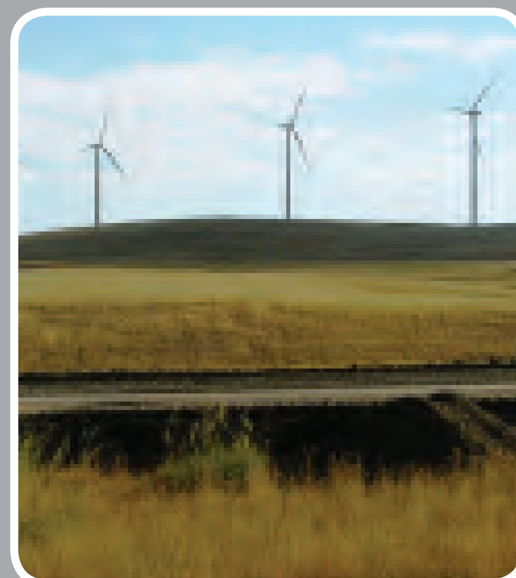
Draft Environmental Impact Statement



Hermosa West Wind Energy Project

DOE/EIS-0438

U.S. Department of Energy–Western Area Power Administration

ShellWind Energy

September 2012

COVER SHEET

LEAD FEDERAL AGENCY: U.S. Department of Energy (DOE), Western Area Power Administration (Western)

COOPERATING AGENCY: Wyoming Industrial Siting Division (WYISD)

TITLE: Hermosa West Wind Energy Project, DOE/EIS-0438

LOCATION: Albany County, Wyoming

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ABSTRACT: ShellWind Energy (SWE), a wholly owned subsidiary of Shell Oil Company, is proposing to construct a commercial, utility-scale wind energy generation facility that would be located near Tie Siding, Wyoming, in Albany County. At full build-out, the Hermosa West Wind Energy Project (Project) would include up to 200 wind turbines with a combined generating capacity of up to 300 megawatts (MW) of renewable energy. The wind turbines would be configured along 11 strings, oriented north to south to capture prevailing winds on an 11,125-acre site. In addition to the turbines, other proposed Project facilities would include all-weather access roads, underground power collection lines linking turbines to the Project substation, the Project substation and switchyard, a short (approximately 0.3-mile) high-voltage gen-tie line linking the Project substation to Western's transmission system, a low voltage distribution line, operation and maintenance facilities, backup power for the 345-kilovolt substation/switchyard site, supervisory control and data acquisition equipment and metering equipment, and up to four permanent meteorological towers. The proposed Project would be located on private and state land; no federally-managed land would be affected.

Western's purpose and need is to consider SWE's interconnection request under its Open Access Transmission Service Tariff (Tariff), which is compliant with Federal Energy Regulatory Commission's Order No. 888 establishing open access to power transmission systems (18 CFR Parts 35 and 385). Under the Tariff, Western must either approve or deny the interconnection request.

Western's decision to approve or deny the interconnection request, and to construct an interconnection facility (switchyard) financed by SWE for operational control of the interconnection is considered a major Federal action subject to NEPA, Council on Environmental Quality (CEQ) regulations for implementing NEPA, and DOE NEPA Implementing Procedures (40 CFR Parts 1500−1508, 10 CFR Part 1021). This environmental impact statement (EIS) is prepared in accordance with NEPA requirements to analyze the potential effects to the natural and human environments associated with approving or denying the interconnection request. As part of the analysis, Western is disclosing the potential effects to the natural and human environments resulting from SWE's proposed Project. This EIS analysis also includes a federal "No Action" alternative under which Western would not consider an interconnection agreement with SWE and the proposed Project would not be constructed and interconnected with Western's transmission system.

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ABBREVIATIONS AND ACRONYMS

§	Section
°F	degrees Fahrenheit
μg/m^3	micrograms per cubic meter
˚C	degrees Celsius
AADT	annual average daily traffic
AQD	Air Quality Division
AWEA	American Wind Energy Association
BA	Biological Assessment
bgs	below ground surface
BGEPA	Bald and Golden Eagle Protection Act
BLM	U.S. Bureau of Land Management
BMP	Best Management Practice
CAA	Clean Air Act
CDOT	Colorado Department of Transportation
CDOW	Colorado Division of Wildlife
CERCLA	Comprehensive Environmental Response, Compensation, and Recovery Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CO	carbon monoxide
CO2e	carbon dioxide-equivalent
CR	county road
CSU	Colorado State University
CWA	Clean Water Act
dBA	decibels, A-weighted
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
ECP	Eagle Conservation Plan
EIS	Environmental Impact Statement
EMF	electric magnetic fields
EMS	emergency medical service
EO	Executive Order

ESA	Environmental Site Assessment
FAA	Federal Aviation Administration
FC	federal candidate
FE	federally endangered
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
FT	federally threatened
FY	fiscal year
gen-tie	generation tie
GIS	Geographic Information System
Hazcom	Hazard Communication
HMA	Hunter Management Area
HSSE	Health, Safety, Security, and Environment
Hz	Hertz
I-25	Interstate 25
I-80	Interstate 80
IEC	International Electrotechnical Commission
kHz	kilohertz
KOP	key observation point
kV	kilovolt
Ldn	day-night sound level
Leq	equivalent sound level
LGIA	Large Generator Interconnection Agreement
LGIP	Large Generator Interconnection Procedures
LOS	level of service
m/s	meters per second
MBTA	Migratory Bird Treaty Act
mph	miles per hour
MW	megawatts
NAAQS	National Ambient Air Quality Standards
NASS	National Agricultural Statistics Service
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act of 1966

NO	nitric oxide
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NSS	native species status
NTIA	National Telecommunications and Information Administration
NWP	nationwide permit
NWR	National Wildlife Refuge
NWS	National Weather Service
OHV	off-highway vehicle
OSHA	Occupational Safety and Health Administration
PAA	public access area
PEM	palustrine emergent wetlands
PGA	priority growth area
PM_{10}	particulate matter of 10 microns or less
$PM_{2.5}$	particulate matter of 2.5 microns or less
ppm	parts per million
Project	Hermosa West Wind Energy Project
PRPA	Paleontological Resource Preservation Act
PSD	Prevention of Significant Deterioration
Reclamation	U.S. Bureau of Reclamation
ROW	right-of-way
RPS	renewable portfolio standard
RSH	rotor sweep height
RV	recreational vehicle
SEO	State Engineer’s Office
SGIA	Small Generator Interconnection Agreement
SGIP	Small Generator Interconnection Procedures

SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SO_x	sulfur oxide
SPCCP	Spill Prevention, Control and Countermeasure Plan
SPL	sound pressure level
SSC	species of special concern
SWA	State Wildlife Area
SWAP	State Wildlife Action Plan
SWE	Shell Wind Energy, Inc.
SWPPP	Stormwater Pollution Prevention Plan
Tariff	Open Access Transmission Service Tariff
TCP	traditional cultural properties
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
TNW	traditional navigable waters
UGA	Urban Growth Area
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
VRM	Visual Resource Management
WECS	Wind Energy Conversion System
Western	Western Area Power Administration
WGFD	Wyoming Game and Fish Department
WHMA	Wildlife Habitat Management Area
WIA	Walk-In Area
WISA	Wyoming Industrial Siting Act
WISC	Wyoming Industrial Siting Council
W.S.	Wyoming Stature

WSGALT	Wyoming Stock Growers Agricultural Land Trust
WY 130	Wyoming State Highway 130
WY 230	Wyoming State Highway 230
WYCRO	Wyoming Cultural Resource Office
WYDEQ	Wyoming Department of Environmental Quality
WYDOT	Wyoming Department of Transportation

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EXECUTIVE SUMMARY

Project Description

Shell WindEnergy (SWE) is proposing to construct a commercial, utility-scale wind energy generation facility that would be located near Tie Siding, Wyoming, in Albany County (figure ES-1). At full-build out, the Hermosa West Wind Energy Project (proposed Project) would include up to 200 wind turbines with a combined generating capacity of up to 300 megawatts (MW) of renewable energy. The wind turbines would be configured along 11 strings, or lines, oriented north to south to capture prevailing winds on an 11,125-acre site. The total number of wind turbines would be determined by the wind turbine model selected and by market conditions for the electricity generated by the proposed Project.

SWE has applied to interconnect the proposed Project with the existing Craig to Ault 345-kilovolt (kV) transmission line jointly owned by Western Area Power Administration (Western), Tri-State Generation and Transmission Association, and Platte River Power Authority. The Craig to Ault 345-kV transmission line bisects the proposed Project site.

In addition to the wind turbines, other proposed Project facilities would include the following:

- All-weather access roads to each wind turbine location
- Underground power collection lines linking the wind turbines to the Project substation
- Project substation
- Western switchyard collocated with the Project substation
- Approximately 0.3-mile-long overhead gen-tie line connecting the substation and switchyard to the existing 345-kV transmission line
- Approximately 1-mile-long low-voltage electric distribution line from the local utility company for daily operations
- Operation and maintenance facilities
- Supervisory control and data acquisition and metering equipment
- Up to four permanent meteorological towers

SWE has proposed the Project to respond to increasing market demand for sources of renewable energy, including wind-generated electricity. The renewable portfolio standards (RPSs) in 35 states, including neighboring Colorado, establish numeric goals for the amount of electricity produced by renewable energy sources. RPSs create a need for additional renewable energy capacity in the Rocky Mountain region to serve future load growth demands while meeting state-mandated RPSs. SWE's proposed Project is complementary to Wyoming's renewable energy generation strategies and satisfies future load and regional RPS requirements.

Western's Purpose and Need

SWE requests to interconnect its proposed Project with the existing Craig to Ault 345-kV transmission line so that electricity generated by the Project can reach the market (figure ES-1).

Western's purpose and need is to act on SWE's interconnection request. Western must consider the interconnection request under its Open Access Transmission Service Tariff (Tariff), which is compliant with Federal Energy Regulatory Commission's Order No. 888 establishing open access to power transmission systems (18 CFR Parts 35 and 385). Under the Tariff, Western must either approve or deny the interconnection request.

Western's action on the interconnection request is considered a major Federal action subject to National Environmental Policy Act (NEPA), in accordance with Council on Environmental Quality (CEQ) regulations for implementing NEPA, and DOE NEPA Implementing Procedures (40 CFR Parts 1500−1508, 10 CFR Part 1021). This environmental impact statement (EIS) is prepared in accordance with NEPA requirements to analyze the potential effects to the natural and human environments associated with approving or denying the interconnection request. As part of the analysis, Western is disclosing the potential effects to the natural and human environments resulting from SWE's proposed Project.

Proposed Federal Action

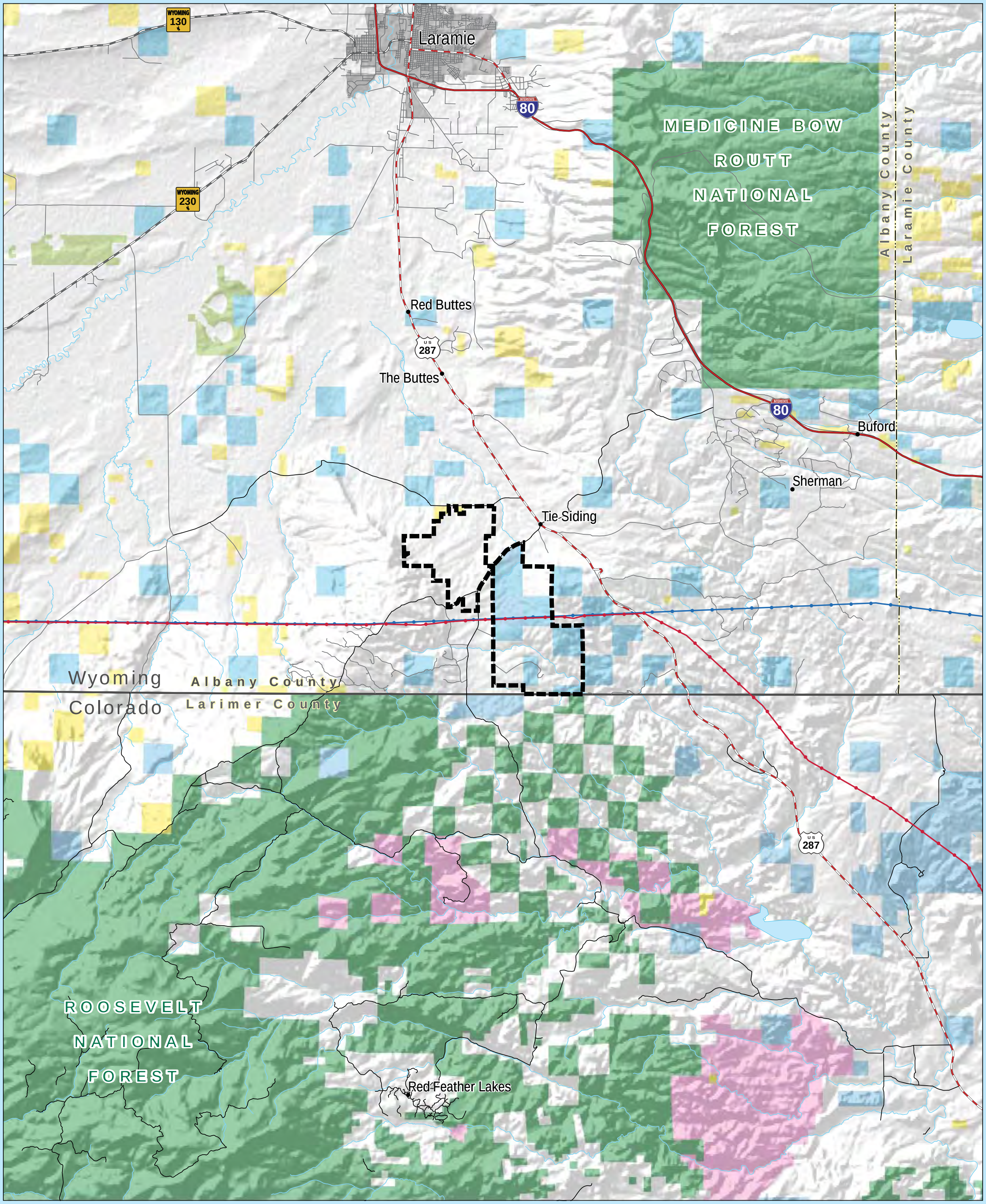
The proposed Federal action is to approve SWE's interconnection request. Western determined that an EIS would be the appropriate level of environmental analysis for the proposed Project under NEPA.

The proposed Federal action is distinct from SWE's proposal to construct a wind energy project. Western's proposed Federal action is limited to consideration of the interconnection request submitted by SWE, and the associated system upgrades that would be required. Western is analyzing the potential environmental effects of SWE's proposed Project in the EIS to fully disclose the activities and impacts associated with the interconnection request. SWE could construct the proposed Project regardless of Western's involvement. In that situation, SWE would seek alternative transmission opportunities. This scenario will not be analyzed in this EIS, as in that case there would be no Western proposed Federal action to address under NEPA.

Western would require transmission system modifications to accommodate the interconnection request, which would be financed by SWE. SWE also would finance approximately $8,918,878 for a Western-operated switchyard, an approximately 0.3-mile-long overhead gen-tie line connecting the Project substation and switchyard to the existing 345-kV transmission line, and associated equipment (see Appendix B). The switchyard would be operated by Western to transfer and manage power between the Project substation and the 345-kV transmission line. Western would operate the switchyard remotely from the agency's Loveland, Colorado Operations Center.

Federal No Action Alternative

Under the Federal no action alternative, Western would not consider an interconnection agreement with SWE and the proposed Project would not be constructed and interconnected with Western's transmission system. Western's determination not to approve the interconnection agreement could make SWE's proposed Project infeasible. SWE could however, continue to pursue their proposed Project by applying for interconnection with another



Project Site

Hermosa West Wind Energy Project

Jurisdiction

- Bureau of Land Management
- U.S. Forest Service
- State Land
- Colorado Division of Wildlife
- Wyoming Fish and Wildlife
- Municipality

Transmission

- 230-kV Transmission Line
- 345-kV Transmission Line

0 1.5 3 Miles

Scale 1:98,213 when printed at 22"X34".

Revised: November 2, 2010
File Name: project_site
MXD: P:\4004_Shell_Hermosa_West\GIS\Layouts\chapter_1
PDF: P:\4004_Shell_Hermosa_West\GIS\Maps\chapter_1
Sources: ESRI, Western, BTS, WyGISC, USGS

Vicinity Map

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transmission provider in the vicinity, although Western cannot speculate on whether access to alternative transmission is a technically and economically feasible option for SWE. The electrical generation capacity of the proposed Project could change depending on the transmission capacity of an alternative transmission provider, and other factors could make the Project infeasible. However, for the purposes of this EIS, which discusses the potential impacts of Western's decision, the no action alternative is considered to result in the Project not being constructed and the environmental impacts associated with the Project not occurring.

For the purposes of this EIS, the term "no action alternative" applies to the interconnection agreement associated with the proposed Federal action and the "no Project option" applies to SWE's proposed Project. This interpretation of the no action alternative and no Project option will allow Western to provide a meaningful analysis of environmental impacts based on the comparison of Western's proposed Federal action and SWE's proposed Project to existing baseline conditions.

Public Involvement Activities

As part of its public involvement activities for the EIS, Western identified a diverse set of stakeholders to ensure adequate public outreach and to gather input from a variety of perspectives. Specifically, Western conducted outreach to the six groups of stakeholders listed below.

1. Federally recognized Indian tribes
2. Landowners within the Project area footprint and within 3 miles of the proposed Project lease boundary
3. Nongovernment organizations
4. Interested parties
5. Federal, State, and local agencies, and elected officials

Public scoping meetings were held for the proposed Project on January 26, 2010, in Cheyenne, Wyoming, and January 27, 2010, in Laramie, Wyoming. One hundred fifty-four individuals signed in at the public scoping meetings. One hundred twenty-eight individual public comments were submitted at the public scoping meetings or afterward, with submissions directly to Western and SWE by mail, email, phone, or through the Project website: http://www.wapa.gov/transmission/hermosawest.htm. As a result of a request by the property owners at Fish Creek Ranch, a low-density development of home sites west of the proposed Project site, representatives from Western and SWE and their contractors conducted a half-day field visit to Fish Creek Ranch on June 24, 2010, to meet with the property owners and hear their concerns, primarily regarding potential impacts to their viewshed and property values. Substantive comments received during public scoping are summarized in the Public Scoping Report (Western 2010c) prepared for the Project, in table 1.10-1 of this EIS, and are addressed in individual resource sections in the EIS.

Western conducted agency consultations for the proposed Project with the Wyoming State Historic Preservation Office, U.S. Fish and Wildlife Service (USFWS), and Bureau of Indian

Affairs. SWE and/or Western met with or discussed the Project with the Albany County Department of Planning, City of Laramie officials, Wyoming Department of Environmental Quality, Wyoming Department of State Parks and Cultural Resources, Wyoming Game and Fish Department (WGFD), Wyoming State Historic Preservation Office, Wyoming Industrial Siting Division, and USFWS. Recommendations from those agencies factored into the analyses conducted for individual resources in the EIS.

Project Site

The proposed Project site has some of the strongest wind resources in the United States. The DOE's National Renewable Energy Laboratory assigns the area one of the highest wind density classifications in the County, ranging from "good" to "superb" (NREL 2009). SWE's analysis of wind data collected onsite indicates that mean representative wind speeds on the proposed Project site range from 19 miles per hour (mph) to 22 mph as measured at an altitude of 262 feet. Mean representative wind speeds peak at approximately 29 mph to 32 mph from November through February and remain high through the spring (wind turbines would typically cut-in, or begin operations, at a wind speed of 9 mph). During the warmer months of July through October, mean representative wind speeds are more typically in the range of 13 mph to 17 mph.

The proposed Project site was selected by SWE because it maximizes the environmental and physical criteria listed below:

- Provide utility-scale wind resources—area of "good" to "superb" high wind density classification
- Avoid sage grouse habitat
- Avoid FAA facilities and flight paths
- Provide sufficient contiguous land area to scale the proposed Project up to 300 MW
- Provide existing high-voltage transmission lines to transport power generated by the proposed Project
- Provide existing transportation infrastructure for delivery of wind turbines, construction materials, and equipment
- Located near a market for the power generated by the proposed Project
- Landowners interested in leasing the land for a wind energy facility

The proposed Project site is located in southeastern Albany County, Wyoming, at an elevation of approximately 7,700 feet. It is 18 miles south of Laramie, Wyoming, and 47 miles north of Fort Collins, Colorado. U.S. Highway 287, the small town of Tie Siding, Wyoming, and the Union Pacific Railroad are immediately east of the proposed Project site. Boulder Ridge, with a maximum elevation of 8,500 feet is immediately west of the proposed Project site. Larimer County, Colorado, and the Arapaho-Roosevelt National Forest are immediately south of the proposed Project site. The area north of the proposed Project site is largely open range consisting of grazing and residential development, light industry, and natural areas from the proposed Project boundary all the way to Laramie, Wyoming.

The proposed Project site contains primarily grassland and rangeland used for cattle grazing. The site would be leased from four individual landowners, including the State of Wyoming. SWE has obtained lease agreements for the site from each of the landowners, including the State of Wyoming.

Permanent facilities supporting the proposed Project would affect approximately 140 acres of land, or 1 percent of the total 11,125 acres. Temporary disturbances during construction would affect approximately 409 acres of land, or 3.7 percent of the total acreage.

The analysis conducted for the EIS assists in understanding the Project setting and determining potential effects from the proposed Project to the natural and human environments. Throughout the EIS, a distinction is made between the proposed Project site and the study area. The terms are defined as follows:

> Project site—the 11,125-acre footprint of land leased for the proposed Project in southeastern Albany County, Wyoming
>
> Study area—the area studied resource-by-resource beyond the boundary of the 11,125-acre footprint. The study area varies by resource because its extent depends on the distance away from the site necessary to adequately describe the resource.

Proposed Construction Activities

Schedule

Construction of the proposed Project would occur over approximately 26 months. The in-service date of the proposed Project is estimated to be December 2015. The outdoor construction season is weather-dependent, but generally is considered to be from March to November, with demobilization of outdoor work in November. Interior work on the wind turbines and finishing work on the operations and maintenance building and substation could continue during the winter months. The construction schedule would take into account any construction restrictions for sensitive wildlife species requested by the USFWS or WGFD.

Equipment

Heavy vehicle traffic would be expected on the Project site during construction. Dump trucks, for example, would be needed to move soil and aggregate. Concrete trucks would be needed for wind turbine foundations and other facilities. Water tankers would be needed to wet down roadways for dust control. The crane needed for wind turbine installation would be assembled at the first wind turbine site and then would be “walked” to subsequent wind turbine sites along the Project access roads. Where the road cannot be built within the tolerances required for walking the crane, the crane would be disassembled, moved to the next wind turbine site, and reassembled.

Pre-Construction Activities

Project materials such as the wind turbines, substation equipment, and pre-engineered operation and maintenance building, would be obtained from individual manufacturers. Materials and services needed to support Project construction would be obtained locally to the extent possible, including concrete used for wind turbine and other foundations, aggregate used as backfill, grading and earthmoving, road construction, and water used for dust suppression.

Three material laydown areas are planned for the proposed Project site where construction materials can be delivered and stored. Each material laydown area would be approximately 15 acres in size. Rather than deliver wind turbine components to the material laydown areas, those components would be trucked directly to each wind turbine site for installation, unless weather, road construction, or crew availability requires off-loading in the material laydown area. Likewise, materials needed to construct the electrical collection system, substation and switchyard, and operation and maintenance building would be off-loaded at their intended sites wherever possible.

Construction personnel would first survey and stake the proposed Project site to identify exact locations for facilities, including access roads and wind turbine locations. Wherever possible, existing disturbances would be used for new access roads. The wind turbines would be sited within 250- or 400-foot-wide wind turbine corridors analyzed in this EIS for environmental impacts, or would be within other identified areas also studied. Post-construction access roads would be 16 feet wide. The sites would be cleared, graded, and finished, as appropriate, with a base of aggregate 6 to 12 inches thick. Permanent access roads would be needed for access to the wind turbines, meteorological towers, substation and switchyard, and the operations and maintenance building. The access roads would also support temporary facilities associated with construction such as the construction office area, construction parking, and material laydown areas.

The majority of the proposed Project site would remain open to public access. For safety and security, permanent chain-link fencing would be installed at the O&M building, substation and switchyard, and storage area, and at additional areas where security or theft might be a concern.

Wind Turbine Installation

SWE has not selected the specific wind turbine model for the Project. Selection of a turbine will depend on final Project specifications, price, and availability from the manufacturer. The construction area around each wind turbine site would be approximately 20,000 square feet.

Wind turbine installation requires specialized crews and equipment, typically provided by the wind turbine manufacturer. Wind turbine components arriving at the Project site would be routed to the designated wind turbine site for installation on a prepared foundation as soon as possible to avoid or minimize the amount of time the equipment was on the ground. Once the foundation is poured, wind turbine towers, generally consisting of three to four sections, would be installed. Once the tower sections were complete, the nacelle would be lifted by crane and secured to the top of the tower. Necessary hydraulic and electrical connections then would be made to the rotor hub and blades, and the rotor hub and blade assemblage would be attached to the nacelle. Installing an individual wind turbine typically requires 6 days with good visibility and low winds.

Substation and Switchyard

The wind turbines would be connected by an underground electrical collection system to deliver power from individual wind turbines to the Project substation. Electrical collection system cables would be buried in 36- to 48-inch deep excavated trenches. Trenching for the electrical collection system would follow roads and disturbed areas wherever possible to minimize new areas of disturbance.

The electrical collection system would enter the Project substation underground. It then would transition to an overhead substation buswork. The Project substation would increase (“step up”) the voltage from the electrical collection system from 34.5-kV to 345-kV to interconnect it with Western’s 345-kV transmission line. Interconnecting the substation with Western’s 345-kV switchyard would require an approximately 5-acre site to allow for transfer and operational control of electricity from the Project to the Western transmission line. The Project substation and Western’s switchyard would be collocated on an approximately 10-acre site. The 0.3-mile-long 345-kV overhead gen-tie line connecting the Project substation to Western’s 345-kV transmission line would be a single steel pole or wooden H-frame configuration.

Additional Structures

The Project would require an onsite operation and maintenance building. The building would be approximately 5,000 to 8,000 square feet. It would be located on an approximately 2-acre site at the intersection of Cherokee Park Road and Boulder Ridge Road. Up to four permanent self-supporting meteorological towers approximately 256 feet tall would be operated on the Project site to measure wind speed, wind direction, barometric pressure, humidity, and temperature for optimal management of the wind turbines.

Reclamation

Once construction was complete, all equipment and structures not required for Project operation would be demobilized and removed. Areas disturbed by construction activities would be reclaimed. Specifically, fill material would be used to return contours on the Project site to near pre-construction conditions based on survey work. Disturbed vegetation would be revegetated using a weed-free, drought-tolerant native seed mixture in coordination with the landowner and Albany County. Revegetated areas would be monitored to ensure that vegetation was established and revegetated as needed to achieve a minimum of 70 percent vegetative cover. Control for noxious weeds would continue onsite during the lifetime of the Project. Project roads would be reduced in width and shoulders restored.

SWE will work with the Wyoming Office of State Lands and the Wyoming Industrial Siting Council to develop a reclamation plan and financial assurance, in accordance with applicable regulations. Reclamation efforts on state lands will be in accordance with section 3.8 and Article 11 of the Wyoming Wind Energy Lease Agreement. Financial assurance would be in place prior to construction in accordance with the Rules and Regulations of the Industrial Siting Council Chapter 1 Section 10(d).

Operation and Maintenance

SWE's operation and maintenance facility would be permanently staffed during normal business hours with a combination of approximately 20 to 40 workers from SWE and contractors from the wind turbine manufacturer. There would be an additional 20 to 30 seasonal and service-specific workers for items such avian monitoring, electrical services, and snow plowing. Wind turbines, however, generally operate automatically without the need for centralized plant operators. Onsite staff would monitor the performance of the wind turbines but would only initiate manual control of the wind turbines when needed for maintenance, troubleshooting, and for other purposes. Staff periodically would analyze meteorological data and performance trends for the wind turbines and associated facilities to determine the overall efficiency of the operation. It is possible some scheduled maintenance activities would be added or adjusted to improve the performance of the operation. Staff would have specific training regarding safe work on wind turbines, and the specific tasks necessary to provide both scheduled and unscheduled wind turbine maintenance.

Staff also would drive the Project site frequently to conduct a visual inspection of the operation, including wind turbines, road conditions, fencing, other infrastructure, and any incidences of waste disposal or vandalism. The purpose of the inspections would be to identify problems requiring maintenance or attention. Individual Project components, including the Project substation, would be inspected on a daily, weekly, or monthly basis, as required by that equipment. The schedule would be part of the Operation and Maintenance Plan.

Road maintenance would be performed on an as-needed basis. Regular snow removal would occur during the winter months to maintain access to the wind turbines, substation, and operation and maintenance building. Care would be taken in siting the operation and maintenance building to avoid contributing to snow drifting on Boulder Ridge Road. Grading and blading would be performed in the spring to remove vehicle ruts. Similar surface work may be needed after heavy rainfall or unusually heavy maintenance traffic. Culverts, drains, and other water management features would be kept clear to allow for natural water flows.

Decommissioning

The Project would have an estimated 20-year life based on the useful life of the wind turbines. After that time, SWE would evaluate the continued operation of the Project and either would upgrade and re-power the facility in accordance with renegotiated leases with landowners, or decommission it. If the Project was decommissioned, the goal of decommissioning would be to remove the power generation equipment and return the site to a condition as close to its pre-construction state as possible. Major activities required for decommissioning would typically occur in reverse order to construction. As part of the permitting process with the state of Wyoming, SWE would coordinate with the Wyoming Industrial Siting Division to develop a decommissioning plan that is acceptable to the agencies involved in the permitting process.

Project Setting

The existing Project setting and natural environment are described in detail, by resource, in chapter 3.0 of the EIS. The description below provides a summary of characteristics regarding the proposed Project site and study area for the following resource categories:

- Land Use
- Biological Resources (including general wildlife, special status species, water, wetlands, floodplains, and vegetation)
- Cultural Resources and Native American Concerns
- Paleontology
- Noise
- Visual Resources
- Air Quality
- Transportation
- Recreational Resources
- Socioeconomics
- Environmental Justice
- Agriculture
- Geology and Soils
- Hazardous Materials

Health and Safety

The Project setting consists primarily of non-irrigated ranchland along the eastern edge of the Laramie Basin. The Laramie Basin is a gently sloping valley between 7,100 and 7,900 feet in elevation, characterized by low rolling hills and nearly flat floodplains. The dominant vegetation in the region is mixed-grass prairie, rabbitbrush, and shrubland. The low mountain ridges and rugged hills surrounding the Laramie Basin contain a mix of aspen, lodgepole pine, Douglas fir, and ponderosa pine. In general, the landscape is open and expansive. The primary land use is seasonal livestock grazing.

The proposed Project site is immediately bounded on the eastern side by U.S. Highway 287 and the small town of Tie Siding, Wyoming, on the western side by scattered residential development on Boulder Ridge, on the southern side by portions of Roosevelt National Forest in Colorado, and on the northern side by Sportsman Lake Road and continued mixed-grass prairie and shrubland. Two parallel high-voltage transmission lines (the 345-kV transmission line and an adjacent 230-kV Western transmission line), communication towers, a rural home site, unpaved roads, barbed-wire fences, snow fences, and various outbuildings related to ranching are located on the proposed Project site and immediate surroundings.

Named surface waters traversing the proposed Project site include Boulder Creek, Fish Creek, Forest Creek, Government Creek, Grant Creek, and Willow Creek. None of the streams are high relief, broad, or deep systems. No water quality stations are located in the study area, but University of Wyoming, U.S. Forest Service, and Wyoming Department of Environmental Quality assessments indicate that the majority of the streams in the study area are meeting their aquatic life uses (WDEQ 2010). Nine palustrine emergent wetlands, affecting approximately 6 acres of land, were identified within the surveyed portion of the proposed Project site (2010h). One of the nine wetlands identified is identified as an isolated wetland. The others were associated with stream corridors.

Wildlife common throughout the study area include large-, medium-, and small-sized mammals; raptors; passerine birds; fish; amphibians; and reptiles. The study area encompasses suitable habitat for a diverse assemblage of terrestrial and aquatic wildlife species, including seven species listed under the Endangered Species Act. The Project area is not located within any big game crucial winter range or identified parturition areas (ERM 2010f). Two species of bat, hoary and eastern red bats, were positively identified within the study area (WEST 2010a). Ten species of raptors were observed during baseline bird surveys (WEST 2010b, 2011). Nine federally listed wildlife species occur within Albany County, and additional wildlife species listed by the state as species of special concern potentially occur within the study area, but not necessarily on the proposed Project site based on the results of field surveys for suitable habitat (ERM 2010a, 2010b).

The population of Albany County, Wyoming, was approximately 32,553, according to the most recent census data (BSR 2010). Major employers are located in Laramie, Wyoming and consist of the University of Wyoming, Albany County Schools, City of Laramie, and the local hospital, Wal-Mart, and shopping center (BSR 2010). Forty-three percent of households earn less than $35,000 per year (BSR 2010).

Environmental Effects

Chapter 3 of the EIS discusses existing baseline conditions for the proposed Project site and study area. Chapter 4 of the EIS discusses potential environmental effects associated with construction, operation, maintenance, and decommissioning of the proposed Project across the following resource categories:

- Land Use
- Biological Resources (including general wildlife, special status species, water, wetlands, floodplains, and vegetation)
- Cultural Resources and Native American Concerns
- Paleontology
- Noise
- Visual Resources
- Air Quality
- Transportation
- Recreational Resources
- Socioeconomics
- Environmental Justice
- Agriculture
- Geology and Soils

- Hazardous Materials
- Health and Safety

40 CFR Part 1508.20 defines mitigation to include:

> *(a) Avoiding the impact altogether by not taking a certain action or parts of an action.*
>
> *(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.*
>
> *(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.*
>
> *(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.*
>
> *(e) Compensating for the impact by replacing or providing substitute resources or environments.*

Best management practices (BMPs) are state-of-the-art measures and industry standards applied on a site-specific basis to reduce, prevent, or avoid adverse environmental or social impacts (BLM 2009). SWE and Western have made a commitment to apply BMPs as listed in table 2.6-1, as part of the Project design and, therefore, prior to impacts analysis. Implementation of these BMPs would serve to avoid or minimize potential effects from the Project to resources in the natural and human environments.

SWE would apply BMPs including industry standards during the construction, operation and maintenance, and decommissioning of the proposed Project components.

Various agencies have regulatory oversight for the implementation of SWE's proposed mitigation measures that are described by issue area in chapter 4 (and listed in table 4.1-1), including Federal, State, and local jurisdictions as the result of Project approvals they may grant.

In addition, Western maintains standard practices for constructing and modifying transmission lines and substations. These standard practices would be followed for any system modifications performed at Western facilities for the proposed Federal action. Additional requirements for BMPs would be imposed by Western as part of its contracting requirements, per Western's Construction Standard 13, and would be implemented as appropriate given site conditions.

Western's Proposed Action

The impacts of Western's proposed Federal action are expected to be minor given the small footprint of the proposed interconnection facilities. Western's proposed Federal action consists of 10 acres of permanent disturbance and 2.8 acres of temporary disturbance, whereas, SWE's proposed Project consists of 140 acres of permanent disturbance and 409 acres of temporary disturbance. The impact analysis in table ES-1, below, provides a summary of potential impacts as they relate to all of the issue areas analyzed in this EIS. Western would comply with those mitigation measures applicable to its much smaller action as well as those listed in chapter 2 of the EIS. Western would also comply with the agency's Construction Standard 13. Table ES-1 provides a list of the resources analyzed, the anticipated level of impact after mitigation measures are implemented, and the mitigation measures that are proposed to be implemented.

Adverse effects associated with the proposed Project are anticipated to be short-term and largely associated with construction and decommissioning activities. With the exception of visual resources, no adverse long-term effects are anticipated from the proposed Project based on the analysis conducted for this EIS, documented in chapter 4, and summarized in table ES-1. Based on the methods employed for the visual resource analysis, the assessment resulted in identification of visual impacts that were characterized as moderate. The numbers of highly sensitive viewers affected at each key observation point (KOP) are few, which lessens the overall impact levels determined through the analysis process used for this EIS. Nevertheless, Western understands that identifiable affected interests, specifically residents near the Project area, will consider the visual impacts experienced from their viewpoints to be significant. This point is documented in section 4.7, in which Western has acknowledged significant visual impacts for residents represented by each KOP. Cumulative impacts associated with the proposed Project in combination with other past, present, or reasonably foreseeable future projects are not anticipated, largely because of the dispersed nature of other wind energy, transportation, and development projects in southeastern Wyoming, as discussed in chapter 5.

