turbines at the wind farm would be completed in an 8-to-10 month construction period, with construction anticipated to begin in spring 2008. Construction employment would begin with a small crew, progress toward peak employment near the middle of construction, and taper off to a small clean-up crew at the conclusion.

An average of about 40 FTE workers are expected to be involved in engineering and design, road and foundation preparation, wind turbine assembly and erection, facility decommissioning and site cleanup. Peak employment is expected to be 70 employees. It is assumed that half the labor force would be hired locally, leaving a peak impact of about 35 employees. Because of the relatively short construction duration (8-to-10 months) and monthly fluctuations in the number and types of employees, it is expected that non-local construction employees would temporarily locate to the county and not bring their families with them. The population impact of the WSWP on Jerauld County would be an influx of temporary construction employees.

Overall, socioeconomic impacts of the construction of the WSWP 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 farm.

Operations and maintenance

When construction is completed in late 2008, operation and maintenance of the WSWP would begin. At that time, five permanent employees, including one manager and four highly skilled technicians, would be hired. The manager would be brought in from outside Jerauld County. The managerial and technician positions would remain in place for the duration of the wind farm operation (20 years or more).

All of the WSWP except for the interconnect substation would be located on private land leased by Babcock & Brown. Leasing of private land for the wind farm would provide additional income to the landowners. Seven property owners have current lease agreements.

Wind turbines are taxed as property on a leased site; land values are not affected for tax purposes. The wind turbine generators themselves and ancillary buildings would be subject to property tax, with the payment made by the owner of the wind project (i.e., Babcock & Brown) (S. Yost, personal communication 2007).

Decommissioning

The economic life of the turbines at the wind farm is approximately 20 years. When the economic life of the turbines is reached, the turbines would be replaced or decommissioned. A slight positive impact to the local economy would occur as construction crews temporarily move to the area and local labor is used to replace or decommission the turbines. Permanent employment at the wind farm would be ongoing until decommissioning. Employment and tax benefits would cease when the wind farm is decommissioned.

4.5.1.2 Public Services

This section discusses impacts of the wind project on law enforcement, fire protection, water and sewer provision, solid waste, education, hospital services, and emergency medical services.

Service providers were interviewed and asked whether or not they had the capacity or would be able to accommodate the proposed WSWP. All service providers indicated that they would be able to accommodate the construction and operations and maintenance phases of the facility without negatively impacting their level of service.

Law Enforcement

The Jerauld County Sheriff's Department is responsible for law enforcement within the County and the city of Wessington Springs. The department does not expect future permanent employees and the resulting resident population to cause an impact on department operations. An influx of temporary employees during construction also would not cause an increase in the department's workload (R. Thompson, personal communication 2007).

Fire Protection

The Wessington Springs Volunteer Fire Department, Inc. provides fire protection and suppression within the city of Wessington Springs. The department would be able to provide fire protection for temporary workers and additional permanent residents during WSWP construction and operation without causing an additional burden to the department.

The WSWP would be served by the Wessington Springs Volunteer Fire Department. The department is responsible for responding to all fire calls in unincorporated Jerauld County. The department would be able to assume the extra fire protection duties associated with the wind farm. Response time to the wind farm would vary between 10 and 12 minutes. The department does not have a HAZMAT team, but there is one available one hour way in Mitchell (S. Mentzer, personal communication 2007).

Water and Sewer

Water and sewer service within the city of Wessington Springs is provided by the City. Water and sewer infrastructure is in place for a larger population. Both systems have excess capacity and could handle the demand from temporary construction workers and permanent employees (L. Willman, personal communication 2007).

Solid Waste

Tri-County Landfill, a 40-acre solid waste landfill in Brule County, is responsible for disposing of solid waste for cities and unincorporated areas of Jerauld County.

Additional solid waste is expected to be generated from the construction and operation of the wind farm and from residential sources from the temporary construction workers and permanent employees. The landfill is capable of handling solid waste generated from both sources. The landfill has an expected life capacity of more than 40 years (L. McManus, personal communication 2007).

Education

The WSWP and the city of Wessington Springs are located in Wessington Springs School District B..

The highest level of hiring by the wind farm would be temporary construction workers who are not expected to move to the area permanently or to bring their families with them. Local hiring would not

increase enrollment as local workers either do not have school-aged children or already have children enrolled in the school system. Some new employees would be hired for operation of the wind farm and would move to the area permanently. Those employees may or may not have school-aged children. The school district currently has the capacity to accept new students (D. Rounds, personal communication 2007).

Hospital Services

Avera Weskota Memorial Medical Center is located in Wessington Springs and provides medical services for the area. It is a 25-bed critical access facility that provides primary and some secondary and tertiary medical care for the region (K. Lee, personal communication 2007). The hospital is currently in the process of being renovated and expanded.

Emergency Medical Services

Avera Weskota Memorial Medical Center also provides emergency medical services for all of Jerauld County. The emergency medical service is headquartered at the hospital. The level of staffing and number of ambulances are adequate to support the construction and operation and maintenance of the WSWP (K. Lee, personal communication 2007).

4.5.2 No Action

Under the No Action Alternative, the proposed wind farm would not be built. The economic benefits and costs that would come to Jerauld County from the WSWP would not occur. Financial costs and commitments associated with the construction and operation of the WSWP would be eliminated or transferred to a different location. WSWP-related increases in temporary and permanent jobs and tax revenues would not occur in the county.

4.6 Environmental Justice

A significant impact upon environmental justice issues would occur from construction or operation of the WSWP if there were a disproportionate negative effect on minority or low-income populations in the area.

4.6.1 Proposed Action

Most of WSWP area is sparsely inhabited. Identified environmental impacts associated with the construction, operation, maintenance, and decommissioning of the proposed wind farm would affect the area's population equally, without regard to ethnicity or income.

It is possible that impacts on traditional cultural properties (TCPs) could disproportionately affect Native Americans concerned about these cultural resources. Specific TCPs have not been identified in the WSWP vicinity. If TCPs are identified during future investigations performed to comply with Section 106 of the NHPA, measures would be identified to mitigate impacts (see Section 4.12).

Based on the requirements of E.O. 12898 and Jerauld County population data, it is concluded that no minority or low-income populations would be disproportionately affected from construction or operation of the WSWP.

4.6.2 No Action

No environmental justice impacts are associated with the No Action Alternative.

4.7 Biological Resources

This section describes the impacts to biological resources that could occur as a result of construction, operation, and maintenance of the wind farm and associated facilities. Impact assessment methodology applied to biological resources is described below. Mitigation measures are presented in Appendix A.

A significant impact to vegetation would occur under the following conditions:

- Loss of vegetation resulting in the listing, or jeopardizing the continued existence, of any invasive plants species; or
- Introduction or spread of invasive plant species to a pristine area (i.e., an area of native vegetation void of invasive species).

A significant impact to wildlife would occur under the following conditions:

- Loss of habitat or individuals resulting in the listing of any species.

A significant impact to special status species would occur if there were:s

- Loss of habitat or individuals that would jeopardize the continued existence of a species;
- Loss of habitat or individuals, resulting in the increase in severity of listing status (e.g., from threatened to endangered);
- Conflict with existing or planned environmental preserves established to protect special status species.

4.7.1 Proposed Action

4.7.1.1 Vegetation

Clearing, grading, and construction would result in the permanent and temporary loss of vegetation. Permanent vegetation loss would result from removal of vegetation at turbines, substations, the O&M building, and access roads. Temporary disturbance would result from turbine work areas, the underground collection system, and areas along the access roads that would be affected only during construction. Table 4.7-1 presents estimates of permanent and temporary disturbance by vegetation type, based on GAP data. Permanent loss of vegetation would be minimized by limiting the area of physical ground disturbance through the use of existing roads, and by reseeding all temporarily disturbed areas with native mixtures of grasses upon completion of construction activities. No rare or sensitive plant species are known to occur in the wind farm area, and surveys have not been conducted to verify presence/absence of plant species and communities providing habitat for sensitive species (e.g., fritillary butterflies, sharp-tailed grouse, and greater prairie chickens).

Physical ground disturbance, construction vehicles, and possibly increased public access could facilitate the establishment and spread of noxious weeds. Noxious weeds compromise native biodiversity and create financial burdens. South Dakota manages weed control under SDCL 38-22. South Dakota has 27 documented noxious weed species, nine of which are known to occur in Jerauld County (see Table 3.7-1). The establishment of noxious/invasive vegetation could be limited by early detection and eradication.

Fugitive dust generated during clearing, grading, and vehicle travel could adversely affect vegetation. However, fugitive dust generation would be short-term and localized to the immediate area of construction. Control measures would be implemented to minimize fugitive dust emissions from construction-related traffic and ground disturbance (see Section 4.15).

Table 4.7-1 Vegetation Disturbance in the WSWP Area

GAP Vegetation Classification	Total (Acres)	Total Temporary Disturbance (Acres)	Total Permanent Disturbance (Acres)
Agriculture	468	13.1	3.4
Grassland	2,591	69.3	32.7
Deciduous Woodland	237	9.7	5.0
Wetland	267	0.4*	0.3*
Total Acreage	3,561	92.5	41.4

* GAP data have a resolution of 30 meters by 30 meters. Based on 2007 wetland delineations, Babcock & Brown plans to avoid disturbing all jurisdictional wetlands.

The construction of access roads could possibly result in increased public access depending on the amount of access permitted by the landowners. If public access is increased, there could be an increase in wildfires, ignited by hot engine parts and careless cigarette use. The potential for wildfires would be greatest in summer and autumn when native grasses have died back and fuel loads are at their peak. To limit new or improved access into the area, all new access roads that are not required for maintenance would be closed. Due to the private ownership of the leased lands, the majority of roads would be gated, further limiting public access and thus minimizing noxious weed spread and wildfire ignition.

4.7.1.2 Wildlife

Activities associated with WSWP would be limited to the land within the boundaries of the project. There would be no disturbance to species in Firesteel Creek or West Branch Firesteel Creek.

In Spring 2007, WEST, Inc. performed a Potential Impact Index (PII) Study to evaluate potential impacts to biological resources in accordance with USFWS guidelines. The WSWP site PII score of 172 is slightly lower than that of the Oakwood Lakes State Park reference area (PII of 199), but it is still relatively high. The high score can be attributed to the presence of many wetlands and grassland areas.

Birds

Construction. Construction activities could affect avian species through mortality, habitat alteration or loss, and disturbance. Mortality is associated with destruction of eggs or abandonment of active nests due to disturbance. Breeding bird surveys in 2007 indicate that the wind farm area supports populations of grassland birds, including a number of species protected under the MBTA.

Construction would not last longer than one nesting season (construction would occur from late March or April to October or November), but would still occur during the nesting period for many bird species. Ground nesting species such as ferruginous hawk, northern harrier, greater prairie chicken, and sharp-tailed grouse would be at higher risk for impacts from disturbance. Although

construction activities may result in some level of egg loss and nest abandonment, several mitigation measures would be implemented to minimize these impacts. First, Babcock and Brown would attempt to do as much grading and other ground disturbance as possible before the start of the breeding season. Avian nest surveys would be conducted within all areas designated for temporary or permanent disturbance immediately prior to construction in that area. Periodic nest surveys would be conducted during the appropriate nesting period for raptor, sharp-tailed grouse, greater prairie chicken, and grassland bird species. All active nests would be marked as avoidance areas. No construction activities would be permitted within a pre-determined radius of an occupied sharp-tailed grouse, greater prairie chicken, or raptor nest until the young have fledged. With appropriate measures in place, loss and nest abandonment would represent a low impact to avian species.

The wind farm would result in the permanent loss of approximately 33 acres of grassland habitat (Table 4.7-1), which represents a small proportion of the total wind farm area (1 percent). The spacing of turbines and access roads could contribute to habitat fragmentation in the wind farm area. Construction noise and associated human activity could temporarily disturb or displace individual birds, and may interfere with migrating, foraging, breeding, and nesting. Disturbance would be limited to the duration of construction activities. Construction-related disturbance would be limited to a single migratory (both spring and fall) and breeding-nesting season; however, survival and reproductive success would be temporally reduced.

The wind farm area represents habitat for sharp-tailed grouse and greater prairie chicken. Active leks are unknown in the project area; however, species occurrence was documented during breeding bird surveys (WEST 2007a). Construction effects would be similar to those previously described for avian species and could include egg loss and nest abandonment, habitat loss, and permanent and temporary disturbance and displacement. Egg loss and nest abandonment would be minimized by pre-construction nest surveys within all areas designated for temporary or permanent disturbance. Nests would be marked as avoidance areas, and no construction activities would be permitted within a pre-determined radius of an occupied nest until the young have fledged. As previously described, a total of 33 acres of grassland habitat would be permanently lost as a result of the wind farm. Construction noise and associated human activity could temporarily disturb or displace individual birds, and may interfere with foraging, breeding, and nesting. Studies have suggested that noise from construction and human activities disturb upland bird species, displacing birds from traditional habitats, reducing use of leks, and causing nest abandonment (Young et al. 2003a; SDGFP 2007). Because construction would not extend over more than a single breeding and nesting season, the period of disturbance would be limited. In order to minimize effects upon greater prairie chickens and sharp-tailed grouse (leks and breeding individuals), no construction activities would be permitted within a pre-determined radius of a known active lek between March 1 and May 1.

Operations and Maintenance . Operation and maintenance of the proposed wind farm could affect avian species through direct mortality, disturbance and displacement, and habitat fragmentation. Bird fatalities resulting from collisions with turbines have been documented at most operational wind farms and have involved a variety of bird species, including passerines, raptors, waterfowl, and shorebirds (Erickson et al. 2003). Data indicate bird vulnerability to collisions with turbines is species-specific, habitat-specific, and facility-specific (Erickson et al. 2001), with morality rates being related to the number of turbines (EFSEC 2003). Other factors that influence avian mortality include the arrangement of turbines (i.e., end turbines have higher collision rates), proximity to migration corridors and rim edges, structure type (e.g., lattice structures provide perches within the Rotor Sweep Area [RSA]), tower height (i.e., blades are closer to the ground on shorter turbines), conditions that reduce visibility (i.e., fog), and attractants such as abundant prey resources and certain FAA marker lights (Johnson et al. 2002; NWCC 2003).

U.S. wind facilities average 2.19 avian fatalities per turbine per year (Erickson et al. 2001). The average is reduced to 1.83 fatalities per turbine per year if the Altamont Pass wind farm in California is excluded from calculations. Passerines make up more than 80 percent of all bird fatalities at wind farms (Erickson et al. 2001), and mortality rates at wind farms have not created population-level effects for any species (Young and Erickson 2003). Average raptor mortality rates are 0.03 raptor per turbine per year overall, and 0.006 raptor per turbine per year excluding Altamont Pass (Erickson et al. 2001). Raptor mortality has been absent to very low at most newer generation wind facilities (NWCC 2003). Waterfowl and shorebird mortality at wind energy projects has been minimal (Erickson et al. 2003; Koford 2005).

Based upon these data, the 34 turbines of the WSWP could result in an annual mortality of 62 to 74 passerines and 1 raptor (Table 4.7-2). The wind farm contains an escarpment along its eastern boundary which was identified as a general high avian use area during 2007 surveys. However, the escarpment is not continuous for a great distance and does not represent a migratory pathway for raptors. Raptor use of the WSWP area is not greater than that observed at most existing and proposed wind projects (WEST 2007b). Higher raptor concentrations are known along the Missouri River corridor 60 miles west of the WSWP area (Birds of South Dakota 2007).

As part of the Proposed Action, measures have been included that would reduce avian mortality associated with turbine operation, and several other mitigation measures would be implemented to further reduce avian mortality. Tubular structures and newer generation turbines (GE 1.5sle; see Section 2.3.2.2) proposed for used at the WSWP would eliminate the creation of perching sites within the project area and pose a lower risk of avian collisions (Erickson et al. 2002). If permitted by the FAA, white lights instead of red lights would be installed on turbines to reduce avian attraction (Ugoretz 2001; Manville 2005). A post-construction monitoring program to assess avian mortality would be designed and implemented in coordination with the USFWS, Western, and SDGFP. Data obtained through baseline avian surveys and local ecological characteristics suggest that avian mortality rates are likely to be similar to or lower than those experienced at other wind farms. While the project design and proposed mitigation measures would further reduce likely wind farm fatalities, avian mortality would occur as a result of the proposed wind farm.

Noise and human activities associated with operation and maintenance of the wind farm would result in temporary disturbance of similar nature but reduced intensity compared to those discussed for project construction. Regional roads may experience increased traffic due to interest in seeing the operational turbines (see Section 4.3); traffic would generally be restricted to public roads. New roads would be constructed for access to the turbine strings, but the majority of these roads would be gated and located on private land.

The presence of turbines and operation and maintenance activities could result in longer-term effects, including avoidance and abandonment of habitats in proximity to the turbines as well as habitat fragmentation. Research has indicated that displacement effects associated with wind turbines are specific to the project location and individual bird species. Studies have identified reduced avian use in habitats within 50 to 180 meters (164 to 590 feet) of turbines (Johnson et al. 2000a; Erickson et al. 2007), and grassland species specifically decreased use of habitats near turbines (Erickson et al. 2007). However, displacement surveys at the Buffalo Ridge wind farm in Minnesota indicated similar pre- and post-construction habitat use by grassland birds in control plots near turbines. Displacement could result in reduced breeding success, productivity, and survival. Given the possible area of displacement, these effects may have population-level consequences for bird species (Johnson et al. 2000b). Baseline surveys have been initiated to assess pre-construction avian abundance and habitat use in the project area. Reference sites have also been established adjacent to the WSWP area as control sites for comparison. Post-construction monitoring would continue pre-construction baseline

surveys for two years to evaluate species-specific changes in abundance, habitat use, and displacement effects associated with wind farm operations to general avian communities. In addition, whooping crane monitoring would occur concurrently for three years. Both of these studies would improve the understanding of species-specific disturbance and displacement effects associated with wind developments.

Operation and maintenance activities and the presence of turbines could also fragment habitat for grassland species. The WSWP grassland ecosystem is relatively intact; however, cropland and roads are present. Human activity and turbine presence could effectively further fragment habitats for avian species. The actual fragmentation effects are difficult to quantify, but would likely be species-specific and could disrupt movement between seasonal habitats. In the worst case, these effects would lead to some reduction of breeding success, productivity, and survival. A post-construction monitoring program would help to determine fragmentation effects.

Possible operation and maintenance impacts for prairie chickens and sharp-tailed grouse are similar to those described above. Collision-related mortality of prairie chickens and sharp-tailed grouse has been relatively rare at wind farms (Erickson et al. 2002). Grouse and prairie chickens may fly within the RSA for the GE 1.5sle wind turbine generator (about 147 to 389 feet above the ground surface), which puts them at potential risk for collision with turbine blades. While the chance for collision-related mortality of prairie chicken and sharp-tailed grouse is low, post-construction monitoring of avian mortality would help to evaluate grouse and prairie chicken fatalities and identify turbines and turbine strings causing disproportionate morality rates. The use of the GE 1.5sle, a tubular turbine structure, would prevent the creation of raptor perches that can result in increased predation upon sharp-tailed grouse and greater prairie chickens. If increased predation does occur and the cause is identifiable, onsite mitigation (i.e., raptor or raven deterrent devices) could be developed to correct the issue. With appropriate mitigation measures, mortality of sharp-tailed grouse and greater prairie chickens would be reduced.

Noise and human activities associated with operation and maintenance would result in temporary disturbances to grouse and prairie chickens similar to those previously discussed for project construction. Although no studies have been conducted to evaluate the effects of turbine presence on greater prairie chickens and sharp-tailed grouse, there is anecdotal evidence that these species exhibit avoidance of tall structures (Braun 1998; Bidwell et al. 2004). For example, lesser prairie chickens avoid even high-quality habitat within 200 meters (656 feet) of a single oil or gas well pump, within 600 meters (1968 feet) of an improved road, and within 1,000 meters (3280 feet) of a transmission line (Bidwell et al. 2004). Accordingly, the presence of turbines could displace greater prairie chickens and sharp-tailed grouse from habitats in the vicinity of turbines. Turbines could also fragment prairie chicken and sharp-tailed grouse habitat by disrupting movement between seasonal habitats. While difficult to quantify, it is likely that the wind farm would result in the effective loss of prairie chicken and sharp-tailed grouse habitat and could adversely affect individual reproduction and survival. Pre- and post-construction avian surveys would help document habitat effects associated with the presence of turbines.

Bats

Construction. Construction of the wind farm could affect bats through direct mortality, habitat loss and fragmentation, and disturbance effects (SDBWG and SDGFP n.d.). Bat surveys for the WSWP are ongoing. There are no known roosts or hibernacula within or adjacent to the area. The probability of construction-related bat mortality is extremely low given their mobility and the absence of any roosts or hibernacula. Habitat loss and fragmentation effects to bats are also expected to be minimal. The permanent loss of approximately 33 acres of grassland foraging habitat would not represent an

adverse effect to bats given the large adjacent tracts of similar habitat. No shrub or forested riparian habitats or other areas of concentrated bat use would be affected. Construction would occur during daylight hours and would not result in any disturbance effects.

Operations and Maintenance . Operation and maintenance impacts to bats include disturbance and displacement, habitat fragmentation, and mortality. As noted above, general disturbance and displacement effects would be minimal given the absence of hibernacula or roosts within or adjacent to the wind farm area. Maintenance activities would be conducted during daylight hours when bats are not present, and noise and movement associated with operating turbines are not likely to affect bats. Wind turbines could fragment foraging habitat for bats.

Collision-related bat mortality has been documented at most wind farms in the western U.S. (Erickson et al. 2002). Annual bat mortality rates have ranged between 0.74 and 2.3 fatalities per turbine at wind farms in Wyoming, Oregon, and Minnesota (Young et al. 2003). Researchers have concluded that observed mortality rates do not have population-level effects, and no significant difference has been noted in mortality rates at lit and unlit turbines (Johnson et al. 2003). Most mortality has involved migrant or dispersing bats rather than residents (Johnson 2005; Johnson et al. 2003; Keeley 2001). Utilizing 1.34 fatalities per turbine per year (the mortality rate at Foot Creek Rim which falls in the middle of the three wind farms in Wyoming, Oregon, and Minnesota with habitat and bat species similar to those at the WSWP), the WSWP could result in an annual average mortality of 46 bats. Bat mortality from collisions with turbines at the WSWP would likely occur. However, bat calls studies in 2007 indicate low bat activity in the project area (see section 3.7.4.1) so the frequency of collisions may be low based on recently collected bat data.

4.7.1.3 Special Status Species

Federally-Listed Species

Whooping Crane. Suitable habitat for the whooping crane in the wind farm area includes stop over, roosting, and foraging habitats. The wind farm is located within the Aransas-Wood Buffalo Population migration corridor. Previous sightings in the region, large numbers of sandhill cranes (a surrogate species of the whooping crane), and the presence of suitable habitat make it possible that whooping cranes occasionally fly over and land in the project area during seasonal migrations, and operating turbines could pose a threat. Whooping crane occurrence is greater closer to the Missouri River, approximately 60 miles west of the WSWP. The Missouri River is generally the centerline of the migration corridor and whooping crane occurrence decreases further away from the Missouri River. Suitable habitat is present throughout the migration corridor and the WSWP. Utilization of the entire corridor is likely during any migratory cycle. Inclement weather, predation, and human disturbance may cause whooping cranes to stray from the main centerline of the migration corridor, the Missouri River. During these events, habitat along the fringes of the corridor, such as the WSWP, may be utilized. Structures located within the corridor, such as wind turbines, pose a collision risk for whooping cranes due to poor visibility during inclement weather and poor flying agility of cranes. No whooping crane mortalities have been documented at wind farms (USDI 2005).

Aside from migration, whooping cranes may also occur at WSWP during stopover; utilizing foraging and roosting habitat within WSWP. Whooping cranes fly at lower altitudes between roosting and foraging habitat, placing them at risk of collision with turbines during take-off, landing, inclement weather, and movement between foraging and roosting habitat.

State-Listed Species

Bald Eagle. The bald eagle may occur in the project area during winter months as a transient resident. The proposed wind farm could affect the bald eagle as a result of temporary disturbance or displacement associated with construction and maintenance activities, loss of foraging habitat, and mortality of individuals via collision with turbines. Traffic, noise, and human presence during construction and maintenance of the wind farm could displace individual bald eagles foraging in the vicinity. However, the wind farm area contains a limited amount of suitable foraging habitat, so construction and maintenance activities would have minimal effect on bald eagles. Mitigation measures would be implemented as part of the project in order to minimize disturbance and displacement effects. Construction activities would be modified or curtailed when bald eagles are present to reduce disturbance. Also, construction crews would be instructed to avoid disturbing or harassing wildlife (including bald eagles) and to report any bald eagle sightings.

The proposed wind farm is not likely to result in bald eagle mortality. Raptor mortality has been relatively low at wind farms and there have been no reported bald eagle fatalities at any wind facilities in the western U.S. (Erickson et al. 2002; Johnson et al. 2000a; Young et al. 2003). The probability of bald eagle mortality would be further minimized because there are no adequate roosting trees or known nesting in the project area. The collection system would be underground, eliminating the risk of collision with and electrocution from new transmission lines. The implementation of specific mitigation measures if bald eagles came into the area would reduce the chance of disturbance.

State Species of Concern

Greater Prairie Chicken and Sharp-tailed Grouse. Suitable habitat for greater prairie chickens and sharp-tailed grouse is present in the wind farm area. Adverse impacts associated with wind farm construction include habitat loss, displacement, and mortality. The habitat loss effects would be directly proportional to the ground disturbance. Individuals were observed during 2007 avian surveys indicating a known presence in the proposed wind farm area. No greater prairie chickens or sharp-tailed grouse leks were documented during 2007 avian surveys, although one active grouse lek and one prairie chicken lek are known approximately 7.5 miles southwest of the proposed wind farm. Construction of the wind farm would result in a loss of grassland habitat and may impact usage of breeding grounds.

Grassland Bird Species (Le Conte's Sparrow, Chestnut-collared Longspur, Grasshopper Sparrow, Western Meadowlark, Upland Sandpiper, Marbled Godwit). Grassland species of concern occur in the wind farm area as migratory and breeding residents. Suitable non-breeding and breeding habitat is present for these species. Adverse impacts associated with wind farm construction include habitat loss, displacement, and mortality. Habitat loss would be directly proportional to the amount of ground disturbance. Grassland species of concern were observed during spring and summer surveys with the exception of Le Conte's sparrow and chestnut-collared longspur.

No species-specific studies have evaluated the effects of wind farms on most grassland species, and it is difficult to predict disturbance and displacement effects. General studies of displacement of bird communities indicate species composition is reduce in the immediate area around wind farms and continues outward up to 180 meters (590 feet) (Erickson et al. 2007). Construction activities would temporarily disturb grassland species in the vicinity. Operation may result in collisions with turbines, causing injury or death.

Wetland Bird Species (American Bittern, Wilson's Phalarope). Wetland bird species may occur in the wind farm area as summer residents, and suitable breeding habitat is present. Adverse impacts

associated with wind farm construction include habitat loss, displacement, and mortality. The habitat loss effects would be directly proportional to the amount of ground disturbance. American bitterns were observed during spring or summer surveys. Pre-construction nest surveys would identify nesting species and nest disturbance would be avoided.

No studies have evaluated the species-specific effects of wind farms on wetland species, and it is difficult to predict the disturbance and displacement effects. General studies of displacement of bird communities indicate species composition is reduce in the immediate area around wind farms and continues outward up to a distance of 180 meters (590 feet) (Erickson et al. 2007). Construction activities would temporarily disturb wetland species in the vicinity. Operation may result in collisions with turbines, causing injury or death.