Table ES-1:
Summary of Impacts of Western's Proposed Federal Action

Issue Area	Level of Impact after Implementing Mitigation	Proposed Mitigation Measures
Land Use	Less than significant	None proposed – impacts are less than significant without mitigation
Biological Resources – Water, Wetlands, and Floodplains	Less than significant	WAT-10: To protect water and wetland resources, a SWPPP that includes erosion control measures will be prepared and its requirements will be implemented onsite for the proposed Project. The SWPPP will be based on USEPA requirements.
		WAT-11: The SWPPP will require the use of water or other dust control measures on or near heavily used public roads and roads internal to the Project. Dust control measures will be included to protect water quality, minimize affects to local residents, and minimize affects to vehicles traveling along local roads.
		WAT-12: The proposed Project will obtain a General Stormwater Construction Permit from the WYDEQ.
		WAT-13: SWE will develop a restoration plan to minimize permanent effects to associated wetlands. Upon the completion of the proposed Project, disturbed portions of the Project site will be restored to pre-construction contours to the extent practicable, with exception of permanent facilities including the turbine foundations, access roads, and permanent Project facilities (i.e., operations and maintenance area and substation). Restoration will be done in accordance with the requirements of the permit.
Biological Resources – Vegetation	Less than significant	VEG-8: Upon completion of construction of the proposed project, SWE will conduct a Post-construction weed inventory survey to validate the effectiveness of the weed management program and insure that invasive weed level have not exceeded base levels.
		VEG-9: SWE will coordinate with the weed management contractor and project landowners regarding specific treatment methods for approval on their respective properties.
		VEG-10: Records, which track weed inventories, treatments, monitoring, and re-infestation trends will be kept.
		VEG-11: SWE will maintain appropriate weed management documentation, including the pre-disturbance weed inventory, management goals for invasive and noxious weeds, the annual weed inventory and weed management report, pesticide application records and pesticide use reports.
Biological Resources-Wildlife and Habitat	Less than significant	WL-7: BMPs listed in table 2.6-1, the SWPPP, and SPCCP such as silt fencing and placement of excavated material away from streams, will be implemented to avoid or minimize potential impacts to fish species. Open-bottom culverts will be used where practicable during road construction to avoid changing stream morphology or removing suitable fish habitat.
		WL-8: Water quality BMPs will be implemented to minimize any unforeseen impacts to the Platte River System's watershed including the use of appropriate sediment and erosion control measures, such as silt fencing and/or hay bales near water bodies and wetlands and the installation of construction barriers and notices to identify sensitive receptors. Furthermore, construction work areas, turbines, access roads, and facilities will be sited outside of wetlands and water bodies, to all extents practicable, to further minimize impacts to the Platte River System watershed (ERM 2010f).
		WL-9: Individuals of threatened and endangered wildlife species passing through the Project site will be allowed to pass unharmed and unharassed, as required under the ESA. This will be accomplished by the implementation of a no approach, no kill policy for all threatened and endangered species by all onsite personnel during construction and operation activities.
		WL-10: Avian collisions with guy wires will be avoided by using self-supporting meteorological towers which do not use guy wires.
		WL-11: Wind turbines will be lighted using FAA requirements.
		WL-12: The USFWS will be notified within 24 hours of federally listed species mortality on the Project site.

Table ES-1:
Summary of Impacts of Western's Proposed Federal Action

Issue Area	Level of Impact after Implementing Mitigation	Proposed Mitigation Measures
		WL-13: As cited in WEST (2010b), impacts to raptor species may be minimized by not placing wind turbines inside spatial buffers (following the recommendations provided by the WGFD in a letter dated June 22, 2009) around the following: - Known raptor nest sites during siting of the wind-energy facility as well as avoiding the two small white-tailed prairie dog colonies identified. - The three small white-tailed prairie dog colonies, to help to minimize impacts to foraging raptors.
Cultural Resources	Less than significant	CUL-4: If the Project design cannot be modified to avoid impacts to sites 48AB1932 and 48AB1933, conduct additional studies to assess NRHP eligibility and, if necessary, conduct data recovery excavations to mitigate impacts.
		CUL-5: Develop an Unanticipated Discoveries Plan that describes procedures for responding to the discovery of archeological or other cultural resources, including unmarked graves, during construction
		CUL-6: Develop plans for ongoing protection and monitoring, as appropriate, of identified cultural resources during the operational life of the Project
Paleontological Resources	Less than significant	None proposed – through implementation of SWE's proposed BMPs, impacts are less than significant and no mitigation measures would be required. See section 4.5 for a list of SWE's proposed BMPs.
Noise	Less than significant	None proposed – through implementation of SWE's proposed BMPs, impacts are less than significant and no mitigation measures would be required. See section 4.6 for a list of SWE's proposed BMPs.
Visual	Less than significant	VIS-8: The building will be painted with earth-tone colors from the BLM Standard Environmental Colors palette or as required by Albany County to reduce visual contrasts from color.
		VIS-9: Outdoor facility lighting will be designed with light caps, and where practicable motion sensors, to minimize offsite glare.
		VIS-13: The towers will be composed of materials and colors that minimize reflectivity. The remaining length of the towers will either be unpainted galvanized steel and be grayish blue in color, or painted to conform to FAA specifications and Albany County requirements of either white or gray.
		VIS-14: Required obstruction lights will be synchronized to flash with obstruction lights of wind turbines.
		VIS-18: Turbine components will be painted with a light, non-reflective color such as white or gray in accordance with the Albany County Wind Siting Regulations (Albany County 2011).
Air Quality	Less than significant	AQ-14: Preparation of a Fugitive Dust Control Plan will be required for the Project pursuant to Wyoming Air Quality Standards and Regulations Chapter 3, Section 2(f).
		AQ-15: An onsite construction manager will be responsible for the implementation and compliance of the construction mitigation program, including the Fugitive Dust Plan. The documentation of the ongoing implementation and compliance with the proposed construction mitigation activities will be provided to WDEQ-AQD on a periodic basis as required.
		AQ-17: Maintenance vehicles subject to the State's motor vehicle registration and emissions compliance programs will be properly registered and comply with any and all motor vehicle "tailpipe" emissions standards and testing requirements based on model year and vehicle type.

Table ES-1:
Summary of Impacts of Western's Proposed Federal Action

Issue Area	Level of Impact after Implementing Mitigation	Proposed Mitigation Measures
		AQ-18: SWE will work with operations and maintenance contractors to use USEPA Tier 2/Tier 3 engine-compliant equipment where applicable, i.e., when equipment rated at more than 100 horsepower is required, to ensure periodic maintenance and inspections per the manufacturer's specifications, and to reduce idling time through equipment and maintenance scheduling.
		AQ-19: Any small or minor stationary sources of air pollutants that are subject to the WDEQ-AQD permitting regulations will be properly permitted prior to being brought onsite or utilized onsite. These sources would typically be emissions units including, but not limited to, emergency electrical generators, small maintenance shop degreaser units, etc.
Transportation	Less than significant	TRANS-12: No improvements are expected to be required for either the Federal highways (I-80, U.S. Highway 287) or State highways (WY 130/230) since the expected future traffic volumes and LOS during construction and decommissioning phases of the Project are acceptable. In addition, since these roads met WYDOT and Federal standards for highway design, the existing slopes, load capacities, vertical curves, and turning radii for these roads are assumed to be within the safety criteria for transport of the Project turbine components. Nonetheless, the I-80/WY 130/230 interchange and U.S. Highway 287/CR 31 intersection would be evaluated in greater detail during the detailed design phase of the Project. If deemed necessary, upgrades to these intersections would be addressed at that time.
		TRANS-13: Culvert and waterbody crossings would be designed in consultation with the WGFD and applicable professional engineering standards. In addition, such waterbody crossings and culverts would be constructed in a manner that prevents sediment erosion, deposition of sediment, and minimizes impacts to any wetlands, waterbodies, and other environmentally sensitive areas.
		TRANS-21: Transport of Project equipment and materials to the site would be performed by professional transportation companies familiar with the type of equipment, loads involved, and DOT, WYDOT, and Albany County regulations.
		TRANS-22: Road signs would be erected to notify travelers and local residents that construction is occurring in the area and provide information regarding the timing and route for oversized vehicle movements and deliveries. The erection/placement of road signs and the Project construction activities would be performed in accordance with the Albany County Zoning Resolution (Albany County 2011) and coordinated with the Albany County Road and Bridge Department.
		TRANS-23: The Project construction activities would not begin until SWE has received authorization and approval by the County Planning and Zoning Commission and County Board of Commissioners.
		TRANS-24: As required by applicable permits, SWE's transportation contractor(s) would utilize escort vehicles (or police vehicles if required by WYDOT) to escort large oversized loads and convoys of large vehicles and to give drivers additional warning.
		TRANS-25: The transportation contractor for the Project would obtain oversized vehicle permits in conjunction with the use of escort vehicles as required by Federal, State, and Albany County regulations.
		TRANS-26: On turbine access roads where cranes may be traveling fully rigged, overhead obstructions must be temporarily removed for the full width of the road to secure free passage of the cranes and possibly other transportation vehicles. The Project would invoke OSHA minimal interference from overhead power lines rules and necessary safety precautions would be applied in situations, if any, requiring temporary removal of overhead power lines.
Recreational Resources	Less than significant	None proposed – through implementation of SWE's proposed BMPs, impacts are less than significant and no mitigation measures would be required. See section 4.10 for a list of SWE's proposed BMPs.

Table ES-1:
Summary of Impacts of Western's Proposed Federal Action

Issue Area	Level of Impact after Implementing Mitigation	Proposed Mitigation Measures
Socioeconomics	Less than significant	None proposed – impacts are less than significant without mitigation
Environmental Justice	Less than significant	None proposed – impacts are less than significant without mitigation
Agriculture	Less than significant	None proposed – impacts are less than significant without mitigation
Geology and Soils	Less than Significant	None proposed – through implementation of SWE's proposed BMPs, impacts are less than significant and no mitigation measures would be required. See section 4.14 for a list of SWE's proposed BMPs.
Hazardous Materials	Less than significant	HAZ-6: If oil products are stored above ground in quantities greater than 1,320 gallons, a SPCC Plan developed in accordance with 40 CFR 112 will be implemented that will define procedures for storage, clean up, and disposal of materials associated with construction, operations and maintenance and decommissioning of the proposed Project. As defined in the SPCC Plan and the HSSE Plans, a spill response crew would respond to accidental releases
		HAZ-7: If an accidental spill of hazardous materials occurs as a result of improper handling or a transportation accident, the materials will be promptly cleaned up by trained spill response crews in accordance with the HSSE plans.
		HAZ-8: A certified waste disposal company will be contracted to properly dispose of wastes according to Federal, State, and local regulations.
		HAZ-9: Prior to construction, SWE will prepare a Decommissioning Plan for the proposed Project in accordance with Albany County Wind Energy Siting Regulations and in accordance with Section 10 of the WYDEQ Rules and Regulations of the Industrial Siting Council. The plan will be updated as necessary throughout the lifetime of the Project to reflect changes in local, State, and Federal regulations. The Plan will document hazardous waste management and disposal procedures.
		HAZ-10: Should previously unknown hazardous materials such as contaminated soils be encountered within the site during construction, operations and maintenance, or decommissioning, the materials will be identified and the appropriate agency will be informed. If this occurs during construction, construction will be halted at the location where the potentially hazardous material is identified.
		HAZ-11: All potentially hazardous materials will be handled, processed, treated, stored, and disposed of in accordance with Federal, State, and county rules and regulations and label instructions.
Health and Safety	Less than Significant	PHS-4: HSSE Plans will be prepared for worker protection, as required by OSHA, with emphasis on safety and health regulations for construction and operations and maintenance. During Project construction, operations, and maintenance, all employees would be required to conform to safety procedures and to receive appropriate training for their job responsibilities. The HSSE Plans will include requirements for first aid and other emergency medical material to be stored on site and in maintenance vehicles.
		PHS-5: Heavy equipment will be outfitted with OSHA-required safety devices. Hard hats, safety boots, ear and eye protective equipment, and other safety equipment will be used on the construction site.

Table ES-1:
Summary of Impacts of Western's Proposed Federal Action

Issue Area	Level of Impact after Implementing Mitigation	Proposed Mitigation Measures
		PHS-6: To minimize workplace dangers, all construction activities will comply with applicable State and Federal worker health and safety regulations which are the primary responsibility of the Wyoming Department of Employment, Occupational Health and Safety and OSHA, respectively. OSHA regulations that are applicable to the proposed Project include 29 CFR 1910 (general industry standards and 29 CFR 1926 (construction industry standards). Additionally, the State of Wyoming has an occupational safety and health program in accordance with Section 18 of the Occupational Safety and Health Act of 1970. Adherence to these regulations is mandatory and will minimize risk to workers.
		PHS-13: Wind turbines will be set back from residences, public roads, and railroads in accordance with Albany County Wind Energy Siting Regulations. This will minimize hazards associated with turbulence, ground blizzards, and drifting snow caused by wind turbines, and in the rare event of blade breakage or ice throw.

Table ES-2:
Summary of Impacts of the Proposed Project

Issue Area	Level of Impact after Implementing Mitigation and BMPs	Proposed Mitigation Measures	SWE Proposed BMPs
Land Use	Less than significant	None proposed – impacts are less than significant without mitigation	None proposed – impacts are less than significant without mitigation
Biological Resources – Water, Wetlands, and Floodplains	Less than significant	WAT-10: To protect water and wetland resources, a SWPPP that includes erosion control measures will be prepared and its requirements will be implemented onsite for the proposed Project. The SWPPP will be based on USEPA requirements.	WAT-1: During the initial clearing phase of the construction process, woody vegetation in potentially disturbed wetlands will be cut at ground level to leave the root systems intact and encourage sprouting of the existing species following construction.
		WAT-11: The SWPPP will require the use of water or other dust control measures on or near heavily used public roads and roads internal to the Project. Dust control measures will be included to protect water quality, minimize affects to local residents, and minimize affects to vehicles traveling along local roads.	WAT-2: Small stumps of shrubs and trees may be cut at or just below ground level.
		WAT-12: The proposed Project will obtain a General Stormwater Construction Permit from the WYDEQ.	WAT-3: Larger trees and shrubs will be removed to ensure a safe, level work surface for equipment working on temporary mats.
		WAT-13: SWE will develop a restoration plan to minimize permanent effects to associated wetlands. Upon the completion of the proposed Project, disturbed portions of the Project site will be restored to pre-construction contours to the extent practicable, with exception of permanent facilities including the turbine foundations, access roads, and permanent Project facilities (i.e., operations and maintenance area and substation). Restoration will be done in accordance with the requirements of the permit.	WAT-4: Equipment operation in wetlands will be kept to the minimum necessary to safely perform the work, and will operate on prefabricated equipment matting or acceptable substitute.
			WAT-5: Wetland boundaries will be clearly identified in the field during construction. SWE has committed to mark the wetland boundaries and to avoid the marked boundaries during construction.
			WAT-6. No parking or servicing of construction-related vehicles should occur within the wetland boundary.
			WAT-7: Temporary impacts to wetlands by construction will be returned to grade and revegetated with native seed mix or as recommended by the local NRCS.
			WAT-8: SWE will implement sediment and erosion control measures, such as silt fencing and/or hay bales near waterbodies and wetlands, the installation of construction barriers.
			WAT-9: Traffic speeds within the Project site will be 15 mph to minimize dust generation.

Table ES-2:
Summary of Impacts of the Proposed Project

Issue Area	Level of Impact after Implementing Mitigation and BMPs	Proposed Mitigation Measures	SWE Proposed BMPs
Biological Resources – Vegetation	Less than significant	VEG-8: Upon completion of construction of the proposed project, SWE will conduct a Post-construction weed inventory survey to validate the effectiveness of the weed management program and insure that invasive weed level have not exceeded base levels.	VEG-1: The permanent disturbance of Project site vegetation will be minimized to the greatest extent practicable. Work zones will be carefully delineated and marked in order to prevent unnecessary access through Project area vegetation.
		VEG-9: SWE will coordinate with the weed management contractor and project landowners regarding specific treatment methods for approval on their respective properties.	VEG-2: A reclamation plan will be prepared prior to the onset of construction that will guide the revegetation of disturbed areas during and following the construction process. The plan is not a requirement of the State siting permit.
		VEG-10: Records, which track weed inventories, treatments, monitoring, and re-infestation trends will be kept.	VEG-3: Water quality BMPs would be implemented to minimize any unforeseen impacts to the Platte River System's watershed and associated vegetation communities, including the use of appropriate sediment and erosion control measures, such as silt fencing and/or hay bales near waterbodies and wetlands and the installation of construction barriers and notices to identify sensitive receptors.
		VEG-11: SWE will maintain appropriate weed management documentation, including the pre-disturbance weed inventory, management goals for invasive and noxious weeds, the annual weed inventory and weed management report, pesticide application records and pesticide use reports.	VEG-4: Temporarily disturbed areas will be revegetated as soon as practicable and active control of noxious weeds will be conducted through the implementation of a site weed management plan, the provisions of which are to be developed. Reseeding will be done with locally approved seed mixtures, as per county requirements.
			VEG-5: During the construction of the proposed project, SWE will utilize BMPs to control the introduction of invasive weeds and manage existing weed populations. These methods will include graveled entrances to all project roads from public roadways to prevent tracking in or out of weed seed bank, and various other weed management methods as described in the weed management plan.
			VEG-6: Weed management methods including prevention; personnel; equipment; integrated pest management using mechanical treatment, herbicide treatment, and/or biological control would be used during pre-construction, construction, post-construction and operations time periods.

Table ES-2:
Summary of Impacts of the Proposed Project

Issue Area	Level of Impact after Implementing Mitigation and BMPs	Proposed Mitigation Measures	SWE Proposed BMPs
			VEG-7: Construction work areas, turbines, access roads, and facilities have been sited outside wetlands and waterbodies to the greatest extent practicable and as required under Federal, State, and local regulations, to minimize indirect impacts to the Platte River System watershed and its associated vegetation communities.
Biological Resources-Wildlife and Habitat	Less than significant	WL-7: BMPs listed in table 2.6-1, the SWPPP, and SPCCP such as silt fencing and placement of excavated material away from streams, will be implemented to avoid or minimize potential impacts to fish species. Open-bottom culverts will be used where practicable during road construction to avoid changing stream morphology or removing suitable fish habitat.	WL-1. The Project will avoid to the greatest extent practicable, siting Project facilities in sensitive areas used by large numbers of wildlife species.
		WL-8: Water quality BMPs will be implemented to minimize any unforeseen impacts to the Platte River System's watershed including the use of appropriate sediment and erosion control measures, such as silt fencing and/or hay bales near water bodies and wetlands and the installation of construction barriers and notices to identify sensitive receptors. Furthermore, construction work areas, turbines, access roads, and facilities will be sited outside of wetlands and water bodies, to all extents practicable, to further minimize impacts to the Platte River System watershed (ERM 2010f).	WL-2. All ground clearing activities will be preceded by surveys for ground nesting birds to prevent take of protected species.
		WL-9: Individuals of threatened and endangered wildlife species passing through the Project site will be allowed to pass unharmed and unharassed, as required under the ESA. This will be accomplished by the implementation of a no approach, no kill policy for all threatened and endangered species by all onsite personnel during construction and operation activities.	WL-3. An Avian Monitoring and Protection Plan will be implemented post construction to collect data (for approximately 1 to 3 years) and understand effects to avian species.
		WL-10: Avian collisions with guy wires will be avoided by using self-supporting meteorological towers which do not use guy wires.	WL-4. Areas temporarily disturbed during construction, such as lay down areas and temporary access roads to the concrete batch plant, construction parking, and construction office area, will be reclaimed by recontouring the area to original conditions if necessary and reseeding with a certified native seed mix.
		WL-11: Wind turbines will be lighted using FAA requirements.	WL-5. A qualified site monitor will be responsible for clearing areas ahead of construction equipment to reduce the potential for wildlife conflict including nesting birds to the extent practicable during construction.

Table ES-2:
Summary of Impacts of the Proposed Project

Issue Area	Level of Impact after Implementing Mitigation and BMPs	Proposed Mitigation Measures	SWE Proposed BMPs
		WL-12: The USFWS will be notified within 24 hours of federally listed species mortality on the Project site.	WL-6. Waste containment facilities will be designed to avoid attracting scavengers.
		WL-13: As cited in WEST (2010b), impacts to raptor species may be minimized by not placing wind turbines inside spatial buffers (following the recommendations provided by the WGFD in a letter dated June 22, 2009) around the following: - Known raptor nest sites during siting of the wind-energy facility as well as avoiding the two small white-tailed prairie dog colonies identified. - The three small white-tailed prairie dog colonies, to help to minimize impacts to foraging raptors.	
Cultural Resources	Less than significant	CUL-4: If the Project design cannot be modified to avoid impacts to sites 48AB1932 and 48AB1933, conduct additional studies to assess NRHP eligibility and, if necessary, conduct data recovery excavations to mitigate impacts.	CUL-1: Modify alignments of proposed access roads to avoid impacts to sites 48AB1932 and 48AB1933.
		CUL-5: Develop an Unanticipated Discoveries Plan that describes procedures for responding to the discovery of archeological or other cultural resources, including unmarked graves, during construction	CUL-2: Supervise construction contractors diligently to ensure that construction activities, including vehicle movements, laydowns, and borrow pitting, take place only in designated, previously-surveyed areas.
		CUL-6: Develop plans for ongoing protection and monitoring, as appropriate, of identified cultural resources during the operational life of the Project	CUL-3: Conduct appropriate worker education concerning the recognition and protection of cultural resources.
Paleontological Resources	Less than significant	None proposed – through implementation of SWE's proposed BMPs, impacts are less than significant and no mitigation measures would be required.	PALEO-1: Paleontological Mitigation Plan—The Project will require the preparation of a mitigation plan for use during construction that includes emergency discovery procedures; sampling and data recovery, if needed; museum storage coordination for any specimen and data recovered; preconstruction coordination; and reporting.
			PALEO-2: Construction Personnel Education—Prior to the start of construction, construction personnel involved with earth-moving activities will be informed of the possibility of encountering fossils, how to recognize fossils, and proper notification procedures. This worker training will be prepared and presented by a qualified paleontologist and be part of the Worker Environmental Awareness Program for the proposed Project. If fossils are discovered in an active construction area,

Table ES-2:
Summary of Impacts of the Proposed Project

Issue Area	Level of Impact after Implementing Mitigation and BMPs	Proposed Mitigation Measures	SWE Proposed BMPs
			work would be stopped at that location and the construction project manager would be notified within 24 hours.
Noise	Less than significant	None proposed – through implementation of SWE's proposed BMPs, impacts are less than significant and no mitigation measures would be required.	NOISE-1: construction vehicles and equipment will be maintained in proper operating condition and would be equipped with manufacturers' standard noise control devices or better (e.g., mufflers, engine enclosures).
Visual	Significant	VIS-8: The building will be painted with earth-tone colors from the BLM Standard Environmental Colors palette or as required by Albany County to reduce visual contrasts from color.	VIS-1: Existing roads will be utilized to the extent possible for access and turbine roads to minimize visual impacts from clearing and grading new roads.
		VIS-9: Outdoor facility lighting will be designed with light caps, and where practicable motion sensors, to minimize offsite glare.	VIS-2: Water will be applied as necessary to exposed soil in active construction areas to minimize dust potential.
		VIS-13: The towers will be composed of materials and colors that minimize reflectivity. The remaining length of the towers will either be unpainted galvanized steel and be grayish blue in color, or painted to conform to FAA specifications and Albany County requirements of either white or gray.	VIS-3: Existing trees and shrubs will be preserved to the extent possible to minimize visual contrasts.
		VIS-14: Required obstruction lights will be synchronized to flash with obstruction lights of wind turbines.	VIS-4: Construction activities in areas of highly erodible soils and steep slopes will be avoided to the extent possible.
		VIS-18: Turbine components will be painted with a light, non-reflective color such as white or gray in accordance with the Albany County Wind Siting Regulations (Albany County 2011).	VIS-5: For the gen tie line, single steel pole or wooden H-frame configuration construction similar to the existing transmission lines on Project site will be used.
			VIS-6: Collector lines will be buried and collocated within access or turbine road rights-of-way to minimize new ground disturbance, to the extent possible.
			VIS-7: The building will be designed with rural and agricultural architectural elements to minimize contrast with existing structures.
			VIS-10: Switchyard and substation facilities will be collocated east of Cherokee Park road to utilize the undulating topography to screen visual impacts from viewers on Cherokee Park Road.
			VIS-11: The size of the disturbance area required at each turbine location will be reduced to the smallest feasible size to create less visual impact from vegetation scarring and to reduce the need for soil and vegetation reclamation.

Table ES-2:
Summary of Impacts of the Proposed Project

Issue Area	Level of Impact after Implementing Mitigation and BMPs	Proposed Mitigation Measures	SWE Proposed BMPs
			VIS-12: A dark-colored gravel or stone will be used for the finish material within the fenced area of the substation a switchyard site to reduce visual contrasts from color.
			VIS-15: Roads will be routed to follow existing contours and to avoid steep slopes that would require cut-and-fill construction.
			VIS-16: The initial disturbance width of the roads will be minimized to the extent possible, and road width will be reduced to 16 feet after construction is completed.
			VIS-17: Vegetation along roadsides will be restored with native vegetation to reduce the color difference associated with reclamation of those areas that require clearing.
Air Quality	Less than significant	AQ-14: Preparation of a Fugitive Dust Control Plan will be required for the Project pursuant to Wyoming Air Quality Standards and Regulations Chapter 3, Section 2(f).	AQ-1: All unpaved roads and disturbed areas where construction activities are occurring, including laydown areas within the Project site, will be watered as frequently as necessary to control fugitive dust. Watering may be reduced or eliminated when the ground is moist.
		AQ-15: An onsite construction manager will be responsible for the implementation and compliance of the construction mitigation program, including the Fugitive Dust Plan. The documentation of the ongoing implementation and compliance with the proposed construction mitigation activities will be provided to WDEQ-AQD on a periodic basis as required.	AQ-2: Onsite vehicle speeds will be limited to 15 mph or less on unpaved areas and unpaved roadways within the Project construction site. Onsite vehicle speeds will be limited to ≤15 mph on graveled and/or paved roadways within the Project construction site.
		AQ-17: Maintenance vehicles subject to the State's motor vehicle registration and emissions compliance programs will be properly registered and comply with any and all motor vehicle "tailpipe" emissions standards and testing requirements based on model year and vehicle type.	AQ-3: The construction site entrance(s) will be posted with highly visible speed limit signs.
		AQ-18: SWE will work with operations and maintenance contractors to use USEPA Tier 2/Tier 3 engine-compliant equipment where applicable, i.e., when equipment rated at more than 100 horsepower is required, to ensure periodic maintenance and inspections per the manufacturer's specifications, and to reduce idling time through equipment and maintenance scheduling.	AQ-4: All construction equipment vehicle tires will be cleaned via track pad entrances as necessary to limit tracking of dirt onto public roadways prior to leaving the construction site.

Table ES-2:
Summary of Impacts of the Proposed Project

Issue Area	Level of Impact after Implementing Mitigation and BMPs	Proposed Mitigation Measures	SWE Proposed BMPs
		AQ-19: Any small or minor stationary sources of air pollutants that are subject to the WDEQ-AQD permitting regulations will be properly permitted prior to being brought onsite or utilized onsite. These sources would typically be emissions units including, but not limited to, emergency electrical generators, small maintenance shop degreaser units, etc.	AQ-5: Gravel ramps will be provided at the tire cleaning area.
			AQ-6: All unpaved exits from the construction site will be graveled track pads or treated to reduce track-out to public roadways.
			AQ-7: All construction vehicles will enter the construction site through the graveled track pad entrance roadways.
			AQ-8: All vehicles that are used to transport solid bulk material on public roadways and have the potential to cause visible emissions either will be covered or the materials sufficiently wetted and loaded onto the trucks in a manner to minimize fugitive dust emissions.
			AQ-9: Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) will be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition will remain in place until the soil is stabilized or permanently covered with vegetation.
			AQ-10: Disturbed areas will be revegetated as soon as practical.
			AQ-11: SWE will work with construction contractors to use USEPA Tier 2/Tier 3 engine-compliant equipment where applicable, i.e., when equipment rated at more than 100 horsepower is required.
			AQ-12: SWE's construction contractors will perform periodic maintenance and inspections of construction equipment per the manufacturer's specifications.
			AQ-13: SWE's construction contractors will endeavor to reduce idling time through equipment and construction scheduling.
			AQ-16: Onsite vehicle speeds will be limited to 15 mph or less on unpaved areas and unpaved roadways within the Project site. Onsite vehicle speeds will be limited to ≤15 mph on graveled and/or paved roadways within the Project site.

Table ES-2:
Summary of Impacts of the Proposed Project

Issue Area	Level of Impact after Implementing Mitigation and BMPs	Proposed Mitigation Measures	SWE Proposed BMPs
Transportation	Less than significant	TRANS-12: No improvements are expected to be required for either the Federal highways (I-80, U.S. Highway 287) or State highways (WY 130/230) since the expected future traffic volumes and LOS during construction and decommissioning phases of the Project are acceptable. In addition, since these roads met WYDOT and Federal standards for highway design, the existing slopes, load capacities, vertical curves, and turning radii for these roads are assumed to be within the safety criteria for transport of the Project turbine components. Nonetheless, the I-80/WY 130/230 interchange and U.S. Highway 287/CR 31 intersection would be evaluated in greater detail during the detailed design phase of the Project. If deemed necessary, upgrades to these intersections would be addressed at that time.	TRANS-1: Maximum access road slope of 5 to 10 percent; depending on turbine requirements. To achieve this grade, potential upgrades to the slopes of existing Albany County roads may be required.
		TRANS-13: Culvert and waterbody crossings would be designed in consultation with the WGFD and applicable professional engineering standards. In addition, such waterbody crossings and culverts would be constructed in a manner that prevents sediment erosion, deposition of sediment, and minimizes impacts to any wetlands, waterbodies, and other environmentally sensitive areas.	TRANS-2: Maximum road slope between turbines (turbine string road) between 5 and 10 percent.
		TRANS-21: Transport of Project equipment and materials to the site would be performed by professional transportation companies familiar with the type of equipment, loads involved, and DOT, WYDOT, and Albany County regulations.	TRANS-3: Maximum road width of 25 feet for access roads and 50 feet for turbine string roads (required for movement of the assembled crane from turbine to turbine onsite). Road width reduction to 16 feet after construction, with reclamation of shoulders with native vegetation.
		TRANS-22: Road signs would be erected to notify travelers and local residents that construction is occurring in the area and provide information regarding the timing and route for oversized vehicle movements and deliveries. The erection/placement of road signs and the Project construction activities would be performed in accordance with the Albany County Zoning Resolution (Albany County 2011) and coordinated with the Albany County Road and Bridge Department.	TRANS-4: Minimum turn radius (inside radius of roadway) of 135 feet (based on transporting three turbine blades at a time) wherever possible (varies by turbine type). To achieve this minimum turning radius, potential upgrades to the existing Albany County roads may be required per SWE's road maintenance agreement with Albany County.

Table ES-2:
Summary of Impacts of the Proposed Project

Issue Area	Level of Impact after Implementing Mitigation and BMPs	Proposed Mitigation Measures	SWE Proposed BMPs
		TRANS-23: The Project construction activities would not begin until SWE has received authorization and approval by the County Planning and Zoning Commission and County Board of Commissioners.	TRANS-5: SWE-developed specific design criteria related to maximum crest vertical curves (or humps), maximum sag vertical curves (or dips), road crown or cross-sloping of the road section (maximum of 2 percent), and cut-and-fill side slopes (dependent on existing soil types). These criteria would be established for the proposed Project site roads during the detailed design stage. The majority of these criteria are dependent on the turbine type selected and manufacturer requirements.
		TRANS-24: As required by applicable permits, SWE's transportation contractor(s) would utilize escort vehicles (or police vehicles if required by WYDOT) to escort large oversized loads and convoys of large vehicles and to give drivers additional warning.	TRANS-6: All-weather gravel road surface for internal Project roads and upgraded existing Albany County and local roads. The thickness of the required gravel layer would be dependent on subgrade soil characteristics to be determined during the detailed design phase of the Project.
		TRANS-25: The transportation contractor for the Project would obtain oversized vehicle permits in conjunction with the use of escort vehicles as required by Federal, State, and Albany County regulations.	TRANS-7: Design speed limit of 15 mph maximum in the Project construction site for all construction and operations equipment and personnel.
		TRANS-26: On turbine access roads where cranes may be traveling fully rigged, overhead obstructions must be temporarily removed for the full width of the road to secure free passage of the cranes and possibly other transportation vehicles. The Project would invoke OSHA minimal interference from overhead power lines rules and necessary safety precautions would be applied in situations, if any, requiring temporary removal of overhead power lines.	TRANS-8: Road dust and maintenance procedures and BMPs as described in chapter 2 and section 4.9 will be implemented.
			TRANS-9: Any existing culvert extensions or improvements would be constructed in a manner that prevents sediment erosion and deposition of sediment and minimizes impacts to any wetlands, waterbodies, and other environmentally sensitive areas.
			TRANS-10: Existing utilities would be avoided whenever possible; however, any required modifications to existing utilities and structures (either temporary or permanent) would be evaluated during the design phase of the Project. Section 4.9.4.6 details the required utility modifications.
			TRANS-11: Onsite Project traffic would use laydown yards as turnarounds where possible. SWE would construct additional turnouts and other turn-around areas as necessary.
			TRANS-14: To minimize conflicts between Project traffic and background traffic, SWE will consider and attempt to work around the local traffic volume peaks when scheduling deliveries to the extent feasible.

Table ES-2:
Summary of Impacts of the Proposed Project

Issue Area	Level of Impact after Implementing Mitigation and BMPs	Proposed Mitigation Measures	SWE Proposed BMPs
			TRANS-15: Movements of oversized trucks (deliveries of turbine components) would be minimized during the afternoon peak and minimized in the morning peak, to the extent practicable. If possible and considering worker safety, such oversized deliveries would occur during other times of the day, when background traffic volume tends to be lower, such as early morning and late afternoon. If necessary, road clearances may also be implemented during component deliveries if they are to occur during peak traffic hours.
			TRANS-16: Road clearances may include blocking road intersections via construction cones and manning blocked intersections with a traffic-control flagger to allow haul trucks sole access to the road while delivering Project components. Once a haul truck has reached its destination, the cones would be removed and public vehicles would be permitted to use the roads. It is estimated that the roads would typically be closed for no longer than 15 minutes during each/any road clearance.
			TRANS-17: To the degree practicable, Project-related activities would be coordinated to avoid major traffic-generating events on the University of Wyoming campus. SWE could contract with local law enforcement, to manage traffic flows and monitor traffic speed to assist with safety during deliveries.
			TRANS-18: Whenever possible, Project turbine components and materials would be delivered directly to the construction/erection pad area for each turbine or other facility, and assembly of the turbine would commence shortly after delivery. If components arrive before the site is prepared for wind turbine erection, they will be stored in the construction laydown areas (figure 1-2).
			TRANS-19: All staging activities and parking of equipment and vehicles would occur onsite and on private rights-of-way, and would not occur on maintained Albany County roads.
			TRANS-20: Construction-related vehicles would only utilize roads identified in this section (to be approved by Albany County) and travel at a maximum of 15 mph within the Project construction site for safety purposes and to reduce dust generation.

Table ES-2:
Summary of Impacts of the Proposed Project

Issue Area	Level of Impact after Implementing Mitigation and BMPs	Proposed Mitigation Measures	SWE Proposed BMPs
Recreational Resources	Less than significant		REC-1: Work with City officials in Laramie and Fort Collins and private campgrounds or mobile home park owners to identify facilities available to construction workers bringing RVs to the area to avoid displacement of public recreational use at private campgrounds.
Socioeconomics	Less than significant		None proposed – impacts are less than significant without mitigation
Environmental Justice	Less than significant		None proposed – impacts are less than significant without mitigation
Agriculture	Less than significant	None proposed – impacts are less than significant without mitigation	None proposed – impacts are less than significant without mitigation
Geology and Soils	Less than Significant	None proposed – through implementation of SWE's proposed BMPs, impacts are less than significant and no mitigation measures would be required.	GEO-1: SWE will conduct additional geotechnical investigations based on final facility layout to reduce potential for impacts from geologic hazards.
			GEO-2: Ditches, tile drains, terraces, and other agricultural features or conservation practices damaged during construction will be repaired or replaced.
			GEO-3: Construction crews will revegetate disturbed areas using an approved weed-free, native seed mixture per the Site Restoration Plan.
			GEO-4: Soil will be stockpiled appropriately and returned to an excavated area in the order in which it was removed to ensure that nutrient and biologically rich topsoil stays at the surface and calcareous and saline-sodic sub-soil remains below the rooting zone.
Hazardous Materials	Less than significant	HAZ-6: If oil products are stored above ground in quantities greater than 1,320 gallons, a SPCC Plan developed in accordance with 40 CFR 112 will be implemented that will define procedures for storage, clean up, and disposal of materials associated with construction, operations and maintenance and decommissioning of the proposed Project. As defined in the SPCC Plan and the HSSE Plans, a spill response crew would respond to accidental releases	HAZ-1: Prior to commencing construction, a Hazard Communication Program will be developed that will document the process of informing Project personnel of the hazardous substances that may be encountered on the proposed Project site. This program will comply with OSHA requirements under the Hazard Communication Standard. Elements of the Hazard Communication Program include a hazard determination process, approval process, materials inventory system, and training for site personnel. At a minimum, hazardous materials will be properly labeled and material safety data sheets will be available at the site.

Table ES-2:
Summary of Impacts of the Proposed Project

Issue Area	Level of Impact after Implementing Mitigation and BMPs	Proposed Mitigation Measures	SWE Proposed BMPs
		HAZ-7: If an accidental spill of hazardous materials occurs as a result of improper handling or a transportation accident, the materials will be promptly cleaned up by trained spill response crews in accordance with the HSSE plans.	HAZ-2: As part of the Hazard Communication program, proper storage of hazardous substances will be identified and implemented. Flammable and combustible materials will be stored in appropriate cabinets or other containers. It is likely that aboveground storage tanks with appropriate containment will be used for fuel storage. Care will be taken when selecting the location of hazardous materials storage areas within the site to avoid potentially sensitive areas. During construction, it is anticipated that most materials will be used as they are delivered to the site.
		HAZ-8: A certified waste disposal company will be contracted to properly dispose of wastes according to Federal, State, and local regulations.	HAZ-3: Secondary containment for all hazardous materials that are stored onsite will be provided to minimize potential effects to the surrounding environment. Examples of secondary containment are concrete bermed areas and manufactured containment pallets.
		HAZ-9: Prior to construction, SWE will prepare a Decommissioning Plan for the proposed Project in accordance with Albany County Wind Energy Siting Regulations and in accordance with Section 10 of the WYDEQ Rules and Regulations of the Industrial Siting Council. The plan will be updated as necessary throughout the lifetime of the Project to reflect changes in local, State, and Federal regulations. The Plan will document hazardous waste management and disposal procedures.	HAZ-4: Concrete washout would only be disposed in properly designed concrete washout facilities or possibly re-using the water for concrete mixing. Re-use for concrete mixing would depend on the chemical composition of the water.
		HAZ-10: Should previously unknown hazardous materials such as contaminated soils be encountered within the site during construction, operations and maintenance, or decommissioning, the materials will be identified and the appropriate agency will be informed. If this occurs during construction, construction will be halted at the location where the potentially hazardous material is identified.	HAZ-5: Trained spill containment crews will respond to accidental releases as described in the HSSE plans.
		HAZ-11: All potentially hazardous materials will be handled, processed, treated, stored, and disposed of in accordance with Federal, State, and county rules and regulations and label instructions.	

Table ES-2:
Summary of Impacts of the Proposed Project

Issue Area	Level of Impact after Implementing Mitigation and BMPs	Proposed Mitigation Measures	SWE Proposed BMPs
Health and Safety	Less than Significant	PHS-4: HSSE Plans will be prepared for worker protection, as required by OSHA, with emphasis on safety and health regulations for construction and operations and maintenance. During Project construction, operations, and maintenance, all employees would be required to conform to safety procedures and to receive appropriate training for their job responsibilities. The HSSE Plans will include requirements for first aid and other emergency medical material to be stored on site and in maintenance vehicles.	PHS-1: All site personnel, regardless of job responsibilities, will receive Project orientation addressing environmental and health and safety Project procedures, requirements and site rules. In addition to reviewing this information with all employees, SWE will review the plan with the Tie Siding Volunteer Fire Department personnel, Laramie Fire Department personnel, and emergency services personnel to ensure response or evacuation plans and procedures are part of construction and operation activities and planning.
		PHS-5: Heavy equipment will be outfitted with OSHA-required safety devices. Hard hats, safety boots, ear and eye protective equipment, and other safety equipment will be used on the construction site.	PHS-2: Fueling of vehicles will be conducted in accordance with procedures that will minimize the risk of fires and spills.
		PHS-6: To minimize workplace dangers, all construction activities will comply with applicable State and Federal worker health and safety regulations which are the primary responsibility of the Wyoming Department of Employment, Occupational Health and Safety and OSHA, respectively. OSHA regulations that are applicable to the proposed Project include 29 CFR 1910 (general industry standards and 29 CFR 1926 (construction industry standards). Additionally, the State of Wyoming has an occupational safety and health program in accordance with Section 18 of the Occupational Safety and Health Act of 1970. Adherence to these regulations is mandatory and will minimize risk to workers.	PHS-3: Selected crew leads will be trained in first aid, automated external defibrillator operation, and CPR. Adequate materials and resources for onsite treatment, first aid, and stabilization will be available onsite at all times. Handling of spills is addressed in section 4.15.2.1.
		PHS-13: Wind turbines will be set back from residences, public roads, and railroads in accordance with Albany County Wind Energy Siting Regulations. This will minimize hazards associated with turbulence, ground blizzards, and drifting snow caused by wind turbines, and in the rare event of blade breakage or ice throw.	PHS-7: Wind turbines will be shut down under wind conditions exceeding manufacturer's operational parameters.
			PHS-8: Staff would be driving the Project site frequently to conduct a visual inspection of the operation during routine maintenance, including wind turbines, road conditions, fencing, other infrastructure, and any incidences of waste disposal, theft, or vandalism. Frequent visual monitoring of the site will also reduce the potential use of the Project site for illegal activities such as drug labs and illegal hunting.
			PHS-9: Permanent chain-link fencing will be installed at the substation and switchyard, at the outdoor storage area adjacent to the operations and maintenance building, and in additional areas where security or theft might be a concern.

Table ES-2:
Summary of Impacts of the Proposed Project

Issue Area	Level of Impact after Implementing Mitigation and BMPs	Proposed Mitigation Measures	SWE Proposed BMPs
			PHS-10: During construction, temporary plastic mesh fencing will be installed to protect public and worker safety near excavated wind turbine foundations, electrical collection system trenches, material laydown areas, or any other areas deemed hazardous. Open holes and trenches without fencing will be covered or fenced to deter wildlife and livestock from becoming trapped or injured.
			PHS-11: The International Electrotechnical Commission has published International Standard 61400-1, which outlines the minimum design requirements for wind turbines. These design requirements are intended to ensure safe operation of wind turbines. The turbines used by SWE for this Project will conform to or exceed these standards.
			PHS-12: The general public will not be permitted to enter the Project construction site. Most private property within the Project area is fenced off. If trespassers are identified on privately owned land, they will be escorted off of the property by SWE personnel. Some of the property that the Project will be constructed on is State land that is open to the public. During inspections, staff will ensure that there are no members of the public disturbing turbines or other project features that are located on lands that are open to the public.
			PHS-14: Dumpsters for solid waste will be used during construction, operation, and decommissioning of the proposed Project and materials will be recycled to the extent feasible.
			PHS-15: Solid waste resulting from the implementation of the proposed Project will be transported by a commercial trash company and disposed of in a designated landfill and will be disposed of in accordance with all local, State, and Federal regulations.
			PHS-16: SWE will prepare an Emergency Response Plan and will consult with Albany County emergency services to ensure that policies and procedures are consistent with those already established for the county.

Table ES-2:
Summary of Impacts of the Proposed Project

Issue Area	Level of Impact after Implementing Mitigation and BMPs	Proposed Mitigation Measures	SWE Proposed BMPs
			PHS-17: SWE will coordinate with local emergency services to determine whether an increase in staff during times when emergency services may be stressed (most likely during construction phase) is warranted.
			PHS-18: SWE operations and contractor personnel are trained and equipped for emergency response and SWE will coordinate with local emergency response providers to supply ongoing additional support.
			PHS-19: Onsite personnel will routinely inspect the wind farm facilities for fire hazards.
			PHS-20: Wind turbines will be outfitted with lightning protection systems that will reduce the chance of fires igniting from lightning. Each wind turbine and associated electrical equipment will be constructed with non-flammable material around the base of the equipment to reduce the spread of fire should electrical equipment ignite.
			PHS-21: Construction and maintenance vehicles will be equipped with fire extinguishers in the event of an equipment fire. Should an onsite fire occur, onsite personnel will call 911 to alert the Laramie Fire Department.
			PHS-22: Throughout the lifetime of the proposed Project, SWE will coordinate with the Tie Siding Volunteer Fire Department and Laramie Fire Department to minimize safety hazards and ensure adequate response times.

1.0 INTRODUCTION

This chapter provides an overview of ShellWind Energy, Inc.'s (SWE's) proposed Hermosa West Wind Energy Project (Project), and describes Western Area Power Administration's (Western's) purpose and need for Federal action on the proposed Project. The chapter also describes SWE's purpose and need, descriptions of the Western and SWE organizations, and public scoping activities conducted for the proposed Project to date. The chapter concludes with a description of how the remainder of the Environmental Impact Statement (EIS) is organized and the schedule for the EIS process.

1.1 Project Overview

SWE's proposed Project is a commercial utility-scale wind energy generation facility that would be located near Tie Siding, Wyoming, in Albany County (figure 1.1-1). At full-build out, the proposed Project would include up to 200 wind turbines with a combined generating capacity of up to 300 megawatts (MW) of renewable energy. It would be located on an 11,125-acre site; the number of turbines installed would be determined by the turbine selected, the market, and power purchase agreements for the electricity generated. In any case, the combined output of 300 MW would act as an upper cap on the number of turbines. SWE has applied to interconnect the proposed Project with the existing Craig to Ault 345-kilovolt (kV) transmission line jointly owned by Western, Tri-State Generation and Transmission Association, Inc., and Platte River Power Authority. The Craig to Ault 345-kV transmission line bisects the proposed Project site.

On the Project site, the wind turbines would be located in 11 strings, or lines, oriented north to south to capture prevailing winds. The wind turbine strings would be approximately 0.5 mile apart. In addition to the wind turbines, other proposed Project facilities would include all-weather access roads to each wind turbine location, underground power collection lines linking the wind turbines to a Project substation, the Project substation, a Western switchyard collocated with the Project substation, a short 345-kV generation tie line (gen-tie line) linking the proposed Project to Western's existing 345-kV transmission line, operation and maintenance facilities, supervisory control and data acquisition equipment and metering equipment, and up to four permanent meteorological towers.

1.2 Description of Western

Western is a Federal power marketing agency within the U.S. Department of Energy (DOE). Congress established Western on August 4, 1977, under Section 302 of the DOE Act, 42 United States Code (USC) Section (§) 7152(a). The statute transferred certain electric power marketing responsibilities and transmission system assets managed by the U.S. Bureau of Reclamation (Reclamation) to Western. Western's mission is to market and deliver reliable, low-cost Federal wholesale electric power. The power is predominantly hydroelectric power from 56 hydroelectric power plants operated by other Federal agencies such as Reclamation, the U.S. Army Corps of Engineers (USACE), and the International Boundary and Water Commission. Western also markets the Federal Government's 547-MW entitlement from the coal-fired Navajo Generating

Station near Page, Arizona. Western markets approximately 40 percent of the total hydroelectric power generated in its service area.

Western receives appropriations from Congress each year to finance its operations, maintain its transmission infrastructure, and carry out construction and rehabilitation activities. These appropriations provide only a portion of Western's funding. Other sources of funding include the sale of electric power; project-specific revolving funds; customer advances for construction, operation, and maintenance; and other reimbursable work.

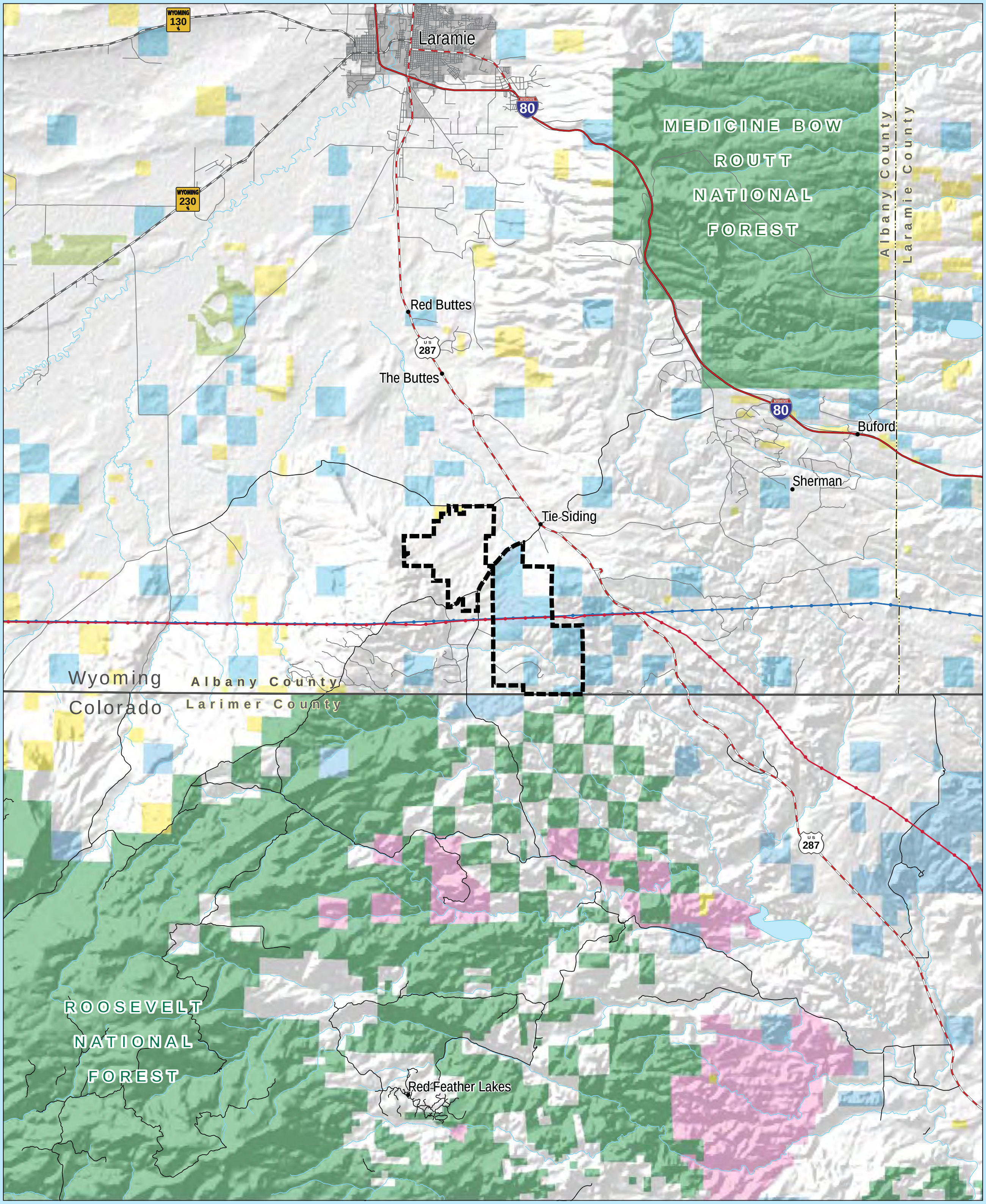
Western's service area covers 1.3 million square miles in 15 states in the central and western United States. In these states, Western delivers power to municipalities; rural electric cooperatives; public utilities and irrigation districts; Federal, State, and military agencies; Native American tribes; investor-owned utilities; and power marketers. As part of its power delivery mission, Western owns and operates an integrated 17,000-mile-long high-voltage Federal transmission system to deliver electric power to a large portion of the western United States.

1.3 Western's Purpose and Need

SWE requests to interconnect its proposed Project to the Craig to Ault 345-kV transmission line via a new substation on the project site. Western's purpose and need is to consider an interconnection agreement in accordance with its Open Access Transmission Service Tariff (Tariff) and the Federal Power Act, as amended (FPA).

Under the Tariff, Western offers capacity on its transmission system to deliver electricity when capacity is available. The Tariff also contains terms for processing requests for the interconnection of generation facilities to Western's transmission system. The Tariff substantially conforms to Federal Energy Regulatory Commission (FERC) final orders that provide for non-discriminatory transmission system access. Western originally filed its Tariff with FERC on December 31, 1997, pursuant to FERC Order Nos. 888 and 889. Responding to FERC Order No. 2003, Western submitted revisions regarding certain Tariff terms and included Large Generator Interconnection Procedures (LGIP) and a Large Generator Interconnection Agreement (LGIA) in January 2005. In response to FERC Order No. 2006, Western submitted additional term revisions and incorporated Small Generator Interconnection Procedures (SGIP) and a Small Generator Interconnection Agreement (SGIA) in March 2007. In September 2009, Western submitted yet another set of revisions to address FERC Order No. 890 requirements along with revisions to existing terms.

In reviewing interconnection requests, Western must ensure that existing reliability and service are not degraded. Western's LGIP provides for transmission and system studies to ensure that system reliability and service to existing customers are not adversely affected by new interconnections. These studies also identify system upgrades or additions necessary to accommodate the proposed project and address whether the upgrades/additions are within the project scope.



Project Site

Hermosa West Wind Energy Project

Jurisdiction

- Bureau of Land Management
- U.S. Forest Service
- State Land
- Colorado Division of Wildlife
- Wyoming Fish and Wildlife
- Municipality

Transmission

- 230-kV Transmission Line
- 345-kV Transmission Line

Vicinity Map

0 1.5 3 Miles

Scale 1:98,213 when printed at 22"X34".

Revised: November 2, 2010
File Name: project_site
MXD: P:\4004_Shell_Hermosa_West\GIS\Layouts\chapter_1
PDF: P:\4004_Shell_Hermosa_West\GIS\Maps\chapter_1
Sources: ESRI, Western, BTS, WyGISC, USGS

HERMOSA WEST WIND ENERGY PROJECT

FIGURE 1.1-1: PROJECT SITE

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Authority:

Western must consider interconnection requests to its transmission system in accordance with its Tariff and the FPA. Western satisfies FPA requirements to provide transmission service on a non-discriminatory basis through compliance with its Tariff. Under the FPA, FERC has the authority to order Western to allow an interconnection and to require Western to provide transmission service at rates it charges itself and under terms and conditions comparable to those it provides itself.

1.4 Description of SWE

SWE is a wholly owned subsidiary of Shell Oil Company. SWE's headquarters in the United States are located in Houston, Texas. SWE is involved in 10 wind projects across the United States and Europe with approximately 1,000 MW of electricity in operation. SWE entered the North American wind energy market in 2002 upon acquisition of the 50-MW Rock River wind farm in Carbon County, Wyoming. Since that time, SWE has participated in eight onshore wind generation facilities and has a total installed wind generation capacity of 900 MW in the United States. Each megawatt of power generated is estimated to provide electricity for approximately 300 homes. In addition, each megawatt of power is estimated to cost $2 million to install, and SWE wind energy projects require approximately 6 years to develop. SWE's U.S. wind generation facilities include the operations listed in table 1.4-1.

Table 1.4-1:
SWE Wind Generation Facilities in the United States

Facility	Location	MW	Number of Turbines	Year of Installation
Rock River	Wyoming	50	50	2001
Top of Iowa	Iowa	80	89	2001
Cabazon	California	41	62	2002
Whitewater Hill	California	62	41	2002
White Deer	Texas	80	80	2002
Colorado Green	Colorado	162	108	2003
Brazos	Texas	160	160	2004
Mount Storm	West Virginia	264	132	2008

1.5 SWE's Purpose and Need

SWE's purpose for the proposed Project is to respond to increasing market demand for sources of renewable energy, including wind-generated electricity. Thirty-five states now have a renewable portfolio standard (RPS) or goal for the amount of electricity produced by renewable energy sources, such as wind, solar, biomass, and geothermal sources (Pew Center on Global Climate Change 2009). Wyoming does not have a renewable energy standard or goal. Neighboring Montana, however, has a renewable energy standard of 15 percent by 2015, meaning that 15 percent of electricity used by consumers in the State must come from sources of renewable energy by 2015. Colorado has a renewable energy standard of 30 percent by

2020 (DSIRE 2011). These renewable energy standards, among others, create a dynamic marketplace in which wind energy can be generated in one location and transmitted to another location in response to market conditions and power purchase agreements between the wind energy developer and the utility or large-scale consumer purchasing the electricity. RPSs create a need for additional renewable energy capacity in the Rocky Mountain region to serve future load growth demands while meeting State-mandated RPSs. The proposed Project is complementary to SWE's renewable energy generation strategy and satisfies future load and regional RPS requirements.

1.6 Regulatory Framework

Construction of the proposed Project would need to comply with the Federal, State, and local statutes, regulations, and permit requirements listed below. Many of the specific requirements listed below are otherwise described by resource in chapter 4. Compliance with some of these requirements would be achieved through completion of the EIS process, but the responsibility for compliance during the construction, operation and maintenance, and eventual decommissioning of the proposed Project would rest with SWE. Western would comply with applicable regulations for its proposed switchyard and connecting gen-tie line.

1.6.1 Federal Statutes

- National Environmental Policy Act of 1969 (NEPA), as Amended
- Endangered Species Act of 1973, as Amended
- National Historic Preservation Act, as Amended
- Clean Air Act, as Amended
- Clean Water Act, as Amended
- Migratory Bird Treaty Act
- Bald and Golden Eagle Protection Act
- Native American Graves Protection and Repatriation Act

1.6.2 Federal Regulations

- Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the NEPA (40 Code of Federal Regulations [CFR] § 1500–1508)
- DOE NEPA Implementing Procedures (10 CFR § 1021)
- DOE Compliance with Floodplain/Wetlands Environmental Review Requirements (10 CFR § 1022)
- Interagency Cooperation, Endangered Species Act of 1973, as Amended (50 CFR Part 402)
- Protection of Historic Properties (36 CFR Part 800)
- General (Clean Air Act) Conformity Regulations (40 CFR Part 93, Subpart B)
- National Pollutant Discharge Elimination system permitting requirements under Section 402 of the Clean Water Act
- Dredge and fill permitting requirements under Section 404 of the Clean Water Act
- Wetland permitting requirements under Section 404 of the Clean Water Act

1.6.3 Federal Executive Orders and Guidelines

- Executive Order (EO) 11988, May 1977: Floodplain Management
- EO 11990, May 1977: Protection of Wetlands
- EO 12898, February 1994: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
- EO 13175, November 2000: Consultation and Coordination With Indian Tribal Governments
- EO 13514, October 2009: Federal Leadership in Environmental, Energy, and Economic Performance
- DOE O 450.1A, June 2008: Environmental Protection Program (addresses greenhouse gas reduction goals, use of renewable energy, and promotion of renewable energy projects in accordance with Section 2(a)(ii))
- DOE O 451.1B, Chg. 2, June 2010: National Environmental Policy Act Compliance Program
- DOE F 1325.8, December 2006: Memorandum Need to Consider Intentional Destructive Acts in NEPA Documents
- Federal Aviation Administration Advisory Circular AC 70/7460-1K (February 2007)
- U.S. Fish and Wildlife Service Turbine Guidelines Advisory Committee Recommendations to the Secretary (April 2010)
- U.S. Fish and Wildlife Service Final Land-Based Wind Energy Guidelines: Recommendations on measures to avoid, minimize, and compensate for effects to fish, wildlife, and their habitats. Effective March 23, 2012.

1.6.4 State and Local Requirements

In 2010, the Wyoming legislature signed Senate File 66, Industrial Siting Amendments. The amendments expand on the original Industrial Siting Act by adding requirements for wind energy facilities with 30 or more wind turbines and expansions to existing wind energy facilities. The amendments require a financial assurance plan from the developer for the life of the project, a decommissioning plan, a reclamation plan, proof of notification to local government(s) and landowners, and copies of the permit application to those parties if requested. The amendments require an evaluation of potential impacts from the facility and mitigation measures. The evaluation includes the following resources or conditions: agriculture, wildlife, threatened and endangered species, and local social and economic conditions.

In 2010, the Wyoming legislature also passed House Bill 101, Tax Upon Production of Electricity from Wind Resources. The law took effect on January 1, 2012, and imposes a tax rate of $1.00 per year on each megawatt hour of wind energy produced in Wyoming at the point of interconnection of the wind energy facility and electricity transmission line.

House Bill 72, Regulation of Wind Energy Facilities, was passed by the Wyoming legislature. The law took effect on July 1, 2010, and requires that new wind energy projects exceeding a certain threshold are subject to county permitting requirements. The law established minimum county standards and permitting requirements for wind energy facilities. The threshold for new projects at the time the bill was adopted was a construction cost of $176.5 million, or 30 or more wind turbines. The threshold for construction costs is subject to semi-annual updates. The law also outlines requirements for rulemaking, penalties, fees, and financial assurances. Other regulatory requirements are listed below.

- Wyoming Industrial Siting Act permitting requirements
- Wyoming Department of Environmental Quality, air quality permitting
- Wyoming Department of Environmental Quality, water quality permitting (Section 401 Water Quality Certification, Construction Storm Water Permit)
- Wyoming Game and Fish Department, Wildlife Protection Recommendations for Wind Energy Development in Wyoming (November 2010)
- Wyoming State Historical Preservation Office, National Historic Preservation Act Section 106 Consultation
- Wyoming State Engineer's Office, water rights permitting
- Wyoming taxes

1.6.5 Albany County Wind Energy Siting Requirements

Albany County's Wind Energy Siting Regulations establish setbacks between wind turbines and municipalities, residences, and physical infrastructure. Albany County adopted the Wind Energy Siting Regulations for the following purposes (Albany County 2011, Chapter V, Section 8A):

a. To assure that any development and production of wind- generated electricity in Albany County is safe, effective, and that it will minimize impacts to wildlife;

b To acknowledge that these facilities are clearly visible and cannot be hidden from view, however, design consideration should include minimizing the degradation of the visual character of the area;

c. To facilitate economic opportunities for local residents;

d. To promote the supply of wind energy in support of Wyoming's goal of increasing energy production from renewable energy sources;

e. To be consistent with the Albany County Comprehensive Plan.

1.6.6 Federal Financial Incentives

The Federal Government provides financial support for both non-renewable and renewable sources of electricity production in the United States. A November 2007 Government Accountability Office report estimated that between 2002 and 2007, $13.7 billion in tax expenditures was spent to support fossil fuel-based electricity production, such as coal and gas. During the same period, $2.8 billion was spent to support renewable energy-based electricity production, such as wind and solar. Similarly, between 2002 and 2007, $9.3 billion of DOE research and development funding was spent on nuclear and fossil fuel-based electricity production. During the same period, $1.4 billion of DOE research and development funding was spent on renewable energy-based electricity production (AWEA undated).

The Federal Government also provides tax incentives for wind energy development. The American Recovery and Reinvestment Act of 2009 extended the production tax credit for wind development of $0.02 per kilowatt hour of wind energy produced through December 31, 2012.

The production tax credit had previously been extended since 1992. The American Wind Energy Association (AWEA) estimated in 2009 that the total wind-generated energy capacity in the United States was approximately 35,600 MW. Of that, there were 1,101 MW produced in Wyoming and 1,246 MW produced in Colorado (AWEA 2010) (figure 1.6-1).

1.7 Outreach to Project Stakeholders

As part of its public scoping activities, Western identified a diverse set of stakeholders to ensure adequate public outreach and to gather input from a variety of perspectives (figure 1.7-1). Specifically, Western conducted outreach to the five groups of stakeholders listed below.

1. Federally recognized Indian tribes
2. Landowners within the Project area footprint and within 3 miles of the proposed Project lease boundary
3. Nongovernment organizations
4. Interested parties
5. Federal, State, and local agencies and elected officials

Once the Project stakeholders had been identified, Western notified the stakeholders about the public scoping period and public scoping meetings using direct mailings, newspaper ads, public service announcements, and press releases. Newspaper ads were placed in six regional newspapers, public service announcements were placed with 10 radio stations in the region, and press releases were submitted to 14 different media outlets in the region.

1.7.1 Government-to-Government Tribal Consultation

As a Federal agency, Western has a government-to-government relationship with federally-recognized Indian tribes and a consultation process that is directed by EO 13175, Section 106 of the National Historic Preservation Act, and DOE policy. Western initiates and coordinates tribal consultation outreach from its Corporate Services Office in Lakewood, Colorado. Tribes contacted to initiate government-to-government consultation are listed below:

- Crow Nation
- Eastern Shoshone
- Northern Arapaho
- Northern Cheyenne

1.7.2 Landowners

Western mailed letters to landowners within the Project area footprint and to those within 3 miles of the Project boundary. The letters were sent to 260 individuals and were mailed on January 11, 2010. Albany County and Larimer County parcel data from 2009 were used to generate the landowner lists described above.

1.7.3 Nongovernment Organizations

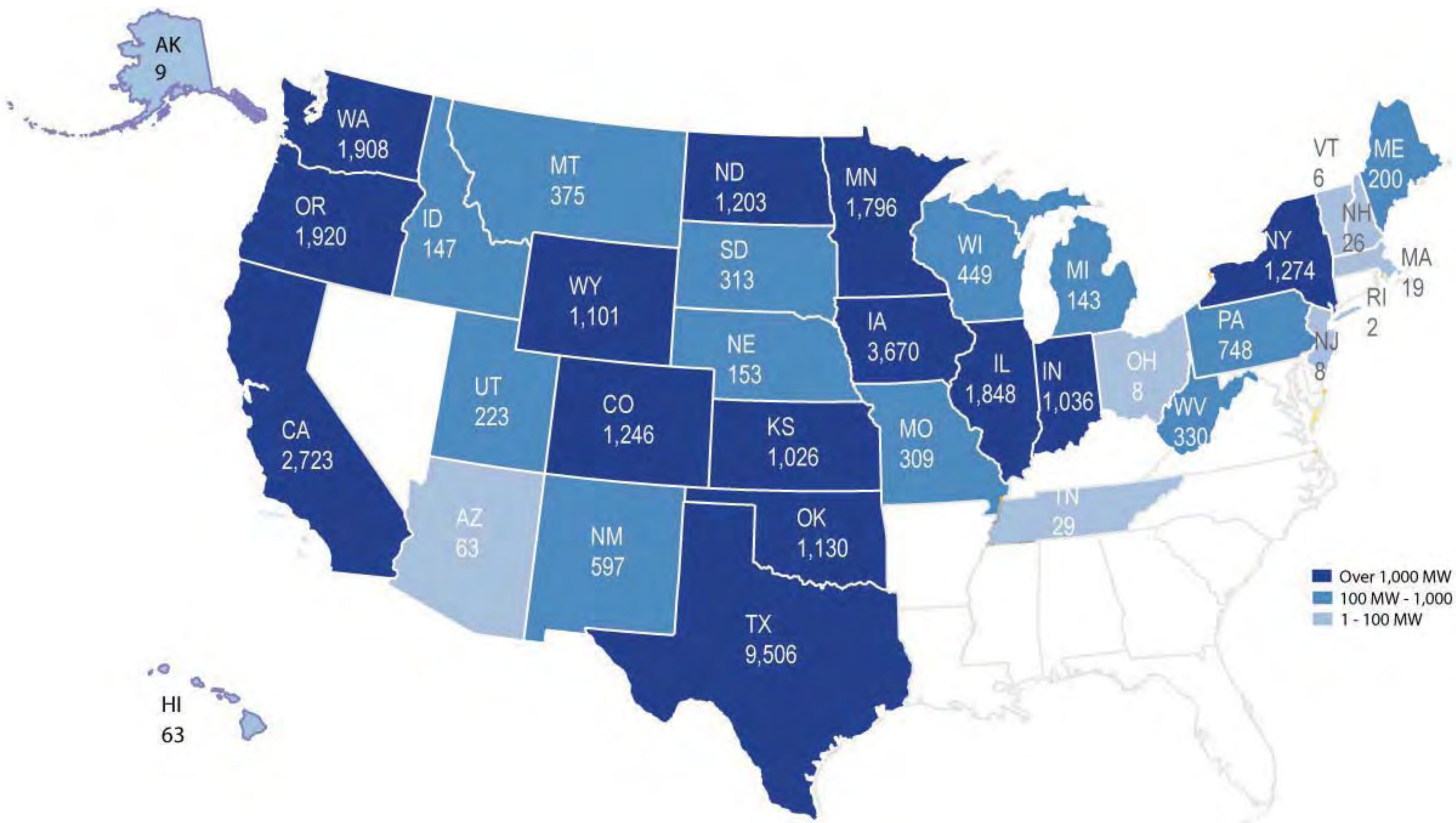
Western gathered the names of non-government organizations by referencing the Directory of Potential Stakeholders for DOE Actions under NEPA (DOE 2010) and researching the appropriate parties to include. The organizations identified are listed below.

- Audubon Colorado
- Audubon Wyoming
- Biodiversity Conservation Alliance
- Center for Resource Conservation
- Colorado Open Lands
- Colorado Renewable Energy Society
- Environmental Defense Fund
- Fort Collins Audubon Society
- Natural Resource Defense Council
- Rocky Mountain Chapter of the Sierra Club
- The Conservation Fund
- The Nature Conservancy
- The Nature Conservancy, Southeast Wyoming Program
- The Wilderness Society
- Trout Unlimited, Colorado Chapter
- University of Wyoming College of Agriculture, Department of Renewable Resources
- University of Wyoming, Ruckelshaus Institute
- University of Wyoming, Wind Energy Resource Center
- University of Wyoming, School of Energy Resources
- Western Environmental Law Center
- Western Interstate Energy Board
- Western Resource Advocates
- Wyoming Chapter of the Sierra Club
- Wyoming Conservation Voters
- Wyoming Energy Council
- Wyoming Native Plant Society
- Wyoming Outdoor Council
- Wyoming Wildlife Federation

1.7.4 Federal, State, and Local Agencies and Elected Officials

Western gathered the names of Federal, State, and local agencies and elected officials by using the sources described above and collecting the existing contacts made by staff at Western and SWE. The agencies identified are listed below.

- Advisory Council on Historic Preservation, Director of the Office of Federal Agency Programs
- Bureau of Indian Affairs, Rocky Mountain Regional Office, Regional Director
- Bureau of Land Management, Wyoming State Office, State Director



Source: www.awea.org May 2010

FIGURE 1.6-1: WIND GENERATION IN THE U.S.

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Hermosa West Wind Energy Project
Figure 1.7-1: Public Scoping Meeting Information Stations

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- Bureau of Land Management, Rawlins Field Office, Field Manager
- Federal Aviation Administration, Regional Administrator of the Northwest Mountain Region
- Federal Emergency Management Agency, Region VIII, Regional Environmental Manager
- Federal Emergency Management Agency, Wyoming Office of Homeland Security, Director
- Federal Energy Regulatory Commission, Director of the Office of Energy Projects
- Federal Highway Administration, Director of Field Services of the West
- National Park Service, Intermountain Regional Director
- National Weather Service Weather Forecast Office, Cheyenne, Wyoming
- U.S. Army Corps of Engineers, Chief of Public Affairs and Wyoming Regulatory Office
- U.S. Department of Agriculture, State Executive Director
- U.S. Department of Agriculture, Rural Development, State Director of Rural Development
- U.S. Department of the Interior, Director, Office of Environmental Policy and Compliance and Regional Environmental Officer
- U.S. Department of Transportation, Secretary
- U.S. Environmental Protection Agency, Director of the Office of Federal Activities and the Director of the NEPA Program
- U.S. Fish and Wildlife Service, Wyoming Ecological Services Office
- U.S. Forest Service, Arapaho and Roosevelt National Forests, and Pawnee National Grass Land, Forest Supervisor
- U.S. Forest Service, Medicine Bow and Routt National Forests, and Thunder Basin National Grassland, Forest Supervisor
- U.S. General Services Administration, NEPA Program Manager
- Colorado Air National Guard, 104th Wing Public Affairs
- Colorado Department of Natural Resources, Executive Director
- Colorado Department of Natural Resources, Office of Energy and Minerals
- Colorado Department of Transportation, Region Four Transportation Director
- Colorado Division of Wildlife, Director and Northeast Region Staff
- Colorado Geological Survey, Director and State Geologist
- Colorado Governor's Energy Office, Director
- Colorado Public Utilities Commission, Director, Chairman, and Commissioners
- Colorado State Historic Preservation Office, State Historic Preservation Officer
- Wyoming Department of Environmental Quality, Administrator, Industrial Siting Division*****
- Wyoming Department of State Parks and Cultural Resources, Director
- Wyoming Business Council, Chief Executive Officer
- Wyoming Department of Agriculture, Director and Manager of Natural Resources and Policy
- Wyoming Department of Education, State Superintendent of Public Instruction
- Wyoming Department of Environmental Quality, Director
- Wyoming Department of Health, Director and State Health Officer
- Wyoming Department of Revenue, Director
- Wyoming Department of Transportation, Director and District Engineer
- Wyoming Division of Wildlife, Director
- Wyoming Environmental Quality Council, Executive Secretary
- Wyoming Game and Fish Department, Director

- Wyoming Governor's Office, Energy and Telecommunications Policy Advisor and Deputy Chief of Staff
- Wyoming Infrastructure Authority, Executive Director
- Wyoming Office of State Lands and Investments, Director
- Wyoming Public Service Commission, Chairman and Commissioner
- Wyoming State Climate Office, Wyoming Water Resources Data System Director and State Climatologist
- Wyoming State Engineer's Office
- Wyoming State Geological Survey, Director and State Geologist
- Wyoming State Historic Preservation Office, State Historic Preservation Officer
- Wyoming Wildlife and Natural Resources Trust, Executive Director
- Albany County Commissioners, Wyoming
- Albany County Department of Planning, Wyoming, Planning Director
- Albany County Department of Planning, Wyoming, Code Compliance Officer
- Albany County Planning and Zoning Commission, Wyoming
- Albany County Road and Bridge Department, Wyoming
- City of Laramie, Wyoming, Mayor and City Manager
- Laramie Rivers Conservation District, Director
- Larimer County Commissioners, Colorado
- Larimer County Manager, Colorado
- Larimer County Surveyor, Colorado
- Larimer County, Colorado Department of Health and Environment, Department Director
- Larimer County, Colorado Department of Natural Resources, Department Director
- Larimer County, Colorado Department of Planning and Building Services, Department Director
- Larimer County, Colorado Department of Public Works, Department Director
- Larimer County, Colorado Road and Bridge Department, Department Director

***** Denotes formal cooperating agencies.

1.7.5 Public Scoping

Federal agencies conduct public scoping as part of the EIS process to help determine the scope and content of an EIS. According to 40 CFR 1501.7, public scoping provides an early and open process for the public to provide input on the issues to be analyzed in the EIS, including identification of issues considered significant.