Northern Harrier. Northern harriers may occur in the wind farm area as summer residents, and suitable breeding habitat is present. Adverse impacts associated with wind farm construction include habitat loss, displacement, and mortality. The habitat loss effects would be directly proportional to the ground disturbance. Pre-construction nest surveys would identify nesting harriers and nest disturbance would be avoided.

No studies have evaluated the effects of wind farms on northern harrier, and it is difficult to predict the disturbance and displacement effects. General studies of displacement of bird communities indicate species composition is reduce in the immediate area around wind farms and continues outward to 180 meters (590 feet) (Erickson et al. 2007). Construction activities would temporarily disturb northern harriers in the vicinity. Operation may result in collisions with turbines, resulting in injury or death.

Regal Fritillary Butterfly. Regal fritillary butterflies may occur in the wind farm area and suitable habitat may be present. Adverse impacts associated with wind farm construction include habitat loss and mortality. Habitat loss would be directly proportional to the amount of ground disturbance. Regal fritillary butterflies were not observed during spring or summer avian surveys, but there has been no survey specifically designed to determine the presence or absence of this species.

No studies have evaluated the effects of wind farms on regal fritillary butterflies, and it is difficult to predict the disturbance and displacement effects. General studies of butterfly mortality attributed to turbine strikes indicate occurrence is likely low due to wind currents generated from turbine rotation (Grealey and Stephenson 2007). Construction activities would temporarily disturb regal fritillary butterflies in the vicinity. Operation could result in collisions with turbines, resulting in injury or death.

4.7.2 No Action

Under the No Action Alternative, the project would not be constructed. There would not be any alteration to the lands; therefore, no impacts to vegetation or wildlife would occur as a result of the No Action Alternative. However, other wind energy development projects could occur in Jerauld County, so the No Action Alternative does not preclude impacts to vegetation and wildlife in the future.

4.8 Water Resources and Wetlands

A significant impact on surface water would result if any of the following were to occur from construction or operation of the proposed project:

- Contamination of surface water from erosion, storm water runoff, or air emissions that would create or contribute to a violation of waste discharge requirements.
- Surface water quality degradation which causes a long-term loss of human use or use by aquatic wildlife and plants.
- Surface water quality degradation that exceeds state-established standards for designated uses.
- Alteration of the existing drainage pattern of the site or area that would result in off-site erosion or siltation.
- Surface water impacts that would violate Section 404 of the Clean Water Act or other applicable surface water regulations.

A significant impact on groundwater would result if any the following were to occur from construction or operation of the proposed project:

- Groundwater quality degradation that causes groundwater quality to exceed state or Federal standards.
- Groundwater depletion or interference with groundwater recharge that adversely affects existing or proposed uses of the groundwater aquifer.

A significant impact on wetlands and riparian areas would result if any of the following were to occur from construction or operation of the proposed project:

- Degradation or loss of any Federal or state protected wetland(s), as defined by Section 404 of the Clean Water Act or other applicable regulations. Mitigation for losses of wetlands may be required as part of a Section 404 Permit.
- Indirect loss of wetlands or riparian areas, caused by degradation of water quality, diversion of water sources, or erosion and sedimentation resulting from altered drainage patterns.

4.8.1 Proposed Action

4.8.1.1 Construction

None of the construction proposed for the WSWP would affect Firesteel Creek or West Branch Firesteel Creek. Also, water used for dust suppression would either be hauled to the site or pumped from existing wells. No water would be pumped from either creek.

Construction of the 34 wind turbines would cause an estimated 24.5 to 25.8 acres of temporary ground disturbance from work areas and 0.2 to 1.5 acres of permanent ground disturbance from the turbine foundations. No direct impacts to surface waters and wetlands would occur from construction of the wind turbines, because the wind turbines were sited specifically to avoid wetlands. In consultation with Western and the USFWS, multiple turbines originally located between and close to two wetlands were relocated to the locations shown in Figure 2.3-2.

The collector and interconnect substations would be co-located. The proposed site is located next to the existing Western 230kV transmission line between the escarpment and West Branch Firesteel Creek. Construction of these facilities would cause an estimated 8 acres of temporary ground disturbance and 5 acres of permanent ground disturbance. The proposed location of the interconnect substation was altered specifically to avoid possible groundwater problems. The nearest wetlands to the substation sites were delineated and the COE determined that they were non-jurisdictional. The

nearest non-delineated NWI wetlands would be approximately 500 feet to the southwest and 1,000 feet to the west.

The O&M building may be built about 2,000 feet southwest of the substations, although the precise location is not finalized. It would cause an estimated 2 acres of temporary ground disturbance and 2 acres of permanent ground disturbance. The nearest non-delineated NWI wetland to the possible location of the O&M building would be approximately 2,000 feet to the north.

Approximately 12.4 miles of new roads would be built to access the wind turbines and other wind farm facilities. The roads would be 16 to 20 feet wide and have a gravel surface. There would also be a temporarily disturbed area on each side of the ground surface. At an estimated eight locations, a 150-foot turnaround area would also be needed for large trucks and trailers hauling turbine components. Construction of the roads and turnarounds would cause an estimated 25.8 to 31.8 acres of temporary ground disturbance and 24.0 to 30.0 acres of permanent ground disturbance.

The road network was designed to avoid wetlands identified on NWI maps. Other wetlands along the road network were delineated by WEST in September 2007. The COE reviewed the results of the wetlands delineation and found that none of the delineated wetlands was jurisdictional (Naylor 2007). Various procedures (e.g., culverts in low areas) would be implemented to minimize possible impacts to surface waters from roads.

Approximately 16.2 miles of trenching would be required for the underground collection system. Of this total, approximately 14.2 miles would parallel new or existing roads. Construction of the underground collection system would cause an estimated 27.8 acres of temporary ground disturbance and no permanent ground disturbance.

None of the wetlands crossed by the collection system that were delineated by WEST was found to be jurisdictional by the COE. However, portions of the underground collection system not adjacent to roads would be in areas that were not examined by WEST. Possible wetlands in these areas would be avoided as necessary.

The temporary ground disturbance from the turbine work areas, substations, O&M buildings, new and improved roads, and trenching for the collection system may adversely impact surface waters and wetlands from storm water runoff, particularly along the east side of the wind farm where the ground slopes steeply to receiving waters. Construction would disturb more than one acre and would require coverage under a General Permit for Storm Water Discharges and development of a Storm Water Pollution Prevention Plan (SWPPP). Babcock & Brown would implement erosion and sediment controls throughout construction of the project, including stabilization measures for disturbed areas and structural controls to divert runoff and remove sediment. Proper implementation of these and other best management practices (BMPs) would minimize impacts to receiving waters.

4.8.1.2 Operations and Maintenance

Operation and maintenance of the collector and interconnect substations may adversely impact surface waters and wetlands from accidental spills from oil-filled electrical equipment. The only oil-filled equipment at the substation would be the transformers, which would most likely use mineral oil. Spills could migrate off-site to receiving waters, such as West Branch Firesteel Creek. EPA's Oil Pollution Prevention regulation (40 CFR part 112) requires Spill Prevention, Countermeasure and Control (SPCC) plans for facilities with aggregate aboveground oil storage capacity of greater than 1,320 gallons or a completely buried oil storage capacity of 42,000 gallons, and a reasonable expection of discharge into navigable waters of the U.S.

West Branch Firesteel Creek ultimately drains to the James River, which is classified as navigable waters of the U.S. by the COE, Omaha District. There would be no buried oil storage capacity at the WSWP. For 34 GE 1.5 wind turbines, the standard operational stock for all oils would be approximately 300 gallons total on hand. A site-wide oil change would occur every three to five years and would require approximately 2,720 gallons of oil (80 gallons per turbine) at the O&M building for a short period. However, the amount stored on-site would be phased, and aggregate storage capacity would remain below 1,320 gallons. Therefore, an SPCC plan would not be necessary for the WSWP.

4.8.1.3 Decommissioning

Decommissioning of the wind farm would not impact water resources or wetlands. The underground collector lines would be left in the ground but these would not be oil-filled. There would be no buried oil storage capacity at the WSWP that would require removal.

4.8.2 No Action

Under the No Action Alternative, there would be no impacts to water resources and wetlands from the construction and operation of the wind farm and other facilities.

4.9 Geology

Analysis of the potential impacts to the geology of the WSWP area was based largely on slope, geology and lithologic characteristics. A significant impact on geology would result if any of the following were to occur from construction or operation of the proposed project:

- Areas of geological importance are lost or made inaccessible for future use..
- Known mineral resources of economic value to the region and the residents of the state are lost or made inaccessible for future use.
- Increases in the probability or magnitude of mass geological movement (e.g., slope failures, slumps, and rockfalls).
- State-identified rock outcroppings of significance are adversely affected.

4.9.1 Proposed Action

Geotechnical drilling at the 34 turbine locations went to a depth of 50 feet, deeper than any of the turbine foundations would be. In no case, did the borehole extend beneath glacial till. At the substation site, the borehole did not extend below alluvium or colluvium.

The most significant direct impact to geologic resources would potentially be large-scale erosion brought on by slope failure. On some projects, this could occur from poor construction in areas of steep terrain and unconsolidated deposits. This type of high level, direct impact to the resource is not likely for the WSWP because onsite geotechnical surveys have been performed (FMG 2007) and a layout of the turbines, internal road network, and collection system has been developed by project engineers with access to the geotechnical data.

The Proposed Action would include the construction of 34 wind turbines spread over an area of 3,560 acres. Geotechnical investigations have been performed at each of the proposed turbine locations.

Roads would cause up to 52.5 acres of disturbance, as much as 28.5 temporary and as much as 30.0 acres permanent, depending on the width of the gravel surface. Areas of potential slope failure would be avoided to the greatest extent practicable, and new road construction would avoid steep slopes.

As mentioned in Section 3.9, the WSWP site is not considered susceptible to liquefaction (FMG 2007).

4.9.2 No Action

No impacts to geologic resources would occur under the No Action Alternative.

4.10 Soils

The primary concern regarding soil resources is to avoid or minimize potential impacts related to wind and water erosion, compaction, and rutting during and after construction. A significant impact on soils would result construction or operation of the WSWP would result in:

- Severe erosion due to disturbance of areas of steep slopes (greater than 20 percent).

4.10.1 Proposed Action

Direct impacts to soil resources would result from construction activities. Construction activities associated with the wind farm would include road building, erecting the wind turbines, trenching for the underground collection system, and constructing the O&M building and substations. These direct impacts would be temporary during construction and permanent where wind turbines, roads, and other facilities are placed.

Soil resource impacts would be reduced by the implementation of erosion and sediment control BMPs as part of the SWPPP required for projects disturbing more than one acre (see Section 4.8). The SWPPP would be developed as part of the civil engineering process and would be based on the specific soil disturbance conditions and the nature of construction, operations and maintenance , or decommissioning. Applicable plans would be provided to appropriate agencies for review and approval. BMPs would be specified in Western's MAP, and Western would monitor construction activities for compliance with the required plans and specifications. In addition, as part of the WSWP design various measures have been proposed where necessary and appropriate to avoid or minimize impacts (Appendix A). These include revegetation of all areas of temporary disturbance using an approved native seed mix.

4.10.2 No Action

No impacts to soil resources related to the WSWP would occur under the No Action Alternative.

4.11 Paleontology

A significant impact would result if:

- Scientifically important paleontological resources are lost or become inaccessible in the future due to physical damage or being covered by fill during construction.

- Scientifically important paleontological resources are lost because of vandalism caused by the presence of construction workers or by improved public access.

4.11.1 Proposed Action

Important fossils have been documented in a man-made exposure of Tertiary deposits in the escarpment west of Wessington Springs (Green 1965). Exposures of Tertiary-age deposits were not observed along the escarpment in the WSWP area in 2007. Geotechnical investigations in the WSWP area (FMG 2007) indicate that the proposed construction activities would not extend below the depth of Quaternary-age glacial deposits or the depth of colluvium and alluvium that originated from glacial till. These deposits are considered to have low potential for containing paleontological remains (R. Baker, personal communication 2007). While ground disturbance may disturb as many as 129 acres in the WSWP, turbine foundations and construction related excavations are not expected to extend beyond 8 feet in depth. Disturbance of scientifically important paleontological resources would probably not occur during construction or operation of the WSWP.

4.11.2 No Action

If the proposed wind farm were not built, there would be no impacts on paleontological resources.

4.12 Cultural Resources

Cultural resources are protected by Federal and State laws if they are found to have some level of significance under the criteria of the NRHP or under State guidance. The cultural resources recorded within the WSWP boundary have not been evaluated for NRHP eligibility. The evaluation of these resources would follow procedures and guidelines established by Section 106 of the NHPA and 36 CFR part 800.

An undertaking results in adverse effects, or impacts, to a historic property (i.e., a cultural resource eligible to or listed in the NRHP) when it alters the resource's characteristics, including relevant features of its environment or use, that qualify it for inclusion in the NRHP. Potential impacts could include:

- Physical destruction, damage, or alteration of all or part of the property;
- Isolation of the property from, or alteration of the character of, the property's setting when that character contributes to the property's qualification to the NRHP;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- Neglect of a property resulting in its deterioration or destruction; and
- Transfer, lease, or sale of the property.

An assessment of effects under Section 106 requires the identification of the Area of Potential Effects, or APE. An APE is the area within which cultural resources could be physically, visually, or audibly affected, or impacted, by the proposed undertaking. A significant impact on cultural resources would result if any of the following were to occur:

- Damage to, or loss of a site of archaeological, Tribal or historical value that is listed, or eligible for listing, on the NRHP.
- Loss or degradation of a TCP or sacred site, or if the TCP or site is made inaccessible for future use.

4.12.1 Proposed Action

Direct impacts that could occur as a result of the WSWP include ground disturbance and visual impacts. Ground disturbance could result from construction, operation, maintenance or decommissioning of the wind turbines, roads, underground collection system, substations, and O&M building. For the WSWP, the APE includes:

- The footprint of each turbine work area plus a 50-foot buffer.
- All new and improved roads plus a 50-foot buffer extending from the centerline.
- Trenches for the underground collection system plus a 25-foot buffer extending from the centerline.
- Footprints of the collection substation interconnect substation, and O&M building plus a 200-foot buffer.
- Borrow areas, staging areas, and other temporary use areas with appropriate buffers.

Visual impacts could result from the presence of wind turbines near a cultural resource for which visual setting is a major consideration in its NRHP eligibility (e.g., an architecturally distinctive building, a TCP considered sacred by Native Americans). The APE for visual impacts would be considered for architectural resources and TCPs within 1.0 mile of any of the wind turbines.

Much the WSWP area has not been surveyed for cultural resources, but the locations of wind turbines, most roads, most of the underground collection system, and substations have been surveyed by archaeologists as part of the geotechnical investigations. Babcock & Brown modified all project components that were within 100 feet of an archaeological resource, regardless of potential NRHP eligibility, to ensure there would be no physical impacts. Possible impacts in other locations of ground disturbance would be addressed prior to construction as part of Section 106 compliance. Avoidance has been and would continue to be the preferred option for the protection of NRHP-eligible cultural resources. If avoidance is not feasible, other measures, including data recovery, may mitigate impacts.

Tribal consultation efforts have produced limited information regarding TCPs in the WSWP area. Tribal consultation is an ongoing process performed by Western that will continue as part of the Section 106 compliance process.

Initial consultation efforts with several tribes have identified concerns regarding visual impacts of the proposed wind farm on cultural resources. Documentation of visually sensitive cultural resources of concern to Native Americans as well as visually sensitive architectural resources within 1.0 mile of the project area would occur prior to construction as part of Section 106 compliance.

While it is possible that improved access to the WSWP area could have an indirect impact on cultural resources by leading to an increase in vandalism and unintentional damage, the specific locations and levels of disturbance are impossible to estimate. All land within the wind farm boundaries is privately owned, and access would be determined by Babcock & Brown and the landowner. Access roads would be gated.

4.12.2 No Action

The No Action Alternative would result in no impacts to cultural resources related to WSWP development.

4.13 Health and Safety

A significant impact on public health would result if any of the following were to occur from construction or operation of the proposed project:

- Interference with emergency response capabilities or resources.
- Serious injuries to workers, visitors to the area, or area land users.
- Creation of electric and magnetic fields near an existing or proposed sensitive land use, such as schools or hospitals, which exceed applicable regulatory requirements.
- Creation of substantial interference and disruption of emergency communications and electronic health/safety devices that results in substandard performance.
- Levels of particulates or air toxics (e.g., mercury) emissions that exceed standards that are based on public health thresholds.
- Changes in traffic patterns that result in hazardous situations for motorists or pedestrians.

A significant impact would result from hazardous materials use or creation of solid wastes if any of the following were to occur during construction or operation of the proposed project:

- Improper disposal of solid or sanitary waste generated by the proposed project that would pose a threat to the public health and environment in the project vicinity.
- Spills or releases of hazardous materials, hazardous substances, or oil in excess of reportable quantities within the project area that would pose a threat to public health and the environment in the project vicinity.
- Impair implementation of or physically interfere with an adopted emergency hazardous materials spills response plan or emergency evacuation plan.

4.13.1 Proposed Action

4.13.1.1 General Health and Safety

Potential risks to health and safety associated with the construction, operation and maintenance of the wind farm and the measures implemented to reduce the risks are summarized in Table 4.13-1.

No occupied residences exist with the proposed WSWP boundary; 16 occupied residences are within 1.5 miles of the project area, and 50 are located within 4 miles. Development in the region is scattered, with the highest concentration occurring in the incorporated area of Wessington Springs just north of the project area.

The WSWP would be served by the Wessington Springs Volunteer Fire Department.. Response time to the wind farm would vary between 10 and 12 minutes. The department does not have a HAZMAT team, but there is one in Mitchell, one hour away (S. Mentzer, personal communication 2007).

Avera Weskota Memorial Medical Center in Wessington Springs provides emergency medical services for all of Jerauld County. The level of staffing and number of ambulances are adequate to support the construction and operation and maintenance of the WSWP (K. Lee, personal communication 2007).

Tri-County Landfill, a 40-acre solid waste landfill in Brule County, is responsible for disposing of solid waste for cities and unincorporated areas of Jerauld County. Additional solid waste is expected

to be generated from the construction and operation of the wind farm. The landfill is capable of handling solid waste generated from the WSWP (L. McManus, personal communication 2007).

Hazardous materials to be transported to the site during operation would include lubricating and mineral oils, cleaners, and herbicides in quantities below State and Federal regulatory thresholds. Transportation of these materials would be conducted in a manner that is protective of human health and the environment and in accordance with applicable Federal and SDDOT requirements.

Because of the tall structures, wind farms have siting concerns related to the locations of airports, flight patterns, and airspace. On September 28, 2007, FAA issued a Determination of No Hazard to Air Navigation for the proposed WSWP. On October 22, 2007, the South Dakota Aeronautics Commission issued a single South Dakota Aeronautical Hazard Permit for the 34 proposed turbine locations. To provide adequate air traffic safety, the wind turbines and MET tower would meet FAA and State safety lighting requirements.

4.13.1.2 Communications Interference

Wind farms may interfere with radio, television and microwave transmissions in several ways:

- A wind turbine may obstruct, reflect or refract the electromagnetic waves used in a range of communication systems;
- The rotating blades may have similar effects; and
- The generator itself can produce electromagnetic interference, although in the case of modern wind turbine design this type of interference is rare because it can be suppressed by shielding and good maintenance of the turbines.

Radio, television, and microwave transmission from towers located within 1,000 to 2,000 feet of one or more wind turbines may be affected by the wind turbine towers or blades. Such effects are very uncommon with today's wind technology because there is little or no metal within the moving blades that could cause interference.

Communications systems most likely to be affected are those that operate at very high frequencies, particularly microwave systems operating at frequencies above 300 MHz. These rely on line of sight between transmitter and receiver. Any obstruction in the vicinity of a straight line between these two points may cause interference and signal degradation.

The three types of degradation methods are:

1. Near field effects (i.e., nearby electromagnetic interference)
2. Diffraction (i.e., signal distortion)
3. Reflection or scattering

Microwave transmission can be mitigated through minor shifts in tower location. There are also simple, straightforward, and cost-effective mitigation measures for the other effects of wind turbines on radio, TV, or other telecommunications functions (e.g., changing the microwave transmission pattern).

The 34 turbines proposed for the WSWP were sited to avoid blockage of Federal agency radio frequency transmission and microwave signals (Nebbia 2007). Also, there would be no conflict between the turbines and existing non-Federal microwave telecom systems (Comsearch 2007).

Table 4.13-1 Risks to Human Health and Safety

Possible Risk	Measures to Reduce Risk
General risks to health and safety	Babcock & Brown and contractors would comply with all applicable local, State, and Federal health and safety laws and regulations.
Increased risk of fire as a result of welding and other human activities.	Designated onsite vehicles would be fitted with fire extinguishers. Only authorized vehicles would be permitted off gravel roads. Smoking would be restricted to designated areas.
Blasting and accidental explosions from electrical collection system.	The proposed collection system would be buried underground, although a small portion near the collector substation could be constructed as overhead cables. Only state-licensed explosive specialist contractors would be allowed to perform blasting work.
Potential electrical shock from touching wind turbine structures.	For IEEE step-and-touch voltage safety compliance, an area around a turbine may be covered in gravel. The need for a gravel layer is determined on a case-by-case basis. Access roads would be gated and public access to turbines would be restricted.
Accidental leakage or spillage of fuel (diesel, gasoline), mineral oil, hydraulic fluid, and lubricating oils.	Generally, only small quantities would be used or stored (see Section 4.8). Design features would be built into the WSWP to reduce risk. A SPCC Plan would not be required (see Section 4.8).
Increased potential for lightning-induced fires because of tall structures.	GE 1.5sle wind turbine generators are equipped with lightning protection systems.
Generation of hazardous waste.	Project operations would not result in the generation of regulated quantities of hazardous wastes. The only hazardous waste at turbines would be florescent bulbs as universal waste. Used oil and batteries are all recyclable and are exempt as a waste qualifier if recycled.
Transport of hazardous materials (lubricating and mineral oils, cleaners, pesticides, industrial materials) to and from site.	Transport of hazardous materials would be in accordance with Federal and SDDOT requirements (see Section 4.3).

Table 4.13-1 Potential Risks to Human Health and Safety (continued)

Potential Risk	Measures to Reduce Risk
Transport of hazardous materials (lubricating and mineral oils, cleaners, pesticides, industrial materials) to and from site.	Transport of hazardous materials would be in accordance with Federal and SDDOT requirements (see Section 4.3).
Ice thrown from blades.	While more than 55,000 wind turbine generators have been installed worldwide, there has been no reported injury from ice thrown from wind turbines.
Falling debris.	Minimum setbacks are incorporated into the WSWP layout. The turbines would comply with design and safety standards. Turbines have been sited to avoid the potential for a turbine to fall on Western's existing 230kV transmission line.

4.13.2 No Action

Under the No Action Alternative, potential risks to health and safety in the WSWP area, mainly the risk of fire, would stay the same as they are today.

4.14 Noise

There are no Federal noise standards that directly regulate noise from the operation of wind turbines. However, to protect public health and welfare, the EPA has developed guidelines on recommended maximum noise levels, and the Occupational Safety and Health Administration (OSHA) has established regulations to safeguard the hearing of workers. There are no local regulations or ordinances for noise in Jerauld County. EPA guidelines recommend a day-night average sound level (L_{dn}) of 55 dB(A) in typically quiet outdoor and residential areas. For protection against hearing loss, the EPA guidelines recommend a sound pressure level less than 70 dB(A) over a 24-hour period. These levels are recommendations, not requirements.

For this EA, a significant impact on noise would result if any of the following were to occur from construction or operation of the proposed project:

- Exceedance of local, state or Federal noise regulations or guidelines at sensitive receptors, such as residences, hospitals, or schools.
- Substantial permanent increase in ambient noise levels at the nearest sensitive receptors within the project vicinity. A 3-dB increase in noise is considered barely noticeable to humans, a 5-dB increase would typically result in a noticeable community response, and a 10-dB increase is considered a doubling of the sound and is generally considered to be substantial.

4.14.1 Proposed Action

4.14.1.1 Construction

According to the BLM (2005), noise levels associated with construction of a wind farm would vary greatly depending on the type of equipment, operation schedule, and condition of the area being worked. Noise levels for typical construction equipment are shown in Table 4.14-1.

Table 4.14-1 Noise Levels at Various Distances from Construction Noise Sources

	Noise Level ($L_{eq(1\text{-}h)}$[a]) [dB(A)]					
Construction Equipment	**50 ft**	**250 ft**	**500 ft**	**1000 ft**	**2500 ft**	**5000 ft**
Bulldozer	85	71	65	59	51	45
Crane, derrick	88	74	68	62	54	48
Front-end loader	85	71	65	59	51	45
Generator	81	67	61	55	47	41
Grader	85	71	65	59	51	45
Truck	88	74	68	62	54	48

Source: HMMH(1995) in BLM (2005)
[a] $L_{eq(1\text{-}h)}$ is the equivalent steady-state sound level that contains the same varying sound level during a one-hour period.

For on-road construction vehicles (e.g., heavy trucks operating at 50 miles per hour), the BLM (2005) estimates a peak noise level of 83 dB(A). However, noise levels for hourly traffic would generally be below the EPA guidelines of 55 dB(A) except in close proximity to the road or whenever there is heavy traffic volume.

Construction noise could temporarily disturb or displace individual birds and wildlife, and potentially interfere with foraging, breeding, and nesting. Disturbance would be limited to the duration of construction activities. Construction-related disturbance would be limited to a single breeding/nesting season. Temporary disturbance from noise is not expected to result in reduced survival and reproductive success, and would result in a small adverse impact to grassland birds and raptors (see Section 4.7).

Construction at the wind farm would occur in an 8-to-10-month period; construction activities would be intermittent; construction would occur during normal day-time working hours; and construction noise would be within acceptable OSHA standards. Also, based on the typical attenuation of sound over distance (6 dBA per doubling of distance from the noise source), construction noise would be reduced to acceptable levels between 1,000 and 2,500 feet from the construction equipment (Table 4.14-1).

Construction-related noise would not have a long-term impact on humans or wildlife.

4.14.1.2 Operations and Maintenance

During operations, major noise sources at a wind farm would include mechanical and aerodynamic noise. The BLM (2005) offers details on the noise generated by wind turbines.

Table 4.14-2 compares noise typically associated with large wind turbines with other noise sources. In addition, Figure 4.14-1 illustrates the results of noise modeling performed by Babcock & Brown.

Babcock & Brown used GH WindFarmer software to calculate noise emissions from individual turbines. Inputs included noise data provided by the turbine manufacturer: the sound power level of the turbine, tonal penalties and octave-specific sound power levels. Terrain data were obtained from the USGS. The software models how sound from the wind turbine generator attenuates as it propagates out from the turbine. The noise calculations consider the three-dimensional distance between each turbine at hub height and numerous near ground-level positions (1.5 meters or approximately 5 feet above ground level). The near ground-level sound levels were compiled and contoured across the WSWP site to produce in the noise level map in Figure 4.14-1.

At the base of turbine towers, the noise level would be about 55dB. Noise level at the nearest occupied residence would be about 40dB, equivalent to background noise levels in a rural environment. This level would be well below EPA recommended guidelines for residential areas and considerably below the recommended 70 dB(A) threshold for hearing protection.

Whether turbine noise would be intrusive or not would depend not only on the distribution of amplitude and frequency but also on background noise, which would vary with the level of human and animal activity, wind speed, and other meteorological conditions. In general, wind-generated background noise tends to increase more rapidly with wind speed than aerodynamic noise from wind turbines. If noise from wind were to increase more than 6 dBA, the wind turbines would no longer contribute to a perceptible increase of noise.