Western initiated the public scoping process for its proposed Federal action and the proposed Project by issuing a Notice of Intent (NOI) to prepare an EIS and conduct scoping meetings that was published on January 14, 2010, in the *Federal Register*. Publication of the NOI officially opened the public comment period for the proposed Project. The NOI provided notice to the public that the public comment period would close on March 1, 2010. Comments received after the close of the public comment period would still be considered as part of the public's review of the EIS.

Western's main objectives for public scoping are listed below:

- Introduce Western's action and the proposed Project and solicit input from the public
- Communicate that public input will be used in the decision-making process
- Identify issues for analysis in the EIS
- Gain an understanding of the concerns and issues expressed by all interested parties
- Receive public input on the purpose and need, Project description, affected environment, environmental effects, potential cumulative effects, and mitigation measures associated with both Western's proposed Federal action and SWE's proposed Project
- Communicate the importance of public input and involvement as a part of the NEPA process

Public scoping meetings were held on January 26, 2010, in Cheyenne, Wyoming, and January 27, 2010, in Laramie, Wyoming. The public scoping meetings were conducted using an open-house format with nine information stations to provide landowners and interested parties the flexibility to attend and view Project materials at their convenience. Western has used the open-house format extensively on past projects, particularly because its informality encourages one-on-one discussions between attendees and Project team representatives to maximize public understanding of the proposed Project and public input. Project team representatives included staff from Western, SWE, and their natural resource and NEPA contractors.

One hundred fifty-four individuals signed in at the public scoping meetings. One hundred twenty-eight individual public comments were submitted at the public scoping meetings or afterward through submissions directly to Western and SWE by mail, email, phone, or through the Project website <http://www.wapa.gov/transmission/hermosawest.htm>.

As a result of a comment letter submitted by the property owners at Fish Creek Ranch requesting a meeting with Western, a half-day field visit was arranged. Representatives from Western and SWE and their contractors went to Fish Creek Ranch on June 24, 2010, to meet with the property owners and hear their concerns. The visit included a tour of Fish Creek Ranch facilities and some of the homes there. The focus of their concerns was visual impacts to their viewshed and potential impacts to property values.

Substantive comments received during public scoping are summarized in table 1.10-1 at the end of this chapter and in the public scoping report (Western 2010c) prepared for the Project. NEPA regulations define what is considered to be a substantive comment. Substantive comments are specific issues or concerns that stakeholders requested be addressed in the EIS. They are not general statements of support or opposition to the proposed Project (40 CFR 1503).

1.7.6 Agency Consultations and Meetings

1.7.6.1 Agency Consultations

Western conducted a direct mailing to the tribes, Federal, State, and local agencies on January 11, 2010, describing the proposed Project, announcing the public scoping period and public scoping meetings, and soliciting input on the proposed Project and requests for consultations with Western. In response to the outreach activities, Western conducted consultations with the agencies listed in table 1.7-1.

Table 1.7-1:
Western Consultations

Agency	Regulatory Consideration	Description of Consultation	Date
Wyoming State Historic Preservation Office	National Historic Preservation Act Section 106	Focused on the area of potential visual effects from historic resources in the Project area	June 10, 2010
U.S. Fish and Wildlife Service	Endangered Species Act, Section 7 and Migratory Bird Treaty Act	Focused on potential effects to avian species and bats	April 29, 2010
Bureau of Indian Affairs, Rocky Mountain Regional Office, Regional Director	Government-to-Government Consultation with Federally recognized Indian tribes	Focused on potential effects to important cultural and natural resources and places with traditional cultural significance	February 5, 2010

1.7.6.2 Agency Meetings

SWE met with the agencies listed in table 1.7-2 to consult with them on Project development. During the meetings, SWE provided information about the proposed Project and obtained input and recommendations to consider in Project design and the EIS.

Table 1.7-2:
SWE Meetings

Agency	Regulatory Consideration	Description of Meeting	Date
Albany County Department of Planning	County planning and siting requirements	SWE met with the Planning Director regarding County planning requirements	August 26, 2009
City of Laramie Mayor and City Manager	Newspaper Article	City Council stated support for Wind Project	February 17, 2010
Wyoming Department of Environmental Quality, Industrial Siting Division	Industrial Siting Act	Met to introduce the project and staff to WISC. Received feedback and permit requirements.	October 19, 2010
Wyoming Department of State Parks and Cultural Resources	Wyoming historic preservation consultation	Reviewed potential impacts and identify concerns.	October 20, 2010
Wyoming Game and Fish Department	Wildlife survey protocols	Provided updates on the Project and obtained input on wildlife surveys of the Project area; met onsite to discuss wildlife survey results and any additional input for studies	March 23, 2010, and May 3, 2010
Wyoming State Historic Preservation Office	National Historic Preservation Act Section 106	Focused on cultural resources research and survey findings and the area of potential visual effects from historic resources in the Project area	June 10, 2010
U.S. Fish and Wildlife Service	Endangered Species Act, Section 7 and Migratory Bird Treaty Act	Focused on potential effects to avian species and bats; met onsite to discuss wildlife survey results and any additional input for studies	April 29, 2010, and May 3, 2010

1.8 Document Organization

The remainder of this EIS is organized as follows:

Chapter 2 describes Western's Federal action and alternative and SWE's proposed Project. The chapter also provides a description of the proposed Project, Project schedule, construction activities, operation and maintenance activities, future decommissioning, and mitigation and monitoring practices.

Chapter 3 describes the existing natural and human environments in the Project area. Specific resources considered are those with relevance to the proposed action and include the following:

- Land Use
- Biological Resources (including special status species and water, wetlands, and floodplains)
- Cultural Resources and Native American Concerns
- Paleontology
- Noise
- Visual Resources
- Air Quality
- Transportation
- Recreational Resources
- Socioeconomics
- Environmental Justice
- Agriculture
- Geology and Soils
- Hazardous Materials
- Health and Safety

Chapter 4 describes the potential effects of Western's proposed Federal action and SWE's proposed Project to the existing resources described in chapter 3. This chapter includes definitions of the significance criteria used to measure and analyze environmental effects, and presents recommendations for resource-specific mitigation measures that would be implemented to reduce impacts associated with the proposed Project.

Chapter 5 describes potential cumulative effects of Western's proposed Federal action and SWE's proposed Project in combination with other past, present, or reasonably foreseeable future projects.

Chapter 6 identifies unavoidable adverse environmental effects.

Chapter 7 discusses the relationship between short-term use of the environment and long-term productivity.

Chapter 8 discusses significant irreversible and irretrievable commitments of resources.

Chapter 9 lists individuals and organizations with which Western consulted during preparation of the EIS.

Chapter 10 includes an alphabetical listing of the references cited in the EIS.

Chapter 11 lists the names and positions of individuals who helped to prepare the EIS.

1.9 EIS Schedule

Table 1.9-1 presents the anticipated EIS schedule. The schedule is based on NEPA guidance for timeframes, such as review and waiting periods on portions of the EIS. Unforeseen information, issues, or requests for additional review time could alter the EIS schedule.

Table 1.9-1:
EIS Schedule

Milestone	Anticipated Date
Issue Public Draft EIS	Week of 8/24/12
Public Hearings on Draft EIS	Week of 9/10/12
End of Draft EIS comment period	Week of 9/08/12
Final EIS issuance	Week of 9/27/12
End of Final EIS waiting period	Week of 10/24/12
Record of Decision (ROD) issuance	Week of 10/24/12

1.10 Public Scoping Comments

Substantive comments received during public scoping are listed in table 1.10-1 by resource category, annotated by the chapter or section in the EIS where the comment is addressed. Commenters are encouraged to review the indicated sections of the EIS to see how their concerns were addressed, and to provide Western with any further thoughts or comments during the public review period for this EIS.

Table 1.10-1:
Summary of Public Scoping Comments

Resource	Comments	Chapter/Section in EIS Where Comment is Addressed	
Agriculture	Concern about the possible effects of wind turbines on grazing land and livestock	4.13.3	Impact Assessment of the Proposed Project
	Concern about potential effects from construction of new roads, increased traffic, and damage to fields, fences, and food for livestock	4.13.3	Impact Assessment of the Proposed Project
	Concern that livestock could escape fenced-in areas and be frightened, injured, or even killed directly or indirectly by construction or operation of the Project	4.13.3	Impact Assessment of the Proposed Project
Air Quality	Concern about the effect of wind turbines on local climate and weather conditions	4.8.5.2	Operations Impacts
	Concern that wind turbines could cause an increase in local air turbidity and moisture content	4.8.5.2	Operations Impacts

Table 1.10-1:
Summary of Public Scoping Comments

Resource	Comments	Chapter/Section in EIS Where Comment is Addressed
Cultural Resources and Native American Concerns	Concern about potential damage to historic trails, historic roads, and Native American cultural resources	4.4.3 Impact Assessment of the Proposed Project
	Concern about physical damage and impairment of recreational uses of the Overland Trail, Cherokee Trail, emigrant trails, North Park Road, Lincoln Highway, the first transcontinental railroad line, and the Willow Creek/Dirty Woman Stage Coach Station	4.4.3 Impact Assessment of the Proposed Project
	Requests that Western consider mitigating visual effects to historically or culturally significant resources	4.4.3 Impact Assessment of the Proposed Project 4.4.5 Mitigation Measures
	Concern about damage to cultural resources from insufficiently trained field operators and non-compliance with the National Historic Preservation Act and the Archeological Resources Protection Act	4.4.5 Mitigation Measures
	Suggestion that the Project team create a plan for unexpected cultural resource discoveries	4.4.5 Mitigation Measures
	Concern about effects to Native American cultural sites and prehistoric sites	4.4.3 Impact Assessment of the Proposed Project
	Requests discussion of a bison kill site and associated structures and religious sites that may be near the Project area	4.4.3 Impact Assessment of the Proposed Project
	Suggestion that the Project team consult with Native American tribes to determine whether the area may be considered traditional cultural property by any tribes, and whether there is potential to discover resources that may be protected under the Native American Graves Protection and Repatriation Act	4.4.3 Impact Assessment of the Proposed Project
Cumulative Effects	Concern regarding the potential cumulative effects of the Project and other energy generation projects in the area and the possibility of those projects interconnecting to Western's Craig to Ault 345-kV transmission line	5.4.1 Industry-Specific Cumulative Effects
	Concern that the Project would not be the only new project interconnecting to Western's Craig to Ault 345-kV transmission line	5.4.1 Industry-Specific Cumulative Effects
	Request for analysis of the environmental effects associated with a foreseeable or potential change to Western's Craig to Ault 345-kV transmission line given the interconnection of the Project and other project interconnections	5.4.1 Industry-Specific Cumulative Effects
	Request that all the energy generation projects that would use Western's Craig to Ault 345-kV transmission line be considered in the EIS	5.4.1 Industry-Specific Cumulative Effects
Environmental Justice	Request that the requirements of EO 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) be addressed in the EIS	4.12.2 Significance Criteria 4.12.3 Impact Assessment of the Proposed Project
Geology, Minerals, and Soils	Concern about changes to access and surface rights for kimberlite deposits in the Project area	4.14.3.2 Mineral Resources
Hazardous Materials	Concern about hazardous materials associated with the Project, which could include industrial waste, air pollutants, toxic chemicals used for vehicle maintenance and in construction, and smoke from the burning of vegetation	4.15.2.1 Construction Activities 4.15.2.2 Operations and Maintenance

Table 1.10-1:
Summary of Public Scoping Comments

Resource	Comments	Chapter/Section in EIS Where Comment is Addressed
Health and Safety	Concern about the adequacy of law enforcement on the Project site, fire prevention and response, road and driving conditions, buffering between residences and the Project, industrial waste, and effects to aviation	4.16.5.3 Solid Waste 4.16.3.3 Emergency Services and Emergency Response 4.16.5.5 Fire Prevention and Control 4.16.4.2 Public Health and Safety and Site Security 4.9.2.3.1 Impacts on Air Traffic Patterns
	Concern about the control of access to the Project site because there have been recorded instances of illegal activity in the area and that providing additional access roads could facilitate such activities, in particular poaching and drug manufacturing	4.16.5.2 Public Health and Safety and Site Security
	Concern that the Project could potentially increase the need for law enforcement in the area	4.16.3.3 Emergency Services and Emergency Response
	Request that the design of the maintenance building include a large water tank for the Tie Siding Volunteer Fire Department to use to fight fires on the Project site	4.16.5.5 Fire Prevention and Control
	Concern about hazardous winter driving conditions, such as turbulence, ground blizzards, and drifting snow caused by wind turbines and maintenance facilities located near Cherokee Park Road and Boulder Ridge Road	4.9.2.1 Other Road Impacts
	Concern about potentially hazardous driving conditions on U.S. Highway 287 from cars trying to pass construction equipment or trucks with a request for mitigation measures during the construction period	4.9.4.4 Other Safety Measures
	Request that a buffer zone of 1.5 to 2 miles be created between homes and the wind farm for health and safety of area residents	4.16.5.2 Public Health and Safety and Site Security
Land Use	Concern about how the Project might affect the agricultural and residential nature of the current and future land use in the area	4.2.3 Impact Assessment of the Proposed Project
	Concern that the Project may affect future land uses for the area, such as planned subdivisions, because a wind farm is incompatible with residential land use and falls into the industrial land use category	4.2.3 Impact Assessment of the Proposed Project
	Statement that wind development is preferable to residential subdivision development because subdivided land is associated with destruction of native flora, fauna, habitat, and ground cover; intensive water use; and negative effects on the viewshed, taxes, fire protection, law enforcement, and roads	4.2.3 Impact Assessment of the Proposed Project
	Statement that wind development is compatible with open space, habitat for wildlife, and agricultural activities, while subdivision development is not	4.2.3 Impact Assessment of the Proposed Project
	Statement that agricultural land in the area is not economically viable and is marginally productive, so wind development provides an additional opportunity to generate income for ranch or agricultural landowners	4.11.2.6 Effects on the Local and State Economy
	Statement that the Project location allows for interconnection to existing transmission lines and is, therefore, less land intensive with less impact to the environment compared to other potential wind farm locations	4.2.3 Impact Assessment of the Proposed Project

Table 1.10-1:
Summary of Public Scoping Comments

Resource	Comments	Chapter/Section in EIS Where Comment is Addressed
NEPA Process	Statement that the public involvement process was inadequate because not all landowners potentially affected by the Project were notified	1.7 Outreach to Public Stakeholders
	Statement that all landowners who use Cherokee Park Road for access to their properties should have been notified, not just those within the Project footprint and adjacent landowners	1.7 Outreach to Public Stakeholders
	Question about whether Western notified interested agencies, specifically the USACE, regarding jurisdictional wetlands in the Project area	1.7.4 Federal, State, and Local Agencies and Elected Officials
	Request that the *Wellington News* be used for public notifications because it is published weekly and could reach stakeholders in a timely manner	1.7.5 Public Scoping
	Question about whether the Project team would consider coordination with other wind developers in the region to share costs of monitoring efforts	SWE Met with WG&F specifically about this issue they indicated this project is not in critical wintering habitat and further study would not be required.
	Concerns about mitigation and reclamation	2.6 Best Management Practices and SWE's Proposed Mitigation Measures 4.1 through 4.16 Mitigation Measures
	Question about the legal and monetary commitment to mitigation, decommissioning, and reclamation	4.1 through 4.16 Mitigation Measures
	Questions about activities associated with decommissioning	2.5 Decommissioning
	Request that Western inspect the mitigation and best management practices post-construction to ensure their adequacy and execution	2.6 Best Management Practices and SWE's Proposed Mitigation Measures
	Request that the EIS address potential adverse effects on specific resources, including the University of Wyoming infrared observatory on Jelm Mountain, the Fish Creek Ranch development, and other Wyoming power-generating sources	4.7.3 Universal Visual Impacts of Project Components 4.7.4 Visual Impacts from Key Observation Points 4.2.3 Land Use—Impact Assessment of the Proposed Project
	Request that the EIS specify the height of the turbines, total acreages of temporary and permanent impacts, the construction schedule, and Project completion date and operation and maintenance activities and associated impacts	2.2.2 Proposed Project Site 2.3.1 Schedule 2.3.10 Wind Turbine Specifications 2.4 Operation and Maintenance
Noise	Request that information be provided about the noise created by one turbine versus the total number of turbines that would be constructed for the Project	4.6.3.2 Operation
	Request that the incremental noise effect of each additional turbine be explained, how far audible noise would travel, and whether the noise could be characterized	4.6.3.2 Operation
	Question about whether the wind turbine noise could be heard inside a car traveling near the wind farm and at what level it would occur; what effects the noise would have on humans, wildlife, and livestock; and whether noise effects could be mitigated with a dampening system	4.6.3.1 Construction 4.6.3.2 Operation

Table 1.10-1:
Summary of Public Scoping Comments

Resource	Comments	Chapter/Section in EIS Where Comment is Addressed
	Request that wind turbine syndrome and the echo effect be analyzed in the EIS and that noise effects to the Mill Creek subdivision in Colorado and subdivisions surrounding the Project be discussed	4.6.3.2 Operation
Purpose and Need Project Alternatives	Request that the EIS include the criteria and process used to develop and eliminate alternatives	2.2.1 Proposed Project Site Selection
	Request that alternative sites in sparsely populated areas along Western's Craig to Ault 345-kV transmission line be considered to minimize environmental impacts	2.2.1 Proposed Project Site Selection
	Request that Western consider the cost of the Project against the value of the power produced	1.3 Western's Purpose and Need
	Request to consider alternative sites on the eastern side of U.S. Highway 287 and at other locations along Western's Craig to Ault 345-kV transmission line	2.2.1 Proposed Project Site Selection
	Question about the Project's efficiency, the demand for power, and the regulatory climate associated with wind development	1.6 Regulatory Framework 2.2.3 Renewable Energy Demand and Incentives 2.4 Operation and Maintenance
	Request that the EIS define the need for the Project because it is believed that it would serve Colorado's energy needs and RPSs and would take advantage of Federal incentives to create additional revenue for SWE, a subsidiary of an international company	1.5 SWE's Purpose and Need 2.2.3 Renewable Energy Demand and Incentives
	Statement that additional electrical power is not needed in the local market and that the local environment and area residents would bear the burden of environmental effects from the Project	2.2.3 Renewable Energy Demand and Incentives
	Request that the location of the Project be moved closer to the energy demand in Colorado	2.2.1 Proposed Project Site Selection
	Question about the current State of Wyoming regulations regarding wind development and whether a new wind development project could even be built	1.6.4 State and Local Requirements
	Request that the strength of the wind resources in the area be independently studied and verified because of the belief that the wind resources in the area are not actually strong enough to make the Project a wise or efficient investment	1.3 Western's Purpose and Need 2.2.1.1 Wind Resources
	Statement that wind resources in the area are weaker in the summer and fall and question about how that would affect the ability of the Project to produce energy	2.2.1.1 Wind Resources
	Question about the general reliability of wind generation and whether creating new wind generation is a practical source of energy	2.2.1.1 Wind Resources
	Question about how the number of turbines per acre would affect efficiency	2.3 SWE's Proposed Project Description
Recreational Resources	Statement that hunting in the area would be negatively affected by the Project given the direct loss of State property to the development	4.10.3.1.1 Hunting
	Statement that State land in the Project area is intended for recreation for the public, specifically hunting	4.10.3.1.1 Hunting

Table 1.10-1:
Summary of Public Scoping Comments

Resource	Comments	Chapter/Section in EIS Where Comment is Addressed
Socioeconomics	Statement that the City of Laramie, Albany County, and the Sate of Wyoming would enjoy job creation, tax revenue, and a general boost to the economy from the purchase of goods and services associated with the Project	4.11.2.1 Population and Employment 4.11.2.6 Effects on the Local and State Economy
	Statement that wind development would allow some families to generate extra income and would help ranchers remain economically viable	4.11.2.6 Effects on the Local and State Economy
	Request that the EIS quantify the effect on the local economy, businesses, and employment from revenue related to taxes, goods, services, and post-construction jobs	4.11.2.6 Effects on the Local and State Economy
	Request for an explanation of how and in what timeframe tax incentives would be applied to the Project	4.11.2.6 Effects on the Local and State Economy
	Statement that economic benefits from the Project would be temporary and would occur during the construction phase but, in the long-term, the Project would negatively affect local economies by requiring the City to pay for road maintenance, snow removal, snow fences, law enforcement, and administrative staffing associated with the Project	4.11.2.6 Effects on the Local and State Economy
	Statement that local tax revenues would actually decline because the Project would reduce property values in the area	4.11.2.5 Property Values 4.11.2.6 Effects on the Local and State Economy
	Concern about a potential decrease in property values from the Project	4.11.2.5 Property Values
	Statement that properties within 1 mile of a wind farm would lose 25 percent of their value	4.11.2.5 Property Values
	Statement that properties in the vicinity would lose value in the following locations because visual quality would be degraded: Tie Siding, the Buttes Subdivision, adjacent properties and subdivisions, and the entire southeastern portion of the State	4.11.2.5 Property Values
	Statement that property values would decline because of the adjacency of an industrial site (the Project)	4.11.2.5 Property Values
	Request that the EIS include (1) a discussion on home value effects, including homes valued at more than $1 million and (2) case studies comparing historical property values of homes adjacent to wind development pre- and post-construction	4.11.2.5 Property Values
	Statement that the cost of the Project would outweigh the financial benefits	4.11.2.6 Effects on the Local and State Economy
	Request that the Project area be expanded to allow more landowners to be included and benefit financially from the Project	2.2.1 Proposed Project Site Selection
	Comment that wind turbines do not conflict with the visual setting of the natural environment and would not deter that stakeholder from purchasing property in the area	4.11.2.5 Property Values

Table 1.10-1:
Summary of Public Scoping Comments

Resource	Comments	Chapter/Section in EIS Where Comment is Addressed
Transportation	Concern about effects of the Project to local roads, including U.S. Highway 287, Cherokee Park Road, and Boulder Ridge Road	4.9.2.1.6 Impacts on Roads
	Request for information in the EIS regarding effects to roads from new roads and road improvements, Project construction and operation, increased access and traffic volumes, and large trucks and heavy equipment	4.9.2.1.6 Impacts on Roads 4.9.2.3 Operations 4.9.4.1 Physical Improvements 4.9.4.2 Operational Procedures for Construction and Decommissioning Phases
	Concern about the potential for car and truck collisions and collisions with wildlife	4.9.4.4 Other Safety
	Question about the requirements of the County Road and Bridge Department, including potential upgrades on public highways, travel management, and enforcement	4.9.4.1 Physical Improvements
	Request that SWE mitigate surface disturbances by minimizing the construction of new roads and, if new road construction was necessary, to adequately plan road construction	4.9.4.1 Physical Improvements
	Request that a map of proposed access roads be included in the EIS	4.9.2.1.8 Internal Road Network 4.9.4.1 Physical Improvements
	Concern that wind farms present aviation hazards, and that bird diverters may serve a dual purpose by providing visual cues to pilots	4.9.2.3.1 Impacts on Air Traffic Patterns
Vegetation	Concern about surface disturbances and damage to vegetation from construction of the Project	4.3.2.3 Impact Assessment of the Proposed Project
	Request that SWE consider implementing a noxious weed management plan to reduce the risk of the dispersion of invasive weed species	4.3.2.3 Impact Assessment of the Proposed Project
Visual Resources	Comment that visual effects would be unavoidable because of the sheer height of the turbines and the associated components of the Project	4.7.1.8 Significance Criteria and Thresholds 4.7.4 Visual Impacts from Key Observation Points
	Request that Project planning consider the visual effects to adjacent properties, properties on Boulder Ridge, and the rural character of the area	4.7.4 Visual Impacts from Key Observation Points
	Concern about how lights required by the Federal Aviation Administration might be placed, flash, and affect views	4.7.3 Universal Visual Impacts of Project Components
	Question about whether turbulence from the turbines could cause visual haze in the valley	4.7.3 Universal Visual Impacts of Project Components
	Concern that shadow flicker from turbines could create hazardous driving conditions along Cherokee Park Road and Boulder Ridge Road with a request that the EIS discuss the flicker effect of up to 200 wind turbines	4.7.3 Universal Visual Impacts of Project Components

Table 1.10-1:
Summary of Public Scoping Comments

Resource	Comments	Chapter/Section in EIS Where Comment is Addressed	
Visual Resources	Request for new photographic simulations of the Project to represent new key observation points and times of day. Photographic simulations were requested from the vantage points listed below: — All directions — Ground level — Adjacent properties — Summit of Interstate 80 — Medicine Bow National Forest — Laramie River valley — Dale Creek area — Roosevelt National Forest in Colorado — Boulder Ridge area — Cherokee Park Road — U.S. Highway 287	4.7.4	Visual Impacts from Key Observation Points
	Request for the following mitigation measures: design wind turbines to have a uniform appearance, locate gen-tie lines and wind turbines in low-lying areas, paint the wind turbines light brown or dark grey to blend with the landscape, and convert surrounding land into conservation easements so that more wind turbines cannot be added in the future	4.7.7	Mitigation Measures
	Request for a specific mitigation measure for Cherokee Park Road to locate the wind turbines on one side of the road (north or south), instead of on both sides to reduce the visual degradation of the area	4.7.7	Mitigation Measures
	Request that SWE follow mitigation measures prescribed in the Albany County Wind Energy Siting Regulations	4.7.7	Mitigation Measures
Water, Wetlands, and Floodplains	Concern about surface disturbances to fragile streams	4.3.1.2	Impact Assessment of the Proposed Project
	Request that the EIS address effects to stream stability, mass failure, surface and subsurface water quality, drainage, water flow, sedimentation, and water rights	4.3.1.2	Impact Assessment of the Proposed Project
	Concern about water quality and flows specific to Fish Creek and Mill Creek	4.3.1.2	Impact Assessment of the Proposed Project
	Request that the EIS consider impaired waters, as defined by Clean Water Act Section 303(d)	3.3.1.4	Surface Water
	Statement that because the Project would be located in a Federal Emergency Management Agency Special Flood Hazard Area, SWE should coordinate with the local floodplain manager to avoid negative effects or damage in the floodplain	4.3.1.2	Impact Assessment of the Proposed Project
	Request for mitigation measures to minimize effects to water, wetlands, fen wetlands, and floodplains, including avoidance of wetlands to the maximum extent practicable, and wetland restoration, creation, or enhancement	4.3.1.2	Impact Assessment of the Proposed Project
	Request that specific information on mitigation plans be provided in the EIS, including the type and location of planned mitigation measures	4.3.2.5	BMPs and Mitigation Measures
	Request that the EIS describe how the Project would address the wetlands protection goals in EO 11990 (Protection of Wetlands)	3.3.1.1	Regulatory Setting
Wildlife	Concern about effects to area wildlife populations, and to the vegetation and habitat supporting wildlife populations	4.2.3.2	Impact Assessment of the Proposed Project

Table 1.10-1:
Summary of Public Scoping Comments

Resource	Comments	Chapter/Section in EIS Where Comment is Addressed
Wildlife	Request that the EIS describe the current use, quality, and capacity of wildlife habitat in the Project area	3.3.3.2 Existing environment
	Request that the EIS describe critical wildlife habitat and identify effects the Project would have on the habitat and species, including habitat fragmentation effects to individual species	3.3.3.2 Existing Environment 4.3.3.2 Impact Assessment of the Proposed Project
	Request that the EIS provide a mitigation plan containing detailed mitigation measures to minimize or eliminate adverse effects to wildlife	4.3.3.4 Mitigation Measures
	Request that the EIS provide a monitoring plan, preconstruction, for terrestrial and aquatic habitats to establish a valid baseline database from which to measure and detect future effects	4.3.3.4 Mitigation Measures
	Comment that the Project area is a transition zone between prairie and mountain that hosts a wide variety of species, among them mule deer, elk, pronghorn, marmot, coyote, rabbit, bobcat, mountain lion, bear, beaver, moose, mink, white-tailed prairie dog, ground-nesting birds, migrating song birds, turkey, blue grouse, goshawk, red-tailed hawk, ferruginous hawk, rough-legged hawk, Swainson's hawk, golden eagle, bald eagle, short-eared owl, long-eared owl, great-horned owl, burrowing owl, mountain plover, greater sage grouse, and turkey vulture	3.3.3.2 Existing Environment
	Request that the EIS analyze potential effects to the specific species in the Project area and that effects to the species be avoided or mitigated	4.3.3.2 Impact Assessment of the Proposed Project 4.3.3.4 Mitigation Measures
	Concern about the safety of large elk herds in the Project area	4.3.3.2 Impact Assessment of the Proposed Project 4.3.3.4 Mitigation Measures
	Concern that the Project area, Fisher Ranch, and Key Creek are wintering and calving areas for elk and fawning areas for pronghorn	3.3.3.2 Existing Environment
	Request for the mitigation measures listed below to minimize effects to elk and pronghorn: — Limit the construction season — Minimize fencing — Use wildlife-friendly fences as prescribed by the Wyoming Game and Fish Department — Minimize winter plowing of access roads — Use only motion-activated and downcast lights on buildings to prevent disturbing or attracting wildlife — Avoid crucial big game winter ranges and migration corridors	4.3.1.4 Mitigation Measures—not all apply 4.7.7 Mitigation Measures—not all apply 4.9.4 Mitigation Measures—not all apply 4.3.3.4 Mitigation Measures—not all apply
	Concern about the potential mortality of avian species and bats from wind turbines and meteorological tower guy wires	4.3.3.2 Impact Assessment of the Proposed Project
	Request that the EIS include maps identifying migration corridors for birds in the Project area and the potential avian collision hazard areas	This information will be included in the Final EIS, pending survey results to be finalized in June 2011.

Table 1.10-1:
Summary of Public Scoping Comments

Resource	Comments	Chapter/Section in EIS Where Comment is Addressed
Wildlife	Request for the mitigation measures listed below to minimize effects to avian species: — Include bird diverters on wind turbines, meteorological towers, and guy wires — Use un-guyed tubular meteorological towers — Conduct preconstruction surveys and use careful planning and siting methods to identify and avoid areas that avian species use the most, such as concentration areas and flight pathways — Complete preconstruction surveys to find and avoid nests — Avoid siting Project components in prairie dog colonies because they are habitat for burrowing owl and mountain plover, and Project components would attract birds of prey — Avoid siting Project components in areas that would attract raptors, such as ridges and bluffs — Conduct weekly fixed-radius (100-meter radius) passerine/small bird and raptor/large bird point counts — Conduct post-construction carcass surveys, scavenger removal trials, and searcher efficiency trials to determine which wind turbines are the most detrimental to avian species — Shut off certain wind turbines that cause many kills during migration season — Comply with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act — Before construction, use field analysis of bat use patterns and flight pathways to avoid high use and bat concentration areas — Raise the cut-in speeds of wind turbines because bats are active at lower wind speeds	4.3.3.4 Mitigation Measures—not all apply
	Concern about the potential effects of Project lighting on wildlife	4.3.2.3 Impact Assessment of the Proposed Project
	Statement that Federal Aviation Administration-required lights are confusing for nighttime migratory species with suggestion that the problem be mitigated by reducing the number, color, and strobe effect of required lights	4.3.3.4 Mitigation Measures
	Statement that certain lights would be more detrimental than others with solid red lights and sodium vapor lights, for example, having been shown to attract active or migrating birds	4.3.3.4 Mitigation Measures
	Request to exclusively using flashing red or white lights on wind turbines, meteorological towers, and communication towers and to avoid using sodium vapor lights	4.3.3.4 Mitigation Measures

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2.0 PROPOSED FEDERAL ACTION AND ALTERNATIVE AND SWE'S PROPOSED PROJECT

This chapter describes Western's proposed Federal action and alternative to the proposed Federal action as well as a detailed description of SWE's proposed Project. Also described are the differences between the two and how each is pertinent to this EIS. Section 2.1 describes the facilities associated with the proposed Federal action including transmission system upgrades necessary for the interconnection. Section 2.2 describes the proposed Project site, including site selection criteria, wind resources at the site, and power delivery. Section 2.3 provides the SWE Project description, including the system upgrade Project elements, along with the wind farm infrastructure required for a 300-MW wind generation facility. It describes the Project schedule, construction activities, operation and maintenance activities, future decommissioning, and mitigation and monitoring practices.

2.1 Western's Proposed Federal Action and Alternative

The proposed Federal action to consider SWE's interconnection agreement is distinct from SWE's proposal to construct a wind energy project. Western's proposed Federal action is limited to consideration of the interconnection request submitted by SWE and the associated system upgrades that would be required. Western is analyzing the potential environmental effects of SWE's proposed Project in this EIS to fully disclose the activities and impacts associated with the interconnection request. SWE's decision to construct the proposed Project, however, could proceed regardless of Western's involvement. In that situation, SWE would seek alternative transmission opportunities. This scenario will not be analyzed in this EIS, as in that case there would be no Western proposed Federal action to address under NEPA.

2.1.1 Interconnection Request

SWE's application to Western requests interconnection under the Tariff of up to 300 MW of energy from the proposed Project with the Craig to Ault 345-kV transmission line jointly owned by Western, Tri-State Generation and Transmission Association, and Platte River Power Authority.

The 345-kV transmission line is approximately 180 miles long, extending from Craig, Colorado, north into Wyoming, then south to Ault, Colorado (figure 2.1-1). Western would require certain system modifications to accommodate the interconnection request, which would be financed by SWE. Western's action on the interconnection request is considered a major Federal action subject to NEPA, in accordance with Council on Environmental Quality regulations for implementing NEPA, and DOE NEPA Implementing Procedures (40 CFR Parts 1500−1508, 10 CFR Part 1021). Western prepared a NEPA determination for the interconnection request that indicated an EIS would be the appropriate level of environmental analysis for the proposed Federal action.

As described in chapter 1, Western's Tariff provides for open access to the Federal transmission system if there is available capacity in the transmission system, or if the SWE creates the capacity by financing system upgrades at its own expense. Also, the interconnection cannot reduce the reliability of the current transmission system or hinder Western's ability to fulfill power delivery to existing customers. The *Facilities Study* (Western 2011; appendix A) for the proposed Project indicates that the transmission system can accommodate the interconnection with the proposed Project with the SWE-financed system upgrades described below.

2.1.2 System Upgrades

Western commissioned a *Facilities Study* (July 2011) to determine whether there was sufficient capacity on the 345-kV transmission line to accommodate the Project. The study documents that capacity on the 345-kV transmission line already is 100 percent obligated. To satisfy SWE's interconnection request, the rating of the transmission line would need to be increased by 300 MW by upgrading the current transformers at both the Craig and Ault Substations, increasing the thermal capacity on the transmission line, and making other improvements. The estimated cost of the improvements is $8,918,878 (Western 2011), which would be the responsibility of SWE as the entity needing the increased capacity.

Western also would require a 10-acre site for a switchyard/proposed Project substation for the SWE interconnection. The switchyard would be collocated with SWE's proposed Project substation near transmission structures 50-3 and 50-4 on the 345-kV transmission line (figure 2.1-2). It would transfer and manage power from SWE's substation and deliver it to the 345-kV transmission line. The switchyard would be configured as a 345-kV three-breaker ring bus with communication equipment to be operated remotely from Western's Operations Center in Loveland, Colorado. A 1,200-square-foot control building would be located adjacent to the switchyard. There would be an approximate 0.3-mile-long overhead gen-tie line connecting the substation and switchyard to the existing 345-kV transmission line. Western chose the switchyard location because it would require only a short gen-tie line, and its location would provide some degree of security for the equipment. The estimated cost of the switchyard and associated equipment is $6,409,421 (Western 2011), for which SWE would be responsible. To address the issue of a backup power supply for the Switchyard and substation, SWE will be extending the existing local low voltage distribution lines (approximately 1 mile away) to the switchyard and substation. Shell will also be extending the existing low voltage distribution line to the Operations and Maintenance building for power needs.

2.1.3 Federal No Action Alternative

Under the no action alternative, Western would not execute an interconnection agreement with SWE and the proposed Project would not be constructed and interconnected with Western's transmission system. Western's determination not to approve the interconnection agreement could make SWE's proposed Project infeasible. SWE could however, continue to pursue their proposed Project by applying for interconnection with another transmission provider in the vicinity, although Western cannot speculate on whether access to alternative transmission is a technically and economically feasible option for SWE. The electrical generation capacity of the proposed Project could change depending on the transmission capacity of an alternative transmission provider, and other factors could make the Project infeasible. However, for the

Craig to Ault 345-kV Transmission Line

Project Features

Hermosa West Wind Energy Project

Craig to Ault 345-kV Transmission Line

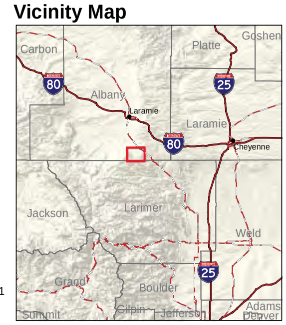
Transmission

230-kV Transmission Line

345-kV Transmission Line

Substation

Vicinity Map



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Revised: January 3, 2011
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PDF: P:\4004_Shell_Hermosa_West\GIS\Maps\chapter_1
Sources: ESRI, Western, Tri-state, BTS, WyGISC, USGS

Hermosa West Wind Energy Project

Figure 2.1-1: Craig to Ault 345-kV Transmission Line

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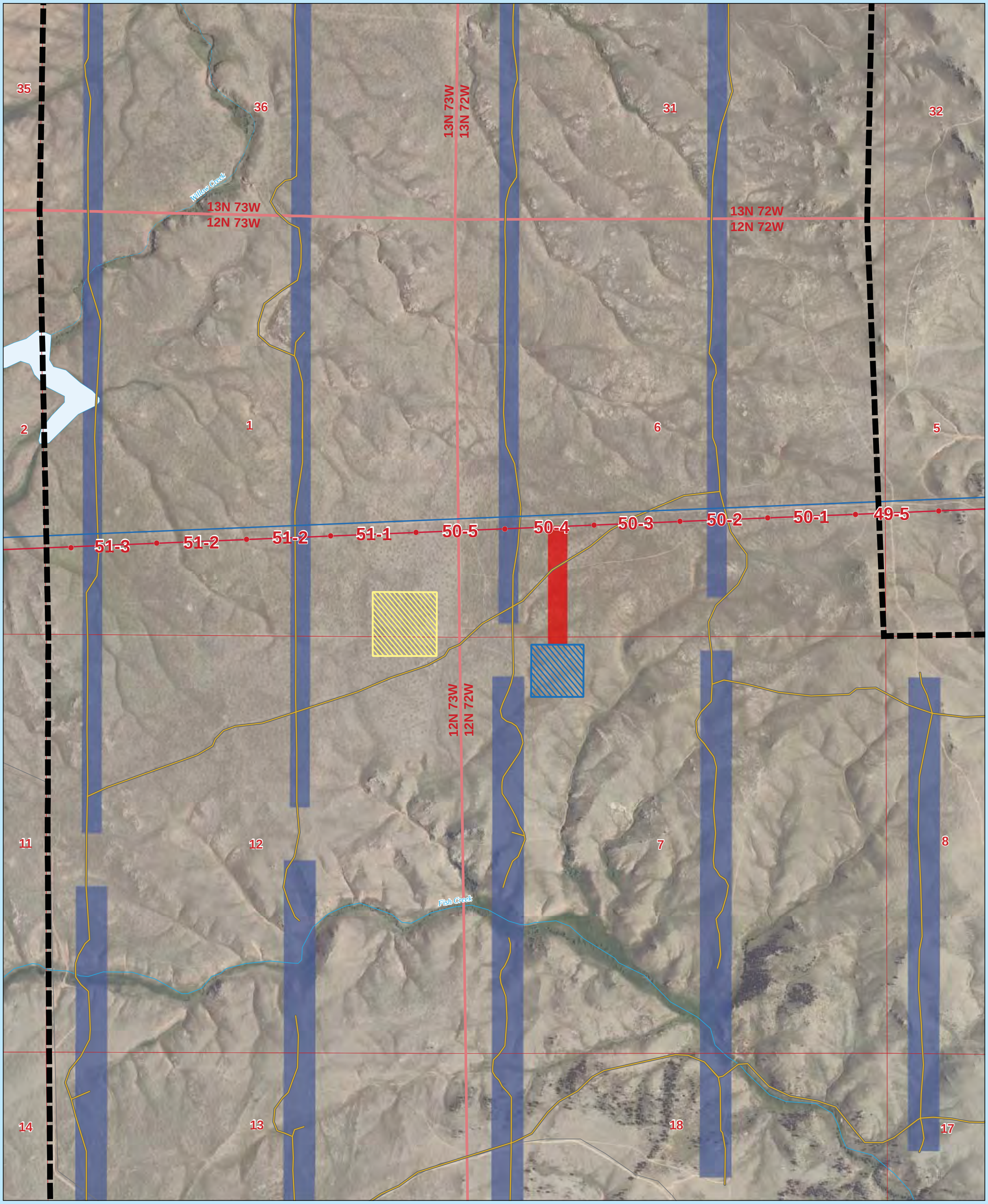

Interconnection to Transmission Line

Project Features

- Hermosa West Wind Energy Project
- New Access Road
- Proposed Transmission Interconnect
- Proposed Turbine Corridor
- Proposed SWE Substation
- Construction Laydown Area

Transmission

- 230-kV Transmission Line
- 345-kV Transmission Line

0 1,000 2,000 Feet

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Sources: ESRI, Western, BTS, WyGISC, USGS

Vicinity Map

Hermosa West Wind Energy Project

Figure 2.1-2: Point of SWE Interconnection with the Craig to Ault 345-kV Transmission Line

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purposes of this EIS, which discusses the potential impacts of Western's decision, the no action alternative is considered to result in the Project not being constructed and the environmental impacts associated with the Project not occurring.

For the purposes of this analysis, the term "no action alternative" applies to the interconnection agreement associated with the proposed Federal action and the "no Project option" applies to SWE's proposed Project. This interpretation of the no action alternative and no Project option will allow Western to provide a meaningful analysis of environmental impacts based on the comparison of Western's proposed Federal action and SWE's proposed Project to existing baseline conditions.

2.2 SWE's Proposed Project Site

SWE is proposing to construct, operate, and maintain a wind-powered electric generating facility producing up to 300 MW of electricity that would be interconnected to Western's existing Craig to Ault 345-kV transmission line in southeastern Wyoming. Western would have no participation in, ownership of, or jurisdiction over SWE's proposed Project. The details of SWE's proposed Project site are presented below.

2.2.1 Proposed Project Site Selection

The search for a site in southeastern Wyoming was begun by SWE in 2006. A variety of criteria were used to identify potential sites leading to the one currently proposed in SWE's application for interconnection. Their objective was to find a location that maximized the key environmental and physical criteria listed below:

- Provide utility-scale wind resources—area of "good" to "superb" high wind density classification
- Avoid sage grouse habitat
- Avoid Federal Aviation Administration (FAA) facilities and flight paths
- Provide sufficient contiguous land area to scale the proposed Project up to 300 MW
- Provide existing high-voltage transmission lines to transport power generated by the proposed Project
- Provide existing transportation infrastructure for delivery of wind turbines, construction materials, and equipment
- Be located near a market for the power generated by the proposed Project
- Landowners interested in leasing the land for a wind energy facility

Other criteria that played a role in SWE's selection of the proposed Project site included the desire to locate the proposed Project on private land to the extent practicable. An area where fewer landowners hold large tracts of land was important to SWE as it would result in negotiating fewer lease agreements. The topographic characteristics were also important in considering the proposed Project site. The selected site consists primarily of rolling prairie and does not have steep slopes that would result in increased construction costs and potential safety concerns.

Several scoping comments requested that alternative sites along Western's Craig to Ault 345-kV transmission line and on the eastern side of U.S. Highway 287 be considered by SWE, that the location of the Project be moved closer to the energy demand in Colorado, and that the Project area be expanded to allow more landowners to be included and benefit financially from the Project. The Hermosa East site on the east side of U.S. Highway 287 was identified by SWE as a potential second phase of the Hermosa Project. The economics of developing the Hermosa East site are less favorable than the Hermosa West site. However, the Hermosa East site could be considered an alternative site for the proposed Project. The Hermosa East site and other sites were not selected because wind resources are less favorable than the Hermosa West site.

The proposed Project site was determined by SWE to be preferred because it has some of the strongest wind resources in the United States. The DOE's National Renewable Energy Laboratory assigns the proposed Project site one of the highest wind density classifications in the country, ranging from "good" to "superb" (figure 2.2-1).

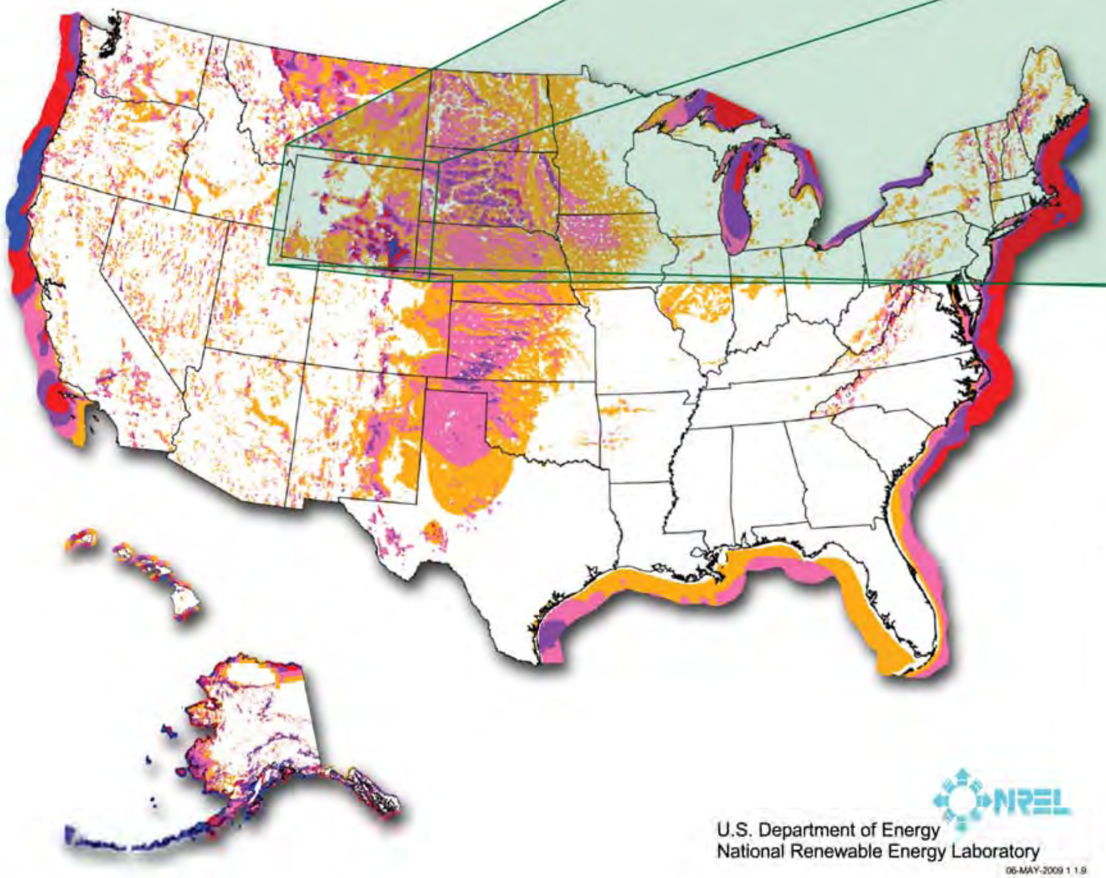
SWE's analysis of wind data collected onsite indicates that wind on the proposed Project site blows primarily from the west and northwest. Past data indicate that mean representative wind speeds on the site range from 19 miles per hour (mph) to 22 mph as measured at an altitude of 262 feet.

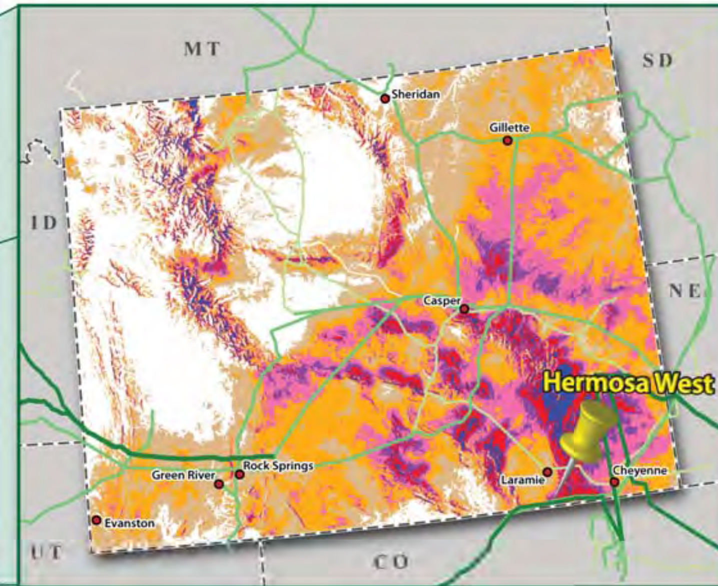
A representation of the seasonal variation in wind speeds is shown in table 2.2-1. Mean representative wind speeds peak at approximately 29 mph to 32 mph from November through February. They remain high through the spring; mean representative wind speeds of approximately 19 mph to 25 mph occur from March through June. During the warmer months of July through October, mean representative wind speeds are more typically in the range of 13 mph to 17 mph. Wind turbines would typically cut-in, or begin operations, at a wind speed of 9 mph. Wind turbines would typically cut out, or suspend operations, at a wind speed of 55 mph. Generally, wind speeds are highest in the pre-dawn hours and in the hours between 12:00 p.m. and 5:00 p.m.

Table 2.2-1:
Seasonal Wind Data on the Proposed Project Site

Month	Wind Speed (mph)
January	30
February	29
March	25
April	22
May	20
June	19
July	13
August	15
September	14
October	17
November	32
December	30

Wyoming Wind Resources





Transmission Line*
Voltage (kV)

- 69
- 115
- 230
- 345

* Source: POWERmap,©2002 Platts, A Division of the McGraw-Hill Companies

Wind Power Classification

Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m^2	Wind Speed[a] at 50 m m/s	Wind Speed[a] at 50 m mph
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	800 - 1600	8.8 - 11.1	19.7 - 24.8

[a] Wind speeds are based on a Weibull k value of 2.0

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2.2.2 Proposed Project Site

As described above, the proposed Project site was selected by SWE because it met the siting criteria SWE identified as important factors for a successful wind generation project. It is located in southeastern Albany County, Wyoming, at an elevation of approximately 7,700 feet (figure 2.2-2). The proposed Project site is 18 miles south of Laramie, Wyoming, and 47 miles north of Fort Collins, Colorado. U.S. Highway 287; the town of Tie Siding, Wyoming; and the Union Pacific Railroad are immediately east of the proposed Project site. Boulder Ridge, with a maximum elevation of 8,500 feet is immediately west of the proposed Project site. Larimer County, Colorado, and the Arapaho-Roosevelt National Forest are immediately south of the proposed Project site. The area north of the proposed Project site is largely open range consisting of grazing and dispersed residential development, light industry, and natural areas from the Project boundary all the way to Laramie.

The proposed Project site is 11,125 acres. It is primarily grassland and rangeland used for cattle grazing. The proposed Project site would be leased from four individual landowners, including the State of Wyoming (figure 2.2-3). The Wyoming Office of State Lands and Investments leases much of the State land within the Project site to generate revenue to support the Wyoming Education Trust Fund and other designated Wyoming public institutions, such as the Wyoming State Hospital. SWE has obtained lease agreements for the proposed Project from each of the landowners, including the State of Wyoming.

Permanent facilities supporting the proposed Project would affect approximately 140 acres of land, or 1.25 percent of the total 11,125 acres. Temporary disturbances during construction would affect approximately 409 acres of land, or 3.7 percent of the total acreage. Together, the permanent and temporary disturbances would total approximately 4.9 percent of the total acreage. The anticipated permanent and temporary disturbance areas are listed in table 2.2-2.

Table 2.2-2:
Estimated Area of Permanent and Temporary Disturbance

Temporary Facilities	Unit Area	Number of Units	Total Area (acres)
Roads (square feet disturbed per linear foot of road)	20	255,920	117
Materials Laydown Areas (acres per area)	15	3	45
Wind Turbine Laydown Areas (square feet per area)	25,000	200	115
Access for Overhead Gen-tie Line (square feet per linear foot of road)	50	2,000	2.8
Underground Collector Cables (square feet per linear foot of trench)	12	468,744	129
Subtotal for Area of Temporary Disturbance			408.8
Permanent Facilities	Unit Area	Number of Units	Total Area (acres)
Wind Turbine Pads (square feet per wind turbine)	5,600	200	26
Substation and Switchyard (acres)	10	1	10
Meteorological Tower (square feet)	2,500	4	0.22
Access Road to Meteorological Tower (square feet per linear foot of road)	16	5,390	2
Operation and Maintenance Facility Area (acres)	2	1	2
Wind Turbine String Roads (square feet per linear foot of road)	16	234,372	86

Table 2.2-2:
Estimated Area of Permanent and Temporary Disturbance

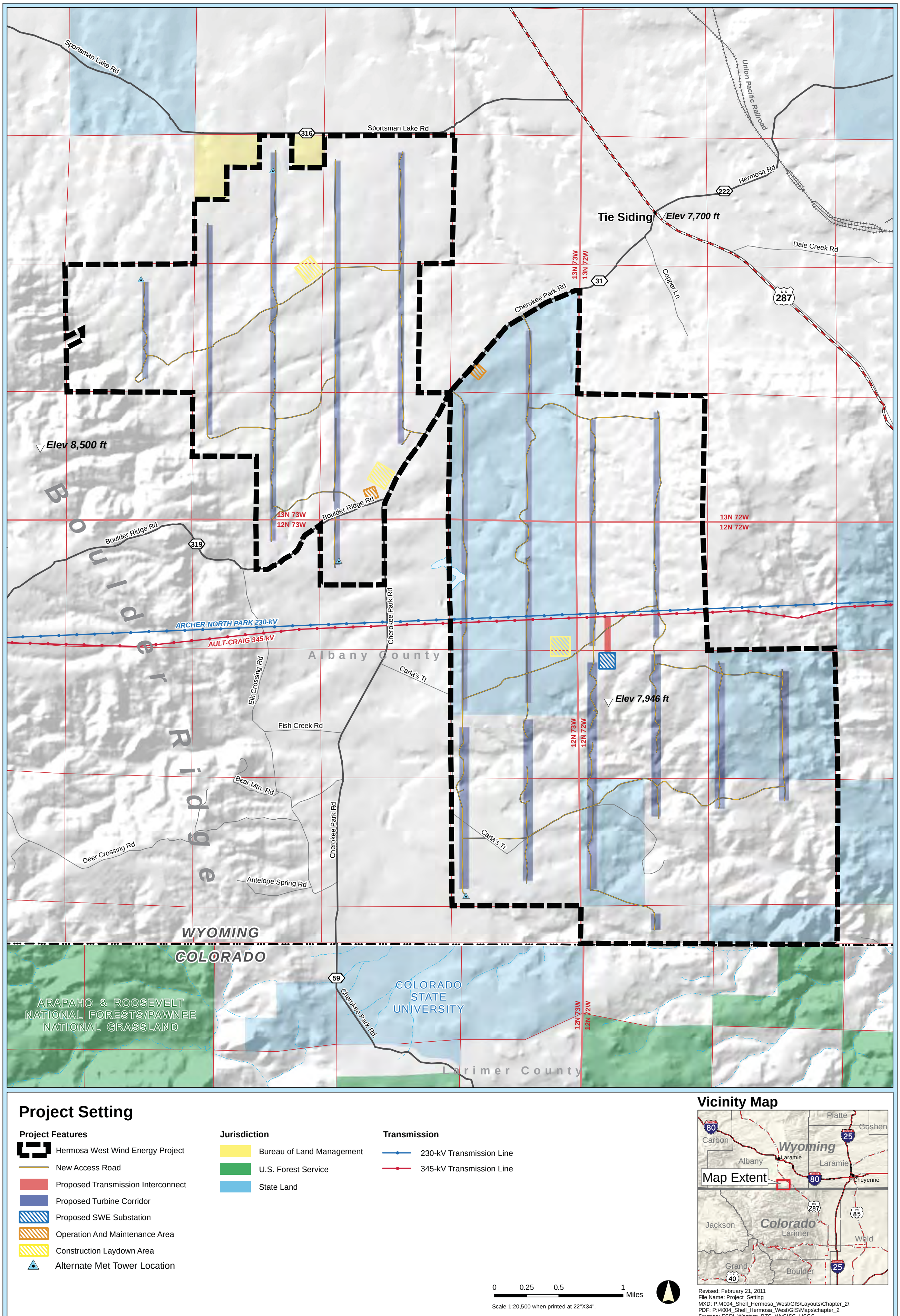
Temporary Facilities	Unit Area	Number of Units	Total Area (acres)
County Road Improvements (square feet per linear foot of road)	24	21,548	12
Turn-out Areas (square feet)	2,400	30	1.7
Subtotal for Area of Permanent Disturbance			139.92

2.2.3 Renewable Energy Demand and Incentives

Construction of the proposed Project responds to increasing market demand in the United States for sources of renewable energy, including wind-generated energy. Thirty-five states now have a RPS or goal for the amount of electricity produced by renewable energy sources, such as wind, solar, biomass, and geothermal sources (Pew Center on Global Climate Change 2009). Wyoming does not have a renewable energy standard or goal. Neighboring Montana, however, has a renewable energy standard of 15 percent by 2015, meaning that 15 percent of electricity used by consumers in the State must come from sources of renewable energy by 2015. Colorado has a renewable energy standard of 30 percent by 2020 (DSIRE 2011). These renewable energy standards, among others, create a dynamic marketplace in which wind energy can be generated in one location and transmitted to another location in response to market conditions and power purchase agreements between the wind energy developer and the utility or large-scale customer purchasing the electricity.

The Federal Government provides financial support for both non-renewable and renewable sources of electricity production in the United States. A November 2007 Government Accountability Office report estimated that between 2002 and 2007, $13.7 billion in tax expenditures were spent to support fossil fuel-based electricity production, such as coal and gas. During the same period, $2.8 billion was spent to support renewable energy-based electricity production such as wind and solar. Similarly, between 2002 and 2007, $9.3 billion of DOE research and development funding was spent on nuclear and fossil fuel-based electricity production. During the same period, $1.4 billion of DOE research and development funding was spent on renewable energy-based electricity production (AWEA undated). The Energy Policy Act (42 U.S.C. §13201 et seq.) and current Administration energy policies provide further government support for developing renewable energy and getting it to markets.

The Federal Government also provides tax incentives for renewable energy development to incentivize investment in low carbon energy generation. The American Recovery and Reinvestment Act of 2009 extended the production tax credit for renewable energy development of $0.02 per kilowatt hour of renewable energy produced, through December 31, 2012. The production tax credit had previously been extended since 1992. AWEA estimated in 2009 that the total wind power capacity in the United States was approximately 35,600 MW. Of that, there were 1,101 MW produced in Wyoming and 1,246 MW produced in Colorado.



HERMOSA WEST WIND ENERGY PROJECT

FIGURE 2.2-2: PROJECT SETTING

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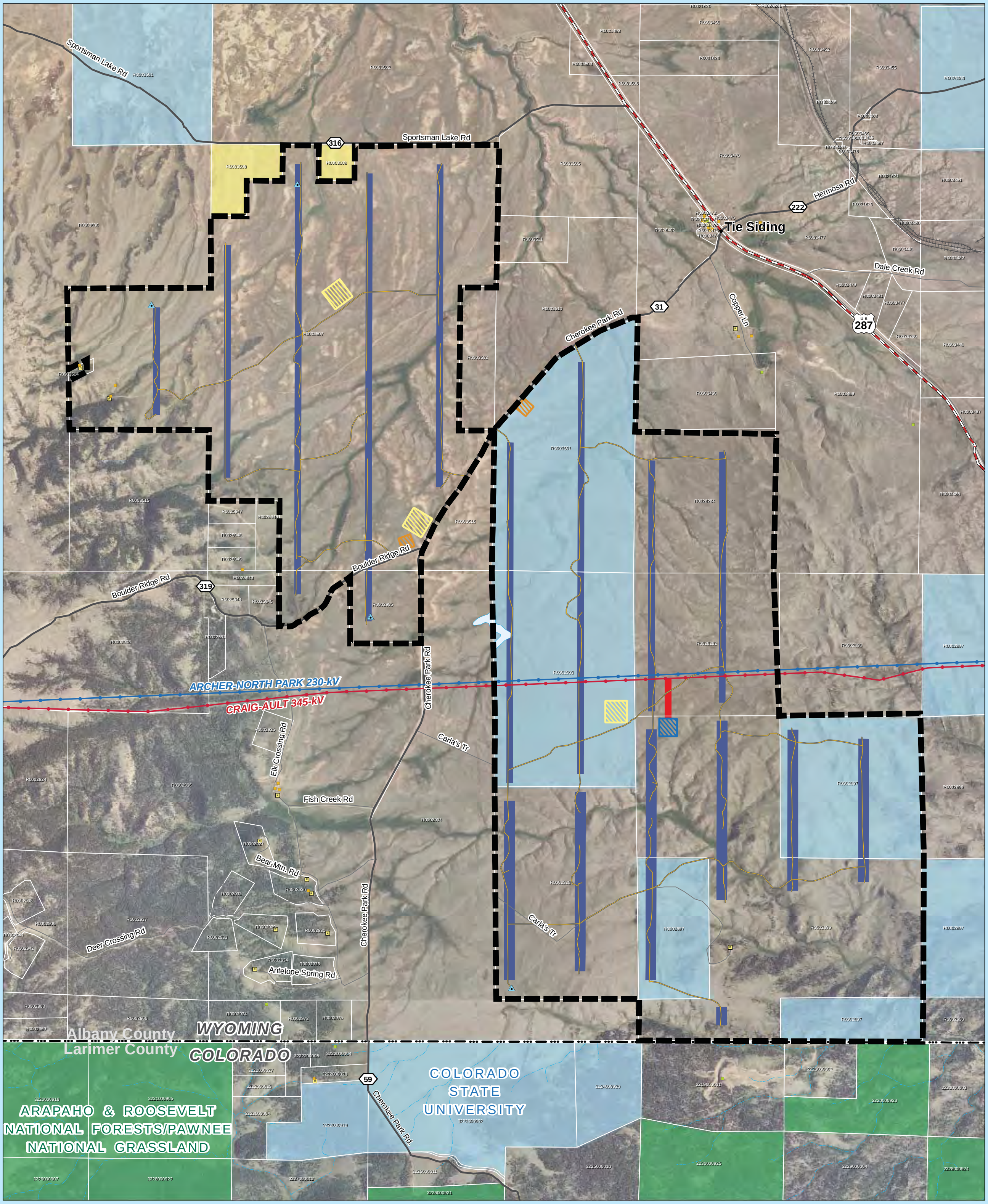


Land Ownership

Project Features
- Hermosa West Wind Energy Project
- New Access Road
- Proposed Transmission Interconnect
- Proposed Turbine Corridor
- Proposed SWE Substation
- Operation And Maintenance Area
- Construction Laydown Area
- Alternate Met Tower Location

Jurisdiction
- Bureau of Land Management
- U.S. Forest Service
- State Land
- Parcel Boundary
- Residence
- Farm or Outbuilding
- Other Building

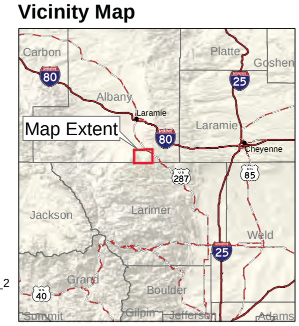
Transmission
- 230-kV Transmission Line
- 345-kV Transmission Line

0 0.25 0.5 1 Miles

Scale 1:20,500 when printed at 22"X34".

Revised: November 2, 2010
File Name: Land_Owner
MXD: P:\4004_Shell_Hermosa_West\GIS\Layouts\chapter_2
PDF: P:\4004_Shell_Hermosa_West\GIS\Maps\chapter_2
Sources: ESRI, Western, BTS, WyGISC, USGS

Vicinity Map



Hermosa West Wind Energy Project
Figure 2.2-3: Project Site Landowner Parcels

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2.3 SWE's Proposed Project Description

This section presents the proposed Project schedule and describes the proposed Project components and construction methods in detail. Figure 2.3-1 shows the proposed major permanent and temporary features required to construct and operate SWE's proposed Project. It includes the existing Cherokee Park and Boulder Ridge Roads, the existing 345-kV Western transmission line, the proposed wind turbine strings, access roads, the substation and switchyard site, overhead gen-tie line, construction laydown areas, operation and maintenance building site, and meteorological towers. It also describes operations and maintenance activities, decommissioning activities, and best management practices SWE has built into the Project design.

SWE could build the proposed Project in phases with up to 200 wind turbines and a total generating capacity of up to 300 MW of electricity at maximum build-out. The phased construction would correspond to SWE's power purchase agreements with utilities or other large consumers for the purchase of electricity generated by the proposed Project.

The wind turbines would be arranged in 11 linear strings running north to south on the proposed Project site (figure 2.3-1) to align with the predominant wind direction across the site. The turbines would be sited to maximize efficiency. Each wind turbine string would be located in a corridor of approximately 250 feet, which provides sufficient area for environmental analysis under NEPA, and a large enough area to allow for flexibility in placement of the wind turbines and access roads, depending on whether environmental resources within the corridor need to be avoided. For safe placement in areas of steep topography, the width of the corridors would be increased to 400 feet to accommodate siting and construction challenges in this terrain. In addition to wind turbines, SWE's proposed Project would include the following permanent facilities.

- Access roads to each turbine site
- Up to four meteorological towers
- Underground collection lines at 34.5 kV to deliver power generated by the wind turbines to the Project substation
- Approximate 10-acre Project substation and Western switchyard
- Approximately 0.3-mile-long 345kV overhead gen-tie line connecting the Project substation and Western switchyard to the existing 345kV transmission line
- A low-voltage distribution line
- Backup power for the 345kV substation/switchyard site
- Metering equipment
- Supervisory control and data acquisition equipment
- A 5,000- to 8,000-square-foot operation and maintenance facility with office, storage for spare parts, restrooms, telecommunications equipment, shop, conference room, emergency living accommodations, parking, and material laydown area.

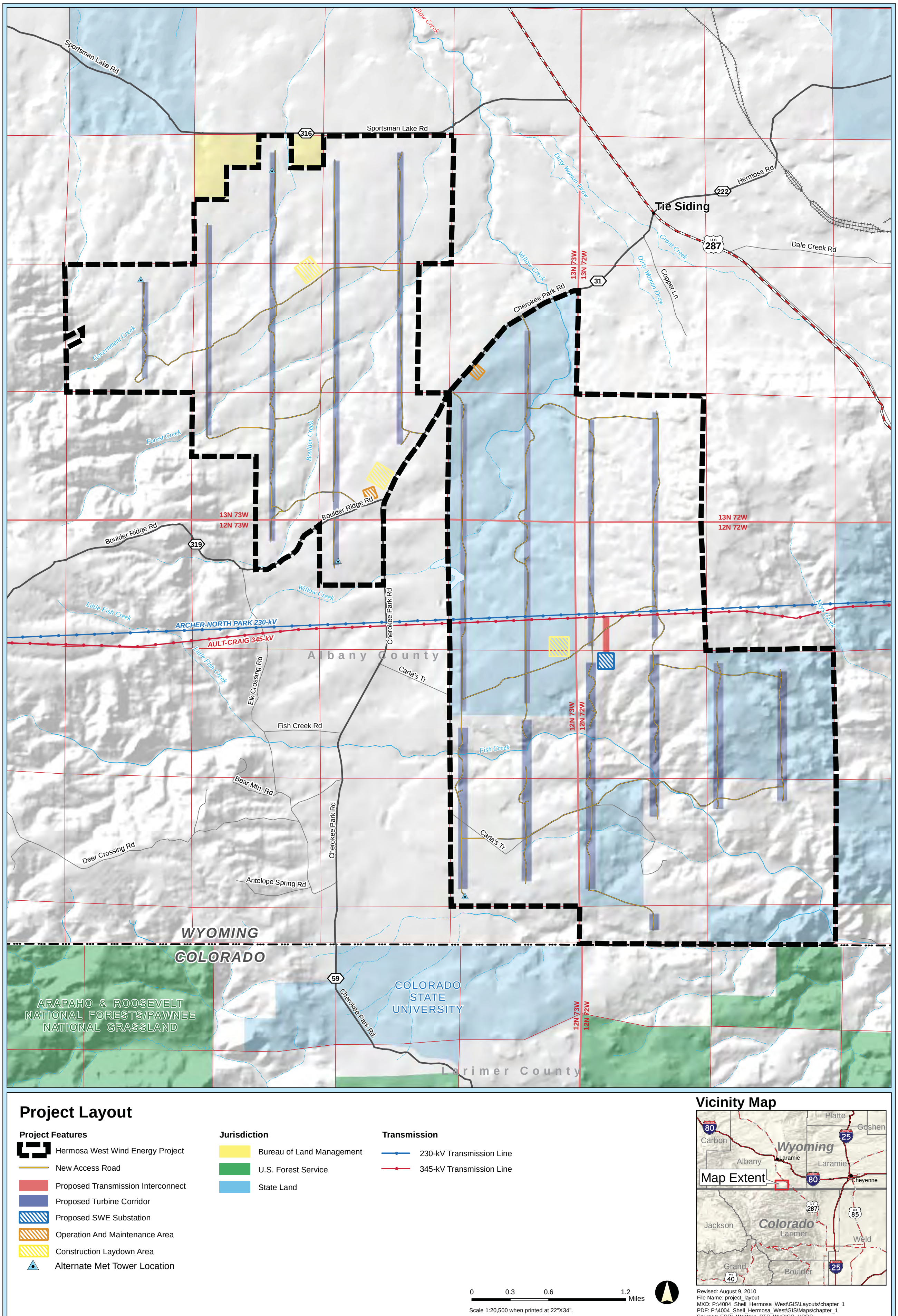
2.3.1 Schedule

Construction of the proposed Project would occur over approximately 26 months. The in-service date of the proposed Project is estimated to be December 2015. The outdoor construction season is weather-dependent, but generally is considered to be from March to November, with demobilization of outdoor work in November. Interior work on the wind turbines and finishing work on the operations and maintenance building and substation could continue during the winter months. The construction schedule would take into account any construction restrictions or seek one time variances for sensitive wildlife species required by the U.S. Fish and Wildlife Service (USFWS) or Wyoming Game and Fish Department (WGFD). The typical sequence of construction activities is shown in the list below:

- Mobilization
- Site preparation
- Access roads and material laydown areas
- Wind turbine foundations
- Substation and switchyard construction
- Electrical collection system installation
- Operation and maintenance building construction
- Overhead gen-tie line construction
- Wind turbine installations
- Acceptance testing
- Site reclamation

Many of the construction activities could occur simultaneously after the access roads and material laydown areas have been constructed. Site reclamation, for example, could occur upon completion of installing individual wind turbines.

An estimated maximum of 268 workers would access the proposed Project site per day during peak construction activities, arriving in an estimated 207 vehicles per day (figure 2.3-2). The workforce for the proposed Project is described in Section 4.9, Transportation, and Section 4.11, Socioeconomics.



HERMOSA WEST WIND ENERGY PROJECT

FIGURE 2.3-1: PROJECT LAYOUT

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Construction Activity	Workers per Month																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Construction Management and Staffing[1]	24	24	24	34	34	42	42	42	42	42	42	42	42	42	42	40	26
Road Construction	48	48	48	48	48	48	24	6	6	6	6	6	6	6	6	6	6
Foundation Excavation		13	13	13	13	13	13	13									
Rebar			16	16	16	16	16	16									
Concrete Placement and Wind Turbine Grounding			14	14	14	14	14	14									
Foundation and Wind Turbine Unloading				25	25	25	25	25	25	10	10	10					
Wind Turbine Installation					18	18	18	18	18	18	18	18	18				
Wind Turbine Nacelle/Rotor Installation						16	16	16	16	16	16	16	16	16	8		
Wind Turbine Mechanical and Wiring						12	16	16	16	16	16	16	16	16	16		
Collection System		12	12	24	24	24	24	24	24	24	8	8	8	8	8	8	
Substation			15	25	30	40	40	10									
Total On-site	**72**	**97**	**142**	**199**	**222**	**268**	**248**	**200**	**147**	**132**	**116**	**116**	**106**	**88**	**80**	**54**	**32**

[1] SWE, contractor, original equipment manufacturer

FIGURE 2.3-2: MANPOWER REQUIREMENTS

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2.3.2 Equipment

Table 2.3-1 lists the types of equipment needed for Project construction, the purpose of each equipment type, and their anticipated numbers.

Table 2.3-1:
Anticipated Construction Equipment

Purpose or Phase of Construction	Equipment Type	Anticipated Amount of Equipment
Road Construction (2 crews)	Bulldozer	3
	Hoe and Ram Hoe	4
	Haul Truck	2
	Grader	1
	Compactor	1
Foundation Excavation (5 crews)	Hoe and Ram Hoe	3
	Air Drill	2
	Bulldozer	1
	Compactor	1
Rebar (2 crews)	Picker	2
	Telehandler	1
Concrete Placement (1 crew)	Belt Truck	1
	Pump Truck	1
	Telehandler	2
	Concrete Truck	12–18
Foundation Backfill (3 crews)	Bulldozer	1
	Compactor	1
Wind Turbine Unloading (1 crew)	Crane	1
	Picker	2
	Telehandler	2
Wind Turbine Base Installation (1 crew)	Crane	1
	Picker	1
	Telehandler	2
Wind Turbine Tower Installation (1 crew)	Crane	1
	Picker	1
	Telehandler	2
Wind Turbine Nacelle/Rotor Installation (1 crew)	Crane	2
	Picker	1
	Telehandler	2
Collection System (1 crew)	Trencher	2
	Bulldozer	2
	Hoe	4
	Haul Truck	2
	Cable Truck/Trailer	2
Substation (1 crew)	Drill Truck	1
	Bulldozer	1
	Picker	1

Table 2.3-1:
Anticipated Construction Equipment

Purpose or Phase of Construction	Equipment Type	Anticipated Amount of Equipment
	Hoe	2
	Bucket Truck	2
	Pole Truck	1
Miscellaneous (1 crew)	Picker	2
	Telehandler	4
	Water Trucks	3–4
	Grader	1
	Fuel/Lube Truck	1

Heavy vehicle traffic would be expected on the Project site during construction. Dump trucks, for example, would be needed to move soil and aggregate. Concrete trucks would be needed for wind turbine foundations and other facilities. Water tankers would be needed to wet down roadways for dust control. The main crane needed for wind turbine installation would be assembled at the first wind turbine site and then would be "walked" to subsequent wind turbine sites along the Project access roads. Where the road cannot be built within the tolerances required for walking the crane, the crane would be disassembled, moved to the next wind turbine site, and reassembled (figure 2.3-3).