Operation of the wind farm would not expose persons to noise levels in excess of EPA recommendations. The most notable noise source in the vicinity of the proposed wind farm area would continue to be ranch and farm equipment.

.4.14.2 No Action

Under the No Action Alternative, natural background noise levels would continue as the wind farm and other facilities would not be built.

4.15 Air Quality

Air quality concerns for the WSWP include fugitive dust from construction activities, exhaust emissions from construction equipment and vehicles, and air toxics or hazardous air pollutants (HAPs) controlled by the EPA or the State.

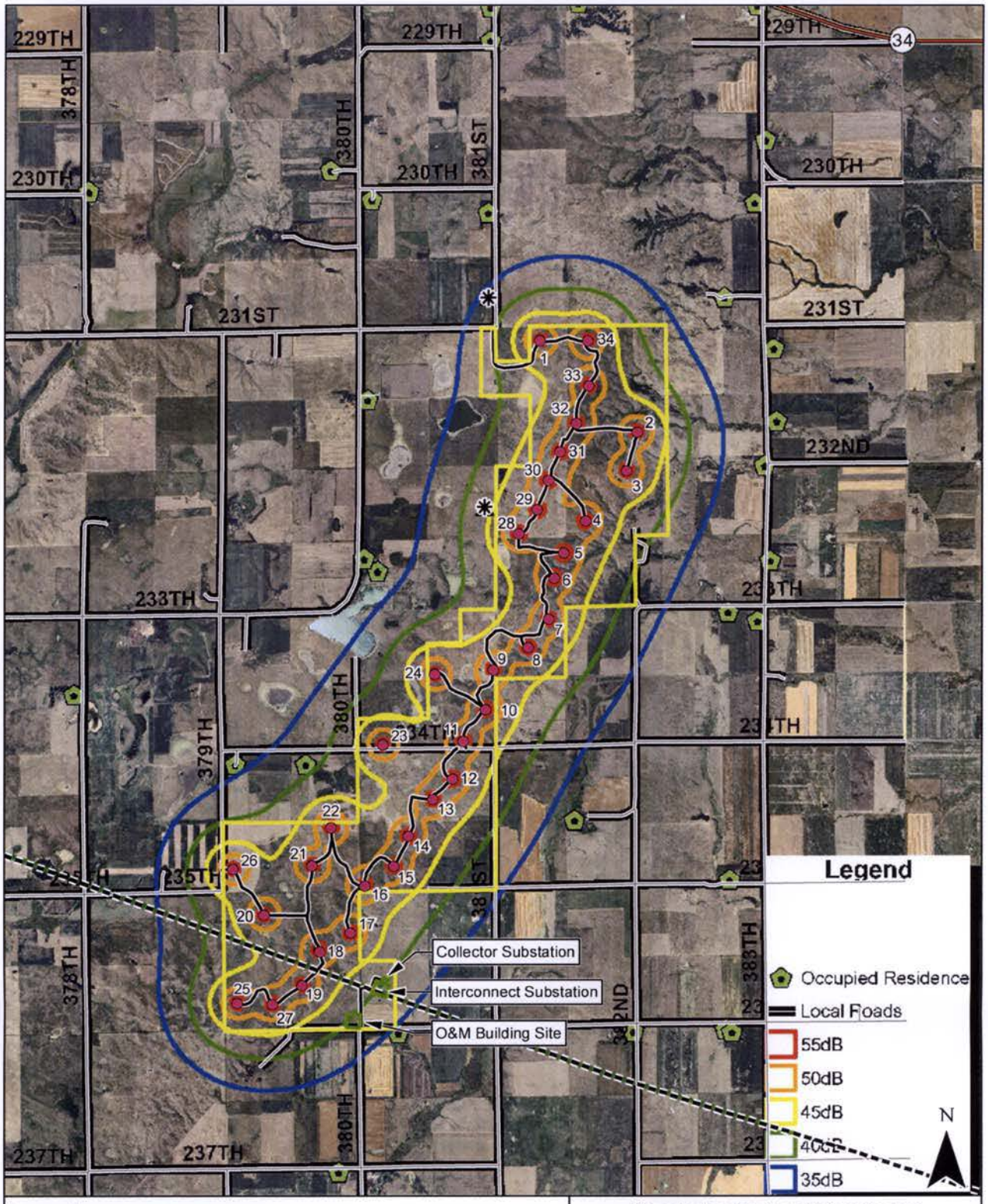
A significant impact on air quality would result if any of the following were to occur as a direct result of the proposed project:

- Predicted emissions that would result in a violation of state and/or Federal ambient air quality standards.
- Predicted emissions that would result in (or contribute to) an amount greater than the Prevention of Significant Deterioration maximum allowable for criteria pollutants.

- Project emissions that would result in a declaration of non-attainment in a specific area for one or more criteria pollutants, or would cumulatively contribute to a net increase in any criteria pollution that would result in non-attainment of the area.
- Predicted air pollutant emissions that would result in a change in visibility that would exceed Class I standards.
- Air emissions that would cause sensitive receptors to be exposed to pollution concentrations that exceed state and Federal standards.
- Predicted emissions that would conflict with or obstruct implementation of an applicable air quality plan (general conformity).
- Predicted mercury emissions that would result in a violation of the Clean Air Mercury Rule.

Table 4.14-2 Comparison of Wind Turbine Noise to Other Noise Sources

Noise Source	Typical dB(A)
Threshold of pain	140
Fire engine siren at 100 feet	130
Flyover of F-16 aircraft at 500 feet	104
Average street traffic	85
Vacuum cleaner	70
Normal conversation	55
Large wind turbine at base of tower	**55**
Soft music, moderate rainfall	50
Background noise in rural environment	48
Typical living room	40
Large wind turbine from 0.25 mile	**35**
Whisper, quiet library	35
Rustling leaves	20
Threshold of hearing	0



Legend

- Turbine
- Temporary MET Tower
- Major Highway
- Existing Road
- New Access Road
- Lease Boundary
- Existing 230kV Transmission Line

Wessington Springs Wind Project

Noise Analysis (dB)

Figure 4.14-1

0 0.5 1 1.5 2 Miles

POWER ENGINEERS

BABCOCK & BROWN

112032_Fig4.14-1_Rev1_092707_TDH

4.15.1 Proposed Action

4.15.1.1 Construction

Construction of the WSWP would create dust from vehicles accessing the project site, road construction, clearing and removal of vegetation, equipment laydown, grading and construction of substations, O&M building construction, and trenching for the underground collection system. Construction equipment and vehicles would create vehicle exhaust (i.e., tailpipe emissions). A concrete batch plant would create particulates, and on-site diesel generators for the batch plant would add to priority pollutants. During construction of the wind farm, trucks, bulldozers, cranes, drill rigs, graders, backhoes, and other pieces of construction equipment would be required for up to 10 months. The total number of pieces of equipment present at the construction site on a given day would be less.

Emissions from construction would be confined to day-time activity for the duration of the construction period.

Because the WSWP area is rural, there are no requirements for fugitive dust control other than taking standard and reasonable precautions and implementing proper dust control measures to ensure opacity limits are not exceeded. Based on EPA's AP-42: Compilation of Air Pollution Emission Factors, approximate emission factors are conservatively estimated at 1.2 tons/acre/month for total suspended particulate (TSP) concentrations from construction activities scattered throughout an area. Dust emissions would be lower. Implementation of BMPs and other measures (e.g., water spraying, revegetation) would reduce fugitive dust.

4.15.1.2 Operations and Maintenance

A wind farm is not considered a combustion source, and wind turbines do not produce direct emissions. While wind turbines do not generate emissions, there could be some minor Volatile Organic Compound (VOC) emissions during routine changes in lubricating and cooling fluids and greases. All activities would be limited in extent and duration and should have no air quality impact.

The BLM Wind Energy Development Programmatic Environmental Impact Statement (BLM 2005), which addressed the potential impacts on air quality of wind energy development on BLM land in 11 western states, concludes that the operation of a wind energy development project would not adversely impact air quality. Vehicle travel and maintenance activities might generate minor tailpipe emissions and fugitive dust, but these activities would be limited in extent and should have no appreciable air quality impacts.

4.15.2 No Action

Under the No Action Alternative there would be no impacts on local air quality, because the WSWP would not be built.

4.16 Cumulative Impacts

Under CEQ regulations, cumulative impacts can result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). Cumulative impacts can result from individually minor, but collectively significant, onsite and offsite actions occurring over a period of time. Similar projects or actions, as well as projects and actions that have similar impacts, can contribute to cumulative impacts.

The geographical area considered for the analysis of cumulative effects generally includes the same area as the Proposed Action. For this EA, the area considered is Jerauld County.

Existing conditions in Jerauld County were shaped by impacts from current and past actions. The county is rural and relatively undeveloped. The 2005 estimated population for Jerauld Coutny is 2,136, of which nearly half live in Wessington Springs (U.S. Census Bureau 2007). Past changes in the county have resulted from activities related to cultivation, grazing, the building of electric transmission lines, the building of the Wessington Springs Airport, outdoor recreation, and limited industrial growth.

4.16.1 Past, Present, and Reasonably Foreseeable Future Actions

4.16.1.1 Future Wind Energy Development Projects

Babcock & Brown

Following implementation of the Proposed Action, Babcock & Brown will perform post-construction monitoring to assess impacts on whooping cranes, raptors, waterfowl, and other wildlife. Western, USFWS, and Babcock & Brown will together develop monitor protocols. If post-construction monitoring demonstrates to Western and USFWS that effects of the 51MW Proposed Action on birds and wildlife are within acceptable levels, then Babcock & Brown may propose additional wind energy development on lands west of the 3,560-acre WSWP. The possible size and configuration of such a wind project are not known.

Babcock & Brown has leased a limited amount of private land near Crow Lake in Aurora County southwest of the WSWP area. Consideration of this potential wind project location has only just begun. No investigations of the wind resource have occurred; there is no identified customer; there has been no analysis of environmental issues; and there is not yet a project proposed for this location.

Clipper Windpower

Clipper Windpower is investigating the possibility of developing a 6000MW phased wind energy project in portions of Hyde, Hand, Buffalo, and Jerauld counties. Specific information about this possible future project is not yet available.

4.16.1.2 Proposed NextGen Project

Basin Electric has applied to Western for interconnection with Western's transmission grid. Basin Electric proposes to construct and operate a 500-to-700MW coal energy facility in central or north-central South Dakota. Most components of the Proposed Action and alternatives would be well outside the Wessington Springs area. However, some alternatives would require approximately 40 miles of 230/345kV transmission lines between the Broadland and Storla substations. The transmission line would run north to south through Jerauld County about 4 miles east of Lane and about 11 miles from the WSWP area. The NEPA scoping process for this project is began in summer 2007. Construction of the generation facility is scheduled to begin in 2010.

4.16.1.3 Future Transportation Projects

The South Dakota State Transportation Improvement Plan (STIP) lists only one transportation project in Jerauld County for the 2008-2012 period. This project consists of only the replacement of crossing signs along the Burlington Northern Santa Fe (BNSF) railroad tracks. No road projects of a scale that would significantly increase traffic are planned (SDDOT 2007).

4.16.1.4 Local Projects

Only a few current or recently completed projects based in Jerauld County were identified by local planning officials (L. Kieser, personal communication 2007; G. Henderson, personal communication 2007). These include the on-going expansion and renovation of Avera Weskota Memorial Medical

Center in Wessington, and the expansion in 2006 of a meat processing facility in Alpena, 13 miles northeast of Wessington Springs, which led to the addition of 150 employees. No future locally-based projects were identified by planning officials.

4.16.2 Analysis

4.16.2.1 Land Use

If all planned and speculative projects were to be implemented in the future, one would see a greater trend toward conversion of rural lands in Jerauld County to commercial utility-related uses. Potential conflicts with recreation activities might increase depending on the specific locations of the projects.

4.16.2.2 Transportation

Localized impacts to traffic could occur during construction of the planned or speculative projects mentioned above. Such impacts would be temporary. Because the projects discussed above would be in different locations and would have different construction schedules, there would generally not be a cumulative effect on transportation.

4.16.2.3 Visual Resources

Transmission line construction and additional wind energy development would have a cumulative effects on the visual landscape in Jerauld County caused by the addition of man-made elements to a landscape that is primarily natural or agricultural. As the number or density of tall, man-made structures increased in rural Jerauld County, it is possible that viewer sensitivity would also increase.

4.16.2.4 Socioeconomics and Public Services

The cumulative economic effects of current and future projects would be related to increased employment opportunities during construction and operation, lease payments to property owners, and increased tax revenues. It is uncertain whether public service providers in Jerauld County have the capacity to handle the increased population, temporary or permanent, that would result from these projects.

4.16.2.5 Environmental Justice

Because of the demographic profile of Jerauld County (see Tables 3.5-1 through 3.5-5; Table 3.6-1), cumulative effects on minority and low-income populations in the county would be unlikely.

4.16.2.6 Biological Resources

Future wind energy development and transmission line projects could all contribute to cumulative impacts on biological resources in Jerauld County. In particular, there could be additional loss of native grassland, habitat fragmentation, and avian and bat mortality resulting from collisions with tall structures. In addition, all of Jerauld County is within the 200-mile whooping crane migratory corridor identified by the USFWS. If there were a substantial increase in the number or density of tall structures near foraging and roosting habitat, there could also be an increase in the probability of whooping crane mortality.

4.16.2.7 Water Resources and Wetlands

It is anticipated that future projects would attempt to minimize disturbance to wetlands. It is also likely that best management practices, SWPP Plans, SPCC Plans, and other measures implemented by each project would minimize any increased pollution in the James River basin. Therefore, the cumulative impact of these projects on water resources and wetlands would probably be low.

4.16.2.8 Geology

Since the projects identified above would be expected to have pre-construction geotechnical investigations, to incorporate appropriate project design, and to implement BMPs during construction and operation, it is anticipated that the cumulative impact on geology would be low.

4.16.2.9 Soils

Since the projects identified above would be expected to incorporate appropriate project design and to implement BMPs during construction and operation, it is anticipated that the cumulative impact on soils would be low.

4.16.2.10 Paleontology

Certain locations in Jerauld County (e.g., west of Wessington Springs) could contain important paleontological resources, and future projects that require NEPA compliance would be expected to identify sensitive areas and to assess potential impacts on these resources. Because the WSWP would have little chance of disturbing paleontological resources, its contribution to any cumulative impact would be very small.

4.16.2.11 Cultural Resources

The WSWP has avoided physical disturbance to all known cultural resources. The potential for future projects to adversely affect cultural resources is unknown until APEs for each project have been surveyed for cultural resources. Cumulative impacts on cultural resources are unknown, but, given the avoidance measures that have been incorporated into project design, the WSWP would contribute little to cumulative impacts.

4.16.2.12 Health and Safety

It is expected that future projects in Jerauld County would plan and implement appropriate health and safety procedures. Therefore, cumulative impact on health and safety would be low.

4.16.2.13 Noise

As discussed in Section 4.14, wind farms generate very little noise, particularly during operation. Similarly, transmission lines produce little noise during operation. Therefore, cumulative impact of reasonably forseeable future projects on the rural noise environment of Jerauld County would be low.

4.16.2.14 Air Quality

Wind farms and transmission lines are not emissions sources, and their operations would have no effect on air quality in Jerauld County. Construction of these projects would increase fugitive dust and construction vehicle emissions, but these increases would be temporary and would occur at different times according to the construction schedules of the individual projects. There would likely be no cumulative impact on air quality in Jerauld County.

4.17 Irreversible and Irretrievable Commitment of Resources

Resources committed to the WSWP would consist of both material resources and nonmaterial, including financial, resources. For the purposes of this EA, the "irreversible commitment of resources" refers to those resources that, once committed to the WSWP, would continue to be committed throughout the 20-year life of the project or longer if the wind farm operates beyond the anticipated 20 years. The "irretrievable commitment of resources" refers to those resources that, once used, consumed, destroyed or degraded during construction, operation, maintenance, or decommissioning of the WSWP, could not be retrieved or replaced during the 20-year life of WSWP

or beyond. Irreversible and irretrievable commitments of resources for the WSWP are summarized in Table 4.17-1.

Table 4.17-1 Irreversible and Irretrievable Commitment of Resources

Resource	Type of Commitment	Irreversible	Irretrievable
Land Use	Exclusion of future land uses in project area.	Yes	Project life
Transportation	Temporary road closures and increased traffic during construction	No	No
Visual Resource	Degradation of scenic quality during construction and operations	No, for construction Yes, for operations	Project life
Socioeconomics and Public Services	Increased regional and local revenues during construction and operation	Yes	Project life
Environmental Justice	None identified	No	No
Biological Resources	Habitat fragmentation; disturbance or loss of vegetation and wildlife species during construction and operations	Yes	Yes or No, depending on particular habitat type and species
Water Resources and Wetlands	Erosion possibly affecting water resources	No	Project life
Geology and Geohazards	Possible slope failure	Yes	Yes
Soils	Soil loss and erosion during construction	Yes	Yes
Paleontology	None identified	No	No
Cultural Resources	Disturbance of resources during construction and operations	Yes	No, if mitigated.
Health and Safety	Low, with Emergency Response Plans, Security Plans, etc.	No	Project life
Noise	Short-term and intermittent increases in noise during construction and operations	Yes	Project life
Air Quality	None, if BMPs implemented during construction and operations.	No	No
Construction Materials and Fuels	Use of materials, water, and fuels during construction and operations	Yes	Yes or No, depending on material

4.18 Unavoidable Adverse Impacts

Committed mitigation measures presented in Appendix A would be applied to possible adverse impacts to reduce or avoid the identified impacts. Some measures have been incorporated into the design of the WSWP; others would be implemented before or during construction, operation, or decommissioning. However, even with these mitigation measures there is the possibility of unavoidable adverse impacts resulting from implementation of the Proposed Action. For example:

- The presence of wind turbines would represent an unavoidable adverse impact for many viewers because they would alter the appearance of the rural landscape over a large area. Flashing lights on the turbines may also be considered an unavoidable adverse impact. The degree of visual impact would depend on each viewer's location and sensitivity and on the quality of the view, as discussed in Section 4.4.

- Some biological resources would be lost due to the construction and operation of the WSWP. Construction of the wind farm and other components would result in the permanent loss of a small amount of native vegetation and wildlife habitat. Operation of the wind farm would likely result in avian and bat mortalities. A Biological Opinion (BO) has been prepared by the USFWS to address possible impacts on the endangered whooping crane. Minimization measures (identical to mitigation measures listed in Appendix A) would be implemented to minimize the loss of biological resources. Nonetheless, some loss of habitat and some wildlife mortality are unavoidable.

- All known cultural resources in the WSWP area have been avoided by adjusting the locations of wind tower sites, access roads, and other components. Other portions of the APE for the WSWP will be surveyed by archaeologists prior to construction. However, it is recognized that previously unknown cultural resources may be discovered during construction. A draft Emergency Discovery Plan has been prepared by Babcock & Brown and is currently under review by Western. Monitoring and other measures would substantially reduce the risk of accidental discovery and disturbance of cultural resources, but cannot eliminate the risk entirely. Should TCPs be identified in the project area, the level of impact and the feasibility of mitigation would be determined through tribal consultation performed by Western. It is possible that such impacts, if any, would be considered by the tribes to be unavoidable.

CHAPTER 5 CONSULTATION AND COORDINATION

5.1 Introduction

The consultation and coordination process for the WSWP has been performed to comply with the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), and Section 106 of the National Historic Preservation Act (NHPA).

5.2 NEPA Review

5.2.1 Public Scoping Process

In response to NEPA and CEQ regulations, a scoping process was developed for the WSWP to ensure that interested parties were contacted, consulted and given an adequate opportunity to be involved in the process.

Western initiated the scoping process in April 2007 and invited public and agency comment on the issues that should be addressed in the environmental analysis and review process for the WSWP. The scoping process began with the development of a mailing list of Federal, State, and local agencies; landowners; Native American tribes; non-governmental organizations; environmental groups; and other interested parties.

The WSWP scoping period was for 44 days from April 17, 2007, to May 31, 2007. Ninety-three letters, each with an attached comment form, fact sheet, and project area map, were mailed on April 17, 2007, one month prior to the public scoping meeting. The letter and fact sheet provided information about the WSWP; announced the time and location of the public scoping meeting; and invited the public, agencies and interest groups to provide information and guidance, as well as to suggest issues that should be examined and to express their concerns.

Western held one public scoping meeting in Wessington Springs on the evening of May 17, 2007. Western issued a news release on May 8, 2007, to several newspapers and local radio stations to announce the meeting. The meeting was held in the 4-H Agricultural Building in Wessington Springs with 45 individuals attending. The scoping meeting had an open house format with tables and displays providing information about the WSWP, the NEPA process, and other topics. The information was presented by representatives from Western, Babcock & Brown, Heartland, and POWER Engineers. All of the representatives were available to discuss the project, answer questions, and take comments. Copies of the fact sheet and project area map were available at the meeting. Forms were available for written comments, and verbal comments received during the meeting were recorded on flip charts and posted during the meeting.

During the scoping meeting, few comments were written on the flip charts; most were written on comment forms. The comments on flip charts included:

- "How would wind turbines affect property value for tax purposes?"
- "Wind towers are taxed as structures on leased sites, land values are not affected."

Table 5.2-1 presents a summary of written comments received either by letter or comment form.

Table 5.2-1 Written Comments Received during WSWP Scoping Process

Type of Correspondence	Individual/ Organization	Comment
Letter	U.S. Army Corps of Engineers	Under Section 404 of the CWA, ACE permits are required for the discharge of fill material into waters of the United States.
Comment Form	Izaak Walton League of America	The Izaak Walton League of America expresses general approval of renewable energy if it is installed with environmental concerns. I am assuming that most all of the electricity will travel out-of-state and South Dakotans will have the effects of the facilities that generate the energy. We will sacrifice our ecology and skyline to benefit those that live in another state. 6000 acres will be impacted, affecting the wildlife and topography of the ground. The IWLA encourages a thorough planning and construction of roads to preserve or enhance water quality in the grade slopes of the land.
Comment Form	Individual	Will this project have any impact on our fragile soils?
Comment Form	Individual	I have concern for wildlife in area of proposed wind turbines. This would be primarily birds and most concern would be the resident birds in the area of the turbines. This would include every species from Larks to Sharptails and pheasants and water fowl. I would like to know how far bird nesting is displaced from active turbine areas?
Comment Form	South Dakota DOT	Please be aware that all structures over 200' Above Ground Level (AGL) must be approved by the Federal Aviation Administration and the State of South Dakota, Office of Local Transportation Programs before construction begins.
Comment Form	Wessington Springs Area Development Corporation	The Development Office is very supportive of this project and just wanted to offer our assistance where ever we can to help impact the local economy as well as be proactive in the global scheme of things.
Comment Form	Individual	My concern is that the environmental assessment may show impacts to bird populations in the pothole regions where the towers will be located. Do not let this slow the project down.

Table 5.2-1 Written Comments Received during WSWP Scoping Process (continued)

Type of Correspondence	Individual/ Organization	Comment
		Pheasant hunting has become more of a negative on the area as land ownership has changed and prices have risen.
		The area on the western ridge of the hills has more drainage and fewer potholes. It is just as close to the WAPA lines.
Comment Form	Individual	A very good project
		Don't let the wildlife issues throw a monkey wrench into the project.
		We need more projects like this.
		We have land that may possibly be developed for wind power.
Comment Form	Individual	My concern is that minor bird concerns could jeopardize a very beneficial project.

5.2.2 Public Review of EA

After the EA is prepared for public distribution, public review of the EA would be completed following a 30-day comment period. If no significant impacts are identified and the WSWP is approved, the lead agency (Western) and cooperating agency (USFWS) would issue a Finding of No Significant Impact (FONSI) for the proposed project, and other permits and certifications would be issued.

5.3 Formal and Informal Consultation and Coordination

Consultation and coordination for the WSWP is taking place to comply with Section 106 of the NHPA and Section 7 of the ESA.

5.3.1 Section 106 Consultation

For the WSWP, Western is the lead agency for complying with Section 106 of the NHPA. Contacts with the South Dakota State Historical Society in Pierre were initiated by Babcock & Brown in 2006, and a records search was performed by the agency that year. Additional coordination with the South Dakota State Historic Preservation Office (SHPO) took place in spring and summer 2007 during implementation and review of cultural resource survey preceding geotechnical investigations in the WSWP area.

In spring 2007, Western and Babcock & Brown first discussed the various tasks required to ensure completion of the Section 106 process for the WSWP. As part of the Section 106 process, tribes in South Dakota and neighboring states were contacted by Western about the WSWP to determine if

they had concerns about the project in general and about cultural resources in the project area. The Rosebud Sioux stated that they did not have concerns about the proposed undertaking at that time but wished to be informed about cultural resources found in the area. The Mille Lacs Band of Ojibwe declined to participate in the consultation process for the WSWP. Several other tribes expressed interest in the project.

On August 7, 2007, Western held a meeting in the WSWP area at the request of representatives of the Lower Sioux Indian Community, Santee Sioux Nation, Sisseton-Wahpeton Oyate, and Fort Peck Tribes. Babcock & Brown, POWER Engineers, and Metcalf Archaeological Consultants also attended the meeting. Various issues were discussed regarding cultural resources in and near the project area, including future cultural resource survey and traditional cultural property (TCP) studies. One onsite request and two written requests were made by Western and Babcock & Brown for participating tribes to conduct a TCP study.

The Section 106 consultation process is ongoing. Additional visits to the project area, consultation meetings, and cultural resource studies are anticipated.

5.3.2 Section 7 Consultation

The ESA (7 U.S.C. 136; 16 U.S.C. 460 et seq.) provides for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The Act is implemented by two Federal agencies, the USFWS and NOAA Fisheries, which have the ability to officially list plant and animal species as endangered or threatened. Section 7 of the ESA imposes an affirmative duty on Federal agencies to ensure that their actions (including permitting) are not likely to jeopardize the continued existence of listed species or result in the destruction or modification of their habitat.

Information on Federal-listed species in the WSWP area was requested from the USFWS on March 15, 2007 and provided on April 16, 2007. Two Federal-listed species were identified as likely to occur within the project area, bald eagle (previously threatened) and whooping crane (endangered). The bald eagle was subsequently removed from the endangered species list in August 2007. POWER Engineers prepared on Babcock & Brown's behalf a Biological Report (BR) to evaluate the potential impacts of the WSWP on Federal-listed Threatened, Endangered, Candidate, and Proposed wildlife species pursuant to the ESA. Supplemental information on the possible occurrence of Federal-listed species in the study area was obtained from a variety of sources, including the South Dakota Natural Heritage Program, and biologists with the SDGFP Pierre office, USFWS-Pierre Field Office, and USFWS-Huron Wetland Management District. On July 31, 2007, the BR was submitted to Western, the lead agency for Section 7 consultation, and Western used the information in the BR to prepare a Biological Assessment (BA). The BA was submitted by Western to the USFWS on August 20, 2007. The USFWS reviewed the BA for adequacy, and USFWS expects to complete a Biological Opinion (BO) in December 2007. The BO will contain requirements and recommendations regarding the protection of whooping cranes during construction and operation of the WSWP.

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APPENDIX A

Mitigation Measures

A. COMMITTED MITIGATION MEASURES

Western's and USFWS's goal for the WSWP is for Babcock & Brown to minimize impacts on the environment during construction, operation, maintenance, and decommissioning of the WSWP. This appendix describes:

- **Project Commitments.** Broad commitments made by Babcock & Brown during the project planning process to minimize or reduce possible impacts. These commitments were incorporated into the description of the Proposed Action (see Section 2.3.2).
- **General Construction Protocols.** General measures that Babcock & Brown commits to doing itself or to requiring of its contractors during construction of the WSWP.
- **Committed Mitigation.** Measures that would be applied to site-specific impacts identified in this EA that would help reduce them a less than significant level.