2.3.3 Construction Materials

Project materials such as the wind turbines, substation equipment, and pre-engineered operation and maintenance building would be obtained from individual manufacturers. Materials and services needed to support Project construction would be obtained locally to the extent possible. For example, grading and access road construction, foundation excavation, concrete used for wind turbine and other foundations, native material used as backfill, and water used for dust suppression on cleared areas or on access roads could be locally sourced.

Since a significant amount of concrete would be needed for construction of the wind turbine foundations, substation foundations, and operation and maintenance building foundation, an onsite batch plant could be used to supply the required concrete. An onsite batch plant would be located in one of the proposed laydown areas. The plant would have the capacity to produce 1,000 yards of concrete daily. The plant would include a generator, a cement storage facility, sand, aggregate, and water storage. The batch plant would occupy approximately 2 to 3 acres of the laydown area and use approximately 30,000 gallons of water daily during peak production of concrete. If an onsite batch plant is not utilized, concrete would be hauled from an offsite plant located near Laramie.

Soil and aggregate used for backfill for roads, wind turbine foundations, the substation and switchyard, and the operation and maintenance building would be obtained onsite to the extent possible from excavated areas. Aggregate also could be hauled in from a nearby quarry.

Hermosa West Wind Energy Project
Figure 2.3-3: Typical Crane Used for Wind Turbine Installation

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2.3.4 Water Supply

During facility construction, construction crews would rely on drinking water and portable toilets trucked onto the Project site. Portable toilets would be serviced by the contractor providing the facilities. The contractors providing dust suppression services would supply water for that purpose from existing offsite facilities. Similarly, the contractors providing blade washing services during Project operation would supply offsite water for that operation. Water for emergency services, such as firefighting, would be provided by the local volunteer fire department.

During the construction phase for the facility, an estimated peak water use of 56,000 gallons per day will be required, with approximately 24,000 gallons/day used for dust suppression. To reduce water demand for dust suppression to the anticipated 24,000 gallons/day, it is proposed to use a chemical stabilizer in the dust suppression water. The total water use during construction is an estimated 2,688,000 gallons (approximately 8.25 acre-feet/year), which would be required for road compaction, underground collection line, dust suppression, and concrete mixing. Water could come from several different sources. Water may be purchased from existing private water source(s) permitted for commercial uses. Recurring post-construction water uses would mainly consist of blade washing services. Water use, primarily for dust suppression during operations of the wind farm, would be minimal given the low vehicle traffic in the Project area.

It is common practice in the ready-mixed concrete industry to thoroughly clean the inside of a concrete trucks drum at the end of each day using approximately 150 to 300 gallons of water. Concrete wash water is alkaline, has high levels of suspended solids, and can contain high levels of metals, which can leach into the ground and contaminate ground water. Contaminated water can also migrate to a drainage which can increase the pH of area waters and harm aquatic life.

Concrete washout would only be disposed in properly designed concrete washout facilities or possibly re-using the water for concrete mixing. Re-use for concrete mixing would depend on the chemical composition of the water.

A permanent groundwater well would be installed in the vicinity of the operation and maintenance building to supply the Project staff with potable water and restrooms during facility operation. The typical peak water usage for the operations and maintenance building will be approximately 55 gallons per minute. Wells in the Project area average 200 to 400 feet in depth; the depth of the water table is 30 to 100 feet below ground level. The groundwater well would also provide water for incidental uses, such as vehicle washing. Groundwater in Wyoming is considered to be property of the State. Installation of the groundwater well would be coordinated with the Wyoming State Engineer’s Office (SEO), which requires an approved permit application prior to well drilling.

In addition to State permitting, groundwater use on the site would be subject to the Platte River Recovery Implementation Program. The State of Wyoming entered into the program with the

States of Colorado and Nebraska and USFWS to protect Platte River Basin target species (whooping crane, interior least tern, piping plover, bald eagle, pallid sturgeon, and western prairie fringed orchid) and their habitats from water depletions in the Platte River. The Platte River Recovery Implementation Program provides a mechanism to comply with Section 7 of the Endangered Species Act. In Wyoming, the program is implemented through the Wyoming Depletions Plan.

The water used for the proposed Project would not be hydrologically connected to the Platte River system. Therefore, there will not be depletion to the Platte River. The USFWS established in 2007 that the depletive effects of projects whose water supply is solely derived from sources that are considered “not hydrologically connected” to the Platte River system do not need to be addressed in consultation with the USFWS.

2.3.5 Material Laydown Areas

Three material laydown areas are planned for the proposed Project site where construction materials can be delivered and stored. Each material laydown area would be approximately 15 acres in size. Rather than deliver wind turbine components to the material laydown areas, those components would be trucked directly to each wind turbine site for installation, unless weather, road construction, or crew availability requires off-loading in the material laydown area. Likewise, materials needed to construct the electrical collection system, substation and switchyard, and operation and maintenance building would be off-loaded at their intended sites wherever possible.

2.3.6 Security

The majority of the proposed Project site is privately owned, and would not be open to the public. The land owned by the State of Wyoming within the Project site would remain open to public access. For safety and security, permanent chain-link fencing would be installed at the substation and switchyard, and at the outdoor storage area adjacent to the operation and maintenance building.

During construction, temporary plastic mesh fencing would be installed to protect the public and workers near excavated wind turbine foundations, electrical collection system trenches, material laydown areas, and any areas deemed hazardous. Open holes will have sides sloped to meet Occupational Safety and Health Administration (OSHA) requirements and trenches would be covered or fenced with appropriate fencing material to deter wildlife and livestock from becoming trapped or injured.

2.3.7 Site Preparation

Construction personnel would first survey and stake the proposed Project site to identify exact locations for facilities, including access roads and wind turbine locations. These facilities would remain inside the 250- or 400-foot wide turbine string corridors analyzed in this EIS for environmental impacts, or would be within other identified areas also studied. The project facility sites would then be cleared, graded, and finished, as appropriate, with a base of aggregate or native material.

Clearing work would consist of removing shrubs and vegetation and disposing of all cuttings and debris to an approved facility designed to handle the material. Final disposal also could include chipping and composting to the extent possible. During site clearing, stumps and roots larger than approximately 2 inches in diameter would be removed down to a depth of approximately 4 inches below the cleared surface. Excavations made during site clearing would be backfilled with compacted earth or aggregate. Site clearing work for the proposed Project is expected to be minimal because the site lacks forested vegetation and cover. During site clearing and grading work, crews would minimize the vegetation removed and alterations to existing stormwater runoff patterns to avoid potential erosion. Topsoil removed would be segregated and stockpiled for post-construction restoration activities.

2.3.8 Roads

All-weather permanent access roads would be needed for access to the wind turbines, meteorological towers, substation and switchyard, and the operation and maintenance building. The access roads would also support temporary facilities associated with construction, such as the construction office area, construction parking, and material laydown areas. Wherever possible, existing disturbances would be used for new access roads. They also would be sited within the approximate 250-foot-wide wind turbine corridors to the extent possible. In the 200-turbine build-out scenario, approximately 12 miles of existing roads would be improved through widening, re-grading, or re-finishing the surface; and more than 31 miles of new access roads would be constructed. Section 4.9, Transportation, discusses the proposed Project's transportation needs and access roads in detail. In particular, trucks carrying wind turbine components would need to be capable of transporting long wind turbine blades and the heavy loads associated with wind turbines. This could require improvements, including widening portions of Cherokee Park Road and Boulder Ridge Road, to accommodate oversized truck deliveries. General road specifications are listed in table 2.3-2.

Table 2.3-2:
General Road Specifications

Characteristic	Specification
Maximum slope	5 to 10% for access and wind turbine string roads
Maximum width (construction)	25 feet for access roads and 50 feet for wind turbine string roads to allow for crane movement
Maximum width (post construction)	Likely 16 feet post construction
Minimum turn radius	115 feet (may vary by wind turbine type)
Road surface	All-weather gravel
Speed limit	25 mph on access roads and 15 mph on wind turbine string roads

Once construction activities are completed, access roads would be narrowed to 16 feet by removing aggregate and reclaiming and revegetating the shoulders.

Based on the proposed Project layout for wind turbines and access roads, internal access roads on the site would need to cross up to 30 water bodies. Of these, 12 are perennial streams, 8 are intermittent streams, and 10 are ephemeral streams. SWE would continue to seek opportunities to minimize stream crossings in the final Project layout by re-routing access roads. Culverts and stream crossings would be designed in accordance with WGFD guidance provided to SWE on October 21, 2009 (ERM 2010e), and professional engineering standards. Such measures would minimize sediment erosion, sediment deposition, and impacts to streams and drainages and other sensitive areas.

2.3.9 Traffic and Deliveries

Delivery times for trucks entering the Project site would be coordinated with use patterns on the public roadways to avoid traffic congestion wherever possible. Truck travel would be confined to roadways and wind turbine sites for noxious weed control.

It is anticipated that trucks would be dispatched from the areas of Fort Collins, Cheyenne, or Laramie, depending on rail deliveries and the sources of equipment and materials. Wind turbine components, for example, may be shipped by rail to Fort Collins or Laramie, and then transported to the site by truck. All deliveries would be required to conform to Federal and State transportation regulations. As described in the Section 4.9,Transportation, construction activities would increase truck travel on U.S. Highway 287. A recent Wyoming Department of Transportation highway widening project, however, expanded U.S. Highway 287 to four lanes in the vicinity of Tie Siding, near the proposed Project site. Signs on the public roadways would warn the public of the increased heavy construction traffic on these roads. Flaggers would be used during delivery of large wind turbine components to alert drivers of turning vehicles and the possible disruption of normal traffic flow. SWE could also coordinate with local law enforcement, to manage traffic flows and monitor traffic speed to assist with safety during deliveries

Regular snow removal is likely during the winter months to maintain access to the turbines and substation for parts delivery and maintenance.

2.3.10 Wind Turbine Specifications

Figures 2.3-4 and 2.3-5 show the configuration of a representative wind turbine. Wind turbines generate electricity from the wind spinning the blades on the wind turbine. As the blades spin, they turn a large, low-speed shaft inside the nacelle, which is the structure at the top of the wind turbine that houses all of the generating equipment. The low-speed shaft turns a large gear inside the gearbox. The large gear turns a smaller gear on a high-speed shaft. This high speed shaft drives the generator, which creates an electric current. The electric current is interconnected to a transformer at the turbine that feeds the current into the underground electrical collection system and onsite substation where the electricity is stepped up to a voltage of 345-kV for transmission on the high-voltage 345-kV transmission line to market.

Cold weather and Wyoming’s winter climate would not be expected to affect operation of the wind turbines because each wind turbine would be equipped with a cold-weather package from the manufacturer consisting of insulation around both the nacelle and the transformer at the base of the wind turbine.

SWE has not selected the specific wind turbine model for the proposed Project. Selection of a model would depend on final Project specifications, price, and availability from the manufacturer. Table 2.3-3 lists the typical turbine models that are used for representation purposes only. The models represent different capacities, ranging from an electrical generation

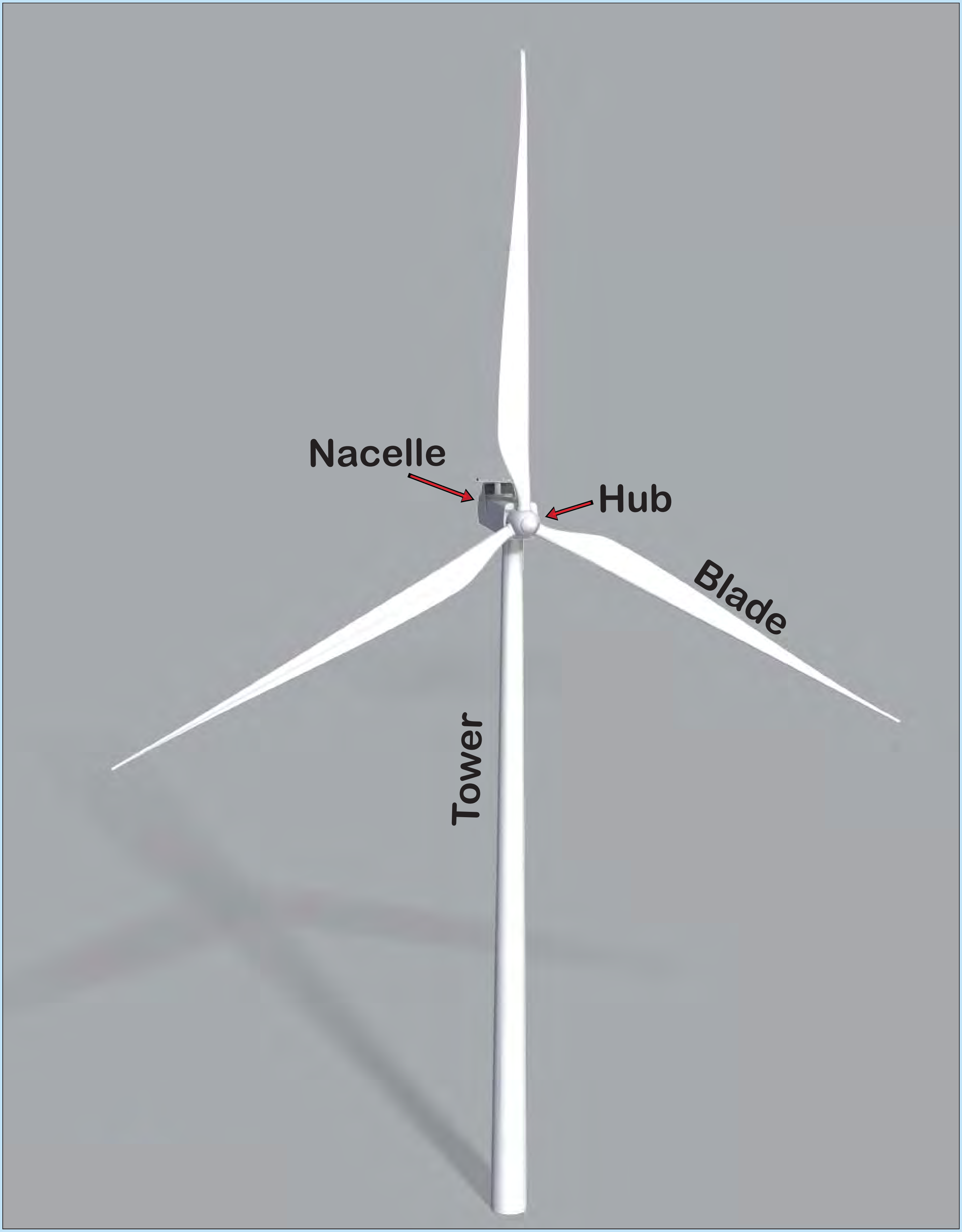

Figure 2.3-4: Representative Wind Turbine

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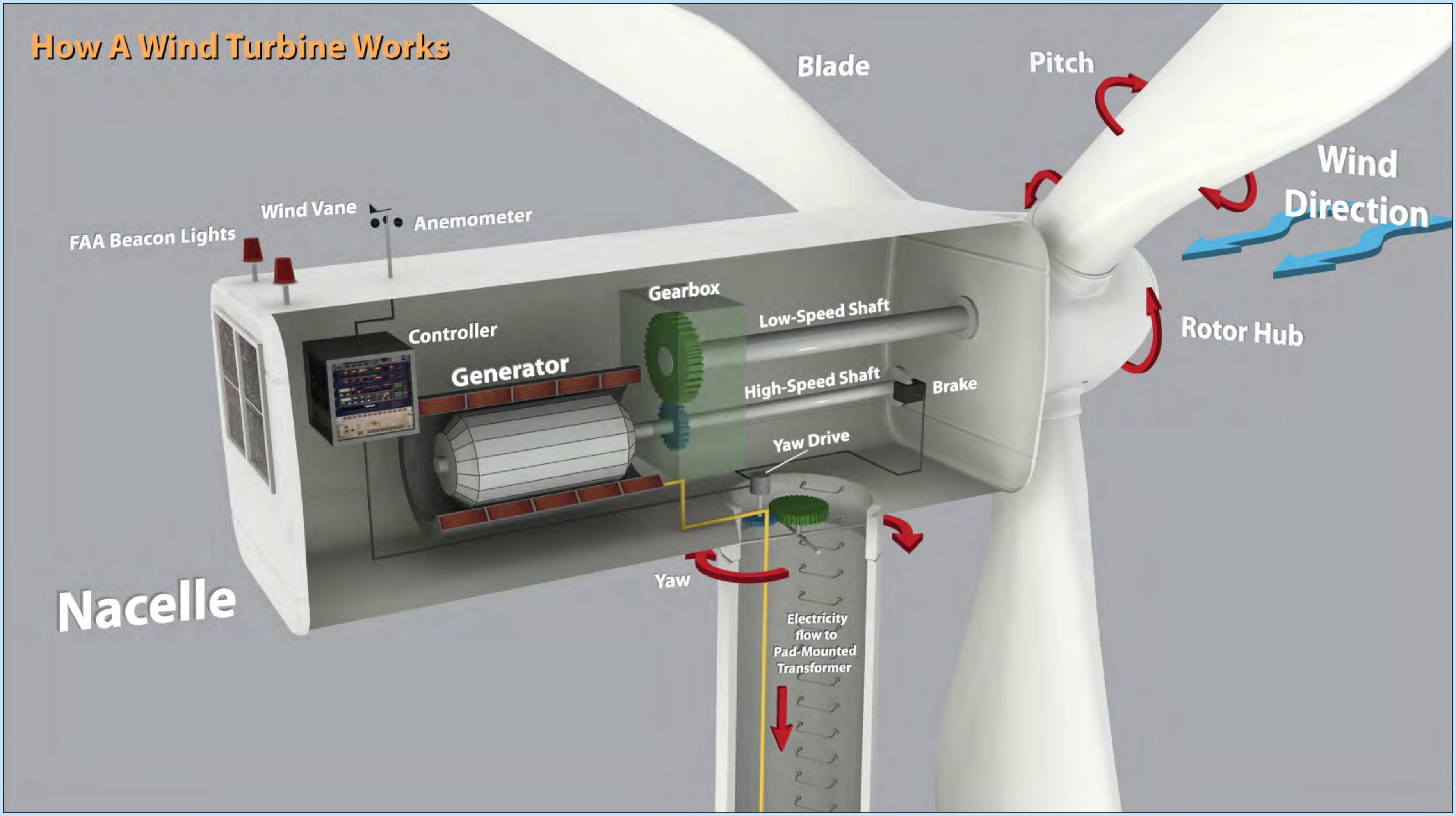

FIGURE 2.3-5: WIND TURBINE NACELLE

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output of 1.5 MW to 3 MW. Achieving the same total facility output would, therefore, require fewer wind turbines with a 3-MW wind turbine than with a 1.5-MW wind turbine.

Table 2.3-3:
Alternative Wind Turbine Specifications

Wind Turbine Specification	GE 1.5 MW 1.5 se	Siemens 2.3 MW SWT-2.3-101	Vestas 3 MW V90
Tower type	Tubular	Tubular	Tubular
Blade diameter (feet)	231	331	295
Hub height (feet from ground)	262	262	262
Total wind turbine height (feet)	379	428	410
Total wind turbine weight (tons)	247	244	230–355

To comply with FAA regulations for structures taller than 200 feet, the wind turbines would require aircraft warning lights per FAA Advisory Circular AC 70/7460-1K (February 2007). Current FAA guidance recommends more conservative lighting plans than past recommendations, such as lighting only the perimeter of the facility with a gap of no more than 0.5 mile between lighted wind turbines. The FAA-required lighting for the proposed Project is described in Section 4.7, Visual Resources. Both the FAA and USFWS would review the proposed Project’s lighting plan to ensure its consistency with FAA guidance and USFWS recommendations for protection of avian species.

To comply with Albany County wind energy siting regulations (Albany County 2011), the turbines would be a non-reflective white or gray color and would have the following setback requirements described in table 2.3-4 and figure 2.3-6.

Table 2.3-4:
Albany County Wind Energy Siting Regulations

<table>
<tr><th>Zoned Area/Infrastructure</th><th>Setback</th></tr>
<tr><td>Incorporated Municipalities</td><td>1 mile</td></tr>
<tr><td>Areas Zoned Residential</td><td>0.5 mile</td></tr>
<tr><td>Primary Structures (residences)</td><td>0.25 mile or 5.5 times the tower height, whichever is greater</td></tr>
<tr><td>Highway Rights-of-Way (ROW)</td><td>0.25 mile</td></tr>
<tr><td>Adjacent Non-leased Property</td><td rowspan="4">total turbine height X 1.10</td></tr>
<tr><td>Public Roads and Railroads</td></tr>
<tr><td>Third-Party Transmission Lines</td></tr>
<tr><td>Communication Towers</td></tr>
</table>

2.3.11 Wind Turbine Foundations

Siting individual wind turbines within each approximate 250-foot-wide corridor (400 feet in some areas) would be determined by the wind turbine model selected, optimizing wind speed and direction at that site, geotechnical conditions of the underlying soils and rock, environmental considerations (e.g., wet soils and topography), and landowner requested setbacks.

The construction area around each wind turbine site would be approximately 20,000 square feet. The wind turbine area and pad would need to be sufficiently clear and level to allow for delivery of wind turbine components, crane operation, and wind turbine installation.

Wind turbine foundations would be either mat (wide and shallow), pier (narrow and deep), or a variation on these foundation types, depending on the soil type and wind turbine requirements. Mat foundations would be approximately 50 to 60 feet wide and 10 to12 feet deep. Pier foundations would be approximately 15 to 18 feet wide and 30 to 40 feet deep. Materials excavated during preparation of the foundations would be used for backfill material on the Project site if they met specified requirements. Once prepared, the foundations would be filled with concrete. The wind turbine base would consist of a metal ring and series of anchor bolts to fasten the wind turbine to its foundation.

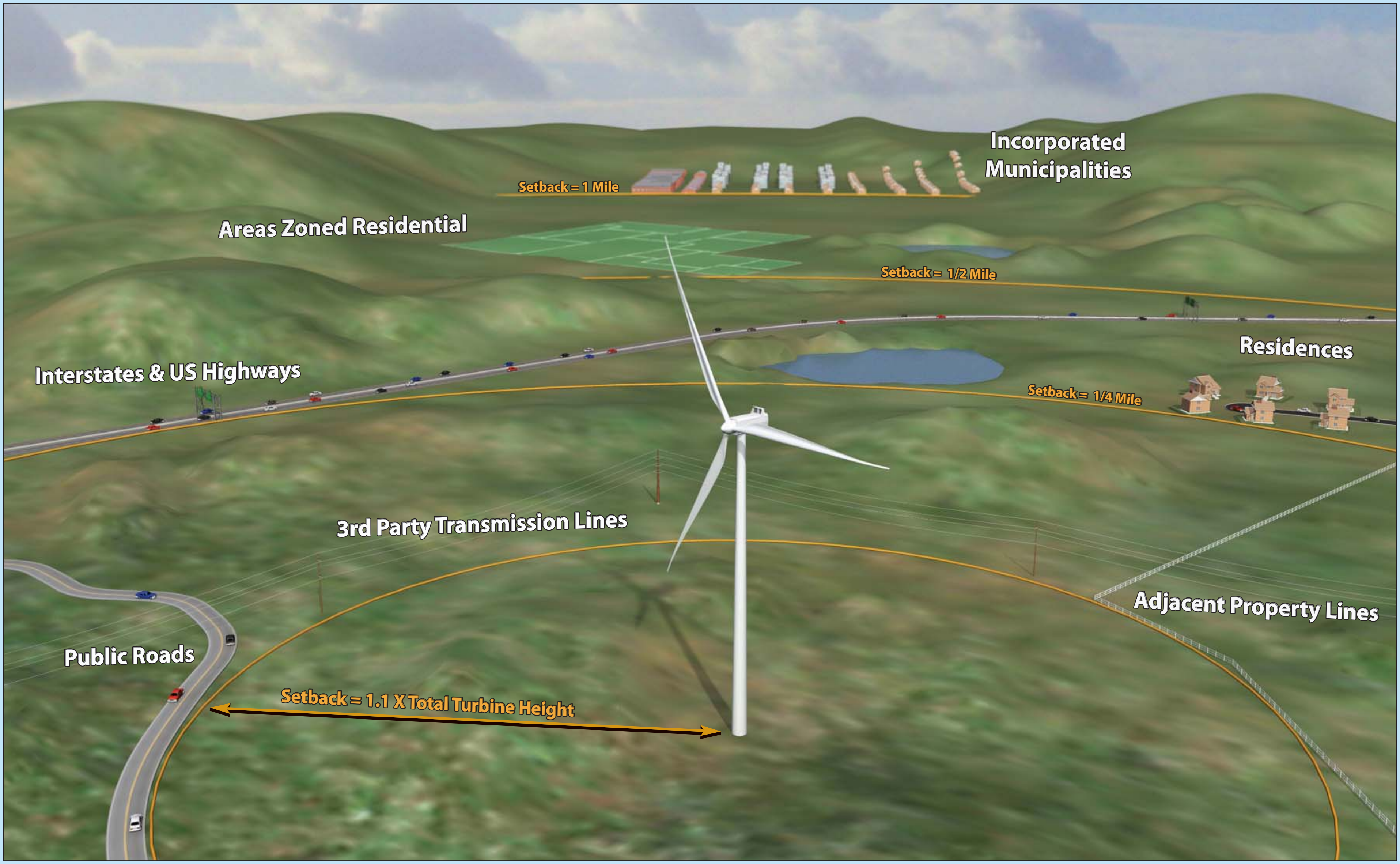
Every wind turbine would have a copper ground cable mat surrounding its foundation to discharge electrical current into the earth if the wind turbine built up an electrical charge because of a lightning strike or equipment malfunction. The Project substation and Western's switchyard would be similarly grounded with a grid laid below grade.

2.3.12 Wind Turbine Installation

Wind turbine installation requires specialized crews and equipment. Wind turbine components arriving at the Project site would be routed to the designated wind turbine site for installation on the prepared foundation as soon as possible to avoid or minimize the amount of time the equipment was on the ground. The major components to be installed in the field include the wind turbine tower sections, nacelle (including gearbox, generator, and other internal equipment), rotor hub, and blades (figures 2.3-4 and 2.3-5).

Wind turbine towers, generally consisting of three to four sections, would be installed first. The first section would be placed on the base with leveling nuts to ensure that the wind turbine was level on its foundation. The section then would be grouted in place and the grout would be allowed to cure for approximately 1 to 5 days, depending on climatic conditions. Once the grout has cured, the base anchor bolts are final tensioned. Each additional section then would be lifted by crane and bolted into place on the previous section, using internal flanges. Cranes would operate on a graded and level crane pad consisting of compacted aggregate. Once the tower sections were complete, the nacelle would be lifted by crane and secured to the top of the tower. Necessary hydraulic and electrical connections then would be made to the rotor hub and blades, and the rotor hub and blade assemblage would be attached to the nacelle.

Installing an individual wind turbine typically requires 6 days with good visibility and low winds. Likewise, inclement weather could delay some construction activities. Two or more cranes could be operated simultaneously to install the wind turbines.



HERMOSA WEST WIND ENERGY PROJECT

FIGURE 2.3-6: ALBANY COUNTY WIND ENERGY SETBACK REQUIREMENTS

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2.3.13 Electrical Collection System

The wind turbines would be connected by an underground electrical collection system to deliver power from individual wind turbines to the Project substation. The underground collection system potentially would be 34.5 kV, but could range from 12 kV to 34.5 kV.

Electrical collection system cables would be buried in 36- to 48-inch deep excavated trenches. Trenching for the electrical collection system would follow roads and disturbed areas wherever possible to minimize new areas of disturbance. Blasting could be required if rock in a particular location could not be adequately excavated and the electrical collection system could not be re-routed. In areas where the native soil would not sufficiently allow heat from the cables to dissipate, then SWE would use engineered granular fill in just the amounts necessary to dissipate heat from the cables and then would backfill the remaining portions of the trench with native soil. The electrical collection system would enter the Project substation underground. It then would transition to an overhead substation buswork (figure 2.3-6).

The proposed 0.3-mile-long 345-kV overhead gen-tie line connecting Western's switchyard to the 345-kV Craig to Ault transmission line would be a single steel pole or wooden H-frame configuration (figure 2.3-7). The gen-tie line would consist of double-circuit single steel pole structures or two sets of single-circuit wood H-frame structures (single circuit in and single circuit out of switchyard). The type of structures to be used would be determined during final engineering.

Construction of the gen-tie line would be completed in two phases. In the first phase, crews would bore transmission structure foundations and install the transmission structures using cranes, bucket trucks, and winches to lift the sections. In the second phase, crews would string the transmission cables along the transmission structures. The gen-tie line would be designed in accordance with Avian Power Line Interaction Committee specifications to mitigate potential effects to avian species.

2.3.14 Substation and Switchyard

The Project substation (figure 2.3-8) would step up (increase) the voltage from the electrical collection system from 34.5 kV to 345 kV to interconnect it with Western's switchyard and then to the 345-kV transmission line. The substation would house a small control building for electrical metering equipment and supervisory control and data acquisition equipment. SWE's substation would connect to Western's switchyard on an approximate 5-acre site to allow for transfer and operational control of electricity from the Project to the Western transmission line. The substation and switchyard would be collocated on a site totaling approximately 10 acres (figure 2.3-1). A low-voltage distribution line would be needed to supply local power to the Project site for operational uses. To address the issue of a backup power supply for the Switchyard and substation, Shell would extend the existing local low voltage distribution lines (approximately 1 mile away) to the switchyard and substation. Shell would also extend the existing low voltage distribution line to the Operations and Maintenance building for power needs.

2.3.15 Operation and Maintenance Building

SWE's Project would require an onsite operation and maintenance building. The building would be approximately 5,000 to 8,000 square feet. It would be located on an approximately 1- to 2-acre site at the intersection of Cherokee Park Road and Boulder Ridge Road (figure 2.3-1). The building likely would be a pre-engineered metal structure, which would be assembled and finished onsite. It would be painted in an earth-tone color to blend in with its surroundings. The building would house the following features:

- Offices, conference room, a possible welcome/information center, break room, restrooms, emergency living accommodations
- Maintenance and shop area, spare parts storage
- Telecommunications and control equipment
- Signage
- Septic system
- Outdoor parking for workers and visitors

2.3.16 Meteorological Towers

Up to four permanent self-supporting meteorological towers approximately 262 feet tall would be operated on the Project site (figure 2.3-1) to measure wind speed, wind direction, barometric pressure, humidity, and temperature for optimal management of the wind turbines. The current guyed meteorological towers located onsite are marked with bird diverters to prevent avian collisions, as recommended by the USFWS.

2.3.17 Reclamation

SWE will work with the Wyoming Office of State Lands and the Wyoming Industrial Siting Council to develop a reclamation plan and financial assurance, in accordance with applicable regulations. Reclamation efforts on state lands will be in accordance with Section 3.8 and Article 11 of the Wyoming Wind Energy Lease Agreement. Financial assurance would be in place prior to construction in accordance with the Rules and Regulations of the Industrial Siting Council Chapter 1 Section 10(d).

2.4 Operation and Maintenance

2.4.1 Operations

SWE's operation and maintenance facility would be permanently staffed during normal business hours with a combination of approximately 20 to 40 employees from SWE and contractors from the wind turbine manufacturer. There would be an additional 20 to 30 seasonal and service-specific workers for items such avian monitoring, electrical services, and snow plowing. Western employees would only be onsite periodically to service Western's switchyard or to inspect or maintain the connecting gen-tie line or the Craig to Ault transmission line. Wind turbines,

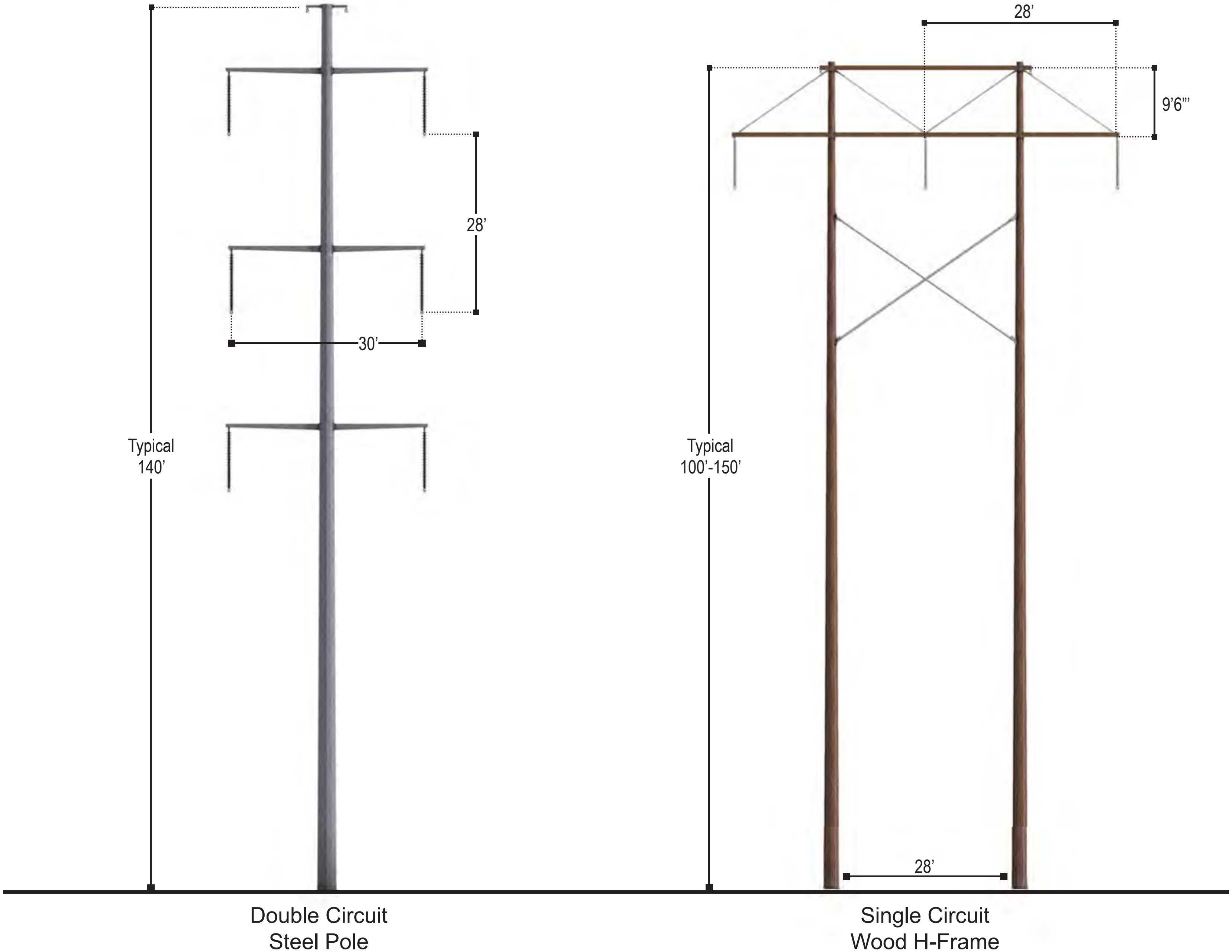

Figure 2.3-7: 345-kV Transmission Structures

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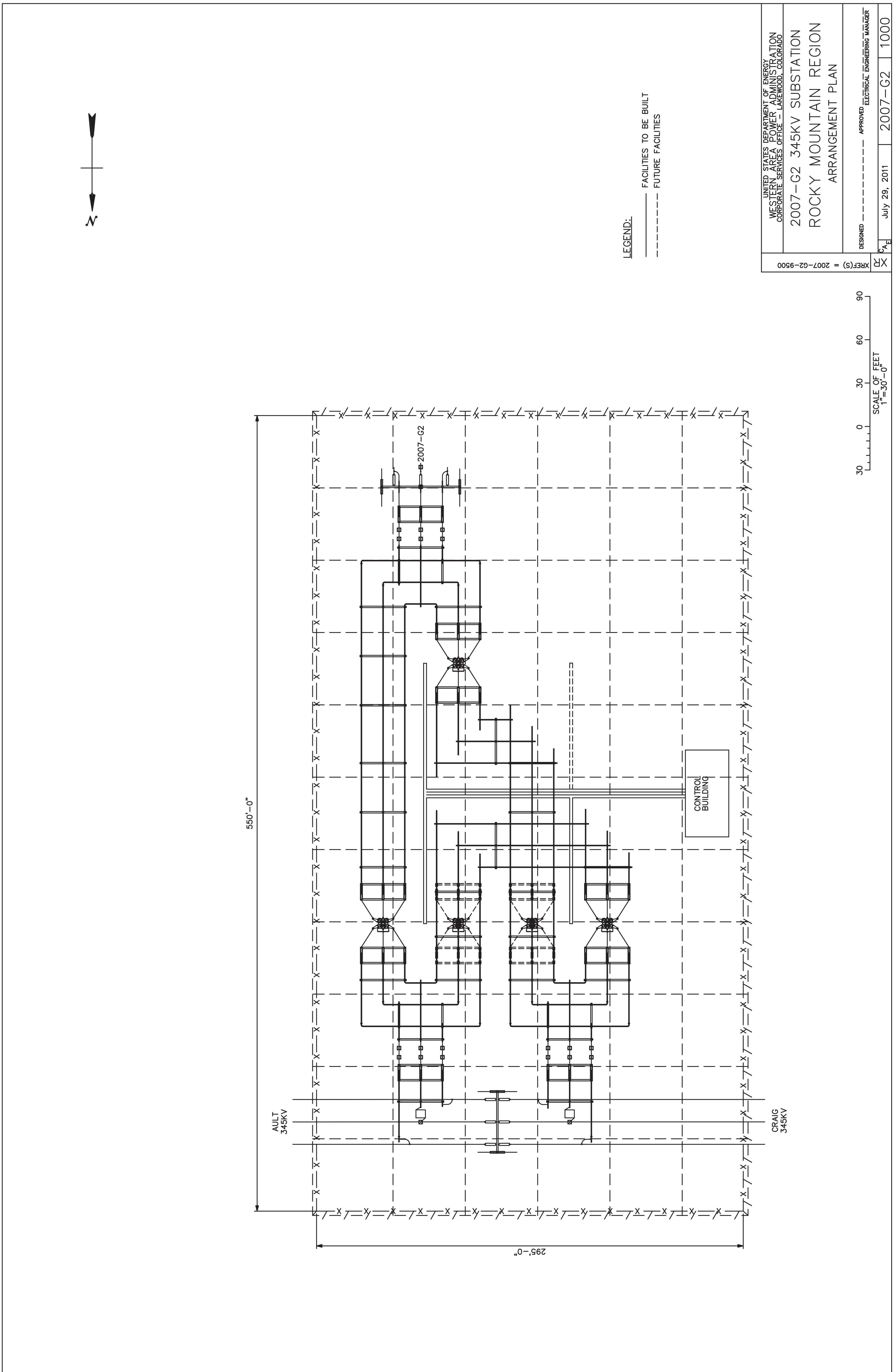

Hermosa West Wind Energy Project
Figure 2.3-8: Plot Plan for Project Switchyard

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however, generally operate automatically without the need for centralized plant operators. Onsite staff would monitor the performance of the wind turbines but would initiate manual control of the wind turbines when needed for maintenance, troubleshooting, and for other purposes.