A.1 Project Commitments

Babcock & Brown has modified the Proposed Action to reduce or minimize possible impacts on various resources. These include:

- **Reduction in the Number of Turbines.** Until spring 2007, Babcock & Brown had proposed that a 99MW wind project be built in the Wessington Springs area. This proposal would have been constructed in two phases. Phase I would have consisted of 34 turbines. Phase II would have had 32 turbines west of Phase I. Following discussions with Western and USFWS, it was determined that turbines planned for Phase II may have had considerable impacts on waterfowl. Babcock & Brown decided to downsize the proposal to the 51MW Proposed Action analyzed in this EA.
- **Reduction in Acreage.** The previously proposed wind project would have included 6,000 acres of leased private land. The current proposal consists of 3,560 acres. This removed 72 wetlands covering about 332 acres from the project boundaries, as well as over 1,500 acres of grassland and over 100 acres of deciduous woodland.
- **Use of Tubular Conical Steel Turbine Towers.** The Proposed Action would employ the GE 1.5sle wind turbine generator. The tower would be a tubular conical steel structure approximately 15 feet in diameter at the base. Unlike lattice steel structures used on some wind energy projects, the GE 1.5sle does not provide locations for raptors to perch, which may increase the mortality of raptors from collisions with turbine blades and the mortality of nearby prey hunted by raptors.
- **Placing Collection System Underground.** In May 2007, following discussions with Western and USFWS staff, Babcock & Brown decided that the Proposed Action would use underground cables rather than overhead subtransmission lines to connect the collection system to the collector substation. An earlier proposal had included a 2-mile long overhead line. Overhead lines can cause avian mortality, an impact eliminated by placing the collection system in trenches the entire distance to the substation.
- **Changing Location of Substations.** At one time, Babcock & Brown and Western considered placing the collector substation and interconnect substation on the higher ground west of the

escarpment forming the eastern boundary of the wind farm. In an effort to find a location that: 1) was close to the existing 230kV transmission line; 2) was large enough, yet level enough, to not require much grading; and 3) avoided wetlands, Babcock & Brown and Western decided to co-locate the two facilities east of the escarpment closer to West Branch Firesteel Creek.

- **Adjusting Project Layout to Avoid Wetlands and Cultural Resources.** During the spring and summer of 2007, Babcock & Brown arranged for cultural, avian, and wetland studies of portions of the WSWP area (Stine and Kulevsky 2007; WEST 2007a, 2007b, 2007c). The proposed layout of the turbines, underground collection system, and internal road network was changed in various locations specifically to avoid wetlands and cultural resources.

- **Ensuring that Turbines Avoid Interference with Line-of-Site Communications.** The 34 turbines were sited to avoid blockage of Federal agency radio frequency transmission and microwave signals and existing non-Federal microwave telecom systems (Comsearch 2007; Nebbia 2007).

A.2 General Construction Protocols

Babcock & Brown commits to observing the following general protocols as part of construction of the WSWP. These practices are considered part of the Proposed Action (refer to section 2.3.2).

A.2.1 Transportation

- Construction vehicle movement within the WSWP boundary would typically be restricted to pre-designated access, contractor-required access, or public roads.

- Existing County and Township roads used for construction would be left in a condition equal to or better than their condition prior to the construction of the project.

- Prior to the start of construction, a traffic management plan would be submitted to the State of South Dakota and Jerauld County. The plan would direct and obligate the construction contractor to implement procedures that would minimize traffic impacts. Routing of construction traffic would be coordinated with the State and Jerauld County

- During construction, oversized or overweight vehicles would comply with applicable State and County requirements, obtaining permits when required.

- During construction, proper road signs and warnings would be used. Detour plans and warning signs would be provided in advance of any traffic disturbances. When slow or oversized wide loads are in transit to and from work areas, advance signs and traffic diversion equipment would be used to improve traffic safety. Pilot cars would be used as required by the State depending on load size and weight.

- Flaggers would be employed as necessary to direct traffic when large equipment is exiting or entering public roads.

A.2.2 Resource Protection

- The limits of construction activities would typically be predetermined, with activity restricted to and confined within those limits. No paint or permanent discoloring agents would be applied to rocks or vegetation to indicate the limits of construction activity.

- The boundaries of known sensitive plant populations, jurisdictional wetlands, cultural resources, and other sensitive resources in proximity to the limits of construction activities that may be accidentally disturbed during construction would be clearly delineated with easily visible flagging or fencing, unless such delineation were deemed by Western or the USFWS to increase the likelihood of vandalism.

- Prior to construction, all supervisory construction personnel would be instructed on the protection of cultural and natural resources. These personnel would be aware of Federal and State laws regarding antiquities, fossils, plants and wildlife; of penalties for collection and removal; and of methods for protecting resources.

A.2.3 Emergency Discoveries

- Construction contractors would abide by an Emergency Discovery Plan prepared by Western to ensure compliance with Section 106 of the NHPA. This plan would contain explicit procedures for responding to the unanticipated discovery of cultural resources and the treatment of human skeletal remains. All activities would halt in the immediate vicinity of the discovery and all actions that might adversely affect the property would be redirected to an area at least 100 feet from the point of discovery. Western's FPO would be notified within 24 hours and would have a cultural resource specialist or a Tribal monitor on-site as soon as possible to assess the discovery.

- Any human remains encountered in a discovery situation would be handled according to the provisions of South Dakota burial law (SDCL 34-27) and the Emergency Discovery Plan. If construction or other project personnel identify what they believe to be human remains, they would immediately halt construction at that location and notify Western's construction inspector who would notify the Jerauld County coroner, the Jerauld County sheriff, the South Dakota State Archaeologist, and Western's FPO within 24 hours of the discovery.

- If paleontological resources are encountered during construction, mitigation efforts would be developed in coordination with Western FPO to protect the resources.

A.2.4 Ground Disturbance and Site Restoration

- In construction areas, vegetation would be left in place wherever possible and original contour would be maintained.

- In construction areas where ground disturbance is unavoidable, surface restoration would occur as required. The method of restoration could consist of returning disturbed areas back to their natural contour (if feasible), reseeding with native seed mix, installing cross drains for erosion control, placing water bars in the road, and filling ditches.

A.2.5 Land Use

- If existing improvements (e.g., fences, gates, roads) are damaged or destroyed by construction activities, they would be repaired or replaced to their condition prior to disturbance as required by the landowner.

A.2.6 Stream Protection

- Erosion and sediment control measures would be implemented during construction. These would include stabilization measures for disturbed areas and structural controls to divert runoff.

- Roads would be built at right angles to the streams and washes to the extent practicable. Culverts would be installed where needed. Construction and maintenance activities would be conducted in a manner that would minimize disturbance to vegetation, drainage channels, and stream banks.

A.2.7 Permits for Construction

- Requirements of those entities having jurisdiction over air quality matters would be adhered to and any permits needed for construction activities would be obtained.

- Open burning of construction trash would not be allowed unless permitted by appropriate authorities.

A.2.8 Hazardous Materials

- No biodegradable or non-biodegradable debris would be deposited within the project boundaries except at locations designated by Babcock & Brown. Enclosed containment would be provided for all trash.

- Hazardous materials would not be drained onto the ground or into streams or drainage areas.

- Construction waste, including trash and litter, garbage, other solid waste, petroleum products, and other possibly hazardous materials, would be removed to a disposal facility authorized to accept such materials.

A.2.9 Noxious Weeds

- Construction personnel would abide by noxious weed control procedures developed and instituted by Babcock & Brown in cooperation with the Jerauld County Weed Supervisor.

A.3 Committed Mitigation

Babcock & Brown has committed to mitigating identified site-specific impacts using the methods identified. Refer to Chapter 4 for a detailed assessment of WSWP impacts. Committed mitigation measures are presented below:

A.3.1 Land Use

- Notice to landowners would be provided when construction takes place to help minimize disruptions to access, recreation, farming, and ranching operations within the WSWP boundaries

- To limit new or improved public access into the area, all new access roads that are undesired or not required for operation and maintenance of the WSWP would be closed, with concurrence of the landowner, using the most effective and least environmentally damaging methods appropriate to that area.

- Babcock & Brown would work with the USFWS to identify appropriate measures to mitigate the permanent loss of lands for which the USFWS holds grassland or wetland easements.

A.3.2 Transportation

Refer to section A.2.1 for transportation-related general construction protocols.

- Existing roads would be used to the maximum extent possible, but only if in safe and environmentally sound locations. New access roads would be designed and constructed to the appropriate standard no higher than necessary to accommodate their intended functions (e.g., traffic volume and weight of vehicles).

- Required modifications to Township roads would be coordinated with the Township Boards of Supervisors.

- Project personnel and contractors would be instructed and required to adhere to speed limits commensurate with road types, traffic volumes, vehicle types, and site-specific conditions to ensure safe and efficient traffic flow.

- During construction and operation, traffic within the WSWP boundaries would be restricted to the roads developed for the project. Use of other unimproved roads would be restricted to emergency situations.

- Following construction, or during construction as necessary to maintain safe driving conditions, damage to existing roadways caused by construction vehicles would be repaired. Repairs would be coordinated with SDDOT, Jerauld County, or the Township.

- The project would comply with all appropriate regulations of the Federal Aviation Administration (FAA).

A.3.3 Visual Resources

- During construction, active dust suppression measures would be implemented to minimize the construction of dust clouds.

- To reduce visual scarring of the landscape, the alignment of access roads would follow landform contours where practicable, providing that such alignment does not impact other resource values.

- When construction is complete, areas temporarily disturbed would be reseeded and revegetated.

- Non-reflective neutral and earth tone (off-white or gray) paints and coatings would be used on turbines, buildings, and other structures, where practical, to reduce reflection, glare, and contrast.

- When night-time lighting is not required for maintenance or other activities, lights would be turned off.

- Where security lights are necessary (e.g., at the O&M building), they would be activated by motion detection (with a manual override) to avoid night-time contrast between the project and the night sky.

- If permitted by the FAA, a synchronized system of aviation warning lights would be installed.

- If future cultural resource studies identify adverse changes to visual setting for National Register-eligible historic properties within 1.0 mile of a wind turbine, Babcock & Brown would work with Western to identify appropriate measures to ensure compliance with Section 106 of the NHPA (see section A.3.12).

A.3.4 Socioeconomics and Public Services

No mitigation measures would be required for socioeconomics and public services.

A.3.5 Environmental Justice

No mitigation measures would be required for environmental justice.

A.3.6 Biological Resources

- The establishment of noxious/invasive vegetation could be limited by early detection and eradication. Babcock & Brown would work with the Jerauld County Weed Supervisor to develop procedures to control the spread of noxious weeds and invasive plants. Specific control measures may include: a) cleaning vehicles that are required to go off designated roadways; b) prompt reseeding of temporarily disturbed areas (e.g., portions of access roads, trenches for the underground collection system, turbine work areas) with a agency-certified weed-free mixture of native grasses, forbs, and shrubs; c) using certified weed-free fill; d) annual post-construction monitoring and treatment of access roads and turbine sites for a designated period following construction; e) storing equipment, materials, and vehicles at specified work areas or construction yards; and f) confining personal vehicles, sanitary facilities, and staging areas to a limited number of specified weed-free locations.

- Control measures would be implemented to minimize fugitive dust emissions from construction-related traffic and ground disturbance.

- Construction crews would be instructed to avoid disturbing or harassing wildlife.

- To limit new or improved access into the area, all new access roads that are not required for maintenance would be closed (see section A.3.1).

- During construction, Babcock & Brown would attempt to complete as much grading and other required ground disturbance as possible before the start of the bird breeding season.

- A nesting survey plan would be developed and coordinated with Western for any construction work that must occur during the breeding season Avian nest surveys would be conducted within all areas designated for temporary or permanent disturbance immediately prior to construction in that area during the nesting season. Periodic nest surveys would be conducted during the appropriate nesting period for raptor, sharp-tailed grouse, greater prairie chicken, and grassland bird species. All active nests would be marked as avoidance areas. No construction activities would be permitted within a pre-determined radius of an occupied sharp-tailed grouse, prairie chicken, or raptor nest until the young have fledged.

- No construction activities would be permitted within a pre-determined radius of a known active lek between March 1 and May 1.

- Fencing would be kept to a minimum to reduce potential harm to sharp-tailed grouse and prairie chickens.

- If avian monitors observe increased predation by raptors and ravens and if the cause is determined to be related to the presence of turbines, Babcock & Brown would implement measures (e.g., raptor or raven deterrent devices) to reduce predation.

- If permitted by the FAA, white lights instead of red lights would be installed on turbines to reduce avian attraction.

- A post-construction monitoring program to assess avian mortality would be designed and implemented in coordination with the USFWS, Western, and SDGFP. Baseline surveys have been initiated to assess pre-construction avian abundance and habitat use in the project area. Reference sites have also been established adjacent to the project area as control sites for comparison. Post-construction monitoring for two years would continue pre-construction baseline surveys to evaluate species-specific changes in abundance, habitat use, displacement effects, and fragmentation effects associated with wind farm operations.

- Babcock & Brown would work with USFWS and Western to develop a three-year post-construction monitoring program for whooping cranes.

- Babcock & Brown would work with USFWS and Western to develop procedures for temporarily shutting down selected wind turbines within a specific radius of a whooping crane siting. Procedures would be reviewed on an annual basis.

- Construction crews would be instructed to report sightings of bald eagles. Construction activities would be modified or curtailed when bald eagles are present in the project area. Babcock & Brown would develop other specific mitigation measures and implement them if bald eagles or golden eagles are observed in the WSWP area.

A.3.8 Water Resources and Wetlands

- Project components would be placed so as to avoid, to the extent practical, riparian areas, water courses, and wetlands. If such features cannot be completely avoided, project components would be placed to minimize the disturbance.

- Because construction in the WSWP area would affect more than 1 acre, Babcock & Brown would obtain a General Permit for Storm Water Discharges and would develop a Storm Water Pollution Prevention Plan (SWPPP).

- For the life of the project, Babcock & Brown would not use any buried oil storage capacity in the project area.

- Erosion and sediment control measures would be implemented during construction. These would include stabilization measures for disturbed areas and structural controls to divert runoff.

- Wetlands, whether or not determined to be jurisdictional by the COE, would continue to be avoided to the maximum extent feasible.

- Babcock & Brown would continue to avoid any impacts to Firesteel Creek or West Branch Firesteel Creek.

A.3.9 Geology

- During construction of roads and the underground collection system, areas of possible slope failure would continue to be avoided to the greatest extent practicable

A.3.10 Soils

- Erosion and sediment control Best Management Practices (BMPs) identified in the SWPPP would be implemented (see section A.3.8).

- Temporarily disturbed areas in the WSWP area would be reseeded with native seed mix and revegetated immediately following construction (see Section A.2.2).

A.3.11 Paleontology

- An Emergency Discovery Plan, would contain explicit procedures for responding to the unanticipated discovery of paleontological resources (see section A.2.3).

A.3.12 Cultural Resources

- Cultural resources would continue to be considered during post-NEPA phases of project implementation, as required for compliance with the NHPA.

- There would continue to be implementation of cultural resource surveys within the entire Area of Potential Effect (APE) as defined by Western. Survey would include an inventory and evaluation of historic buildings and structures (within 1 mile of a wind turbine) that may be adversely affected by changes in visual setting.

- An Emergency Discovery Plan would contain explicit procedures for responding to the unanticipated discovery of cultural resources, including human remains (see section A.2.3).

- Babcock & Brown would work with Western in continuing Native American consultation efforts required by Section 106 of the NHPA.

A.3.13 Health and Safety

- Babcock & Brown and its contractors would comply with all applicable local, State, and Federal health and safety laws and regulations.

- Construction sites would be maintained in a sanitary condition at all times; waste materials at those sites would be disposed of promptly at an appropriate waste disposal site. "Waste" refers to all discarded matter, including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment.

- To reduce fire risk, designated onsite vehicles would be fitted with fire extinguishers, only authorized vehicles would be permitted off gravel roads, and smoking would be restricted to designated areas.

- Only state-licensed explosive specialist contractors would be allowed to perform blasting work.

- Access roads would be gated and public access to turbines would be restricted.
- Transport of hazardous materials would be in accordance with Federal and SDDOT requirements.

A.3.14 Noise

No mitigation measures would be required for noise.

A.3.15 Air Quality

- During construction, active dust suppression measures would be implemented to minimize the formation of dust clouds.

APPENDIX B

Western Area Power Administration
Construction Standards
Standard 13

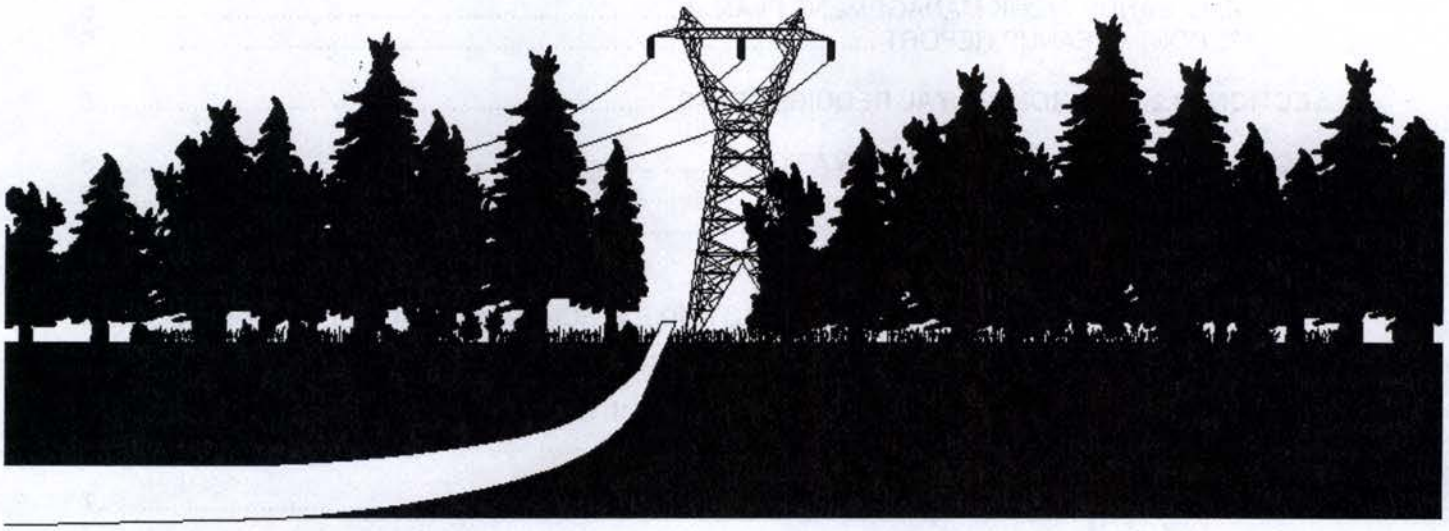
ENVIRONMENTAL QUALITY PROTECTION

Western
AREA POWER
ADMINISTRATION

CONSTRUCTION STANDARDS

STANDARD 13

ENVIRONMENTAL QUALITY PROTECTION



June 2003

SAFETY
A HABIT TO LIVE BY

STANDARD 13 - ENVIRONMENTAL QUALITY PROTECTION

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STANDARD 13 - ENVIRONMENTAL QUALITY PROTECTION

SECTION 13.1--CONTRACTOR FURNISHED DATA

1. RECYCLED MATERIAL QUANTITY REPORT: Submit quantities for recycled material listed in Section 13.6, "Recycled Material Quantities", to the COR after completion and prior to submittal of final invoice.

2. PRODUCTS CONTAINING RECOVERED MATERIAL REPORT: Provide the COR the following information for purchases of items listed in Section 13.7, "Use of Products Containing Recovered Material":

   (1) Quantity and cost of listed items with recovered material content and quantity and cost of listed items without recovered material content after completion and prior to submittal of final invoice.

   (2) Written justification 7 days prior to purchase of listed items if recovered material content products are not available: 1) competitively within a reasonable time frame; 2) that meet performance criteria defined in the Standards or Project Specifications; or 3) at a reasonable price.

3. RECLAIMED REFRIGERANT RECEIPT: A receipt from the reclaimer stating that the refrigerant was reclaimed, the amount and type of refrigerant, and the date shall be submitted to the COR after completion and prior to submittal of final invoice in accordance with Section 13.8.5, "Refrigerants And Receipts".

4. WASTE MATERIAL QUANTITY REPORT: Submit quantities of total project waste material disposal as listed below to the COR after completion and prior to submittal of final invoice in accordance with Section 13.8.8, "Waste Material Quantity Report".

   (1) Sanitary Wastes: Volume in cubic yards or weight in pounds.

   (2) Hazardous or Universal Wastes: Weight in pounds.

   (3) PCB Wastes: Weight in pounds.

   (4) Other regulated wastes (e.g., lead-based paint or asbestos): Weight in pounds (specify type of waste in report).

5. SPILL PREVENTION NOTIFICATION AND CLEANUP PLAN (Plan): Submit the Plan as described in Section 13.10.2, "Spill Prevention Notification and Cleanup Plan", to the COR for approval 14 days prior to start of work. Approval of the Plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations.

6. TANKER OIL SPILL PREVENTION AND RESPONSE PLAN: Submit the Plan as described in Section 13.10.3, "Tanker Oil Spill Prevention and Response Plan", to the COR for approval 14 days prior to start of work. Approval of the Plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations.

7. PESTICIDE USE PLAN: Submit two copies of a pesticide use plan as described in Section 13.11.3, "Pesticide Use Plan", to the COR for approval 14 days prior to use. Approval of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations. Within seven days

after application, submit a written report in accordance with Standard 2 – Sitework, Section 2.1.1.5, "Soil-Applied Herbicide".

8. TREATED WOOD POLE AND MEMBERS RECYCLING CONSUMER INFORMATION RECEIPT: Submit treated wood pole and members consumer receipt forms to the COR after completion and prior to submittal of final invoice (see 13.12, "Treated Wood Poles and Members Recycling or Disposal").

9. PREVENTION OF AIR POLLUTION: Submit a copy of permits, if required, from Federal, State, or local agencies to the COR 14 days prior to the start of work.

10. ASBESTOS LICENSES OR CERTIFICATIONS: Submit a copy of licenses and/or certifications for asbestos work as described in 13.14, "Handling and Management of Asbestos Containing Material" paragraph a., to the COR prior to work. Submit copies of certificates of disposal and/or receipts for waste to the COR after completion and prior to submittal of final invoice.

11. LEAD PAINT NOTICES: Submit a copy of lead paint notices as described in 13.15, "Material with Lead-based Paint" paragraph b., to the COR upon completion and prior to submittal of final invoice. Submit copies of certificates of disposal and/or receipts for waste to the COR after completion and prior to submittal of final invoice.

12. WATER POLLUTION PERMITS: Submit copies of any water pollution permits as described in 13.16, "Prevention of Water Pollution" paragraph b., to the COR prior to work.

13. PCB TEST REPORT: Submit a PCB test report as described in 13.17, "Testing, Draining, Removal, and Disposal of Oil-filled Electrical Equipment" paragraph b., prior to draining, removal, or disposal of oil or oil-filled equipment that is designated for disposal.

14. OIL AND OIL-FILLED ELECTRICAL EQUIPMENT RECEIPT: Obtain and submit a receipt for oil and oil-filled equipment transported and disposed, recycled, or reprocessed as described in 13.17, "Testing, Draining, Removal, and Disposal of Oil-filled Electrical Equipment", to the COR upon completion and prior to submittal of final invoice.

15. OSHA PCB TRAINING RECORDS: Submit employee training documentation records to the COR 14 days prior to the start of work as described in 13.18.1.

16. CLEANUP WORK MANAGEMENT PLAN: Submit a Cleanup Work Management Plan as described in 13.18, "Removal of Oil-contaminated Material" paragraph b., to the COR for approval 14 days prior to the start of work. Approval of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations.

17. POST CLEANUP REPORT: Submit a Post-Cleanup Report as described in 13.18, "Removal of Oil-contaminated Material" paragraph g., to the COR upon completion and prior to submittal of final invoice.

SECTION 13.2--ENVIRONMENTAL REQUIREMENTS

Comply with Federal, State, and local environmental laws and regulations. The sections in this Standard further specify the requirements.

SECTION 13.3--LANDSCAPE PRESERVATION

1. GENERAL: Preserve landscape features in accordance with the contract clause titled "Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements."

2. CONSTRUCTION ROADS: Location, alignment, and grade of construction roads shall be subject to the COR's approval. When no longer required, construction roads shall be restored to their original condition. Surfaces of construction roads shall be scarified to facilitate natural revegetation, provide for proper drainage, and prevent erosion. If revegetation is required, then use regionally native plants.

3. CONSTRUCTION FACILITIES: Shop, office, and yard areas shall be located and arranged in a manner to preserve trees and vegetation to the maximum practicable extent and prevent impact on sensitive riparian areas and flood plains. Storage and construction buildings, including concrete footings and slabs, shall be removed from the site prior to contract completion. The area shall be regraded as required so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate natural revegetation, provide for proper drainage, and prevent erosion. If revegetation is required, then use regionally native plants.

SECTION 13.4--PRESERVATION OF CULTURAL AND PALEONTOLOGICAL RESOURCES

1. GENERAL: Do not remove or alter cultural artifacts or paleontological resources (fossils). Cultural artifacts are of potential scientific or cultural importance and include bones, tools, historic buildings, and features. Paleontological resources can be of scientific importance and include mineralized animals and plants or trace fossils such as footprints. Both cultural and paleontological resources are protected by Federal Regulations during Federal construction projects.

2. KNOWN CULTURAL OR PALEONTOLOGICAL SITES: Following issuance of notice to proceed, Western will provide two sets of plan and profile drawings showing sensitive areas located on or immediately adjacent to the transmission line right-of-way and/or facility. These areas shall be considered avoidance areas. Prior to any construction activity, the avoidance areas shall be marked on the ground in a manner approved by the COR. Instruct employees, subcontractors, and others that vehicular or equipment access to these areas is prohibited. If access is absolutely necessary, first obtain approval from the COR. Ground markings shall be maintained throughout the duration of the contract. Western will remove the markings during or following final cleanup. For some project work, Western will require an archaeological, paleontological or tribal monitor at or near cultural or paleontological site locations. The contractor shall work with the monitor to identify avoidance areas.

3. UNKNOWN CULTURAL OR PALEONTOLOGICAL SITES: On rare occasions cultural or paleontological sites may be discovered during excavation or other earth-moving activities.

   (1) Reporting: If evidence of a cultural or paleontological site is discovered, immediately notify the COR and give the location and nature of the findings. Stop all activities within a 50-foot radius of the discovery and do not proceed with work within that radius until directed to do so by the COR.

   (2) Care of Evidence: Do not damage artifacts or fossils uncovered during construction.

4. CONTRACT ADJUSTMENTS: Where appropriate by reason of delays caused by a discovery, the Contracting Officer may make adjustments to contract requirements.

SECTION 13.5--NOXIOUS WEED CONTROL

1. GENERAL: Comply with Federal, state, and local noxious weed control regulations. Provide a "clean vehicle policy" while entering and leaving construction areas to prevent transport of noxious weed plants and/or seed. Transport only construction vehicles that are free of mud and vegetation debris to staging areas and the project right-of-way.

SECTION 13.6--RECYCLED MATERIAL QUANTITIES

1. GENERAL: Record quantities of the following material by category that is salvaged, recycled, reused, or reprocessed:

   (1) Transformers, Breakers: Weight without oil.

   (2) Electrical Conductors: Length in feet and Type (for example, ACSR, Copper, and gauge).