An environmental monitoring program would be developed through consultation with the USFWS, WGFD, and other appropriate agencies. This program would be conducted during the first three years of operation as required, and staffed appropriately. Additional years could be added if USFW or WGFD determines need. The wind turbines may occasionally need to draw power from the Western transmission line and/or the participating utility company to optimize the direction of the nacelle when the turbines are idle. Supporting infrastructure would be built into the Project design to support this contingency.

2.4.2 Project Maintenance

As with any machinery, regularly scheduled preventive maintenance would help to ensure the safe and efficient long-term operation of the wind turbines. The Project's Operation and Maintenance Plan would describe the scheduled minor and major maintenance activities and inspection requirements anticipated during the calendar year.

Staff periodically would analyze meteorological data and performance trends for the wind turbines and associated facilities to determine the overall efficiency of the operation. It is possible some scheduled maintenance activities would be added or adjusted to improve the performance of the operation. Staff would have specific training regarding safe work on wind turbines, and the specific tasks necessary to provide both scheduled and unscheduled wind turbine maintenance.

Staff also would drive the Project site frequently to conduct a visual inspection of the operation, including wind turbines, road conditions, facility fencing, other infrastructure, and any incidences of weed infestations, waste disposal, or vandalism. Most private property within the Project area is fenced off. If trespassers are identified on privately owned land, they would be escorted off of the property by construction personnel or SWE operations personnel. Some of the property that the Project would be constructed on is State land that is open to the public. During inspections, staff would ensure that there are no members of the public disturbing turbines or other project features that are located on lands that are open to the public. The purpose of the inspections would be to identify obvious problems requiring maintenance or attention. Visual inspections are considered to be a redundant check on the wind turbines. Each wind turbine would have internal sensors to monitor many aspects of its operating condition. Wind turbines requiring maintenance would be stopped remotely to allow the condition to be fixed.

SWE will develop a Hermosa Wind Energy Project Weed Management Plan that will provide for monitoring for the presence of noxious weeds, other invasive plant species and treating weed infestations throughout all phases of the Project. The plan will include monitoring and treatment of areas to be reclaimed, areas undergoing reclamation, and reclaimed areas. Weed management is further described in section 4.3.

Individual Project components, including the Project substation, would be inspected on a daily, weekly, monthly, or annual basis, as required by that equipment. The schedule would be part of the Operation and Maintenance Plan. Inspection results would be logged and used to plan future maintenance activities. Minor oil leaks, for example, would be promptly addressed to prevent a problem from developing. Wind turbine maintenance events would be scheduled based on the manufacturer's specifications. They likely would be planned for the spring and summer each year. Blade washing, when required, would be conducted by a contractor who would supply the necessary water. Maintenance of the substation's transformers, switchgear, and buswork likely would require that the substation be de-energized. Most scheduled substation maintenance activities could be performed during a single day each year.

Unscheduled repair work may be either minor or major. Replacing faulty internal components on the wind turbines, for example, would be considered a minor repair done with small tools and the wind turbine's integrated winch system. Only a pickup or small truck would be need to access the wind turbine using the existing Project access roads. Similarly minor repairs are listed below:

- Replacing wind turbine sensors
- Replacing small motors (e.g., for the yaw drive or fans)
- Replacing small pumps (e.g., for the hydraulic system or cooling system)
- Replacing gear oil
- Replacing coolant
- Replacing hydraulic fluid
- Replacing seals (e.g., on generators or gearboxes)

Major repairs are far less common and may require a crane and heavy trucks. If the crane pad used during construction was no longer available, a pad consisting of aggregate would need to be installed. The repair activity would be planned to minimize the crane's time onsite and the overall effects of the repair. Major repairs are listed below:

- Replacing wind turbine blades
- Replacing a wind turbine generator
- Replacing a wind turbine gearbox
- Replacing a wind turbine transformer

The need to replace an entire wind turbine prior to decommissioning is extremely unlikely. If a wind turbine tower or foundation would somehow fail, replacement of the wind turbine would require that the wind turbine be removed in the reverse order in which it was installed. Components not used for the replacement wind turbine would be loaded onto trucks and removed from the site. The new wind turbine would be installed using the appropriate combination of original and replacement parts with the construction methods described previously.

Road maintenance would be performed on an as-needed basis. Regular snow removal would occur during the winter months to maintain access to the wind turbines, substation, and operation and maintenance building. Care would be taken in siting the operation and maintenance building to avoid contributing to snow drifting onto Boulder Ridge Road. Grading and blading would be performed as required in the spring to remove vehicle ruts. Similar surface work may be needed after heavy rainfall or unusually heavy maintenance traffic. Culverts, drains, and other water management features would be kept clear to allow for unobstructed water flows and erosion minimization.

There may be times during the year when portions of the Project site could not easily be accessed due to high winds, or heavy rain or snow storms. A Health, Safety, Security, and Environment (HSSE) Plan would be developed for the Project to guide staff's activities during these adverse weather conditions.

2.5 Decommissioning

The Project would have an estimated 20-year life based on the useful life of the wind turbines. After that time, SWE would evaluate the continued operation of the Project and either would upgrade and re-power the facility in accordance with renegotiated leases with landowners, or decommission it. As part of the permitting process with the state of Wyoming, SWE would coordinate with the Wyoming Industrial Siting Division to develop a decommissioning plan that is acceptable to the agencies involved in the permitting process.

If the Project was decommissioned, the goal of decommissioning would be to remove the power generation equipment and return the site to a condition as close to its pre-construction state as possible. Major activities required for decommissioning would typically occur in reverse order to construction and are listed below:

- Wind turbine, wind turbine foundation, and meteorological tower removal to Wyoming Industrial Siting Council (WISC) guidelines. Concrete and steel would be hauled offsite and recycled as appropriate. Removed portions of the foundations would be replaced with native weed-free aggregate and soils.
- Electrical collection system removal for above-ground structures and decommissioning in place for below-ground cables. Salvage material values could result in consideration of removal of below ground cables.
- Substation removal. Fencing and fence posts would be removed. Foundations would be removed to WISC guidelines. Concrete and steel would be hauled offsite and recycled as appropriate. Removed portions of the foundations would be replaced with native weed-free aggregate and soils.
- Sale or demolition of the operation and maintenance building. The onsite septic system would be abandoned consistent with State of Wyoming and local requirements, unless needed for a future use of the site.
- Gen-tie line removal to WISC guidelines. Foundation holes would be filled with native weed-free soil.
- Access road removal (as required by permit on State land and/or site control agreements by landowners). Road disturbances would be re-graded to original contours where cut and fill

made re-contouring feasible. Any roads left in place would become the responsibility of the landowner.

- Finish grading and contouring.
- Revegetation and revegetation monitoring to ensure establishment of vegetation.

2.6 Best Management Practices and SWE's Proposed Mitigation Measures

40 CFR Part 1508.20 defines mitigation to include:

> *(a) Avoiding the impact altogether by not taking a certain action or parts of an action.*
> *(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.*
> *(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.*
> *(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.*
> *(e) Compensating for the impact by replacing or providing substitute resources or environments.*

Best management practices (BMPs) are state-of-the-art measures and industry standards applied on a site-specific basis to reduce, prevent, or avoid adverse environmental or social impacts (BLM 2009). SWE and Western have made a commitment to apply BMPs as listed in table 2.6-1, as part of the Project design and, therefore, prior to impacts analysis. Implementation of these BMPs would serve to avoid or minimize potential effects from the Project to resources in the natural and human environments.

SWE would apply BMPs including industry standards during the construction, operation and maintenance, and decommissioning of the proposed Project components.

Various agencies have regulatory oversight for the implementation of SWE's proposed mitigation measures that are described by issue area in Chapter 4.0 (and listed in table 4.1-1), including Federal, State, and local jurisdictions as the result of Project approvals they may grant.

In addition, Western maintains standard practices for constructing and modifying transmission lines and substations. These standard practices would be followed for any system modifications performed at Western facilities for the proposed Federal action. Additional requirements for BMPs would be imposed by Western as part of its contracting requirements, per Western's Construction Standard 13, and would be implemented as appropriate given site conditions.

Table 2.6-1:
Construction and Operation BMPs

Resource	BMPs
Air Quality	
AQ-1	All unpaved roads and disturbed areas where construction activities are occurring, including laydown areas within the Project site, will be watered as frequently as necessary to control fugitive dust. Watering may be reduced or eliminated when the ground is moist.
AQ-2	Onsite vehicle speeds will be limited to 15 mph or less on unpaved areas and unpaved roadways within the Project construction site. Onsite vehicle speeds will be limited to ≤15 mph on graveled and/or paved roadways within the Project construction site.
AQ-3	The construction site entrance(s) will be posted with highly visible speed limit signs.
AQ-4	All construction equipment vehicle tires will be cleaned via track pad entrances as necessary to limit tracking of dirt onto public roadways prior to leaving the construction site.
AQ-5	Gravel ramps will be provided at the tire cleaning area.
AQ-6	All unpaved exits from the construction site will be graveled track pads or treated to reduce track-out to public roadways.
AQ-7	All construction vehicles will enter the construction site through the graveled track pad entrance roadways.
AQ-8	All vehicles that are used to transport solid bulk material on public roadways and have the potential to cause visible emissions either will be covered or the materials sufficiently wetted and loaded onto the trucks in a manner to minimize fugitive dust emissions.
AQ-9	Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) will be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition will remain in place until the soil is stabilized or permanently covered with vegetation.
AQ-10	Disturbed areas will be revegetated as soon as practical.
AQ-11	SWE will work with construction contractors to use U.S. Environmental Protection Agency (USEPA) Tier 2/Tier 3 engine-compliant equipment where applicable, i.e., when equipment rated at more than 100 horsepower is required.
AQ-12	SWE's construction contractors will perform periodic maintenance and inspections of construction equipment per the manufacturer's specifications.
AQ-13	SWE's construction contractors will endeavor to reduce idling time through equipment and construction scheduling.
AQ-16	Onsite vehicle speeds will be limited to 15 mph or less on unpaved areas and unpaved roadways within the Project site. Onsite vehicle speeds will be limited to ≤15 mph on graveled and/or paved roadways within the Project site.
Cultural Resources	
CUL-1	Modify alignments of proposed access roads to avoid impacts to sites 48AB1932 and 48AB1933.
CUL-2	Supervise construction contractors diligently to ensure that construction activities, including vehicle movements, laydowns, and borrow pitting, take place only in designated, previously-surveyed areas.
CUL-3	Conduct appropriate worker education concerning the recognition and protection of cultural resources.
General	
GEN-1	Contractors will preserve the natural landscape to the extent possible. Construction operations, access roads, and staging areas will be designed to prevent any unnecessary damage to, scarring of, or destruction of natural features.
GEN-2	Construction activities will comply with Federal, State, and county environmental regulations and guidelines. Prior to construction, supervisory construction personnel will be instructed on the protection of cultural and biological resources and will frequently inspect operations.
GEN-3	Albany County Wind Energy Siting Regulations will be followed to avoid effects to land uses.
GEN-4	Contractors will maintain fences and gates during the construction period. The contractor responsible will repair any fence or gate damaged during construction.
Hazardous Materials	
HAZ-1	Prior to commencing construction, a Hazard Communication Program will be developed that will document the process of informing Project personnel of the hazardous substances that may be encountered on the proposed Project site. This program will comply with OSHA requirements under the Hazard Communication Standard. Elements of the Hazard Communication Program include a hazard determination process, approval process, materials inventory system, and training for site personnel. At a minimum, hazardous materials will be properly labeled and material safety data sheets will be available at the site.

Table 2.6-1:
Construction and Operation BMPs

Resource	BMPs
HAZ-2	As part of the Hazard Communication program, proper storage of hazardous substances will be identified and implemented. Flammable and combustible materials will be stored in appropriate cabinets or other containers. It is likely that aboveground storage tanks with appropriate containment will be used for fuel storage. Care will be taken when selecting the location of hazardous materials storage areas within the site to avoid potentially sensitive areas. During construction, it is anticipated that most materials will be used as they are delivered to the site.
HAZ-3	Secondary containment for all hazardous materials that are stored onsite will be provided to minimize potential effects to the surrounding environment. Examples of secondary containment are concrete bermed areas and manufactured containment pallets.
HAZ-4	Concrete washout would only be disposed in properly designed concrete washout facilities or possibly re-using the water for concrete mixing. Re-use for concrete mixing would depend on the chemical composition of the water.
HAZ-5	Trained spill containment crews will respond to accidental releases as described in the HSSE plans.
Health and Safety	
PHS-1	All site personnel, regardless of job responsibilities, will receive Project orientation addressing environmental and health and safety Project procedures, requirements and site rules. In addition to reviewing this information with all employees, SWE will review the plan with the Tie Siding Volunteer Fire Department personnel, Laramie Fire Department personnel, and emergency services personnel to ensure response or evacuation plans and procedures are part of construction and operation activities and planning.
PHS-2	Fueling of vehicles will be conducted in accordance with procedures that will minimize the risk of fires and spills.
PHS-3	Selected crew leads will be trained in first aid, automated external defibrillator operation, and CPR. Adequate materials and resources for onsite treatment, first aid, and stabilization will be available onsite at all times. Handling of spills is addressed in section 4.14.2.1
PHS-7	Wind turbines will be shut down under wind conditions exceeding manufacturer's operational parameters.
PHS-8	Staff would be driving the Project site frequently to conduct a visual inspection of the operation during routine maintenance, including wind turbines, road conditions, fencing, other infrastructure, and any incidences of waste disposal, theft, or vandalism. Frequent visual monitoring of the site will also reduce the potential use of the Project site for illegal activities such as drug labs and illegal hunting.
PHS-9	Permanent chain-link fencing will be installed at the substation and switchyard, at the outdoor storage area adjacent to the operations and maintenance building, and in additional areas where security or theft might be a concern.
PHS-10	During construction, temporary plastic mesh fencing will be installed to protect public and worker safety near excavated wind turbine foundations, electrical collection system trenches, material laydown areas, or any other areas deemed hazardous. Open holes and trenches without fencing will be covered or fenced to deter wildlife and livestock from becoming trapped or injured.
PHS-11	The International Electrotechnical Commission has published International Standard 61400-1, which outlines the minimum design requirements for wind turbines. These design requirements are intended to ensure safe operation of wind turbines. The turbines used by SWE for this Project will conform to or exceed these standards.
PHS-12	The general public will not be permitted to enter the Project construction site. Most private property within the Project area is fenced off. If trespassers are identified on privately owned land, they will be escorted off of the property by SWE personnel. Some of the property that the Project will be constructed on is State land that is open to the public. During inspections, staff will ensure that there are no members of the public disturbing turbines or other project features that are located on lands that are open to the public
PHS-14	Dumpsters for solid waste will be used during construction, operation, and decommissioning of the proposed Project and materials will be recycled to the extent feasible
PHS-15	Solid waste resulting from the implementation of the proposed Project will be transported by a commercial trash company and disposed of in a designated landfill and will be disposed of in accordance with all local, State, and Federal regulations.
PHS-16	SWE will prepare an Emergency Response Plan and will consult with Albany County emergency services to ensure that policies and procedures are consistent with those already established for the county.
PHS-17	SWE will coordinate with local emergency services to determine whether an increase in staff during times when emergency services may be stressed (most likely during construction phase) is warranted.
PHS-18	SWE operations and contractor personnel are trained and equipped for emergency response and SWE will coordinate with local emergency response providers to supply ongoing additional support.

Table 2.6-1:
Construction and Operation BMPs

Resource	BMPs
PHS-19	Onsite personnel will routinely inspect the wind farm facilities for fire hazards.
PHS-20	Wind turbines will be outfitted with lightning protection systems that will reduce the chance of fires igniting from lightning. Each wind turbine and associated electrical equipment will be constructed with non-flammable material around the base of the equipment to reduce the spread of fire should electrical equipment ignite.
PHS-21	Construction and maintenance vehicles will be equipped with fire extinguishers in the event of an equipment fire. Should an onsite fire occur, onsite personnel will call 911 to alert the Laramie Fire Department.
PHS-22	Throughout the lifetime of the proposed Project, SWE will coordinate with the Tie Siding Volunteer Fire Department and Laramie Fire Department to minimize safety hazards and ensure adequate response times.
Noise	
NOISE-1	Construction vehicles and equipment will be maintained in proper operating condition and will be equipped with manufacturers' standard noise control devices or better (e.g., mufflers, engine enclosures).
Geology and Soils	
GEO-1	SWE will conduct additional geotechnical investigations based on final facility layout to reduce potential for impacts from geologic hazards.
GEO-2	Ditches, tile drains, terraces, and other agricultural features or conservation practices damaged during construction will be repaired or replaced.
GEO-3	Construction crews will revegetate disturbed areas using an approved weed-free, native seed mixture per the Site Restoration Plan.
GEO-4	Soil will be stockpiled appropriately and returned to an excavated area in the order in which it was removed to ensure that nutrient and biologically rich topsoil stays at the surface and calcareous and saline-sodic sub-soil remains below the rooting zone.
Paleontological Resources	
PALEO-1	Paleontological Mitigation Plan—The Project will require the preparation of a mitigation plan for use during construction that includes emergency discovery procedures; sampling and data recovery, if needed; museum storage coordination for any specimen and data recovered; preconstruction coordination; and reporting.
PALEO-2	Construction Personnel Education—Prior to the start of construction, construction personnel involved with earth-moving activities will be informed of the possibility of encountering fossils, how to recognize fossils, and proper notification procedures. This worker training will be prepared and presented by a qualified paleontologist and be part of the Worker Environmental Awareness Program for the proposed Project. If fossils are discovered in an active construction area, work would be stopped at that location and the construction project manager would be notified within 24 hours.
Recreation	
REC-1	Work with City officials in Laramie and Fort Collins and private campgrounds or mobile home park owners to identify facilities available to construction workers bringing RVs to the area to avoid displacement of public recreational use at private campgrounds.
Transportation	
TRANS-1	Maximum access road slope of 5 to 10 percent; depending on turbine requirements. To achieve this grade, potential upgrades to the slopes of existing Albany County roads may be required.
TRANS-2	Maximum road slope between turbines (turbine string road) between 5 and 10 percent.
TRANS-3	Maximum road width of 25 feet for access roads and 50 feet for turbine string roads (required for movement of the assembled crane from turbine to turbine onsite). Road width reduction to 16 feet after construction, with reclamation of shoulders with native vegetation.
TRANS-4	Minimum turn radius (inside radius of roadway) of 135 feet (based on transporting three turbine blades at a time) wherever possible (varies by turbine type). To achieve this minimum turning radius, potential upgrades to the existing Albany County roads may be required per SWE's road maintenance agreement with Albany County.
TRANS-5	SWE-developed specific design criteria related to maximum crest vertical curves (or humps), maximum sag vertical curves (or dips), road crown or cross-sloping of the road section (maximum of 2 percent), and cut-and-fill side slopes (dependent on existing soil types). These criteria would be established for the proposed Project site roads during the detailed design stage. The majority of these criteria are dependent on the turbine type selected and manufacturer requirements.

Table 2.6-1:
Construction and Operation BMPs

Resource	BMPs
TRANS-6	All-weather gravel road surface for internal Project roads and upgraded existing Albany County and local roads. The thickness of the required gravel layer would be dependent on subgrade soil characteristics to be determined during the detailed design phase of the Project.
TRANS-7	Design speed limit of 15 mph maximum in the Project construction site for all construction and operations equipment and personnel.
TRANS-8	Road dust and maintenance procedures and BMPs as described in chapter 2 and section 4.9 will be implemented.
TRANS-9	Any existing culvert extensions or improvements would be constructed in a manner that prevents sediment erosion and deposition of sediment and minimizes impacts to any wetlands, waterbodies, and other environmentally sensitive areas.
TRANS-10	Existing utilities would be avoided whenever possible; however, any required modifications to existing utilities and structures (either temporary or permanent) would be evaluated during the design phase of the Project. Section 4.9.4.6 details the required utility modifications.
TRANS-11	Onsite Project traffic would use laydown yards as turnarounds where possible. SWE would construct additional turnouts and other turn-around areas as necessary.
TRANS-14	To minimize conflicts between Project traffic and background traffic, SWE will consider and attempt to work around the local traffic volume peaks when scheduling deliveries to the extent feasible.
TRANS-15	Movements of oversized trucks (deliveries of turbine components) would be minimized during the afternoon peak and minimized in the morning peak, to the extent practicable. If possible and considering worker safety, such oversized deliveries would occur during other times of the day, when background traffic volume tends to be lower, such as early morning and late afternoon. If necessary, road clearances may also be implemented during component deliveries if they are to occur during peak traffic hours.
TRANS-16	Road clearances may include blocking road intersections via construction cones and manning blocked intersections with a traffic-control flagger to allow haul trucks sole access to the road while delivering Project components. Once a haul truck has reached its destination, the cones would be removed and public vehicles would be permitted to use the roads. It is estimated that the roads would typically be closed for no longer than 15 minutes during each/any road clearance.
TRANS-17	To the degree practicable, Project-related activities would be coordinated to avoid major traffic-generating events on the University of Wyoming campus. SWE could coordinate with local law enforcement, to manage traffic flows and monitor traffic speed to assist with safety during deliveries.
TRANS-18	Whenever possible, Project turbine components and materials would be delivered directly to the construction/erection pad area for each turbine or other facility, and assembly of the turbine would commence shortly after delivery. If components arrive before the site is prepared for wind turbine erection, they will be stored in the construction laydown areas (figure 1-2).
TRANS-19	All staging activities and parking of equipment and vehicles would occur onsite and on private ROW, and would not occur on maintained Albany County roads.
TRANS-20	Construction-related vehicles would only utilize roads identified in this section (to be approved by Albany County) and travel at a maximum of 15 mph within the Project construction site for safety purposes and to reduce dust generation.
Vegetation	
VEG-1	The permanent disturbance of Project site vegetation will be minimized to the greatest extent practicable. Work zones will be carefully delineated and marked in order to prevent unnecessary access through Project area vegetation.
VEG-2	A reclamation plan will be prepared prior to the onset of construction that will guide the revegetation of disturbed areas during and following the construction process. The plan is not a requirement of the State siting permit.
VEG-3	Water quality BMPs would be implemented to minimize any unforeseen impacts to the Platte River System's watershed and associated vegetation communities, including the use of appropriate sediment and erosion control measures, such as silt fencing and/or hay bales near waterbodies and wetlands and the installation of construction barriers and notices to identify sensitive receptors.
VEG-4	Temporarily disturbed areas will be revegetated as soon as practicable and active control of noxious weeds will be conducted through the implementation of a site weed management plan, the provisions of which are to be developed. Reseeding will be done with locally approved seed mixtures, as per county requirements.
VEG-5	During the construction of the proposed project, SWE will utilize BMPs to control the introduction of invasive weeds and manage existing weed populations. These methods will include graveled entrances to all project roads from public roadways to prevent tracking in or out of weed seed bank, and various other weed management methods as described in the weed

Table 2.6-1:
Construction and Operation BMPs

Resource	BMPs
	management plan.
VEG-6	Weed management methods including prevention; personnel; equipment; integrated pest management using mechanical treatment, herbicide treatment, and/or biological control would be used during pre-construction, construction, post-construction and Operations time periods.
VEG-7	Construction work areas, turbines, access roads, and facilities have been sited outside wetlands and waterbodies to the greatest extent practicable and as required under Federal, State, and local regulations, to minimize indirect impacts to the Platte River System watershed and its associated vegetation communities.
Visual Resources	
VIS-1	Existing roads will be utilized to the extent possible for access and turbine roads to minimize visual impacts from clearing and grading new roads.
VIS-2	Water will be applied as necessary to exposed soil in active construction areas to minimize dust potential.
VIS-3	Existing trees and shrubs will be preserved to the extent possible to minimize visual contrasts.
VIS-4	Construction activities in areas of highly erodible soils and steep slopes will be avoided to the extent possible.
VIS-5	For the gen tie line, single steel pole or wooden H-frame configuration construction similar to the existing transmission lines on Project site will be used.
VIS-6	Collector lines will be buried and collocated within access or turbine road ROW to minimize new ground disturbance, to the extent possible.
VIS-7	The building will be designed with rural and agricultural architectural elements to minimize contrast with existing structures.
VIS-10	Switchyard and substation facilities will be collocated east of Cherokee Park road to utilize the undulating topography to screen visual impacts from viewers on Cherokee Park Road.
VIS-11	The size of the disturbance area required at each turbine location will be reduced to the smallest feasible size to create less visual impact from vegetation scarring and to reduce the need for soil and vegetation reclamation.
VIS-12	A dark-colored gravel or stone will be used for the finish material within the fenced area of the substation an switchyard site to reduce visual contrasts from color.
VIS-15	Roads will be routed to follow existing contours and to avoid steep slopes that would require cut-and-fill construction.
VIS-16	The initial disturbance width of the roads will be minimized to the extent possible, and road width will be reduced to 16 feet after construction is completed.
VIS-17	Vegetation along roadsides will be restored with native vegetation to reduce the color difference associated with reclamation of those areas that require clearing.
Water Quality	
WAT-1	During the initial clearing phase of the construction process, woody vegetation in potentially disturbed wetlands will be cut at ground level to leave the root systems intact and encourage sprouting of the existing species following construction.
WAT-2	Small stumps of shrubs and trees may be cut at or just below ground level.
WAT-3	Larger trees and shrubs will be removed to ensure a safe, level work surface for equipment working on temporary mats.
WAT-4	Equipment operation in wetlands will be kept to the minimum necessary to safely perform the work, and will operate on prefabricated equipment matting or acceptable substitute.
WAT-5	Wetland boundaries will be clearly identified in the field during construction. SWE has committed to mark the wetland boundaries and to avoid the marked boundaries during construction.
WAT-6	No parking or servicing of construction-related vehicles should occur within the wetland boundary.
WAT-7	Temporary impacts to wetlands by construction will be returned to grade and revegetated with native seed mix or as recommended by the local NRCS.
WAT-8	SWE will implement sediment and erosion control measures, such as silt fencing and/or hay bales near waterbodies and wetlands, the installation of construction barriers.
WAT-9	Traffic speeds within the Project site will be 15 mph to minimize dust generation

Table 2.6-1:
Construction and Operation BMPs

Resource	BMPs
Wildlife	
WL-1	The Project will avoid to the greatest extent practicable, siting Project facilities in sensitive areas used by large numbers of wildlife species.
WL-2	All ground clearing activities will be preceded by surveys for ground nesting birds to prevent take of protected species.
WL-3	An Avian Monitoring and Protection Plan will be implemented post construction to collect data (for approximately 1 to 3 years) and understand effects to avian species.
WL-4	Areas temporarily disturbed during construction, such as lay down areas and temporary access roads to the concrete batch plant, construction parking, and construction office area, will be reclaimed by recontouring the area to original conditions if necessary and reseeding with a certified native seed mix.
WL-5	A qualified site monitor will be responsible for clearing areas ahead of construction equipment to reduce the potential for wildlife conflict including nesting birds to the extent practicable during construction.
WL-6	Waste containment facilities will be designed to avoid attracting scavengers.

3.0 AFFECTED ENVIRONMENT

This chapter describes the existing conditions of the natural and human environments for the proposed Project site and surrounding study area and is referred to as the affected environment. In accordance with NEPA regulations at 40 CFR 1502.15, the chapter provides a baseline from which to understand the potential effects of the proposed Federal action and no action alternative and SWE's proposed Project as discussed in Chapter 4, Environmental Consequences.

SWE's proposed Project site referenced in this chapter is the 11,125-acre footprint of land leased for the proposed Project in southeastern Albany County, Wyoming, within which also lies Western's proposed Federal action (approximately 20 acres). Since the area affected by Western's proposed Federal action is an extremely small component of the proposed Project site, the resource discussions that follow will focus on the larger area, but the descriptions will apply to both Western's proposed Federal action and SWE's proposed Project. The study area referenced in this chapter is the area beyond the boundary of the 11,125-acre footprint, which varies by resource because its extent depends on the distance away from the site necessary to adequately describe the resource. For example, the study area used to describe vegetation is less than 1 mile outside of the proposed Project site boundary because disturbances to vegetation from construction and operation of the proposed Project are not anticipated outside the site boundary. In contrast, the study area used to describe recreational resources extends as far as 50 miles from the proposed Project site boundary because there is potential that construction workers and permanent employees of the proposed Project living in the vicinity would access distant recreational resources.

Each resource section in chapter 3 begins with a definition of the study area appropriate to that resource, followed by a description of the baseline condition of the area that could be affected by the proposed Project. Consideration of public comments received during Project scoping helped to identify the resource issues of greatest interest to the public for analysis in this Draft EIS. The public scoping comments are summarized in Chapter 1, Introduction.

For ease of understanding the evaluation of impacts, the document has been prepared so that a resource described in Chapter 3, Affected Environment, has the same section number in Chapter 4, Environmental Consequences (e.g., Section 3.3, Biological Resources; Section 4.3, Biological Resources; etc.). The order in which the resources are discussed is provided below by section number:

3.1 Existing Conditions – Western's Proposed Federal Action
3.2 Land Use
3.3 Biological Resources
3.4 Cultural Resources and Native American Concerns
3.5 Paleontology
3.6 Noise

3.1 Existing Conditions – Western's Proposed Federal Action

The proposed Project site is the 11,125-acre footprint of land leased by SWE for the proposed Project in southeastern Albany County, Wyoming, within which also lies the area of Western's proposed Federal action (approximately 10 acres). Depending on the resource or issue, the study area for the Project is either the same as the Project site or a larger area as identified in table 3.1-1. Since the 10-acre area affected by Western's proposed Federal action is an extremely small component of the overall proposed Project site, the resource discussions in sections 3.2 through 3.16 focus on the larger Project site or study area, but the descriptions are intended to apply to both Western's proposed Federal action and SWE's proposed Project. Table 3.1-1 lists the resources or issues described in chapter 3 and associated study areas that were used to characterize baseline conditions associated with Western's proposed Federal action.

Table 3.1-1:
Resources and Associated Study Areas

Resource/Issue	Study Area Boundary
Land Use	Albany County, Wyoming, and Roosevelt National Forest in Larimer County, Colorado
Biological Resources	11,125-acre footprint of leased land for all resources except water resources which extends beyond the proposed Project boundary to include three primary aquifers, portions of which underlie the proposed Project site.
Cultural Resources and Native American Concerns	11,125-acre footprint of leased land
Paleontological Resources	11,125-acre footprint of leased land
Noise	The area within two miles of the Project area
Visual Resources	The area within 15 miles of the Project area
Air Quality	11,125-acre footprint of leased land
Transportation	Transportation facilities surrounding the proposed Project site, including Albany County, Wyoming State and County roadways, and Interstate 80 (I-80) and Interstate 25 (I-25) near Cheyenne
Recreation	The area within 50 miles of the Project area
Socioeconomics	Albany County, Wyoming and Larimer County, Colorado
Environmental Justice	Albany County, Wyoming, Larimer County, Colorado, and two census block groups (one in Wyoming and one in Colorado)
Agriculture	Irrigated and non-irrigated farmland, ranchland, and prime agricultural lands within the study area and in Albany County
Geology and Soils	11,125-acre footprint of leased land and a portion of Albany County surrounding it in southeastern Wyoming
Mineral Resources	11,125-acre footprint of leased land
Hazardous Materials	11,125-acre footprint of leased land
Health and Safety	11,125-acre footprint of leased land and residences and towns or cities that receive public services from Albany County or Laramie

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3.2 Land Use

3.2.1 Overview

This section identifies existing land uses in the proposed Project site and surrounding areas, referred to as the study area. For land use, the study area was defined as Albany County, Wyoming, and Roosevelt National Forest in Larimer County, Colorado. The section also identifies land management objectives and policies for the study area as outlined by documents governing the region. The following sources of information were consulted for this land use discussion:

- Albany County Comprehensive Plan (August 2008)
- Albany County Planning Department staff
- Albany County Zoning Resolution (May 2011)
- The Nature Conservancy (TNC)
- Threatened and Endangered Species Report, Hermosa West Wind Farm Project (ERM 2010f; appendix b)
- Wyoming Stock Growers Agricultural Land Trust (WSGALT)

3.2.2 Regulatory Setting

3.2.2.1 State Regulations

3.2.2.1.1 Wyoming Industrial Information and Siting Act

The State of Wyoming requires that wind energy facilities be permitted under the Wyoming Industrial Siting Act (WISA). Under new rules that went in to effect on July 1, 2010, projects are required to obtain a WISA permit when they meet any of the following thresholds: (1) project construction cost of $186.1 million (including the collector system); (2) 30 or more wind turbines (regardless of construction cost), including any project that plans on expanding to 30 or more turbines in the future and/or (3) any facility over which the board of county commissioners has authority to issue the permit required by Wyoming Stature (W.S.) 18-5-502 and which the board of county commissioners has referred to the council under W.S. 18-5-509. The WISC encourages all developers to receive a jurisdictional determination. The WISA permit requires a financial assurance plan from the developer for the life of the project, a decommissioning plan, a reclamation plan, proof of notification to local government(s) and landowners, and copies of the permit application to those parties, if requested. The amendments require an evaluation of potential impacts from the facility and mitigation measures. The evaluation includes the following resources or conditions: agriculture, wildlife, threatened and endangered species, and local social and economic conditions. Additional application requirements for wind energy facilities are specified in W.S. 35-12-109.

3.2.2.1.2 Wyoming State Lands

The mission of the Wyoming State Lands Office is to provide timely, accurate and cost-effective service to the Board of Land Commissioners, the State Loan and Investment Board, policymakers and the residents of Wyoming to facilitate wise and reasonable analytical decision making that will maximize the State's assets and resources in accordance with mandated authorities.

The State of Wyoming requires that a special use lease be obtained for ROW on State Trust Lands under the provisions of W.S. 36-5-101 et seq. Special use leases are authorized under Chapter 5's Special Use Leasing of the Board of Land Commissioners Rules and Regulations. Special Use means any use of state land other than for grazing, agriculture, the extraction of minerals, or uses authorized under easements granted pursuant to Chapter of the Rules and Regulations, or hunting, fishing and general recreational uses pursuant to Chapter 13 of the Rules and Regulations. Some examples of special use leases are communication sites, wind farms, cabin sites, water wells for commercial or municipal use, and compressor sites.

Rental for special use leases can be the amount bid by the applicant, if accepted by the Board, or it is based on fair market value for same or similar use of the land and any improvements owned by the State after an economic analysis is made. In cases where annual rental cannot be established based on fair market value for the same or similar use of the land, the minimum rental shall not be less than $250.00 or 5.5 percent of the appraised land value and any improvements owned by the State.

An applicant for a special use lease must consult with any existing lease holder, i.e. the grazing lease holder, prior to issuance of a special use lease. If the applicant for a special use lease obtains written consent from the existing lessee(s) to the issuance of a special use lease, the special use lease shall be deemed to not result in substantive impairment of the existing lease(s).