   (3) Structural Steel: Weight in pounds or tons.

   (4) Aluminum Buswork: Weight in pounds or tons.

   (5) Other Metals: Weight in pounds or tons.

   (6) Oil: Gallons (separate by type - less than 2 ppm PCB, 2 to 50 ppm PCB, and 50 or greater ppm PCB).

   (7) Gravel, Asphalt, Or Concrete: Weight in pounds or tons.

   (8) Batteries: Weight in pounds.

   (9) Wood Poles and Crossarms: Weight in pounds.

   (10) Cardboard. Weight in pounds.

   (11) Porcelain insulators. Weight in pounds.

2. RECYCLED MATERIAL QUANTITY REPORT: Submit quantities for recycled material listed above to the COR after completion and prior to submittal of final invoice.

SECTION 13.7--USE OF PRODUCTS CONTAINING RECOVERED MATERIAL AND BIOBASED PRODUCTS

1. PRODUCTS CONTAINING RECOVERED MATERIAL: If the products listed below are obtained as part of this project, purchase the items with the highest recovered material content possible unless recovered material content products are not available: 1) competitively within a reasonable time frame; 2) that meet performance criteria defined in the Standards or Project Specifications; or 3) at a reasonable price.

   (1) Construction Products:

   - Building Insulation Products
   - Carpet
   - Carpet cushion
   - Cement and concrete containing coal fly ash, ground granulated blast furnace slag, cenosperes, or silica fume

- Consolidated and reprocessed latex paint
- Floor Tiles
- Flowable fill
- Laminated Paperboard
- Modular threshold ramps
- Nonpressure pipe
- Patio Blocks
- Railroad grade crossing surfaces
- Roofing materials
- Shower and restroom dividers/partitions
- Structural Fiberboard

(2) Landscaping Products:

- Compost made from yard trimmings or food waste
- Garden and soaker hoses
- Hydraulic Mulch
- Lawn and garden edging
- Plastic lumber landscaping timbers and posts

(3) Non-paper Office Products:

- Binders, clipboards, file folders, clip portfolios, and presentation folders
- Office furniture
- Office recycling containers
- Office waste receptacles
- Plastic desktop accessories
- Plastic envelopes
- Plastic trash bags
- Printer ribbons
- Toner cartridges

(4) Paper and Paper Products:

- Commercial/industrial sanitary tissue products
- Miscellaneous papers
- Newsprint
- Paperboard and packaging products
- Printing and writing papers

(5) Park and Recreation Products:

- Park benches and picnic tables
- Plastic fencing
- Playground equipment
- Playground surfaces
- Running tracks

(6) Transportation Products:

- Channelizers
- Delineators
- Flexible delineators
- Parking stops

- Traffic barricades
- Traffic cones

(7) Vehicular Products:

- Engine coolants
- Rebuilt Vehicular Parts
- Re-refined lubricating oils
- Retread tires

(8) Miscellaneous Products:

- Awards and plaques
- Bike racks
- Blasting grit
- Industrial drums
- Manual-grade strapping
- Mats
- Pallets
- Signage
- Sorbents

(9) For a complete listing of products and recommendations for recovered content, see http://www.epa.gov/cpg/products.htm

2. PRODUCTS CONTAINING RECOVERED MATERIAL REPORT: Provide the COR the following information for purchases of those items listed above:

(1) Quantity and cost of listed items with recovered material content and quantity and cost of listed items without recovered material content after completion and prior to submittal of final invoice.

(2) Written justification 7 days prior to purchase of listed items if recovered material content products are not available: 1) competitively within a reasonable time frame; 2) that meet performance criteria defined in the Standards or Project Specifications; or 3) at a reasonable price.

3. BIOBASED PRODUCTS: If the products listed below are obtained as part of this project, purchase the items with the highest biobased content possible and no less than the percent indicated for each product unless biobased products: 1) are not available within a reasonable period of time, 2) fail to meet performance criteria defined in the Standards or Project Specifications, or 3) are available only at an unreasonable price.

(1) Mobile Equipment Hydraulic Fluids (minimum 24% biobased content)
(2) Urethane Roof Coatings (minimum 62% biobased content)
(3) Water Tank Coatings (minimum 62% biobased content)
(4) Diesel Fuel Additives (minimum 93% biobased content)
(5) Penetrating Lubricants (minimum 71% biobased content)
(6) Bedding, Bed Linens, and Towels (minimum 18% biobased content)

(7) For additional information regarding biobased products, see **http://www.biobased.oce.usda.gov**

4. BIOBASED PRODUCTS REPORT: Provide the COR the following information for purchases of those biobased items listed above:

(1) Quantity and cost of listed items with biobased content and quantity and cost of listed items without biobased content after completion and prior to submittal of final invoice.

(2) Written justification 7 days prior to purchase of listed items if biobased products: 1) are not available within a reasonable period of time, 2) fail to meet performance criteria defined in the Standards or Project Specifications, or 3) are available only at an unreasonable price.

SECTION 13.8--DISPOSAL OF WASTE MATERIAL

1. GENERAL: Dispose or recycle waste material in accordance with applicable Federal, State and Local regulations and ordinances. In addition to the requirements of the Contract Clause "Cleaning Up", remove all waste material from the construction site. No waste shall be left on Western property, right-of-way, or easement. Burning or burying of waste material is not permitted.

2. HAZARDOUS, UNIVERSAL, AND NON-HAZARDOUS WASTES: Manage hazardous, universal, and non-hazardous wastes in accordance with State and Federal regulations.

3. USED OIL: Used oil generated from the Contractor activities shall be managed in accordance with used oil regulations.

4. RECYCLABLE MATERIAL: Reduce wastes, including excess Western material, by recycling, reusing, or reprocessing. Examples of recycling, reusing, or reprocessing include reprocessing of solvents; recycling cardboard; and salvaging scrap metals.

5. REFRIGERANTS AND RECEIPTS: Refrigerants from air conditioners, water coolers, refrigerators, ice machines and vehicles shall be reclaimed with certified equipment operated by certified technicians if the item is to be disposed. Refrigerants shall be reclaimed and not vented to the atmosphere. A receipt from the reclaimer stating that the refrigerant was reclaimed, the amount and type of refrigerant, and the date shall be submitted to the COR after completion and prior to submittal of final invoice.

6. HALONS: Equipment containing halons that must be tested, maintained, serviced, repaired, or disposed must be handled according to EPA requirements and by technicians trained according to those requirements.

7. SULFUR HEXAFLOURIDE (SF6): SF6 shall be reclaimed and not vented to the atmosphere.

8. WASTE MATERIAL QUANTITY REPORT: Submit quantities of total project waste material disposal as listed below to the COR after completion and prior to submittal of final invoice.

   (1) Sanitary Wastes: Volume in cubic yards or weight in pounds.

   (2) Hazardous or Universal Wastes: Weight in pounds.

   (3) PCB Wastes: Weight in pounds.

   (4) Other regulated wastes (e.g., lead-based paint or asbestos): Weight in pounds (specify type of waste in report).

SECTION 13.9--CONTRACTOR'S LIABILITY FOR REGULATED MATERIAL INCIDENTS

1. GENERAL: The Contractor is solely liable for all expenses related to spills, mishandling, or incidents of regulated material attributable to his actions or the actions of his subcontractors. This includes all

response, investigation, cleanup, disposal, permitting, reporting, and requirements from applicable environmental regulation agencies.

2. SUPERVISION: The actions of the Contractor employees, agents, and subcontractors shall be properly managed at all times on Western property or while transporting Western's (or previously owned by Western) regulated material and equipment.

SECTION 13.10--POLLUTANT SPILL PREVENTION, NOTIFICATION, AND CLEANUP

1. GENERAL: Provide measures to prevent spills of pollutants and respond appropriately if a spill occurs. A pollutant includes any hazardous or non-hazardous substance that when spilled, will contaminate soil, surface water, or ground water. This includes any solvent, fuel, oil, paint, pesticide, engine coolants, and similar substances.

2. SPILL PREVENTION NOTIFICATION AND CLEANUP PLAN (Plan): Provide the Plan to the COR for approval 14 days prior to start of work. Approval of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations. Include the following in the Plan:

   (1) Spill Prevention measures. Describe the work practices or precautions that will be used at the job site to prevent spills. These may include engineered or manufactured techniques such as installation of berms around fuel and oil tanks; Storage of fuels, paints, and other substances in spill proof containers; and management techniques such as requiring workers to handle material in certain ways.

   (2) Notification. Most States and the Environmental Protection Agency require by regulation, that anyone who spills certain types of pollutants in certain quantities notify them of the spill within a specific time period. Some of these agencies require written follow up reports and cleanup reports. Include in the Plan, the types of spills for which notification would be made, the agencies notified, the information the agency requires during the notification, and the telephone numbers for notification.

   (3) Employee Awareness Training. Describe employee awareness training procedures that will be implemented to ensure personnel are knowledgeable about the contents of the Plan and the need for notification.

   (4) Commitment of Manpower, Equipment and Material. Identify the arrangements made to respond to spills, including the commitment of manpower, equipment and material.

   (5) If applicable, address all requirements of 40CFR112 pertaining to Spill Prevention, Control and Countermeasures Plans.

3. TANKER OIL SPILL PREVENTION AND RESPONSE PLAN: Provide a Tanker Oil Spill Prevention and Response Plan as required by the Department of Transportation if oil tankers with volume of 3,500 gallons or more are used as part of the project. Submit the Tanker Oil Spill Prevention and Response Plan to the COR for approval 14 days prior to start of work. Approval of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations.

SECTION 13.11--PESTICIDES

1. GENERAL: The term "pesticide" includes herbicides, insecticides, rodenticides and fungicides. Pesticides shall only be used in accordance with their labeling.

2. ENVIRONMENTAL PROTECTION AGENCY REGISTRATION: Use EPA registered pesticides.

3. PESTICIDE USE PLAN: The plan shall contain: 1) a description of the pesticide to be used, 2) where it is to be applied, 3) the application rate, 4) a copy of the label, and 5) a copy of required applicator certifications. Submit two copies of the pesticide use plan to the COR for approval 14 days prior to the date of intended application. Approval of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations. Within seven days after application, submit a written report in accordance with Standard 2 – Sitework, Section 2.1.1.5, "Soil-Applied Herbicide".

SECTION 13.12--TREATED WOOD POLES AND MEMBERS RECYCLING OR DISPOSAL

Whenever practicable, treated wood poles and members removed during the project shall be recycled or transferred to the public for some uses. Treated wood poles and members transferred to a recycler, landfill, or the public shall be accompanied by a written consumer information sheet on treated wood as provided by Western. Obtain a receipt form, part of the consumer information sheet, from the recipient indicating that they have received, read, and understand the consumer information sheet. Treated wood products transferred to right-of-way landowners shall be moved off the right-of-way. Treated wood product scrap or poles and members that cannot be donated or reused shall be properly disposed in a landfill that accepts treated wood and has signed Western's consumer information sheet receipt. Submit treated wood pole and members consumer receipt forms to the COR after completion and prior to submittal of final invoice.

SECTION 13.13--PREVENTION OF AIR POLLUTION

1. GENERAL: Ensure that construction activities and the operation of equipment are undertaken to reduce the emission of air pollutants. Submit a copy of permits, if required, from Federal, State, or local agencies to the COR 14 days prior to the start of work.

2. MACHINERY AIR EMISSIONS: The Contractor and subcontractor machinery shall have, and shall use the air emissions control devices required by Federal, State or Local Regulation or ordinance.

3. DUST ABATEMENT: Dust shall be controlled. Oil shall not be used as a dust suppressant. Dust suppressants shall be approved by the COR prior to use.

SECTION 13.14--HANDLING AND MANAGEMENT OF ASBESTOS CONTAINING MATERIAL

1. GENERAL: Obtain the appropriate Federal, State or local licenses or certifications prior to disturbing any regulated asbestos-containing material. Submit a copy of licenses and/or certifications for asbestos work to the COR prior to work. Ensure: 1) worker and public safety requirements are fully implemented and 2) proper handling, transportation, and disposal of asbestos containing material.

2. TRANSPORTATION OF ASBESTOS WASTE: Comply with Department of Transportation, Environmental Protection Agency, and State and Local requirements when transporting asbestos wastes.

3. CERTIFICATES OF DISPOSAL AND RECEIPTS: Obtain certificate of disposals for waste if the waste is a hazardous waste or receipts if the waste is a non-hazardous waste. Submit copies to the COR after completion and prior to submittal of final invoice.

SECTION 13.15--MATERIAL WITH LEAD-BASED PAINT

1. GENERAL: Comply with all applicable Federal, State and local regulations concerning work with lead-based paint, disposal of material painted with lead-based paint, and management of these material. OSHA and General Industry Standards apply to worker safety and right-to-know issues. Federal EPA and State agencies regulate waste disposal and air quality issues.

2. TRANSFER OF PROPERTY: If lead-based paint containing equipment or material is to be given away or sold for reuse, scrap, or reclaiming, a written notice shall be provided to the recipient of the material stating that the material contains lead-based paint and the Hazardous Waste regulations may apply to the waste or the paint in some circumstances. The new owner must also be notified that they may be responsible for compliance with OSHA requirements if the material is to be cut, sanded, abraded, or stripped of paint. Submit a copy of lead paint notices to the COR upon completion and prior to submittal of final invoice.

3. CERTIFICATES OF DISPOSAL AND RECEIPTS: Obtain certificate of disposals for waste if the waste is a hazardous waste or receipts if the waste is a non-hazardous waste. Submit copies to the COR after completion and prior to submittal of final invoice.

SECTION 13.16--PREVENTION OF WATER POLLUTION

1. GENERAL: Ensure that surface and ground water is protected from pollution caused by construction activities and comply with applicable regulations and requirements.

2. PERMITS: Ensure that:

   (1) Streams, and other waterways or courses are not obstructed or impaired, unless the appropriate Federal, State or local permits have been obtained;

   (2) A National Pollutant Discharge Elimination System (NPDES) Permit is obtained if required by State or Federal regulation; and

   (3) A dewatering permit is obtained from the appropriate agency if required for construction dewatering activities.

   (4) Copies of any water pollution permits are submitted to the COR prior to work.

3. EXCAVATED MATERIAL AND OTHER CONTAMINANT SOURCES: Control runoff from excavated areas and piles of excavated material, construction material or wastes (to include truck washing and concrete wastes), and chemical products such as oil, grease, solvents, fuels, pesticides, and pole treatment compounds. Excavated material or other construction material shall not be stockpiled or deposited near or on streambanks, lake shorelines, ditches, irrigation canals, or other areas where run-off could impact the environment.

4. MANAGEMENT OF WASTE CONCRETE OR WASHING OF CONCRETE TRUCKS: Do not permit the washing of concrete trucks or disposal of excess concrete in any ditch, canal, stream, or other surface water. Concrete wastes shall be disposed in accordance with all Federal, State, and local regulations. Concrete wastes shall not be disposed on any Western property, right-of-way, or easement; nor on any streets, roads, or property without the owner's consent.

5. STREAM CROSSINGS: Crossing of any stream or other waterway shall be done in compliance with Federal, State, and local regulations. Crossing of some waterways may be prohibited by landowners, State or Federal agencies or require permits.

SECTION 13.17--TESTING, DRAINING, REMOVAL, AND DISPOSAL OF OIL-FILLED ELECTRICAL EQUIPMENT

1. SAMPLING AND TESTING OF INSULATING OIL FOR PCB CONTENT: Sample and analyze the oil of electrical equipment for PCB's. Use analytical methods approved by EPA and applicable State regulations. Decontaminate sampling equipment according to documented good laboratory practices (these can be contractor developed or EPA standards). Use only laboratories approved by Western. The COR will furnish a list of approved laboratories.

2. PCB TEST REPORT: Provide PCB test reports that contain the information below for disposing of oil-filled electrical equipment. Submit the PCB test report prior to draining, removal, or disposal of oil or oil-filled equipment that is designated for disposal.

   - Name and address of the laboratory
   - Description of the electrical equipment (e.g. transformer, breaker)
   - Serial number for the electrical equipment.
   - Date sampled
   - Date tested
   - PCB contents in parts per million (ppm)
   - Unique identification number of container into which the oil was drained (i.e., number of drum, tank, tanker, etc.)

3. OIL CONTAINING PCB: Comply with the Federal regulations pertaining to PCBs found at Title 40, Part 761 of the U.S. Code of Federal Regulations (40 CFR 761).

4. REMOVAL AND DISPOSAL OF INSULATING OIL AND OIL-FILLED ELECTRICAL EQUIPMENT: Once the PCB content of the oil has been identified from laboratory results, the oil shall be transported and disposed, recycled, or reprocessed according to 40 CFR 761 (if applicable), Resource Conservation and Recovery Act (RCRA) "used oil", and other applicable regulations. Used oil may be transported only by EPA-registered used oil transporters. The oil must be stored in containers that are labeled "Used Oil." Use only U.S. transporters and disposal sites approved by Western.

5. OIL AND OIL-FILLED ELECTRICAL EQUIPMENT RECEIPT: Obtain and submit a receipt for oil and oil-filled equipment transported and disposed, recycled, or reprocessed to the COR upon completion and prior to submittal of final invoice.

SECTION 13.18--REMOVAL OF OIL-CONTAMINATED MATERIAL

1. GENERAL: Removing oil-contaminated material includes excavating, stockpiling, testing, transporting, cleaning, and disposing of these material. Personnel working with PCBs shall be trained in accordance with OSHA requirements. Submit employee training documentation records to the COR 14 days prior to the start of work.

2. CLEANUP WORK MANAGEMENT PLAN: Provide a Cleanup Work Management Plan that has been approved by applicable Federal, State, or Local environmental regulation agencies. Submit the plan to the COR for approval 14 days prior to the start of work. Approval of the plan is for the purpose of determining compliance with the specifications only and shall not relieve the Contractor of the responsibility for compliance with all Federal, State, and Local regulations. The plan shall address on-site excavation of contaminated soil and debris and include the following:

   - Identification of contaminants and areas to be excavated
   - Method of excavation
   - Level of personnel/subcontractor training

- Safety and health provisions
- Sampling requirements including quality control, laboratory to be used
- Management of excavated soils and debris
- Disposal methods, including transportation to disposal

3. EXCAVATION AND CLEANUP: Comply with the requirements of Title 40, Part 761 of the U.S. Code of Federal Regulations (40 CFR 761).

4. TEMPORARY STOCKPILING: Excavated material, temporarily stockpiled on site, shall be stored on heavy plastic and covered to prevent wind and rain erosion at a location designated by the COR.

5. SAMPLING AND TESTING: Sample contaminated debris and areas of excavation to ensure that contamination is removed. Use personnel with experience in sampling and, in particular, with experience in PCB cleanup if PCBs are involved. Use analytical methods approved by EPA and applicable State regulations.

6. TRANSPORTION AND DISPOSAL OF CONTAMINATED MATERIAL: The Contractor shall be responsible and liable for the proper loading, transportation, and disposal of contaminated material according to Federal, State, and local requirements. Use only U.S. transporters and disposal sites approved by Western.

7. POST CLEANUP REPORT: Provide a Post-Cleanup Report that describes the cleanup of contaminated soils and debris. Submit the report to the COR upon completion and prior to submittal of final invoice. The report shall contain the following information:

   - Site map showing the areas cleaned
   - Description of the operations involved in excavating, storing, sampling, and testing, and disposal
   - Sampling and analysis results including 1) Name and address of the laboratory, 2) sample locations, 3) sample dates, 4) analysis dates, 5) contents of contaminant (e.g. PCB or total petroleum hydrocarbons) in parts per million (ppm)
   - Certification by the Contractor that the cleanup requirements were met
   - Copies of any manifests, bills of lading, and disposal certificates
   - Copies of correspondence with regulatory agencies that support completion of the cleanup

SECTION 13.19—CONSERVATION OF NATURAL RESOURCES

1. GENERAL: Federal law prohibits the taking of endangered, threatened, proposed or candidate wildlife and plants, and destruction or adverse modification of designated Critical Habitat. Federal law also prohibits the taking of birds protected by the Migratory Bird Treaty Act. "Take" means to pursue, hunt, shoot, wound, kill, trap, capture or collect a protected animal or any part thereof, or attempt to do any of those things.

2. KNOWN OCCURRENCE OF PROTECTED SPECIES OR HABITAT: Following issuance of the notice to proceed, and prior to the start of construction, Western will provide training to all contractor and subcontractor personnel involved in the construction activity. Untrained personnel shall not be allowed in the construction area. Western will provide two sets of plan and profile drawings showing sensitive areas located on or immediately adjacent to the transmission line right-of-way and/or facility. These areas shall be considered avoidance areas. Prior to any construction activity, the avoidance areas shall be marked on the ground in a manner approved by the COR. If access is absolutely necessary, the contractor shall first obtain permission from the COR, noting that a Western and/or other government or tribal agency biologist may be required to accompany personnel and equipment. Ground markings shall be maintained through the duration of the contract. Western will remove the markings during or following final inspection of the project.

3. UNKNOWN OCCURRENCE OF PROTECTED SPECIES OR HABITAT: If evidence of a protected species is found in the project area, the contractor shall immediately notify the COR and provide the location and nature of the findings. The contractor shall stop all activity in the vicinity of the protected species or habitat and not proceed until directed to do so by the COR.

4. CONTRACT ADJUSTMENTS: Where appropriate by reason of delays caused by a discovery, the Contracting Officer may make adjustments to contract requirements.

APPENDIX C

Agency Correspondence

BABCOCK & BROWN

Babcock & Brown LP
1600 Smith Street · Suite 4025 · Houston TX 77002 USA
T 713 571 8900 · F 713 571 8004 · www.babcockbrown.com

October 5, 2007

Sydney
Melbourne
Brisbane
San Francisco
San Diego
Dallas
Houston
New York
Greenwich
Dublin
Madrid
London
Paris
Luxembourg
Milan
Munich
Johannesburg
Dubai
Kuala Lumpur
Singapore
Hong Kong
Tokyo

Steve Naylor
South Dakota Regulatory Office
28563 Powerhouse Road Room 118
Pierre, SD 57501

Dear Mr. Naylor,

Babcock & Brown is requesting a jurisdictional determination in regards to the Wessington Springs Wind Project (WSWP) that is planned to begin construction next Spring. The proposed action would consist of a 51MW wind energy development facility with 34 wind turbine generators, new and improved roads, an O&M building, a 34.5kV underground collection system, a collector substation, and an interconnect substation next to an existing Western Area Power Administration (Western) 230kV transmission line. Babcock & Brown proposes to have the WSWP in commercial operation by November 2008.

In September of 2007, Western EcoSystems Technology, Inc. (WEST) performed wetlands delineation surveys for proposed access roads, substation, transmission line routes, truck turn arounds and other areas that were planned for possible ground disturbance. It is WEST's recommendation that none of the project components will affect any jurisdictional wetlands. Surveys to determine wetlands in the project were based on specific classification guidelines. It is recommended that the wetlands surveyed are non-jurisdictional. Some of the proposed roads do go through swale like depressions. To minimize impacts, Babcock would employ bridge culverts in these areas when building roads. The WSWP project will not be discharging any dredged or fill material into any regulated waterways. No elements of our facility (access roads, wind turbines, collection system) cross or directly effect any ephemeral waterways or lakes. Babcock has worked closely with WEST and the U.S. Fish and Wildlife Service to make sure that none of our wind turbines are located in or affect any wetlands areas. Enclosed you will find the wetland delineations report and two project maps. Please let me know if we are required to be regulated by section 404 or 401 of the Clean Water Act. We have a critical timing schedule for this project so any expedited review would be greatly appreciated. If you have any questions, please give me a call.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
SOUTHDAKOTA REGULATORY OFFICE
28563 POWERHOUSE ROAD, ROOM 118
PIERRE, SOUTH DAKOTA 57501-6174

REPLY TO
ATTENTION OF

October 24, 2007

South Dakota Regulatory Office
28563 Powerhouse Road, Room 118
Pierre, South Dakota 57501

Wessington Wind I, LLC
Attn: Natalie McCue
Environmental/Land Aquisition
1600 Smith Street, Suite 4025
Houston, Texas 77002

Dear Ms. McCue:

Reference is made to the information received October 15, 2007, concerning Section 404 of the Clean Water Act permit requirements. After reviewing your proposal to construct an Energy Development Facility, this office has determined that a Department of the Army permit will not be required. The proposed project is located in several Sections, Townships 106 and 107 North, Range 65 West, Jerauld County, South Dakota.

However, if in the future you anticipate doing work or placing material in any waters of the United States, please provide this office with an application for review for possible permit requirements.

Although a Department of the Army permit pursuant to Section 404 of the Clean Water Act is not required for the project, this does not eliminate the requirement that you obtain other applicable Federal, state, tribal and local permits as required.

If you have any questions or need any assistance, please feel free to contact this office at the above Regulatory Office address or telephone Carolyn Kutz at (605) 224-8531 and reference action ID NWO-2007-3438.

Sincerely,

M. James DeKlerkwig

for Steven E. Naylor
Regulatory Program Manager,
South Dakota

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
SOUTHDAKOTA REGULATORY OFFICE
28563 POWERHOUSE ROAD, ROOM 118
PIERRE, SOUTH DAKOTA 57501-6174

REPLY TO
ATTENTION OF

April 26, 2007

South Dakota Regulatory Office
28563 Powerhouse Road, Room 118
Pierre, South Dakota 57501

Department of Energy
Upper Great Plains Region
Western Area Power Administration
Attn: Matt Marsh, Environmental Protection Specialist
PO Box 35800
Billings, MT 59107-5800

Dear Mr. Marsh:

Reference is made to the preliminary information received April 23, 2007, concerning Department of the Army authorization requirements for the construction of a wind energy development south of the city of Wessington Springs in Jerauld County, South Dakota.

The Corps' jurisdiction is derived from Section 404 of the Clean Water Act passed by Congress in 1972, which calls for Federal regulation of the discharge of dredged or fill material into certain waterways, lakes and/or wetlands, (i.e. waters of the United States). Since the proposed project may involve either the discharge of dredged or fill material into waters subject to Federal regulation, it is requested that you submit an application for a Department of the Army permit.

Enclosed is the necessary application form (ENG Form 4345). When completing the application form, we would request from the applicant (a) a detailed description of the work activity [i.e., explain precisely what you are going to do and how you are going to accomplish it; include fill and/or excavation quantities and dimensions to be performed below the ordinary high water elevation (if in a lake, river or steam) or to be performed within the boundary of jurisdictional wetlands (if the project involves wetlands), along with the source/type of fill and the type of equipment to be used during construction]; (b) the purpose, need and/or benefits of the proposed project; and (c) any alternative project designs or locations considered.

Along with the completed application form, we would request from the applicant (1) detailed drawings (plan and cross-sectional views; the drawings should be submitted on 8-1/2x11 inch paper), (2) a location map showing the project site, (3) a delineation of affected wetlands if the project involves wetlands, (4) if available, colored pictures showing at least two views of the proposed project site and (5) any ecological or environmental information available that you feel may be pertinent to your project (i.e., area wildlife activity, area vegetation, area land use, quality of fishery, etc.).

Adherence to the above information requests will speed up the application evaluation and permit processing time. The requested information is used to help the Corps determine the type of permit to process if a permit is required and is used in the public review.

You can obtain additional information about the Regulatory Program and download forms from our website: https://www.nwo.usace.army.mil/html/od-rsd/frame.html.

If you have any questions or need any assistance, please feel free to contact this office at the above Regulatory Office address or telephone Carolyn Kutz at (605) 224-8531.

Sincerely,

Steven E. Naylor
Regulatory Program Manager,
South Dakota

Enclosures

2007

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT *(33 CFR 325)*	OMB APPROVAL NO. 0710-0003 Expires December 31, 2004

The public reporting burden for this collection of information is estimated to average 10 hours per response, although the majority of applications should require 5 hours or less. This includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies. Submission of requested information is voluntary, however, if information is not provided, the permit application cannot be processed nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE *(an agent is not required)*
6. APPLICANT'S ADDRESS	9. AGENT'S ADDRESS
7. APPLICANT'S PHONE NUMBERS WITH AREA CODE a. Residence b. Business	10. AGENT'S PHONE NUMBERS WITH AREA CODE a. Residence b. Business

11. **STATEMENT OF AUTHORIZATION**

I hereby authorize _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

_____

APPLICANT'S SIGNATURE DATE

NAME, LOCATION AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE *(see instructions)*

13. NAME OF WATERBODY, IF KNOWN *(if applicable)*	14. PROJECT STREET ADDRESS *(if applicable)*
15. LOCATION OF PROJECT COUNTY _____ STATE _____	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions) **LEGAL DESCRIPTION - SECTION, TOWNSHIP, RANGE**

17. DIRECTIONS TO THE SITE

18. Nature of Activity *(Description of project, include all features)*

19. Project Purpose *(Describe the reason or purpose of the project, see instructions)*

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards

22. Surface Area in Acres of Wetlands or Other Waters Filled *(see instructions)*

23. Is Any Portion of the Work Already Complete? Yes _____ No _____ IF YES, DESCRIBE THE COMPLETED WORK

24. Addresses of Adjoining Property Owners, Lessees, etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

25. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

*Would include but is not restricted to zoning, building and flood plain permits

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT _____ DATE _____ SIGNATURE OF AGENT _____ DATE _____

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States, knowingly and willfully falsifies, conceals, or covers up any trick scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Instructions for Preparing a
Department of the Army Permit Application

Blocks 1 through 4. To be completed by Corps of Engineers.

Block 5. Applicant's Name. Enter the name of the responsible party or parties. If the responsible party is an agency, company, corporation, or other organization, indicate the responsible officer and title. If more than one party is associated with the application, please attach a sheet with the necessary information marked Block 5.

Block 6. Address of Applicant. Please provide the full address of the party or parties responsible for the application. If more space is needed, attach an extra sheet of paper marked Block 6.

Block 7. Applicant Telephone Number(s). Please provide the number where you can usually be reached during normal business hours.

Blocks 8 through 11. To be completed, if you choose to have an agent.

Block 8. Authorized Agent's Name and Title. Indicate name of individual or agency, designated by you, to represent you in this process. An agent can be an attorney, builder, contractor, engineer, or any other person or organization. Note: An agent is not required.

Blocks 9 and 10. Agent's Address and Telephone Number. Please provide the complete mailing address of the agent, along with the telephone number where he / she can be reached during normal business hours.

Block 11. Statement of Authorization. To be completed by applicant, if an agent is to be employed.

Block 12. Proposed Project Name or Title. Please provide name identifying the proposed project, *e.g.*, Landmark Plaza, Burned Hills Subdivision, or Edsall Commercial Center.

Block 13. Name of Waterbody. Please provide the name of any stream, lake, marsh, or other waterway to be directly impacted by the activity. If it is a minor (no name) stream, identify the waterbody the minor stream enters.

Block 14. Proposed Project Street Address. If the proposed project is located at a site having a street address (not a box number), please enter it here.

Block 15. Location of Proposed Project. Enter the county and state where the proposed project is located. If more space is required, please attach a sheet with the necessary information marked Block 15.

Block 16. Other Location Descriptions. If available, provide the Section, Township, and Range of the site and / or the latitude and longitude. You may also provide description of the proposed project location, such as lot numbers, tract numbers, or you may choose to locate the proposed project site from a known point (such as the right descending bank of Smith Creek, one mile downstream from the Highway 14 bridge). If a large river or stream, include the river mile of the proposed project site if known.

Block 17, Directions to the Site. Provide directions to the site from a known location or landmark. Include highway and street numbers as well as names. Also provide distances from known locations and any other information that would assist in locating the site.

Block 18. Nature of Activity. Describe the overall activity or project. Give appropriate dimensions of structures such as wingwalls, dikes (identify the materials to be used in construction, as well as the methods by which the work is to be done), or excavations (length, width, and height). Indicate whether discharge of dredged or fill material is involved. Also, identify any structure to be constructed on a fill, piles, or float-supported platforms.

The written descriptions and illustrations are an important part of the application. Please describe, in detail, what you wish to do. If more space is needed, attach an extra sheet of paper marked Block 18.

Block 19. Proposed Project Purpose. Describe the purpose and need for the proposed project. What will it be used for and why? Also include a brief description of any related activities to be developed as the result of the proposed project. Give the approximate dates you plan to both begin and complete all work.

Block 20. Reasons for Discharge. If the activity involves the discharge of dredged and/or fill material into a wetland or other waterbody, including the temporary placement of material, explain the specific purpose of the placement of the material (such as erosion control).

Block 21. Types of Material Being Discharged and the Amount of Each Type in Cubic Yards. Describe the material to be discharged and amount of each material to be discharged within Corps jurisdiction. Please be sure this description will agree with your illustrations. Discharge material includes: rock, sand, clay, concrete, etc.

Block 22. Surface Areas of Wetlands or Other Waters Filled. Describe the area to be filled at each location. Specifically identify the surface areas, or part thereof, to be filled. Also include the means by which the discharge is to be done (backhoe, dragline, etc.). If dredged material is to be discharged on an upland site, identify the site and the steps to be taken (if necessary) to prevent runoff from the dredged material back into a waterbody. If more space is needed, attach an extra sheet of paper marked Block 22.

Block 23. Is Any Portion of the Work Already Complete? Provide any background on any part of the proposed project already completed. Describe the area already developed, structures completed, any dredged or fill material already discharged, the type of material, volume in cubic yards, acres filled, if a wetland or other waterbody (in acres or square feet). If the work was done under an existing Corps permit, identity the authorization, if possible.

Block 24. Names and Addresses of Adjoining Property Owners, Lessees, etc., Whose Property Adjoins the Project Site. List complete names and full mailing addresses of the adjacent property owners (public and private) lessees, etc., whose property adjoins the waterbody or aquatic site where the work is being proposed so that they may be notified of the proposed activity (usually by public notice). If more space is needed, attach an extra sheet of paper marked Block 24.

Information regarding adjacent landowners is usually available through the office of the tax assessor in the county or counties where the project is to be developed.

Block 25. Information about Approvals or Denials by Other Agencies. You may need the approval of other federal, state, or local agencies for your project. Identify any applications you have submitted and the status, if any (approved or denied) of each application. You need not have obtained all other permits before applying for a Corps permit.

Block 26. Signature of Applicant or Agent. The application must be signed by the owner or other authorized party (agent). This signature shall be an affirmation that the party applying for the permit possesses the requisite property rights to undertake the activity applied for (including compliance with special conditions, mitigation, etc.).

DRAWINGS AND ILLUSTRATIONS

General Information.

Three types of illustrations are needed to properly depict the work to be undertaken. These illustrations or drawings are identified as a Vicinity Map, a Plan View or a Typical Cross-Section Map. Identify each illustration with a figure or attachment number.

Please submit one original, or good quality copy, of all drawings on 8½ x11 inch plain white paper (tracing paper or film may be substituted). Use the fewest number of sheets necessary for your drawings or illustrations.

Each illustration should identify the project, the applicant, and the type of illustration (vicinity map, plan view, or cross-section). **While illustrations need not be professional (many small, private project illustrations are prepared by hand), they should be clear, accurate, and contain all necessary information**.

Federal Aviation Administration
Air Traffic Airspace Branch, ASW-520
2601 Meacham Blvd.
Fort Worth, TX 76137-0520

Aeronautical Study No.
2007-AGL-7477-OE

Issued Date: 09/28/2007

Natalie McCue
Wessington Wind I LLC
1600 Smith St, Suite 4025
Houston, TX 77002

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Wind Turbine W10
Location:	Wessington Springs, SD
Latitude:	43-59-54.18 N NAD 83
Longitude:	98-35-32.23 W
Heights:	389 feet above ground level (AGL)
	2262 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, pursuant to the authority delegated to me, it is hereby determined that the structure would not be a hazard to air navigation provided the following condition(s) is(are) met:

As a condition to this Determination, the structure is marked and/or lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint/synchronized red lights - Chapters 4,12&13(Turbines).

It is required that the enclosed FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part I)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part II)

See attachment for additional condition(s) or information.
While the structure does not constitute a hazard to air navigation, it would be located within or near a military training area and/or route.

This determination expires on 03/28/2009 unless:

(a) extended, revised or terminated by the issuing office.
(b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within

6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE POSTMARKED OR DELIVERED TO THIS OFFICE AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE.

This determination is subject to review if an interested party files a petition that is received by the FAA on or before October 28, 2007. In the event a petition for review is filed, it must contain a full statement of the basis upon which it is made and be submitted in triplicate to the Manager, Airspace and Rules Division - Room 423, Federal Aviation Administration, 800 Independence Ave., Washington, D.C. 20591.

This determination becomes final on November 07, 2007 unless a petition is timely filed. In which case, this determination will not become final pending disposition of the petition. Interested parties will be notified of the grant of any review. For any questions regarding your petition, please contact Office of Airspace and Rules via telephone -- 202-267-8783 - or facsimile 202-267-9328.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

This aeronautical study considered and analyzed the impact on existing and proposed arrival, departure, and en route procedures for aircraft operating under both visual flight rules and instrument flight rules; the impact on all existing and planned public-use airports, military airports and aeronautical facilities; and the cumulative impact resulting from the studied structure when combined with the impact of other existing or proposed structures. The study disclosed that the described structure would have no substantial adverse effect on air navigation.

An account of the study findings, aeronautical objections received by the FAA during the study (if any), and the basis for the FAA's decision in this matter can be found on the following page(s).

A copy of this determination will be forwarded to the Federal Communications Commission if the structure is subject to their licensing authority.

If we can be of further assistance, please contact William Merritt, at (718)553-2560. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2007-AGL-7477-OE.

Signature Control No: 536776-100739042 (DNH)
Kevin P. Haggerty
Manager, Obstruction Evaluation Service

Attachment(s)
Additional Information
Case Description
Map(s)

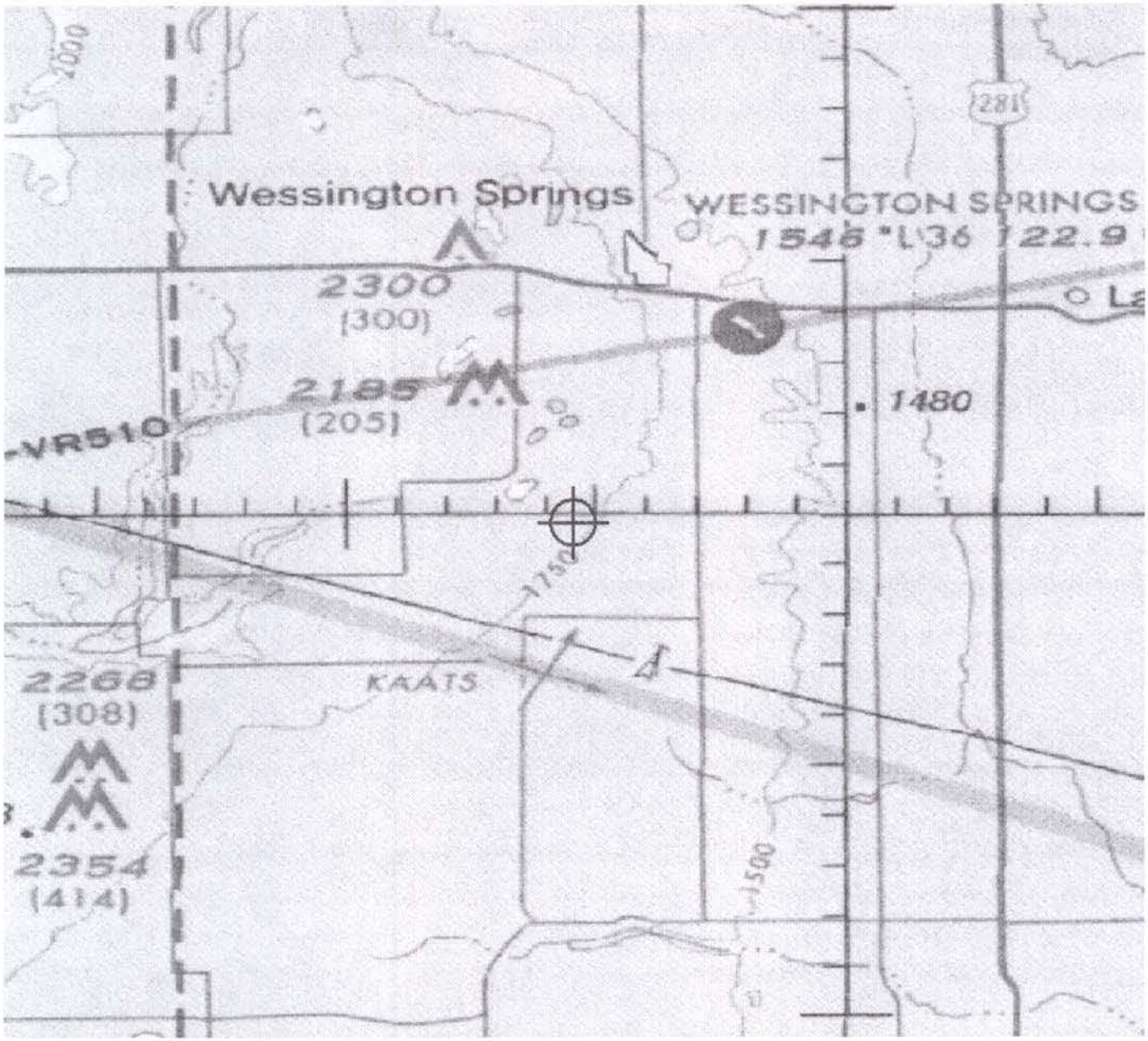
7460-2 Attached

Additional information for ASN 2007-AGL-7477-OE

Proposal exceeds Part 77.23(a)(2) by 189 feet - a height that exceeds a specified height within 5 nautical miles (NM) of the Wessington Springs Airport (4X4), reference point.
Current FAA policy does not require the circularization for public comment, when the above noted obstruction standard is exceeded and aeronautical impact is known.
At 2.8 NM to 7 NM southwest of 4X4, eleven of the thirty four proposed wind turbines exceed the above standard. These proposals do not impact any plan on file. The structures would be beyond the airport traffic pattern airspace for any category of aircraft and as defined in FAA Order 7400.2F, Part 2, Chapter 6, paragraph 6-3-8d. These proposals have no impact on any VFR/IFR, terminal or en route procedure, either current or planned. These proposals do not have a cumulative impact on any airport.
Because they do exceed a Part 77 obstruction standard, obstruction marking and/or lighting as noted above, is a condition of this determination of no hazard to air navigation.

Wind turbine is part of 34 turbine array- pls evaluate together- scattered medium red flashing lights, sychronized.

Sectional Map for ASN 2007-AGL-7477-OE



USDA United States Department of Agriculture
Farm Service Agency
510 Dakota Avenue North
Wessington Springs, SD 57382-2044
Telephone 605 539 9232
Facsimile 605 539 0020

March 16, 2007

Natalie McCue – Babcock and Brown
PH# 713-571-8900

Regarding your request for information of CRP land found in Anina and Media townships, here are the affected sections:

ANINA (106-65)	MEDIA (107-65)
NW ¼ Sect 2 -2 Phase II turbines	NW ¼ Sect 1
NW ¼ Sect 4	SE ¼ Sect 1
NE ¼ Sect 4	SW ¼ Sect 5
SE ¼ Sect 4	SW ¼ Sect 13
SW ¼ Sect 5	NE ¼ Sect 18
NE ¼ Sect 6	SE ¼ Sect 18
SW ¼ Sect 7	SE ¼ Sect 21
NW ¼ Sect 7	SE ¼ Sect 22
NE ¼ Sect 7	NE ¼ Sect 23
NW ¼ Sect 9	SE ¼ Sect 23
NW ¼ Sect 15 -1 Phase II turbine	NW ¼ Sect 26
SW ¼ Sect 16	SE ¼ Sect 26 -2 Phase II turbines
NW ¼ Sect 20	NE ¼ Sect 27
NW ¼ Sect 21	SE ¼ Sect 28
SW ¼ Sect 24	NE ¼ Sect 29
NE ¼ Sect 25	NW ¼ Sect 31
NE ¼ Sect 26	NE ¼ Sect 31
NW ¼ Sect 31	NW ¼ Sect 33
SW ¼ Sect 31	SE ¼ Sect 33
NE ¼ Sect 34	SW ¼ Sect 34

Please contact me at (605) 539-9232, Ext 2 if you have further questions.

Mary Johnson
County Executive Director

281 Erroneous Eligibility Determinations

A Erroneous Land Eligibility

Land enrolled that is ineligible and continues to be ineligible shall be terminated according to paragraph 355 from CRP-1. Refunds are not required.

B Erroneous Ownership Determination

If it is determined that CRP-1 was approved based on an erroneous ownership or operatorship determination, COC shall:

- not assess liquidated damages
- not require refund of C/S if participant agrees to maintain the practice for the practice's lifespan

  Note: The practice lifespan equals the length of the approved CRP-1.

- not require refund of annual rental payments earned
- allow producers adversely affected to earn the current year's annual rental payment
- terminate affected acres of CRP-1.

Note: If the eligible ownership or operatorship requirement was not met at the time CRP-1 was approved, but is currently met, COC shall not terminate CRP-1.

282 Wind Turbines

A Policy

COC may authorize the installation of windmills, wind turbines, wind-monitoring towers, or other wind-powered generation equipment on CRP acreage on a case-by-case basis. COC may approve up to 5.0 acres per contract of wind turbines on CRP acreage provided the environmental impacts have been considered according to subparagraph 242 F. For authority over 5 acres, COC shall submit a request in writing to CEPD through the State Office according to subparagraph 31 A. The 5.0-acre per contract threshold is a cumulative figure *--that is calculated by totaling the square footage of land area devoted to the footprint of the wind-generating device and any firebreak installed around the footprint. Access roads, transformers, and other ancillary equipment will not be considered in calculating the--* 5.0-acre per contract threshold.

Each request shall be documented in the COC minutes and forwarded to CEPD through the State Office. A copy of the environmental review should be included with the request. Before final approval, all of the environmental review process must be completed, including the conclusion of any public comment periods for EA.

283-291 (Reserved)

THE MILLE LACS BAND OF
OJIBWE INDIANS
Executive Branch of Tribal Government

May 2, 2007

Matt Marsh, Enviromental Protection Specialist
US Department of Energy
Western Power Administration
P.O. Box 35800
Billings, MT 59107-5800

Re: Section 106 Consultation and Tribal Review NHPA: US Department of Energy/ Western Power Administration: Proposal to interconnect a wind farm with Western Power Administration transmission system.

Dear Mr. Marsh,

Thank you for the opportunity to review and comment on the above project. It has been reviewed pursuant to the responsibilities given the Tribal Historic Preservation Office by the National Historic Preservation Act of 1966 and the Procedures of the Advisory Council of Historic Preservation (36CFR800).

Based on available information, no further Section 106 consultation is required as we have chosen to eliminate ourselves from the 'consulting party' list for the proposed undertaking. .

Please contact Natalie Weyaus at 320-532-4181 extension 7450 if you have any questions regarding our review of this project.

Respectfully,

Natalie Weyaus
Natalie Weyaus
Tribal Historic Preservation Officer

DISTRICT I
43408 Oodena Drive • Onamia, MN 56359
(320) 532-4181 • Fax (320) 532-4209

DISTRICT II
36666 State Highway 65 • McGregor, MN 55760
(218) 768-3311 • Fax (218) 768-3903

DISTRICT III
Route 2 • Box 233-N • Sandstone, MN 55072
(320) 384-6240 • Fax (320) 384-6190

UNITED STATES DEPARTMENT OF COMMERCE
National Telecommunications and Information Administration
Washington, D.C. 20230

JUN 9 2007

Mr. Lester E. Polisky
Comsearch
Senior Principal Engineer
Field Services Department
19700 Janelia Farms Blvd
Ashburn, VA 21147

Re: Wessington Springs Wind Farm in Jerauld County, SD

Dear Mr. Polisky:

In response to your request, the National Telecommunications and Information Administration provided to the federal agencies represented in the Interdepartment Radio Advisory Committee (IRAC) the plans for the Wessington Springs Wind Farm in Jerauld County, SD. After a 30 day period of review, the agencies have not identified any concerns regarding blockage of their radio frequency transmissions.

The Department of Energy (DOE) indicated that they have microwave links that cross the project boundary, but that the turbine locations are outside the exclusion zone of these links. DOE's Western Area Power Administration revealed that they may expand their operation and that the expansion was not accounted for in the DOE analysis. Please contact the Western Area Power Administration to mitigate any potential signal blockage. The Western Power Administration contact is:

Scott E. Johnson
Spectrum Program Manager
Western Area Power Administration
Phone: (720) 962-7380
Fax: (720) 962-7400
sjohnson@wapa.gov

While the other IRAC agencies did not identify any concerns regarding radio frequency blockage, this does not eliminate the need for the wind energy facilities to meet any other requirements specified by law related to these agencies. For example, this review by the IRAC does not eliminate any need that may exist to coordinate with the Federal Aviation Administration concerning flight obstruction.

Thank you for the opportunity to review these proposals.

Sincerely.

Karl B. Nebbia
Associate Administrator
Office of Spectrum Management

Preserving the Land, Cultural Heritage, Tradition for the Future Generation

Rosebud Sioux Tribe
Tribal Historic Preservation Office
P.O. Box 809
Rosebud, South Dakota
Telephone: (605) 747-4255
Fax: (605) 747-4211
Email: rstthpo@yahoo.com

Russell Eagle Bear
Officer

Kathy Arcoren
Administrative Assista

April 30, 2007

Mr. Matt Marsh
Environmental Project Manager
Upper Great Plains Region
Western Area Power Administration
PO Box 35800
Billings, Mont. 59107-5800

Re: Interconnection to a proposed wind farm

Dear Mr. Marsh,

We are responding to your letter dated April 26, 2007 in reference to the wind farm with it's transmission system project near Wessington Springs, SD.

As the Tribal Historic Preservation Officer for the Rosebud Sioux Tribe I appreciate your notification of the undertaking and the awareness you are demonstrating for the archaeological sites and cultural heritage of Indigenous peoples.

In review of the area shown on the accompanying maps of your proposed undertaking we do not have sites listed in our data base. This does not preclude the possibility of a site of heritage importance being located by forest personnel or an archaeological contractor that may have an oral reference among the Rosebud people.

If sites are to be affected by this undertaking, please notify my office as soon as possible for consultation. At this time we have no concerns for this project to proceed as planned.

Thank you for your time and consideration of this letter.

Sincerely,

Kathy Arcoren

by Mr. Russell Eagle Bear
RST- THPO

Department of Transportation

Division of Finance & Management
Office of Local Transportation Programs
700 East Broadway Avenue
Pierre, South Dakota 57501-2586
OFFICE: 605/773-3574
FAX: 605/773-4870

October 22, 2007

Natalie McCue
Wessington Wind LLC
1600 Smith Street, Suite 4025
Houston, TX 77002

RE: South Dakota Aeronautical Hazard Permit #2007-7468
Wind Farm Located near Wessington Springs, SD
One Permit for Multiple Applications

Enclosed you will find a single permit approved by the South Dakota Aeronautics Commission for the attached list of Federal Aviation Administration (FAA) Obstruction Evaluations.

Sheet 2 of the permit is to be completed and returned to the Office of Local Transportation Programs – Aeronautics within five days after the construction is completed.

If you have any questions, please contact me at (605) 773-4430 or email me at jennifer.clements@state.sd.us .

Sincerely,

Jennifer Clements

Jennifer Clements, Aeronautics Program Assistant

Case Number	ID #	Latitude	Longitude	Height Above Ground	Overall Height	Lighted?
2007-AGL-7468-OE	1	44° 02' 11.60" N	98° 35' 03.43" W	389	2351	Y
2007-AGL-7469-OE	2	44° 01' 37.19" N	98° 34' 13.04" W	389	2239	Y
2007-AGL-7470-OE	3	44° 01' 22.72" N	98° 34' 18.58" W	389	2246	N
2007-AGL-7471-OE	4	44° 01' 04.16" N	98° 34' 40.01" W	389	2243	Y
2007-AGL-7472-OE	5	44° 00' 52.40" N	98° 34' 51.23" W	389	2262	N
2007-AGL-7473-OE	6	44° 00' 43.93" N	98° 34' 56.28" W	389	2259	Y
2007-AGL-7474-OE	7	44° 00' 27.70" N	98° 34' 59.17" W	389	2262	N
2007-AGL-7475-OE	8	44° 00' 17.11" N	98° 35' 09.98" W	389	2243	Y
2007-AGL-7476-OE	9	44° 00' 09.00" N	98° 35' 28.00" W	389	2269	N
2007-AGL-7477-OE	10	43° 59' 54.18" N	98° 35' 32.23" W	389	2262	Y
2007-AGL-7478-OE	11	43° 59' 42.39" N	98° 35' 43.63" W	389	2226	N
2007-AGL-7479-OE	12	43° 59' 28.50" N	98° 35' 49.29" W	389	2256	Y
2007-AGL-7480-OE	13	43° 59' 20.99" N	98° 35' 59.57" W	389	2256	N
2007-AGL-7481-OE	14	43° 59' 07.48" N	98° 36' 12.19" W	389	2249	Y
2007-AGL-7482-OE	15	43° 58' 56.36" N	98° 36' 19.76" W	389	2243	N
2007-AGL-7483-OE	16	43° 58' 49.12" N	98° 36' 34.98" W	389	2259	Y
2007-AGL-7484-OE	17	43° 58' 31.48" N	98° 36' 42.50" W	389	2259	N
2007-AGL-7485-OE	18	43° 58' 25.18" N	98° 36' 59.06" W	389	2259	Y
2007-AGL-7486-OE	19	43° 58' 11.79" N	98° 37' 07.76" W	389	2276	N
2007-AGL-7487-OE	20	43° 58' 38.44" N	98° 37' 27.43" W	389	2239	Y
2007-AGL-7488-OE	21	43° 58' 56.70" N	98° 37' 02.40" W	389	2276	Y
2007-AGL-7489-OE	22	43° 59' 10.80" N	98° 36' 52.34" W	389	2308	Y
2007-AGL-7490-OE	23	43° 59' 41.30" N	98° 36' 25.25" W	389	2259	Y
2007-AGL-7491-OE	24	44° 00' 07.43" N	98° 35' 58.36" W	389	2276	Y
2007-AGL-7492-OE	25	43° 58' 05.03" N	98° 37' 41.46" W	389	2308	Y
2007-AGL-7493-OE	26	43° 58' 55.47" N	98° 37' 43.35" W	389	2243	Y
2007-AGL-7494-OE	27	43° 58' 04.55" N	98° 37' 23.11" W	389	2259	Y
2007-AGL-7495-OE	28	44° 00' 59.52" N	98° 35' 14.49" W	389	2308	Y
2007-AGL-7496-OE	29	44° 01' 08.43" N	98° 35' 04.86" W	389	2308	N
2007-AGL-7497-OE	30	44° 01' 19.27" N	98° 34' 59.26" W	389	2292	Y
2007-AGL-7498-OE	31	44° 01' 29.91" N	98° 34' 53.08" W	389	2279	N
2007-AGL-7499-OE	32	44° 01' 40.48" N	98° 34' 44.56" W	389	2285	Y
2007-AGL-7500-OE	33	44° 01' 54.59" N	98° 34' 38.03" W	389	2292	N
2007-AGL-7501-OE	34	44° 02' 11.35" N	98° 34' 38.59" W	389	2341	Y

SOUTH DAKOTA AERONAUTICAL HAZARD PERMIT

PERMIT NO. 2007-7468

Date of Aeronautics Commission Approval: October 22, 2007

Approval Is Hereby Given To:
Wessington Wind LLC
1600 Smith Street, Suite 4025
Houston, TX 77002

Nearest City: Wessington Springs

Latitude ***Longitude***
44d02m11.6sN 098d35m3.43sW
FAA Aeronautical Study: 07-AGL-7468-OE (2927)
Structure Height: 389 ft. AMSL 2351 ft.

Proposed Sructure: 389 ft. Wind Turbines
(34 Total)

As per FAA aeronautical study 07-AGL-7468-OE, any marking and lighting requirements are shown here:
Marking or Lighting Required: Standard Red Light & Paint

This approval is not to be interpreted to constitute an approval of structural design or materials, but merely in the matter of location, height, marking and lighting of the structure. This approval is subject to such further requirements as the South Dakota Aeronautics Commission may prescribe relating to marking, lighting and safety to the flying public as may from time to time be adopted by the Commission. This approval in no way implies that the Commission will approve an extension in height above top elevation(s) of said structure. The attached application is included as an integral part of this approval.

Jennifer Clements 10/22/07

Application Reviewer
South Dakota Aeronautics Commission

B S Lindholm 10/22/07

Bruce Lindholm, Program Manager, Air Rail and Transit
SD Department of Transportation
Office of Aeronautics

Please note: If the construction has not been completed and sheet 2 of this Permit completed and returned,this Permit will expire within one (1) year of date of issuance.

Extensions of this permit may be requested in writing to this office, before expiration of Permit.

Please complete and return this sheet within 5 days after structure is built

TO:

South Dakota Aeronautics Commission
DEPARTMENT OF TRANSPORTATION
Becker Hansen Building
700 E Broadway Avenue
Pierre, South Dakota 57501-9989

SUBJECT: Certification of Construction
Permit No. 2007-7468, Commission Hearing on 10/22/2007 Location: Wessington Springs
Federal Airspace Case Number 07-AGL-7468-OE

I, _____ do hereby certify that I have examined the completed structure described in the subject application to the South Dakota Aeronautics Commission and find it to have been constructed at the location, to the height of _____' and marked and lighted as specified in the subject application and according to the Special Conditions of the referenced Approval Permit as prescribed by the Aeronautics Commission as a part of their approval.

It is agreed by the owner that the future lighting and marking standards adopted by the South Dakota Aeronautics Commission will be adhered to within six months after being directed to do so by the Aeronautics Commission.

Date **Signature and Title of Authorized Individual**

DEPARTMENT OF GAME, FISH AND PARKS
Foss Building
523 East Capitol
Pierre, South Dakota 57501-3182

RECEIVED JUL 09 2007

June 29, 2007

David Dean
POWER Engineers, Inc.
1295 South Eagle Flight Way
Boise, ID 83709

RE: Wind Energy Development Project in Jerauld County

David:

I have searched the South Dakota Natural Heritage Database for records of rare, threatened or endangered species in the area of the proposed project. There is only one record of a rare species, the regal fritillary butterfly. This is a large butterfly that requires native prairie habitat. Although still fairly common in South Dakota, this species has been in severe decline in much of its range, due to loss of native prairie habitat.

Most of the land in the project area is private land and probably never been surveyed for rare or T&E species. It is possible the other rare species are present but not reported. Migratory species such as the federally endangered whooping crane could occur here. Whooping cranes are regular but rare migrants in central South Dakota each spring and fall.

If you have any questions, please contact me at your convenience.

Sincerely,

Doug Backlund
Wildlife Biologist

Element Occurrence Record for Wind Energy Development Project, Jerauld County
South Dakota Natural Heritage Database
June 29, 2007

Scientific Name: *Speyeria idalia*
Common Name: Regal Fritillary
Global Rank: G3
State Rank: S3
Township Range: 107N065W
Section: 13

Occurrence #: 76
Last Observed: 1992-07-18
State Status:
Federal Status:
County: Jerauld

ABUNDANT ON NATIVE PRAIRIE

DEPARTMENT OF GAME, FISH AND PARKS
Foss Building
523 East Capitol
Pierre, South Dakota 57501-3182

INVOICE

June 29, 2007

Fee for South Dakota Natural Heritage Database Search performed for:

David Dean
POWER Engineers, Inc.
1295 South Eagle Flight Way
Boise, ID 83709

For service provided: Wind Energy Development Project in Jerauld County

.5 hours of staff time @ $30.00 per hour	**$15.00**
One computer searche @ $30.00 per search	**$30.00**
TOTAL	**$45.00**

Make check payable to **SD Dept. of Game, Fish and Parks**

Submit payment to:

South Dakota Dept. of Game Fish and Park
523 E. Capitol-Foss Bldg.
Pierre, SD 57501
ATTN: Doug Backlund

DEPARTMENT OF GAME, FISH AND PARKS
Foss Building
523 East Capitol
Pierre, South Dakota 57501-3182

Nicholas J. Stas
Environmental Manager
Department of Energy
Western Area Power Administration
Upper Great Plains Region
P.O. Box 35800
Billings, MT 59107-5800

August 30, 2007

RE: Invitation to participate as a cooperating agency for the proposed Wessington Springs Wind Project and associated Environmental Assessment.

Dear Mr. Stas:

The South Dakota Department of Game, Fish and Parks respectfully declines the above referenced invitation. Other agency obligations preclude involvement at this time. Although our participation will not be as a cooperating agency, we will continue to provide feedback as the state wildlife agency through the NEPA input process. We appreciate your concern regarding potential impacts to wildlife from wind power development in South Dakota.

Respectfully,

Silka Kempema

Silka L. F. Kempema
Wildlife Biologist

DEPARTMENT OF GAME, FISH AND PARKS
Foss Building
523 East Capitol
Pierre, South Dakota 57501-3182

Terry Erk
Power
From Clayton Derby
WEST

April 27, 2007

Clayton Derby, Project Manager
Western EcoSystems Technology, Inc.
4007 State St. Ste. 109
Bismarck, ND 58503

RE: Proposed wind farm in Jerauld County, South Dakota

Dear Mr. Derby:

The following comments are in response to your letter dated 26 March 2007 requesting input on biological issues (unique habitats, wetlands, migratory pathways, raptor and bat use, and species of conservation concern) associated with the above-referenced potential wind farm located two miles south of Wessington Springs, South Dakota. The proposed siting and operation of this wind farm has potential to directly and indirectly impact area wildlife by killing bats and birds through tower and power line strikes, altering important and declining habitats and breeding and movement behavior of wildlife. While we applaud efforts to seek alternative energy sources, we offer the following considerations for your planning efforts, encouraging responsible siting and mitigation where appropriate to avoid direct strikes and additional habitat loss.

Unique and Rare Habitats in Project Site:
The project is located within the mixed grass prairie and the prairie pothole region; both of these wildlife habitats are unique and declining. Mixed grass prairie habitat in South Dakota has decreased by approximately 70% due primarily to cropland conversion. However, of the Great Plains states, South Dakota comparatively contains much of the mixed grass prairie remnant. Many of these remnants may exist as smaller disjunct patches which provide less suitable habitat for many native species of grassland wildlife. The proposed project is located within some of the last remaining contiguous grassland in Jerauld County.

The Prairie Pothole region, extending through most of eastern South Dakota, including the proposed project area, is a mosaic of prairie uplands and glacially formed wetland basins of various depths and sizes. Although most of the continent's waterfowl population is produced in this region, many wetlands have been lost to agricultural production and draining. Protection of remaining areas with abundant wetlands, such as Jerauld County (with 23 wetland basins/mi^2), is crucial for wetland dependent species. Because of the potential impacts placement of the proposed wind farm would have on unique and declining habitats in the region, we recommend the placement of wind turbines in areas already disturbed such as agricultural fields which provide limited resources to wildlife.

Impacts to Birds and Butterflies:
The South Dakota Natural Heritage Program (NHP; division within South Dakota Game, Fish and Parks [SDGFP]) monitors species that are rare, declining, or are of unknown status in the state. The data base maintained by NHP is based upon voluntary reports and limited survey information. Because the proposed project area has not been surveyed specifically for species monitored by our program, the absence of species records within our data base does not preclude the presence of any species in the proposed project area. However, within Jerauld County and the immediate surrounding area, our data base has documented records of water birds (great blue herons, great egrets, and black terns), northern mocking birds, and long-eared owls.

Placement of turbines in this area may fragment grassland wildlife habitat reducing the amount of suitable habitat, and modify behavior of grassland bird species, many of which are in decline. The proposed project area is in the current geographic distribution of the greater prairie chicken. This species is known to be area-sensitive, requiring comparatively large tracts of open, contiguous grassland. The lesser prairie chicken, a similar species found more commonly in the southern Great Plains, avoids nesting within 400 m of transmission lines or improved roads. This highly suggests that placement of turbines and associated infrastructure (roads and transmission lines) may also negatively affect greater prairie chickens. Properly timed, species-appropriate surveys for prairie grouse (greater prairie chickens and sharp-tailed grouse) and other grassland bird species should be conducted pre-construction.

The regal fritillary butterfly is a species of special conservation concern and occurs in Jerauld County. This butterfly is a species monitored by the NHP and is also recognized as a Species of Greatest Conservation Need, as listed in our State Wildlife Action Plan. Much of the required habitat (sufficient area of unburned prairie with a variety of larval host plants such as violets) for this species is rapidly declining in most of its range. Some of the last strongholds of this species are located within prairie states such as South Dakota in large areas of grassland (such as the proposed project area) that support larval host plants (violets).

The resulting mosaic of grassland and wetland basins and corridors in the proposed project area makes it an important migration route for birds (e.g., neotropical migrants, shorebirds, waterfowl) and bats. The Central Flyway, an important pathway for migratory ducks, geese, swans, and cranes runs through the midsection of the country, including South Dakota. Species using this flyway during migration, and particularly during inclement weather when birds alter their flight altitude, may suffer increased mortality due to direct strikes with wind turbines and associated power lines.

We are exceptionally concerned about direct impacts of wind turbines and overhead powerlines to whooping cranes. This species has suffered significant habitat loss and consequently ***only approximately 350 animals remain in the wild.*** This species is protected as endangered under both South Dakota law (SDCL 34A-8) and federal law (Endangered Species Act; 16 U.S C. 1531 et seq.). The proposed project location is within the primary migration route of the 'Aransas National Wildlife Refuge to Wood Buffalo National Park' population of whooping cranes. Placement of turbines in this area could very likely increase the chances of wind turbine and power line strikes and electrocutions. Power line strikes are one of the greatest threats to this

species. The new and existing power lines associated with the proposed project should be buried, marked, or retrofitted to reduce strikes and electrocutions of whooping cranes and other bird species. The Avian Protection Power line Interaction Committee (APLIC) has developed two documents that may be of use: 1) 'Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006' and 2) 'Mitigating Bird Collisions with Power lines'. Both of these documents are available from the Edison Institute (http://www.aplic.org/, under 'products and services').

Open grasslands, ridgelines, and interspersed wooded wetland drainages and basins in the proposed project area provide foraging, nesting, and perching habitat for raptors and owls such as Swainson's hawk, red-tailed hawk, northern harrier and great-horned owl. The topography along the eastern edge of the proposed project area provides air currents that raptors may use for soaring and gliding. Due to flight and feeding behavior, raptors will more than likely be susceptible to collisions with wind turbines, especially those located along ridges. We highly recommend placement of wind turbines away from ridges or known raptor flight paths.

Impacts to Bats:

Placement of turbines between wetlands affects not only birds, but also daily and seasonal bat movements between breeding, nesting and foraging areas. We know bats migrate and forage along rivers, streams and lakes. Thirteen species of bats are found in South Dakota, some of which are summer residents, year-round residents, or migratory (Table 1). Six bat species are considered rare and monitored by the NHP: 1) *Myotis evotis*, 2) *Myotis thysanodes*, 3) *Myotis septentrionalis*, 4) *Lasiurus noctivagans*, 5) *Corynorhonus townsendii*, and 6) *Nycticeius humeralis*. Although the NHP data base has no records of theses species in the proposed project area, this does not preclude the presence of any of these species in the area. We would suggest surveying the area for potential bat habitat and species.

Table 1. South Dakota Bats

Common Name	Scientific Name	Type
Big Brown Bat	*Eptesicus fuscus*	Year-round resident
Eastern Red Bat	*Lasiurus borealis*	Summer resident
Evening Bat*	*Nycticeius humeralis*	Migratory
Fringed Myotis	*Myotis thysanodes*	Year-round resident
Hoary Bat	*Lasiurus cinereus*	Summer resident
Little Brown Myotis	*Myotis lucifugus*	Year-round resident
Long-eared Myotis	*Myotis evotis*	Year-round resident
Long-legged Myotis	*Myotis volans*	Year-round resident
Northern Myotis	*Myotis septentrionalis*	Year-round resident
Silver-haired Bat	*Lasionycteris noctivagans*	Summer resident
Townsend's Big-eared Bat	*Corynorhinus townsendii*	Year-round resident
Western Small-footed Myotis	*Myotis ciliolabrum*	Year-round resident

* Species in grey font would not commonly be found in the proposed project area.

Recently, South Dakota Department of Game, Fish and Parks (SDGFP) in cooperation with the South Dakota Bat Working Group, developed a South Dakota Bat Management Plan specific to bats and their habitats in South Dakota (http://www.sdgfp.info/Wildlife/Diversity/batmanagmentplan71304.pdf). Please review this document for pertinent information. Again, because bats reside and migrate through South

Dakota, it is important to evaluate the propose project area for roosting, feeding, migration and/or stopover habitat and to survey these areas for bats.

In coordination with the SDBWG, the SDGFP has developed 'Siting Guidelines for Wind Power Projects in South Dakota' This document addresses many of the concerns involved with siting wind power projects in South Dakota and may be found at on the world wide web (http://www.sdgfp.info/Wildlife/Diversity/windpower.htm).

Connected Actions and Cumulative Impacts:
Placement of this proposed wind farm should take into account larger landscape-level impacts and the relationship of this action to nearby land use. Two SDGFP Game Production Areas are located within 2.5 miles of the project boundary. In addition, a U. S. Fish and Wildlife Service Waterfowl Protection Area would be nearly surrounded by the completed proposed project boundary. Placement of public lands is done so in areas with existing and potential wildlife habitat. Management of these lands is conducted in the interest of the public and associated trust resources. The size and juxtaposition of this potential wind farm may negatively affect wildlife use of these public areas. Impacts to wildlife in the surrounding project area could very likely have a cumulative effect to wildlife within these public trust lands.

Pre- and Post-Project Surveys and Monitoring:
As outlined above, our agency has concerns regarding direct and indirect impacts to wildlife and associated habitats in association with the siting of the proposed project. Before project construction, appropriate monitoring should be conducted to determine bird and bat use of the project and surrounding public areas. Based upon results of these studies, project construction should be modified, continued, or cancelled. If the project is continued as planned, monitoring should be conducted for two years post construction to determine if and how many bird and bat strikes are caused by this project, if habitats have been significantly altered, and if the surrounding public lands and their uses have been impacted. Any mitigation should be carefully planned and followed with every effort taken to avoid losses of rare and endangered species and their habitats.

If monitoring involves live trapping or collection of wildlife species, you must first obtain a collection permit from our agency. Also, we kindly request that if you or your associates observe any of the animal (http://www.sdgfp.info/Wildlife/Diversity/RareAnimal.htm) or plant species (http://www.sdgfp.info/Wildlife/Diversity/rareplant2002.htm) monitored by the NHP, please contact myself or any of our NHP staff (http://www.sdgfp.info/Wildlife/Diversity/staff_contact.htm).

The South Dakota Department of Game, Fish and Parks appreciates the opportunity to provide comments on the proposed project. If you have any questions on the above comments, please feel free to contact me at 605-773-2742 or Silka.Kempema@state.sd.us.

Regards,

Silka Kempema

Silka L. F. Kempema
Terrestrial Wildlife Biologist

CC: Natalie Gates, US Fish and Wildlife Service, Pierre, SD
Ron Schauer, SD Game, Fish and Parks, Region 3

South Dakota Department of Tourism and State Development

February 21, 2007

Natalie McCue
Babcock & Brown
1600 Smith Street
Suite 4025
Houston, Tx 77002
Search S07-

Dear Ms McCue:

I have completed your archaeological records search in Jerauld County:

T107N, R65W, Sec. 26, 27, 28, 35, and 36, Wessington Springs and Wessington Springs SW Quadrangles

Survey: Buechler (2001) Report Archive #ESD-0263

- **One Mile Radius**

Site: 39JE2

Surveys: Buechler (2001)	Report Archive #ESD-0263
Buechler (2002)	Report Archive #ESD-0288
Buechler (2003)	Report Archive #AJE-0012

This concludes your record search and I have enclosed copies of the GIS quadrangle map showing the site and survey locations and copies of the report data information and site form. State Historic Preservation Office guidelines require listing all sites and surveys within a mile of a project area. Researchers/contractors must be aware that lack of sites or surveys at a particular location does not mean the project site may not need a Class III archaeological resources survey by a qualified archaeologist. The SHPO has set an arbitrary date of 1982 as the cut-off for previous surveys to be considered valid and not require a new survey. This arbitrary date does not grandfather in inadequate surveys. The SHPO has also established a policy that a file search is valid for six months prior to the submission of the report.

The purpose of the Level 1 archaeological records search is for informational purposes only and does not constitute compliance with Section 106 of the National Historic Preservation Act of 1966 (as amended). **This information must be submitted for review to the Office of the State Historic Preservation Officer (SHPO), Review and Compliance Coordinator, 900 Governors Drive, Pierre, SD, 57501.**

Sincerely,

Jane P. Watts

Jane P. Watts
Records Manager

Office of Tourism
Governor's Office of Economic Development
Tribal Government Relations
711 E. Wells Ave. / Pierre, SD 57501-3369
Phone: 605-773-3301 / Fax: 605-773-3256
travelsd.com / sdgreatprofits.com / sdtribalrelations.com

South Dakota Arts Council
800 Governors Dr. / Pierre, SD 57501-2294
Phone: 605-773-3131 or 1-800-423-6665 in S.D.
Fax: 605-773-6962
sdac@state.sd.us / sdarts.org

South Dakota State Historical Society
Archaeological Research Center
2425 E. Saint Charles St. / PO Box 1257
Rapid City, SD 57709-1257
Phone: 605-394-1936 / Fax: 605-394-1941
sdhistory.org

South Dakota Housing Development Authority
PO Box 1237 / Pierre, SD 57501-1237
Phone: 605-773-3181 / Fax: 605-773-5154
sdhda.org

Great Faces. Great Places.

South Dakota Department of Tourism and State Development

July 16, 2007

Mary Barger
Federal Preservation Officer
Department of Energy
Western Area Power Administration
PO Box 281213
Lakewood CO 80228-8213

SECTION 106 PROJECT CONSULTATION – IDENTIFICATION/EVALUATION
Project: 070424012F – Basin Electric Power Cooperative/ Wessington Springs Wind Farm
Phase I – Geotechnical Investigations
Location: Jerauld County
(WAPA)

Dear Ms. Barger:

Thank you for the opportunity to comment on the above referenced project pursuant to Section 106 of the National Historic Preservation Act of 1966 (as amended). The South Dakota Office of the State Historic Preservation Officer (SHPO) concurs with your determination regarding the effect of the proposed undertaking on the non-renewable cultural resources of South Dakota.

The SHPO has made this consensus determination based on information provided in the July 10, 2007, correspondence from David W. Kluth which included the report entitled "Summary of Results from the Wessington Springs Wind Project Geotechnical Investigations: A Cultural Resource Inventory in Jerauld County, South Dakota," prepared by Metcalf Archaeological Consultants, Inc. and your correspondence received on July 16, 2007. SHPO concurs with the determination of No Historic Properties Affected for this undertaking based on the following stipulations. Stipulation 1) sites unevaluated 39JE0027, 39JE0028, 39JE0029, 39JE0030, 39JE0031, 39JE0032, 39JE0033, 30JE0034, 39JE0035, 39JE0036, 39JE0037, MAC-WS-12 and MAC-WS-13 are avoided by all ground disturbing activities associated with the proposed project, including staging areas. Stipulation 2) activities occurring in areas not identified in your request will require the submission of additional documentation pursuant to 36 CFR part 800.4.

Please note that South Dakota Codified Law 34-27-26 prohibits the disturbance of human skeletal remains or funerary objects except by a law enforcement officer, coroner or other official designed by law.

If historic properties are discovered or unanticipated effects on historic properties are found after the agency official has completed the Section 106 process, the agency official shall avoid, minimize or mitigate the adverse effects to such properties and notify the SHPO/ THPO, and Indian tribes that might attach religious and cultural significance to the affected property within 48 hours of the discovery, pursuant to 36 CFR part 800.13.

Concurrence of the SHPO does not relieve the federal agency official from consulting with other appropriate parties, as described in 36CFR Part 800.2(c).

Should you require additional information, please contact Paige Hoskinson, Review & Compliance Coordinator, at (605) 773-6004. Your concern for the non-renewable cultural heritage of our state is appreciated.

Sincerely,

Jay D. Vogt
State Historic Preservation Officer

Paige Hoskinson
Review and Compliance Coordinator

Cc: James Rudolph, Power Engineers
David W. Kluth, Western Area Power Administration

JOHN THUNE
SOUTH DAKOTA

COMMITTEES
ARMED SERVICES
ENVIRONMENT & PUBLIC WORKS
SMALL BUSINESS
VETERANS' AFFAIRS

United States Senate

WASHINGTON, DC 20510

April 25, 2007

Mr. Bob Harris
Upper Great Plains Regional Manager
Western Area Power Administration
PO Box 35800
Billings, MT 59107

Dear Mr. Harris:

On my recent energy tour across much of South Dakota, including a visit to your Watertown Operations Office, it was clear that the Western Area Power Administration (WAPA) will play a key role in the development of our state's vast wind power generation opportunities.

As a follow up to my April 9, 2007, letter to you regarding the potential integration of hydropower and wind power along the Missouri River, I am very interested in the pending wind farm near Wessington Springs, SD. This venture is the result of a partnership and renewable purchase agreement between Heartland Consumers Power District (HCPD) and Babcock & Brown, which calls for a wind power facility of up to 51MW capacity by the end of 2008 with plans to supply renewable wind power to the WAPA grid.

Considering its close proximity to tribal land, the Missouri River, and WAPA-owned transmission lines, this project may be a good candidate to study the possible integration of federal hydropower and wind power generation resources as envisioned in the Energy Policy Act of 2005. Although it is not located on tribal land, I ask that you please consider the impact wind-hydro integration may have on this proposed wind farm as you proceed with your study.

As I also mentioned in my previous correspondence, having the necessary transmission capabilities is critical to significant expansion of wind power in South Dakota. With that in mind, please keep me informed as to the progress of the transmission studies being performed for interconnection of this wind project with the WAPA transmission grid, including the required Environmental Assessment to be performed by WAPA, and your efforts to integrate this project with existing hydro generation.

Again, I believe there is great potential in this undertaking by HCPD and Babcock & Brown, and I look forward to hearing about your work pertaining to the Wessington Springs project. Thank you for your continued cooperation in strengthening South Dakota's energy infrastructure.

Kindest regards,

John Thune

JOHN THUNE
United States Senator

JT:br
cc: Jack Dodd, Assistant Administrator for Power Marketing Liaison Office

320 NORTH MAIN AVENUE
SIOUX FALLS, SD 57104
(605) 334-9596

1313 WEST MAIN STREET
RAPID CITY, SD 57701
(605) 348-7551

320 SOUTH 1ST STREET
SUITE 101
ABERDEEN, SD 57401
(605) 225-8823

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Huron Wetland Management District
Room 309, Federal Bldg.
200 4th Street SW
Huron, SD 57350
605/352-5894 FAX: 605/352-6709
Internet:harris_hoistad@fws.gov

May 8, 2007

Ms. Denise Williams
Power Engineers Inc.
15621 Blue Ash, Suite 110
Houston, TX 77090

Dear Ms. Williams: RE: Wessington Springs, SD Wind Project

I'm writing in follow-up to our phone conversations and in response to the project map you sent me earlier this week. As we have discussed on the phone, the US Fish and Wildlife Service (Service) holds property interests within the planned wind project area. The Service has both fee title interests and conservation easement interests within the project boundary.

I have also enclosed a photocopy of the project area map you sent to me. On this copy I have delineated the tracts where the Service holds an interest. As you will see, there is one 40 acre tract that the Service owns in fee title. The Service has exclusive rights to control the activities that occur on or may impact this tract of land. Also marked on the map are the tracts where the Service holds easement interests. As I explained on the phone, these tracts are covered by two different types of easements. The wetland easement protects the wetland basins on the tract. It does not encumber the upland portions of the tract. The grassland easement contract does encumber the entire tract of land. The grass easement prohibits the alteration of the permanent vegetative cover on the tract.

Also enclosed are selected pages from the Service's easement enforcement manual. These pages give a good general description of the different easements and the restrictions they place on the lands they encumber. Please review these pages along with the marked up map and if you have any questions, please feel to give me a call to discuss them. Thank you for contacting me during the design phase of the project. Discussing the easements early in the process will make it easier to address any impacts that may occur where the Service holds an interest.

Sincerely,

Harris J. Hoistad
Project Leader

CHAPTER I.

PURPOSE, NEED, AND BACKGROUND

The Small Wetlands Acquisition Program (SWAP) was authorized by Congress in 1958 by an amendment to the Migratory Bird Hunting and Conservation Stamp Act. The purpose of this important program is to ensure long-term protection of waterfowl and other migratory bird breeding habitat located primarily within the Prairie Pothole Region (PPR) of the North American prairie.

The North American prairie once formed the largest grassland area in the world, and the Prairie Pothole Region, the glaciated northern part of North American prairie, was once covered with millions of small, shallow, depressional wetlands. Over the entire PPR, wetland densities averaged an astounding 83 potholes per square mile!

The Prairie Pothole Region is vitally important to hundreds of migratory bird species for breeding and migrational habitat. In any given year, up to 50% of North America's waterfowl are produced within this region. Unfortunately, this region has also suffered some of the worst habitat losses. North Dakota has only 50% of its original pothole wetlands remaining; Minnesota only 10%, and the Northern Tall Grass Prairie is some of the most threatened habitat in all of North America. Habitat conversion and destruction within this area have long been considered a major decimating factor to populations of waterfowl. The 1938 Yearbook of Agriculture stated that:

> "drainage of the most productive waterfowl breeding places in the Northern Great Plains was one of the prime factors in reducing the continental populations of waterfowl."

Wetland drainage and conversion of grassland acres have taken their tolls, and waterfowl and other grassland nesting migratory birds have been forced into what remains of the once vast areas of grassland and wetlands. By the late 1950's, the need to act, the need to preserve some of what was left, was overwhelmingly apparent!

The Fish and Wildlife Service's (Service, FWS) Small Wetlands Program grew out of this need. In combination, the long term preservation of wetlands through the wetland easement program coupled with the preservation of grassland areas through the grassland easement program, have contributed significantly to the maintenance of prairie nesting migratory birds. The ability to protect what has already been preserved through these programs, along with the ability to continue preserving these vital habitats, is of national significance, and vital to the maintenance of the Trust migratory bird resources administered by the Service.

Since the program started in the early 1960's, over 2 million acres of wetland and grassland habitats have been protected in North Dakota, South Dakota, Minnesota, and Montana just through the easement programs. Many more thousands of acres have been preserved through fee title acquisition.

A Word About the Region 6 Easement Program:

Conservation easements used in the Prairie Pothole Region emanated from the conservation philosophy of protecting large landscapes for wildlife resources, particularly waterfowl. The pothole region has been and continues to be the most important landscape within the continental U.S. for breeding waterfowl.

The Service first implemented this landscape approach by acquiring "no burn, drain, fill, or level" easements on wetlands and acquiring fee title interests in wetlands and uplands. The programmatic guidance for the program was designed to protect large complexes of a diversity of wetlands with easements and provide waterfowl brood habitat and upland nesting cover with fee acquisition. The concept behind this approach was protection of landscapes for waterfowl production while minimally affecting the farming and ranching economy.

In late 1991 the Migratory Bird Conservation Commission approved a proposal by Region 6 for the purchase of easements designed to protect grassland habitat, while minimally affecting the farming and ranching operation. The grassland easement document further advanced the philosophy of protecting working landscapes in the agricultural environment. Region 6 developed a grassland easement that prohibited conversion of grassland to cropland, limited cutting of hay from grassland until after the prime nesting season (July 15th), but did not limit livestock grazing practices. The refuge managers, biologists, and realty specialists who devised the easement made a clear choice to minimally restrict agricultural practices on large blocks of grassland, while clearly prohibiting the conversion of such grassland to cropland. The biological foundation for this policy decision was found in data revealing the importance of upland grasslands to successful nesting of waterfowl.

A fact sheet was developed in 1991 for discussions with the Governor of North Dakota as the grassland easement program was initiated. This fact sheet revealed the primary intent of the easement program was to protect grassland from conversion and cultivation while not limiting other agricultural developments or uses.

The first grassland policy manual, approved in 1992, further advanced the underlying philosophy that grassland easements would protect larger blocks of habitat while (1) allowing 'normal' agricultural activities(i.e. working farms and ranches), (2) allowing non-cropland related agricultural development, (3) restricting urban subdivision and development, and (4) not restricting mineral rights such as sand and gravel rights by the easement. The Service wanted to tightly control any conversion of grassland to cropland,

but wanted flexibility to allow small and minor changes to the landscape that related to agriculture uses.

The 1992 and 1997 versions of the grassland easement manual reinforced this approach of flexibility by providing specific guidelines for easement managers to permit small foodplots, small shelter belts/tree rows, construction of stock-watering facilities, reseeding of grasslands, and early mowing. In addition the policy recognized that the easement did not encumber any minerals, including sand and gravel. However, the easement manager was advised to treat mineral development similar to subsurface outstanding oil and gas rights, i.e. issue a permit for site occupancy with conditions for disturbance and restoration, but not prohibiting the extraction.

Acquired Property Interests: Wetland Easement **purposes** relate to the protection and maintenance of protected basins. Specifically, the property interests acquired from the landowner are their rights to burn, drain, level or fill the wetlands. As a rule of thumb, any proposed use which may drain, burn, level, or fill a protected wetland will need to be pursued as a potential violation or evaluated under compatibility standards. Activities which would occur on the uplands without involvement of protected wetlands are generally not subject to compatibility requirements.

The intent of the Region 6 grassland easement is to protect (not manage) grasslands (uplands) encumbered by the easement. In almost all cases, wetlands are protected under a separate Wetland Easement on the same property. The easement does not grant the Service management capabilities in the same sense as owning the land in fee title. The landowner retains the majority of the property rights and is paid only for those rights specified in the easement contract and itemized below. The grassland easement:

1. is perpetual, i.e., runs with the land and is binding on all successors in title;

2. provides a one -time, lump sum payment;

3. protects only those lands legally described in the easement document and described and depicted on the Exhibit A map(s);.

4. prohibits any alteration of permanent vegetative cover, including grasses, forbs, and low-growing shrubs except those alterations approved in writing by the District Manager;

5. prohibits agricultural crop production except when approved in writing by the District Manager;

6. prohibits haying or mowing for any reason, including mowing for noxious weed control, until after July 15 without prior written approval by the District Manager;

7. authorizes representatives of the United States the right of ingress and egress for purposes of inspecting and enforcing the terms of the easement;

The Grassland Easement document currently in use (Exhibit III-7) has minor word changes from the document used prior to January 1992.

Management rights, such as rotational grazing or other grazing methods, considered desirable to better manage grasslands for wildlife, should be encouraged through an additional contract with the landowner, i.e., a short-term agreement through the Service's Partners for Wildlife program.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

April 16, 2007

Jim Rudolph
fr: Clayton Derby

Nicholas J. Stas, Environmental Manager
Department of Energy
Western Area Power Administration
Upper Great Plains Region
P.O. Box 35800
Billings, Montana 59107-5800

Re: Proposed Wessington Springs Wind Project, Jerauld County, South Dakota

Dear Mr. Stas:

This letter is in response to your request dated March 15, 2007 (received in our office on March 19, 2007), for a list of federally endangered, threatened, proposed, or candidate species or critical habitat in the area of the above referenced project. The Wessington Springs wind farm is a 99 megawatt (MW) wind energy facility proposed by Babcock and Brown and is located south of the town of Wessington Springs, Jerauld County, South Dakota. Sixty-six (66) 1.5 MW, 389 meter (m) tall turbines are proposed at the site. Numerous new roads, initially 35 feet wide to accommodate construction, will be established leading to and between turbine sites with additional vegetation clearing and grading for turnaround areas, turbine sites, the project substation, and underground lines. Overhead transmission lines will also be part of this project. Per your letter, the percentage of land to be disturbed has not yet been determined. Based on maps provided in your letter, options/leases obtained by Babcock and Brown from area landowners for future placement of turbines and/or related facilities are located in all or portions of:

- Sections 26, 35, and 36, Township 107 North, Range 65 West
- Sections 1, 2, 3, 10, 11, 12, 14, 15, and 22, Township 106 North, Range 65 West
- Section 31, Township 107 North, Range 64 West
- Section 6, Township 106 North, Range 64 West

In accordance with section 7(c) of the Endangered Species Act, as amended, 16 U.S.C. 1531 et seq., we have determined that the following federally listed species may occur in the project area (this list is considered valid for 90 days):

Species	Status	Expected Occurrence
Bald eagle (Haliaeetus leucocephalus)	Threatened	Migration, Winter Resident, Possible Nesting.
Whooping crane (Grus americana)	Endangered	Migration.

Bald eagles occur throughout South Dakota, and new nests are appearing each year. We are not currently aware of any nests in the immediate project area; any nests found should be reported to this office. No construction should occur within the vicinity of any known active bald eagle nest. The species' nesting season is January to August. Adult and juvenile bald eagles are known to be susceptible to collision and electrocution mortality.

Whooping cranes migrate through South Dakota on their way to northern breeding grounds and southern wintering areas. They occupy numerous habitats such as cropland and pastures; wet meadows; shallow marshes; shallow portions of rivers, lakes, reservoirs, and stock ponds; and both freshwater and alkaline basins for feeding and loafing. Overnight roosting sites frequently require shallow water in which they stand and rest. Line strike mortality at power lines is one of the greatest threats to this species. More information on avian collisions is provided below. The potential for whooping crane mortality due to turbine collisions may also exist; the project appears to be located within the 100-mile migration corridor identified for the whooping crane. Should construction occur during spring or fall migration, the potential for disturbances (flushing the birds) at critical times of the year may be of concern as well. Any whooping crane sightings should be reported to this office.

If the Western Area Power Administration (WAPA) or their designated representative determines that the project "may adversely affect" listed species in South Dakota, it should request formal consultation from this office. If a "may affect - not likely to adversely affect" determination is made for this project, it should be submitted to this office for concurrence. If a "no effect" determination is made, further consultation may not be necessary. However, a copy of the determination should be sent to this office.

According to National Wetlands Inventory maps (available online at http://wetlands.fws.gov/), numerous wetlands exist within the proposed project area. If a project may impact wetlands or other important fish and wildlife habitats, the U.S. Fish and Wildlife Service (Service), in accordance with the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347) and other environmental laws and rules, recommends complete avoidance of these areas, if possible; then minimization of any adverse impacts; and finally, replacement of any lost acres; in that order. Alternatives should be examined and the least damaging practical alternative selected. If wetland impacts are unavoidable, a mitigation plan addressing the number and types of wetland

acres to be impacted and the methods of replacement should be prepared and submitted to the resource agencies for review.

Primary concerns of the Service regarding wind farms are collision mortality, the loss of habitat, and habitat avoidance behaviors by wildlife. While there is still much to be learned regarding wind turbine-wildlife interactions, we do know that wind turbines can have adverse impacts on some species. Recent studies of grassland nesting birds have shown a tendency for avoidance of areas immediately surrounding turbines; thus, when considering the issues of habitat fragmentation and grassland bird avoidance, the area impacted may be larger than the final footprint of the project.

Much of the proposed project area is grassland with relatively high density of a variety of wetland types interspersed. A ridge line exists at the eastern edge of the site with forest/shrub/grass lined coulees and rolling topography across the area. It appears that the area proposed for construction exhibits relatively high value for wildlife, particularly avian species. A diversity of grassland nesting birds, shorebirds, and raptors are likely to occur there. Establishment of the a wind energy facility at the proposed site is likely to adversely impact a variety of these species. The best means of avoiding impacts to wildlife by wind farms is to avoid such high wildlife use areas. Placement of turbines within existing cropland or in/near developed areas is recommended for this reason.

The Service has developed voluntary interim guidelines to assist energy companies in accomplishing the goal of reducing the risk posed by turbines to wildlife. You may access these guidelines on the internet at: http://www.fws.gov/habitatconservation/wind.htm. The guidelines stress the importance of proper evaluation of potential wind turbine development sites, proper location and design of turbines and related facilities, and pre- and post-construction research and monitoring.

Please note that the South Dakota Department of Game, Fish and Parks (SDDGFP) has coordinated with the South Dakota Public Utilities Commission (SDPUC) regarding distribution of the SDDGFP's "Siting Guidelines for Wind Power Projects in South Dakota" to wind developers intending to construct projects within the state of South Dakota. You may wish to contact the SDPUC and/or the Wildlife Diversity Division of the SDDGFP in Pierre, South Dakota, for more information. Contact information may be found on their respective websites: http://www.state.sd.us/puc/ index.htm and http://www.sdgfp.info/Wildlife/Diversity/index.htm. The guidelines themselves may be found on the internet at: http://www.sdgfp.info/wildlife/diversity/windpower.htm.

Additionally, bats are known to suffer mortality due to collisions with wind turbines. The SDDGFP has completed a State Management Plan for bats and may be able to provide additional information and/or recommendations regarding this project. If you have not already done so, please contact Ms. Silka Kempema at the SDDGFP-Wildlife Division, Joe Foss Building, 523 East Capitol Avenue, Pierre, South Dakota 57501, Telephone No. (605) 773-2742, for more information.

As you are already aware, per the WAPA's previous discussions with Mr. Harris Hoistad of the Service's Huron Wetland Management District (WMD), the Service owns easement rights on a number of properties in the project area in addition to fee title ownership of a Waterfowl Production Area (WPA). The existence of the WPA and these easements in the project area is further indication of the high value for wildlife placed on this area by the Service. The Service currently has policy regarding placement of turbines on easements. We defer to the Huron WMD for actions that may impact easements or the WPA, but we anticipate being kept informed of these actions via continued contact with both the WAPA and the Service's Huron WMD.

If placement of the wind farm and associated facilities must occur within intact native grasslands, offsetting and/or mitigative measures should be considered to compensate for loss and fragmentation of wildlife habitat. Additionally, a mixture of native grasses and forbs typical of those found in this region should be planted to reclaim temporarily disturbed areas. Monitoring and contingency measures should be worked into reclamation plans to ensure that the native prairie is reestablished and that invasive weeds do not overtake disturbed sites.

The need for dust abatement is mentioned in your letter as well. The Service recommends the use of water or non-toxic, bio-degradeable substances for this purpose.

Although your letter did not mention a meteorological tower, it is our understanding that meteorological towers are often constructed in association with wind turbines and that these structures are often similar in design to typical communications towers: tall, lighted, lattice structured, and guyed. These types of towers can be problematic for birds that may fly into the light of the towers and may become reluctant to leave the lighted area, particularly during inclement weather. Mortality results as the birds circle the structure and collide with the guy wires or the lattice of the tower itself. We presume that meteorological tower(s) have already been established as part of the proposed project. We recommend review of the guidance set forth in "U.S. Fish and Wildlife Service Interim Guidelines for Recommendations on Communications Tower Siting, Constructions, Operation and Decommissioning," available on the internet at http://migratorybirds.fws.gov/issues/towers/comtow.html, and application of any retrofit measures possible to minimize the threat of avian mortality. If a need for any new towers arises, we encourage you to again refer to these guidelines.

As with towers, the above ground utilities proposed in association with this turbine project (overhead transmission lines and substation) pose the risk of collision mortality as well as electrocution of birds. Thousands of birds, including endangered species, are killed annually as they attempt to utilize overhead power lines or areas near power lines as nesting, hunting, resting, feeding, and sunning sites. Transmission lines are typically less problematic than distribution lines in terms of electrocutions due to their relatively larger size and spacing between conductive components, but transmission lines still pose a collision mortality risk. The proposed substation may also pose a risk of electrocutions.

We recommend the installation of underground, rather than overhead, power lines whenever possible and appropriate to minimize avian mortality and environmental disturbances. For all new above ground facilities, overhead lines or modernization of old overhead lines, we

recommend incorporating measures to prevent avian electrocutions and collisions. The publication entitled "Suggested Practices for Avian Protection on Power Lines - The State of the Art in 2006" has many good suggestions including pole extensions, modified positioning of live phase conductors and ground wires, placement of perch guards and elevated perches, elimination of cross arms, use of wood (not metal) braces, and installation of various insulating covers. You may obtain this publication by contacting the Edison Electric Institute on the internet via their website at www.eei.org or by calling 1-800-334-5453.

Additional information regarding simple, effective ways to prevent raptor electrocutions on power lines is available in video form. "Raptors at Risk" may be obtained by contacting EDM International, Inc. at 4001 Automation Way, Fort Collins, Colorado 80525-3479, Telephone No. (970) 204-4001, or by visiting their web site at http://www.edmlink.com/raptorvideo.htm.

We also recommend marking overhead lines in order to make them more visible to birds. Orange or yellow aviation balls are frequently used for this purpose. We encourage the use of yellow balls, preferably with a vertical black stripe around the center, as these have been shown to be most effective in preventing line strikes by birds. Most bird strikes occur at mid-span; thus, balls should be placed at least along the central portion of a span. For spans 50 meters or less, place one ball at the center of the span. For more information on bird strikes, please see "Mitigating Bird Collisions With Power Lines: The State of the Art in 1994" which may be obtained by contacting the Edison Electric Institute at the same web site and telephone number listed above.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

October 23, 2007

Mr. Nicholas J. Stas
Department of Energy
Western Area Power Administration
Upper Great Plains Region
P.O. Box 35800
Billings, Montana 59107-5800

Re: Formal Consultation, Wessington Springs Wind Project, Jerauld County, South Dakota

Dear Mr. Stas:

This letter acknowledges the U.S. Fish and Wildlife Service's (Service) August 23, 2007, receipt of your August 20, 2007, letter requesting initiation of formal section 7 consultation under the Endangered Species Act (ESA). The consultation concerns the possible effects of a proposed interconnection request for transmission to support a 51 megawatt (MW) wind farm by Babcock and Brown near Wessington Springs in Jerauld County, South Dakota, on the endangered whooping crane (Grus americana).

The Service has not received all of the information necessary to initiate formal consultation on the Wessington Springs wind farm as outlined in the regulations governing interagency consultations (50 CFR § 402.14).

One of the Service's responsibilities under 50 CFR § 402.14(g)(4) is to formulate a Biological Opinion (BO) as to whether the action taken, together with cumulative effects, is likely to jeopardize the continued existence of federally threatened and endangered species. Overhead power line collision mortality is known as the greatest threat to fledged whooping cranes, and it is suspected that wind farms and guyed communications towers may also pose a collision mortality risk. Wind farms, power lines, and communications towers are often established in remote areas; areas that may provide stopover habitat for whopping cranes during migration. If whooping cranes actually avoid utilizing wind farm areas entirely, significant losses of migration stopover habitat could occur. Transmission lines and towers are often established with these farms, posing additional collision risk.

We have information regarding the 200 mile-wide migration corridor of the whooping crane between the Aransas National Wildlife Refuge, Texas, and the Wood-Buffalo National Park in Northwest Territories/Alberta, Canada. Within this corridor, 94 percent of whooping crane migration sightings have been documented. We will provide you with that information and, in order to complete the initiation package, we will require from you the following information:

- Empirical data regarding the existing/proposed number and/or miles of overhead transmission and distribution lines, guyed communications towers, and wind farms which may pose a collision mortality risk to the Wood-Buffalo/Aransas flock of whooping cranes within their 200 mile-wide migration corridor.

- Empirical data regarding the acres of potential habitat that may be affected by established and proposed wind farms within the 200 mile-wide migration corridor.

Per 50 CFR § 402.14(c)(4), analysis of any cumulative effects should be included in the written request to initiate formal consultation. Also, 50 CFR § 402.14(c)(6) outlines the need for any other relevant information. While your Biological Assessment (BA) contained a brief overview of cumulative effects, it lacks the quantitative data defined above that is necessary to assess collision mortality risk to the whooping cranes of the Wood-Buffalo/Aransas population as a result of the establishment of this wind farm and other current and future structures on the landscape. Additionally, if whooping cranes are found to avoid wind farms completely, a significant exclusion from use of stopover habitat may occur, potentially adversely affecting the physiological health of migrating whooping cranes between their breeding and wintering areas. Without this information, adequate assessment of the cumulative risks posed to whooping cranes may not be possible within the time frames afforded by formal consultation procedures. Continued coordination, monitoring, and analysis regarding the effects of this project and others may be necessary to ascertain actual effects.

Please note that 50 CFR § 402.12(f) describes the recommended contents for BAs written by Federal agencies. These include an analysis of alternate actions considered by the Federal agency for the proposed action. While not necessarily a requirement of your BA, we recommend providing information in that document regarding alternatives to the current action, as proposed, and analysis of each alternative that clearly defines the necessity of the current proposal. The Service has, to date, been coordinating informally with the Western Area Power Administration (WAPA) and the applicant, Babcock and Brown, and we have indicated that the proposed wind farm site has high value in terms of wildlife use, including potential whooping crane stopover habitat. Site visits and reports by the applicant's environmental consultant support that assertion. The applicant has also made clear that the wind resource at the current proposed location and the economics associated with that resource have driven the current proposal; however, data to support that position has not been presented. We suggest that the WAPA and/or the applicant present specific details regarding the economic analysis of the proposed project versus other alternatives, particularly as related (but not limited) to alternate locations for the facility.

As per informal conversations with personnel from your office, we have learned that the WAPA may be amenable to undertaking a Population Viability Analysis (PVA) of the whooping crane to assist in determining what, if any, level of take of whooping cranes in the Wood-Buffalo/Aransas population might be incurred without reaching a jeopardy situation (where recovery of the whooping crane would be precluded). We would like to continue such discussions, keeping the possibility of a PVA open, although we are not currently requesting the WAPA to undertake this action.

Whooping cranes are large birds with low maneuverability. The Wood-Buffalo/Aransas population currently contains only 236 individuals and is the only self-sustaining migratory population of whooping cranes in existence. Significant data collection and analysis is necessary to determine the potential impacts of wind energy and other types of energy development on the whooping crane. This consultation may become the first formal consultation under the ESA that we are aware of regarding a wind farm related to the endangered whooping crane. It is critical to establish baseline information and carefully evaluate current and potential future impacts to

avoid jeopardizing this species' ability to achieve recovery. While we understand that compilation of a thoroughly complete data set of current/predicted mortality-risk structures on the landscape and current/future available stopover habitats may not be possible, it is prudent to make every effort to attain the best available information.

The formal consultation process for the project will not begin until we receive all of the necessary information or a statement explaining why that information cannot be made available. We will notify you when we receive this additional information; our notification letter will also outline the dates within which formal consultation should be complete and when the BO should be delivered on the proposed action.

If you have any questions or concerns about this consultation or the consultation process in general, please feel free to contact Natalie Gates of this office at (605) 224-8693, Extension 234.

Sincerely,

P Gober

Pete Gober
Field Supervisor
South Dakota Field Office

cc: USFWS/ES; Bismarck, ND
(Attention: Jeff Towner)
WAPA; Lakewood, CO
(Attention: Misti Schriner)

B0401.BL

AUG 20 2007

Mr. Pete Gober
U.S. Fish and Wildlife Service
420 S. Garfield
Pierre, SD 57501

SUBJECT: Biological Assessment for Babcock and Brown's proposed Wessington Springs Wind Project.

Dear Mr. Gober:

The Upper Great Plains Regional Office of the Western Area Power Administration (Western) has received an interconnection request for transmission to support a proposed 51 megawatt (MW) wind farm proposed for location in Jerauld County, South Dakota. Babcock and Brown's (Applicant) proposed Wessington Springs Wind Project (Project) is a 34 turbine wind farm proposed for location a few miles south of the town of Wessington Springs, South Dakota.

Western is the lead Federal agency for this proposed Project and has prepared the enclosed Biological Assessment in accordance with U.S. Fish and Wildlife Service regulations found at 50 CFR 402 for the following species:

Bald Eagle (*Haliaeetus leucocephalus*)	Threatened (delisted August 8, 2007)
Whooping Crane (*Grus Americana*)	Endangered

The Bald Eagle was delisted on August 8, 2007, but was included in the Biological Assessment in order to address concerns raised by the recent delisting and protection afforded by the Bald and Golden Eagle Protection Act. The proposed action may affect, but is not likely to adversely affect, the Bald Eagle.

Western has determined that the proposed action, as described in the Biological Assessment, may adversely affect the whooping crane. Western wishes to initiate formal consultation.

Please feel free to telephone me at (406) 247-7399.

Sincerely,

Nicholas J. Stas

Nicholas J. Stas
Environmental Manager

Enclosure

bcc:
M. Schriner A7400, Lakewood, CO
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B0402.BL

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APPENDIX D

Wildlife Species Observed During 2007 Site Visits and Field Surveys in the WSWP Area

Wildlife Species Observed During 2007 Site Visits and Field Surveys in the WSWP Area

Common Name	Scientific Name	Associated Habitat
Mammals		
Striped skunk	*Mephitis mephitis*	Mixed grass prairie, cropland
Birds		
Spotted towhee	*Pipilo maculatus*	Woody patches
Canada goose	*Branta canadensis*	Aquatic/wetland, cropland
Bufflehead	*Bucephala albeola*	Aquatic/wetland
Gadwall	*Anas strepera*	Aquatic/wetland
American wigeon	*Anas americana*	Aquatic/wetland
Mallard	*Anas platyrhynchos*	Aquatic/wetland
Blue-winged teal	*Anas discors*	Aquatic/wetland
Northern shoveler	*Anas clypeata*	Aquatic/wetland
Northern pintail	*Anas acuta*	Aquatic/wetland
Green-winged teal	*Anas carolinensis*	Aquatic/wetland
American bittern	*Botaurus lentiginosus*	Aquatic/wetland
Redhead	*Aythya americana*	Aquatic/wetland
Ruddy duck	*Oxyura jamaicensis*	Aquatic/wetland
Ring-necked pheasant	*Phasianus colchicus*	Mixed-grass prairie, cropland
Sharp-tailed grouse	*Tympanuchus phasianellus*	Mixed-grass prairie
Pied-billed grebe	*Podilymbus podiceps*	Aquatic/wetland
Barn swallow	*Hirundo rustica*	Mixed-grass prairie
Common grackle	*Quiscalus quiscula*	Aquatic/wetland, cropland, woody patched, mixed-grass prairie
Double-crested cormorant	*Phalacrocorax auritus*	Aquatic/wetland
Sandhill crane	*Grus canadensis*	Aquatic/wetland, cropland
Northern harrier	*Circus cyaneus*	Mixed-grass prairie, cropland
Cooper's hawk	*Accipiter cooperii*	Mixed-grass prairie, cropland
Red-tailed hawk	*Buteo jamaicensis*	Mixed-grass prairie, cropland
American kestrel	*Falco sparverius*	Mixed-grass prairie, cropland
Rough legged hawk	*Buteo lagopus*	Mixed-grass prairie, cropland
Turkey vulture	*Cathartes aura*	Mixed-grass prairie, cropland, woody patches

Wildlife Species Observed During 2007 (continued)

Common Name	Scientific Name	Associated Habitat
Snow goose	*Chen caerulescens*	Aquatic/wetland, cropland
Eastern bluebird	*Sialia sialis*	Mixed-grass prairie, cropland
Sora	*Porzana carolina*	Aquatic/wetland
American coot	*Fulica americana*	Aquatic/wetland
Killdeer	*Charadrius vociferus*	Aquatic/wetland, mixed-grass prairie
Lesser scaup	*Aythya affinis*	Aquatic/wetland, mixed-grass prairie
Upland sandpiper	*Bartramia longicauda*	Mixed-grass prairie
Marbled godwit	*Limosa fedoa*	Aquatic/wetland
Wilson's phalarope	*Phalaropus tricolor*	Aquatic/wetland
Orchard oriole	*Icterus spurius*	Woody patch edges
Mourning dove	*Zenaida macroura*	Mixed-grass prairie, cropland
Tree swallow	*Tachycineta bicolor*	Mixed-grass prairie, cropland, wetland
Great horned owl	*Bubo virginianus*	Woody patches
Common nighthawk	*Chordeiles minor*	Mixed-grass prairie
Vesper sparrow	*Pooecetes gramineus*	Mixed-grass prairie
Northern flicker	*Colaptes auratus*	Woody patches
Brewer's blackbird	*Euphagus cyanocephalus*	Mixed-grass prairie, woody patches, cropland
Eastern kingbird	*Tyrannus tyrannus*	Mixed-grass prairie, woody patches
European starling	*Sturnus vulgaris*	Cropland
Common redpoll	*Carduelis flammea*	Mixed-grass prairie (winter), woody patches
California gull	*Larus californicus*	Aquatic/wetland, cropland
American crow	*Corvus brachyrhynchos*	Mixed-grass prairie, woody patches, cropland
Horned lark	*Eremophila alpestris*	Mixed-grass prairie
American robin	*Turdus migratorius*	Mixed-grass prairie
Yellow warbler	*Dendroica petechia*	Woody patches
California gull	*Larus californicus*	Aquatic/wetland, cropland

Wildlife Species Observed During 2007 (continued)

Common Name	Scientific Name	Associated Habitat
American crow	*Corvus brachyrhynchos*	Mixed-grass prairie, woody patches, cropland
Horned lark	*Eremophila alpestris*	Mixed-grass prairie
American robin	*Turdus migratorius*	Mixed-grass prairie
Yellow warbler	*Dendroica petechia*	Woody patches
Common yellow throat	*Geothlypis trichas*	Aquatic/wetland
Grasshopper sparrow	*Ammodramus savannarum*	Mixed-grass prairie
Bobolink	*Dolichonyx oryzivorus*	Mixed-grass prairie, cropland
Red-winged blackbird	*Agelaius phoeniceus*	Aquatic/wetland
Western meadowlark	*Sturnella neglecta*	Mixed-grass prairie, cropland
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	Aquatic/wetland
American goldfinch	*Carduelis tristis*	Mixed-grass prairie, cropland
House sparrow	*Passer domesticus*	Cropland
Brown headed cowbird	*Molothrus ater*	Woody patches, cropland

Sources: WEST 2007b, USFWS 2007, SDGFP 2007; Kempema, personal communication 2007