3.2.2.2 County Regulations

3.2.2.2.1 Albany County Comprehensive Plan

Albany County spans 4,273 square miles and is largely rural outside the municipal areas of Laramie and Rock River. The Albany County Comprehensive Plan contains a Long Range Growth Plan and a Land Use element governing development in the unincorporated areas of the county. According to the Comprehensive Plan, it is intended to meet basic health, safety, and welfare requirements that will not place an undue financial burden on the county and its taxpayers.

The Comprehensive Plan designates four categories of growth and development areas, known as Priority Growth Areas (PGAs):

- PGA 1—City of Laramie Urban Growth Area
- PGA 2—Water and/or Sewer Service
- PGA 3—Community Centers and other Growth-efficient Nodes
- PGA 4—Agricultural and Natural and Environmental Resource Areas

The Long Range Growth Plan identifies four land use objectives:

LU1—Promote development patterns that are growth efficient and logically sequenced to be efficiently served by public services. Direct development to specific areas, facilitating this by phasing infrastructure and service investments.

LU2—Preserve open spaces, agricultural lands and environmentally-sensitive areas that are not currently suitable for development.

LU3—Fulfill needs for various kinds of housing and employment opportunities for current and future residents.

LU4—Provide recreational opportunities.

The proposed Project site is designated as Agricultural (A, 40 acres or greater) by the Comprehensive Plan. Agricultural is defined as land for commercial farming and ranching operations. The (A) designation allows for active production and management of livestock, production and storage of commercial and grain crops, and related functions. The town of Tie Siding, immediately northeast of the proposed Project site, is designated as an existing PGA 3 community center.

3.2.2.2.2 Albany County Zoning Resolution

Since 1997, the Albany County zoning system has been based on the land use classifications assigned in 1997 by the county assessor for tax purposes. In this system, land is classified into one of four categories: agricultural, residential, commercial, or industrial. (State and Federal lands are exempt.) The majority of the county is categorized as agricultural (62 percent). Residential uses make up about 4 percent of the county's land area, while commercial and industrial uses make up less than 1 percent. The remaining portion, 34 percent, is public land. Public lands in the county are used extensively for recreation. The Albany County Zoning Resolution classifies the proposed Project site as Agriculture. Commercial wind energy projects are considered a permitted use within areas classified as Agriculture.

3.2.2.2.3 Albany County Wind Energy Siting Regulations

Albany County has developed Wind Energy Siting Regulations (Zoning Resolution Chapter V, Section 8) that establish setbacks between wind turbines and municipalities, residences, and physical infrastructure (table 3.2-1).

Table 3.2-1:
Albany County Wind Energy Siting Regulations

Zoned Area/Infrastructure	Setback
Incorporated Municipalities	1 mile
Areas Zoned Residential	0.5 mile
Primary Structures (Residences)	0.25 mile
Highway ROW	
Adjacent Property Lines	total turbine height X 1.10
Public Roads and Railroads	
Third-Party Transmission lines	
Communication Towers	

The setbacks in table 3.2-1 were established for the following purpose (Albany County 2011, Chapter V, Section 8A):

a. *To assure that any development and production of wind- generated electricity in Albany County is safe, effective, and that it will minimize impacts to wildlife;*
b *To acknowledge that these facilities are clearly visible and cannot be hidden from view, however, design consideration should include minimizing the degradation of the visual character of the area;*
c. *To facilitate economic opportunities for local residents;*
d. *To promote the supply of wind energy in support of Wyoming's goal of increasing energy production from renewable energy sources;*
e. *To be consistent with the Albany County Comprehensive Plan.*

3.2.3 Affected Environment

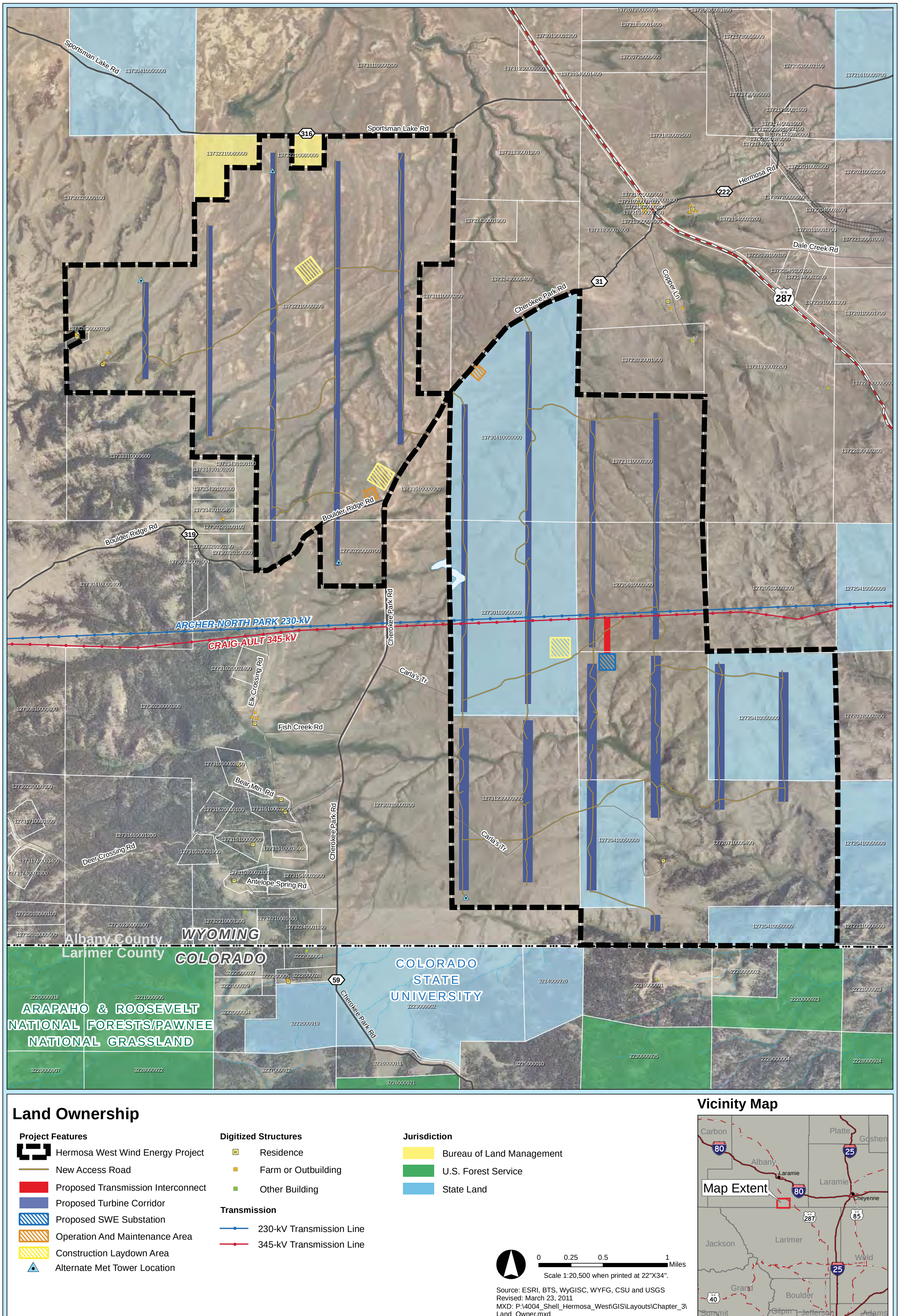
The typical landscape of the region is low mountain slopes and nearly level floodplains. The Project is located at an elevation of approximately 7,700 feet. The Project area is located within the Laramie River perennial drainage. The Laramie River is located approximately 12 miles to the northwest of the study area at its closest point. The proposed Project site is located within the Upper Laramie River and South Platte River Sub-basins of the Platte River Basin.
Table 3.2-2 identifies current land uses for the proposed Project site.

Table 3.2-2:
Mapped Habitats/Current Land Uses on the Project Site

Habitat Type	Acreage	Percent Cover
Grassland (Rangeland)	9,743	87.5%
Coniferous Forest	661	6%
Mountain Mahogany	131	1%
Shrub Steppe	106	1%
Riparian Areas	398	3.5%
Riparian/Willow Areas	86	1%
TOTAL:	11,125	100.0%

Source: ERM (2010h)

Figure 3.2-1 plots residences in relation to the proposed Project site. There are two residences located within the Project site boundary and one located just outside the Project site boundary. The closest existing residence, is approximately 0.52 mile, from the nearest proposed turbine string. Two parallel gen-tie lines owned and operated by Western traverse the proposed Project site in an east-west direction and cross the area between the nearest existing residence and the nearest proposed turbine location. The Craig to Ault 345-kV transmission line is the southern line, and connects the Craig and Ault Substations. The northern line is a 230-kV transmission line that connects the Archer and Hayden Substations. SWE is seeking to interconnect the proposed Project with the Craig to Ault 345-kV transmission line.



HERMOSA WEST WIND ENERGY PROJECT

FIGURE 3.2-1: LAND OWNERSHIP

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3.2.3.1 Ranchland

The study area consists of non-irrigated ranchland. Albany County designates land uses in the proposed Project site as agricultural (private lands) and exempt (State of Wyoming lands). Figure 3.2-1 shows parcel boundaries for land ownership in the study area. The proposed Project site has four individual landowners, which include three private landowners and the State of Wyoming.

3.2.3.2 State Trust Land

The State of Wyoming holds 3.9 million mineral acres and 3.6 million surface acres, which are managed by the State Board of Land Commissioners. The Office of State Lands and Investments provides administrative support to the Board, with the goal of effectively managing natural resources and funds for current and future generations. The revenues generated by trust lands and minerals are reserved for the exclusive benefit of the beneficiaries designated in the congressional acts. The beneficiaries are the common (public) schools and certain other designated public institutions in Wyoming such as the Wyoming State Hospital.

3.2.3.3 National Wildlife Refuges, Forests, and Special Status Lands

National Wildlife Refuges (NWRs) in the study area include Hutton Lake NWR, approximately 10 miles northwest of the proposed Project site; Mortenson Lake NWR; approximately 20 miles northwest of the proposed Project site; and Bamforth NWR approximately 8 miles northwest of Laramie. The NWRs are managed by the USFWS. Two of the refuges are unstaffed and closed to the public. They were established to support wildlife species, including habitat for migratory birds and recovery of listed species, such as the Wyoming toad.

The Medicine Bow National Forest is located approximately 10 miles northeast of the proposed Project site, and Roosevelt National Forest in Colorado abuts the southern boundary of the proposed Project site (figure 3.2-2).

The proposed Project site is located outside the core greater sage grouse habitat areas designated for the State of Wyoming. The southern tip of the closest sage grouse habitat area is approximately 10 miles north of Laramie, or approximately 28 miles to the north of the proposed Project site.

3.2.3.4 Conservation Easements

A conservation easement is a restriction placed on a piece of property to protect its resources. The easement is either voluntarily donated or sold by the landowner and constitutes a legally binding agreement that limits certain types of uses or prevents development on the land in perpetuity while the land remains in private hands. Based on publicly available information, no conservation easements occur in the proposed Project site.

In Albany County, however, several areas are under conservation easement with the WSGALT and TNC (Burgess 2010), including a 3,000-acre TNC easement in the northern portion of the study area and an area east of U.S. Highway 287 near The Buttes, Wyoming, which extends to the Laramie Mountains (Lathrop 2010). Through the USFWS Wetland Reserve Program, the Buford Foundation has a permanent conservation easement for 300 acres west of the proposed Project site near Centennial, Wyoming, to support restoration of the Wyoming toad (USFWS 2006). South of the proposed Project site, the Colorado State University (CSU) Research Foundation manages 1,900 acres (one portion of the Maxwell Ranch) near the Colorado-Wyoming State line. CSU maintains a herd of Angus X Hereford-based cows, and the property is used for teaching and research (CSU 2009).

3.2.4 Involved Agencies and Agency Contacts

The county agencies involved relative to land use are provided in table 3.2-3.

Table 3.2-3:
Involved Agencies and Agency Contacts

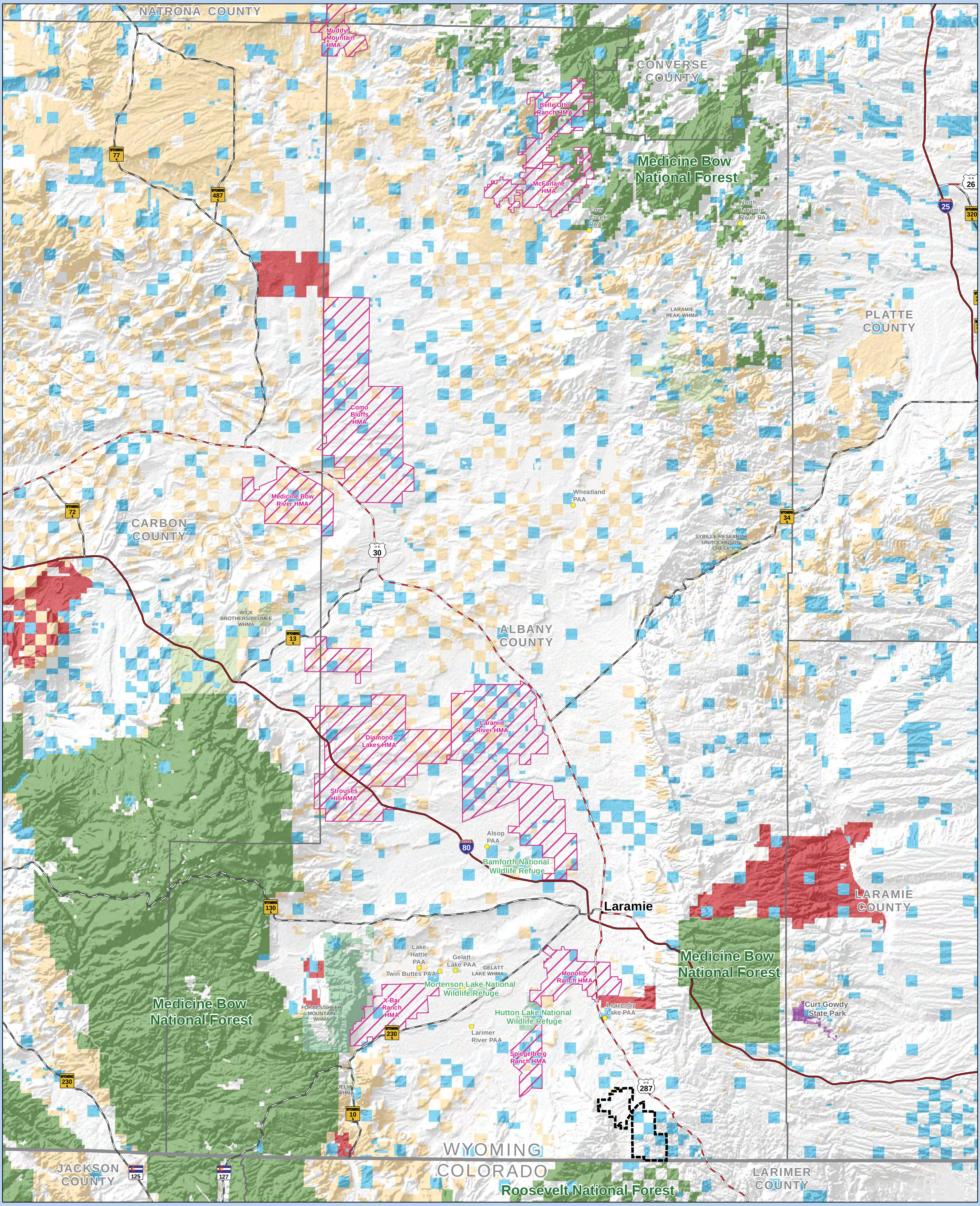
Agency/Address	Reason for Involvement
Albany County Planning Department 1002 South Third St. Laramie, WY 82070	Information on land use and permitting

3.2.5 Albany County Permitting Requirements

Applications for a county permit must include the following information:

- Proof of landowner notification within a 1-mile radius of the project and city and town notifications within a 20-mile radius
- Emergency and waste management plans
- Evidence of legal access
- A traffic study
- Identification of locations for wind turbines, meteorological towers, substation, collector lines, and other ancillary facilities
- Detailed summary of any adverse environmental, social, or economic effects and efforts to alleviate any anticipated effects

County permit applications are be deemed complete or incomplete 30 days after submittal to the county. A public hearing is held no less than 45 days and no more than 60 days after the application has been deemed complete. Within 45 days from the date of the hearing, the County Board of County Commissioners must complete its findings, issue an opinion, and render a decision on the record regarding the permit application.



National Wildlife Refuges, Forests, and Special Status Lands

Project Features

Hermosa West Wind Energy Project

Jurisdiction

U.S. Forest Service

U.S. Fish and Wildlife Service

Bureau of Land Management

State Land

State Park

Wildlife Habitat Management Area

Nature Conservancy Easement

Public Access Area

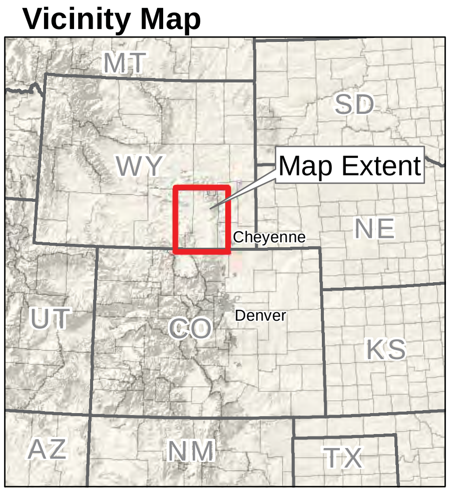
Hunter Management Area

0 3 6 12 Miles

Scale 1:256,000 when printed at 22"X34".

Source: ESRI, BTS, WyGISC, CSU, KOA, TNC WYFG, and USGS
Revised: December 23, 2010
MXD: P:\4004_Shell_Hermosa_West\GIS\Layouts\chapter_3\Jurisdiction_and_Special_Status_Lands.mxd

Vicinity Map



HERMOSA WEST WIND ENERGY PROJECT

FIGURE 3.2-2: NATIONAL WILDLIFE REFUGES, FOREST, AND SPECIAL STATUS LANDS

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3.2.6 Permits Required

Agency-required permits related to land use are summarized in table 3.2-4.

Table 3.2-4:
Permits Required for Construction and Operation

Governmental Entity	Permit/Approval Required
Albany County	Commercial Wind Energy Conversion System Permit
	Conditional Use Permit
	Zoning Certification (for operation and maintenance and for office buildings)
	Road Access Permit
	Utility Access Permit
State of Wyoming	Special Use Lease (for Project development on State lands; obtained by SWE, Project Proponent)

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3.3 Biological Resources

3.3.1 Water Resources

This section describes the water resources present in and near the 11,125-acre proposed Project site, including groundwater, surface water, springs and seeps, wetlands, floodplains and water supply. The proposed Project consists of the wind farm and ancillary facilities as well as Western's interconnection facilities (proposed Federal action). For the purposes of this EIS, the study area for water resources extends beyond the proposed Project boundary to include three primary aquifers, portions of which underlie the proposed Project site.

3.3.1.1 Regulatory Setting

The Federal and State laws and regulations listed below are those that apply to hazardous materials that would be used over the lifetime of the proposed Project that would have the potential to affect water resources. These laws and regulations provide the basis for the thresholds used in the analysis of potential impacts presented in section 4.3.

3.3.1.1.1 Federal

3.3.1.1.1.1 U.S. Army Corps of Engineers

Section 404 of the Clean Water Act (CWA) requires approval prior to discharge of dredged or fill materials into waters of the United States, including wetlands. Construction of the Project would require SWE to obtain either a nationwide permit (NWP) or an individual permit (IP) from the USACE depending on the acreage of permanent effect to a jurisdictional wetland or other water of the United States. An NWP is typically required for permanent impacts of 0.5 acre or less. An IP is typically required when permanent impacts are estimated to be 0.5 acre or more.

3.3.1.1.1.2 Lead Federal Agency

The provisions of EO 11990 (Protection of Wetlands) state that Federal agencies shall

> *provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; and (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.*

As the lead Federal agency for NEPA compliance, Western is responsible for compliance with EO 11990 for Western's proposed Federal action.

The provisions of EO 11988, Floodplain Management, May 24, 1977, direct that Federal actions should be taken to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values provided by floodplains. Such actions include:

- Acquiring, managing, and disposing of Federal lands and facilities
- Providing federally-undertaken, financed, or assisted construction and improvements
- Conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulation, and licensing activities

3.3.1.1.2 State

3.3.1.1.2.1 Wyoming Department of Environmental Quality

Section 401 requires that any applicant for a Section 404 permit provide certification to the USACE from the Wyoming Department of Environmental Quality (WYDEQ) that the activity complies with State water quality requirements. Additionally, Section 402 of the CWA requires that States regulate pollutant discharges from a point source into waters of the United States, in this instance the Wyoming Pollutant Discharge Elimination System. Wyoming has been delegated permit authority for the National Pollutant Discharge Elimination System (NPDES). An NPDES permit, as well as a State permit, for stormwater discharges associated with construction of the proposed Project would be required for construction activities that disturb 5 acres or more of land. The WYDEQ is also responsible for isolated wetlands (wetlands not under Federal jurisdiction) and may require an Isolated Wetland Fill permit if isolated wetlands are disturbed by Project construction.

Section 305(b) of the CWA requires states to describe the water quality condition of all their waters, including all designated use determinations. In addition, Section 303(d) requires that a state develop a listing of all waters that do not fully support existing or designated uses and require development of a Total Maximum Daily Load (TMDL). Wyoming's assessment program makes use-support determinations based on scientifically valid, objective, and representative data and assessments. The USEPA guidance and the WYDEQ–Water Quality Division policy are to use the same assessment methodology to develop both the 303(d) List and the 305(b) Report. The combined 305(b) Report containing the 303(d) list is referred to as the "Integrated Report". Generally, a water is deemed to be "non-supporting" of one or more designated uses ("impaired") if any narrative or numeric criteria are exceeded, or designated uses are shown to be adversely affected by man's activities. The WYDEQ assessment methodology outlines the criteria and decision-making processes employed by the agency for the purpose of making designated use support determinations about the water quality of surface waters of the State.

3.3.1.1.2.2 Wyoming State Engineer's Office

The Surface Water and Engineering Division of the SEO is responsible for reviewing permit applications for any request for putting surface waters of the State to a beneficial use. Permits are required for transporting water through ditch or pipelines, for storage in reservoirs, for storage in smaller reservoir facilities for stock water or wildlife purposes (less than 20 acre-feet of capacity and a dam height 20 feet or less), for enlargements to existing ditch or storage facilities, and for instream flow purposes. Drilling of any groundwater wells associated with the proposed Project would require that a permit be obtained from the Ground Water Division of the SEO.

3.3.1.1.3 Local

The construction of the proposed Project structures and buildings within a floodplain would require that a Floodplain Development Permit be obtained from Albany County prior to construction of the Project. There are no mapped 100-year floodplains within the proposed Project site; therefore, the proposed Project would not require a Floodplain Development Permit.

3.3.1.2 Existing Environment

3.3.1.2.1 Hydrology Baseline

Wyoming has an arid climate and expansive basins and mountain ranges. Most of the State's precipitation comes in the form of snow, which runs off to form the headwaters of Wyoming's major river systems and recharges aquifer systems. Land uses in the higher elevations are logging, recreation, and grazing. At lower elevations, land uses include grazing, irrigated hay production, and oil and gas development. Wyoming's limited water is used extensively for irrigation recreation, wildlife, and urban consumption.

The basic hydrology of the study area is typical of the mountainous high plains of Wyoming. Water is stored in the mountainous headwaters and is released throughout the year, and rainfall runoff is a small component of overall streamflow. Snowmelt runoff peaks in May through July. The Western Regional Climate Center (WRCC 2010) provides a summary of the climate for the Laramie area. Average annual precipitation for Laramie is 10.58 inches. The wettest month of the year is May (1.52 inches of precipitation). The hottest month on average is July, with an average maximum temperature of 80.2°F). The coldest month on average is January, with an average maximum temperature of 32.5°F. The highest average snowfall occurs in March (8.3 inches). The numerous ephemeral and intermittent streams in the proposed Project site indicate that base flow and rainfall-driven streamflow are low.

3.3.1.2.2 Groundwater

The aquifer systems map for the Upper Laramie Basin (WWDO 2006) shows three primary aquifers in the study area. The western unit of the basin in the study area is dominated by the Late-Paleozoic Aquifer system and pockets of the Quaternary Aquifer system—non-alluvial. The Late Paleozoic Aquifer and the Quaternary Aquifer systems are described in the Wyoming State Water Plan as the most extensively developed aquifers for high capacity wells within the Upper Laramie River sub-basin. The eastern portion of the proposed Project site is dominated by the Precambrian Aquifer system.

Mazor (1990) describes the groundwater aquifers of the Laramie Basin. The Casper Aquifer system consists of Precambrian igneous and metamorphic rocks, Pennsylvanian Fountain Formation sandstone, and the Permo-Pennsylvanian Casper Formation (interbedded sandstone, limestone, and dolomite). A second aquifer, the Redbed Aquifer system, includes Permian-age Satanka shale and Forelle limestone and the Triassic-age Chugwater shale and mudstone.

A series of faults act to deform the Casper Aquifer system as it outcrops on the western flank of the Laramie Range. The Redbed Aquifer system confines the Casper Aquifer from a point just east of Laramie continuing west in the Laramie Basin. Mazor (1990) reports that Casper wells west of the confining contact are free-flowing. Both the Casper and the Redbed aquifers receive recharge through local precipitation. The direction of groundwater flow is normally east to west. Depth to groundwater in a well located in the Casper Aquifer, south of Laramie (41°17'03"N, 105°31'40"W), was reported to be 81 feet below ground surface (bgs). This well is 243 feet bgs (USGS 2010).

No municipal or community supply wells are located in the study area (WWDO 2006). There are a number of rural domestic wells adjacent to and within the proposed Project site (SEO 2010). The town of Tie Siding has a number of wells. One of these wells (domestic use), located in T13N, R72W, Sec. 19, NW¼ of the SE¼, was determined to have a total depth of 40 feet below ground surface (bgs) and a static water level of 24 feet bgs. Another shallow well (domestic and stock use) was located in the northwestern portion of the proposed Project site (T13 N, R73 W, Sec. 28, NW¼, SW¼). This well has a total depth of 16 feet bgs and a depth to static water of 13 feet bgs. A second well (domestic and stock use) in this same quarter section was completed to a depth of 300 feet bgs, with a static water level of 20 feet bgs.

Groundwater in Wyoming is considered to be the property of the State. SWE would coordinate the installation of the groundwater well with the SEO, which requires an approved permit application prior to well drilling.

Consumption of groundwater or surface water that could result in depletions to flows in the Platte River system are a concern under the endangered species act (ESA) because of potential impacts to threatened and endangered species habitat along the Platte River in Nebraska (i.e., Platte River Basin target species; for information on these species see sections 3.3.2.2.2 and 3.3.3.2.2). The Platte River Recovery Implementation Program, effective January 1, 2007, was conceived to provide ESA Section 7 compliance for water users in the Platte River Basin upstream of the Loup River confluence in Nebraska for effects on Platte River Basin target species and critical habitat (USFWS 2007). The State of Wyoming entered into the Program with the States of Colorado and Nebraska and the USFWS to protect Platte River Basin target species and their habitat from water depletions in the Platte River. In Wyoming, the Program is implemented through the Wyoming Depletions Plan. The Platte River Recovery Implementation Program established a *de minimis* effect threshold of 0.1 acre-foot of water per year. This level of depletions in flow to the nearest surface water tributary to the Platte River system has "an insignificant effect on the Platte River target species, and thus do not require consultation with the Service for potential effects on those species" (USFWS 2007). Projects that result in depletions below this threshold are pre-determined to have an insignificant effect on downstream listed species. In 2007, the USFWS established non-hydrologically connected water uses. The depletive effects of projects whose water supply is solely derived from sources that are considered "not hydrologically connected" to the Platte River system do not need to be addressed in consultation with the USFWS. These sources include wells that are located and constructed such that, if water were withdrawn continuously for 40 years, the cumulative stream depletion would be less than 28 percent of the total volume of groundwater withdrawn from that well, i.e., wells that are not in the "28%-in-40-years zone."

3.3.1.2.3 Groundwater Quality

The only groundwater quality data that could be obtained for the study area came from a U.S. Geological Survey (USGS) fact sheet on pesticides in groundwater (USGS 2005). The fact sheet describes 11 groundwater wells that were selected within Albany County for baseline monitoring. Ten of these wells were finished in unconsolidated deposits of the Quaternary and Tertiary Periods. One well was completed in the Santaka Formation of the Permian Period. Groundwater samples were collected in 2003 and 2004. None of these 11 wells was located in the proposed Project site. The nearest well to the site is located near the Laramie River in T15N, R74W (approximately 15 miles northwest of the proposed Project site).

Results of sampling indicated that pesticides were present in measurable quantities in 6 of the 11 wells tested, although none of the pesticides that were detected were found in quantities that exceeded applicable drinking water standards (USGS 2002).

3.3.1.2.4 Groundwater Quantity

The recorded yield of the domestic well described above for Tie Siding (T13, R72W, Sec. 19, NW¼, SE¼) is 10 gallons per minute. Wells in the northwest portion of the proposed Project site (T13N, R73W, Sec. 28, NW¼, SW¼), which are used for domestic and stock purposes, have yields averaging 3 to 5 gallons per minute (SEO 2010).

3.3.1.3 Springs and Seeps

Mazor (1990) reported that the fractured zones in the Casper Aquifer tend to have large transmissivities (the volume of water flowing through an aquifer). This hydraulic conductivity results in a local lowering of groundwater heads, and groundwater flows into the fault zones. Groundwater then moves upward through the fault planes and it is expressed as surface springs. Three springs are depicted on topographic maps available for the proposed Project site. These springs include one located in the northwestern portion of the proposed Project site (T13N, R73W, Sec. 28, NE¼, SW¼, SW¼). A second spring is identified near the center of the proposed Project site (T13N, R73W, Sec. 36, SW¼, SE¼, NW¼). A third spring is found in the southeastern portion of the proposed Project site (T12N, R72W, Sec. 18, SW¼, SE¼, NW¼). The three springs located within the Project area are shown on figure 3.3-1. A fourth spring located adjacent to the Project site boundary is also shown on figure 3.3-1.

3.3.1.4 Surface Water

A surface water resource assessment report was prepared for the proposed Project (ERM 2010e; appendix C). This assessment employed desktop analysis and field surveys (August and October 2009) to characterize surface water resources in the proposed Project site. Much of the following text was derived from this report unless otherwise referenced.

Field survey verified that all surface waterbodies have a direct or indirect connection to the North Platte or South Platte Rivers, which are both considered traditional navigable waters (TNW). As a result, these surface waters are likely to be jurisdictional waters of the United States. Named surface waters in the proposed Project site include Government Creek, Forest Creek, Boulder Creek, Willow Creek, Fish Creek, and Grant Creek. There are also many unnamed streams in the proposed Project site that are tributary to the streams that are listed above. Streams within the site include stream orders 1 through 3. None of these streams is a high relief, broad, or deep system. Normal flows were estimated to be between 1 and 60 cubic feet per second (cfs) (ERM 2010e).

3.3.1.4.1 Hydrology Baseline

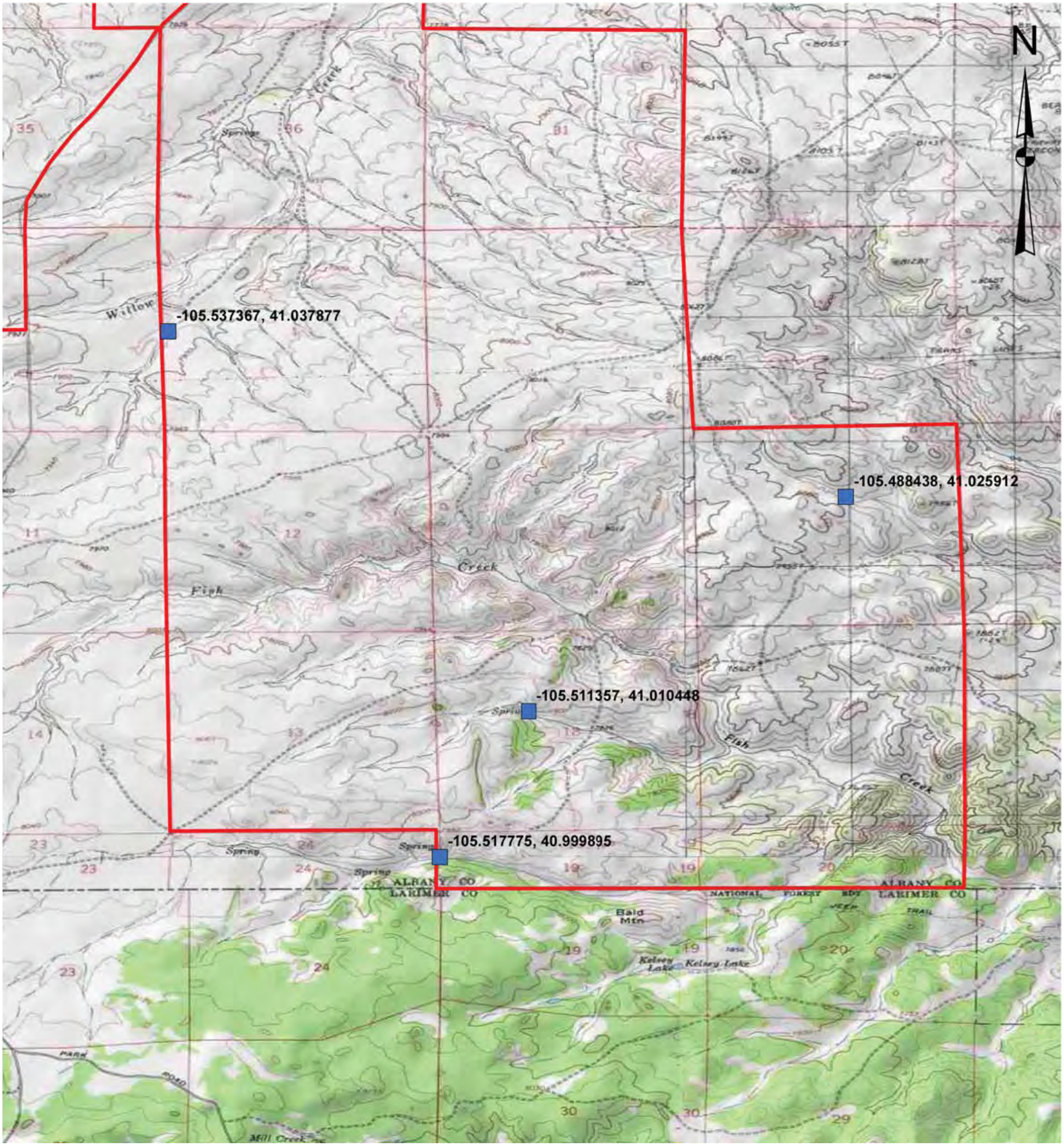
Wyoming has an arid climate and expansive basins and mountain ranges. Most of the State's precipitation comes in the form of snow, which runs off to form the headwaters of Wyoming's major river systems and to recharge aquifer systems. Land uses in the higher elevations are logging, recreation, and grazing. At lower elevations, land uses include grazing, irrigated hay production, and oil and gas development. Wyoming's limited water is used extensively for irrigation recreation, wildlife, and urban consumption.

The basic hydrology of the study area is typical of the mountainous high plains of Wyoming. Water is stored in the mountainous headwaters and is released throughout the year; rainfall runoff is a small component of overall streamflow. Snowmelt runoff peaks from May through July. The Western Regional Climate Center (WRCC 2010) provides a summary of the climate for the Laramie area. Average annual precipitation for Laramie is 10.58 inches. The wettest month of the year is May (1.52 inches of precipitation). The hottest month on average is July, with an average maximum temperature of 80.2°F). The coldest month on average is January, with an average maximum temperature of 32.5°F. The highest average snowfall occurs in March (8.3 inches). The numerous ephemeral and intermittent streams in the proposed Project site indicate that base flow and rainfall-driven streamflow are low.

3.3.1.4.2 Watersheds

The proposed Project site is located in the Upper Laramie River sub-basin (HUC 10180010). This sub-basin includes all the drainages upgradient of Wheatland Reservoir #2. The major streams in this sub-basin are the Laramie River and the Little Laramie River, both of which headwater in the Medicine Bow Mountains. A small portion of the site lies within the Fish Creek Watershed of the Cache la Poudre sub-basin (HUC 10190007). Fish Creek originates in the Laramie Mountains and drains to the south into Colorado.

Drainage areas for each watershed at the boundaries of the proposed Project site and drainage areas at each stream crossing were delineated by ERM (2010h) using Aquaveo's Watershed Modeling System (WMS) software (2010). The WMS uses USGS digital elevation model maps downloaded from a publicly available server at <http://www.webgis.com>. A watershed map is provided as figure 3.3-2. Drainage areas for each watershed are listed in table 3.3-1.



Spring Locations

Spring Location

Hermosa West Wind Farm Boundary

0 0.6 1.2 Miles

Vicinity Map

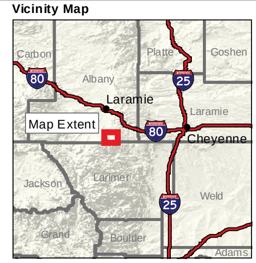


FIGURE 3.3-1: SPRING LOCATIONS

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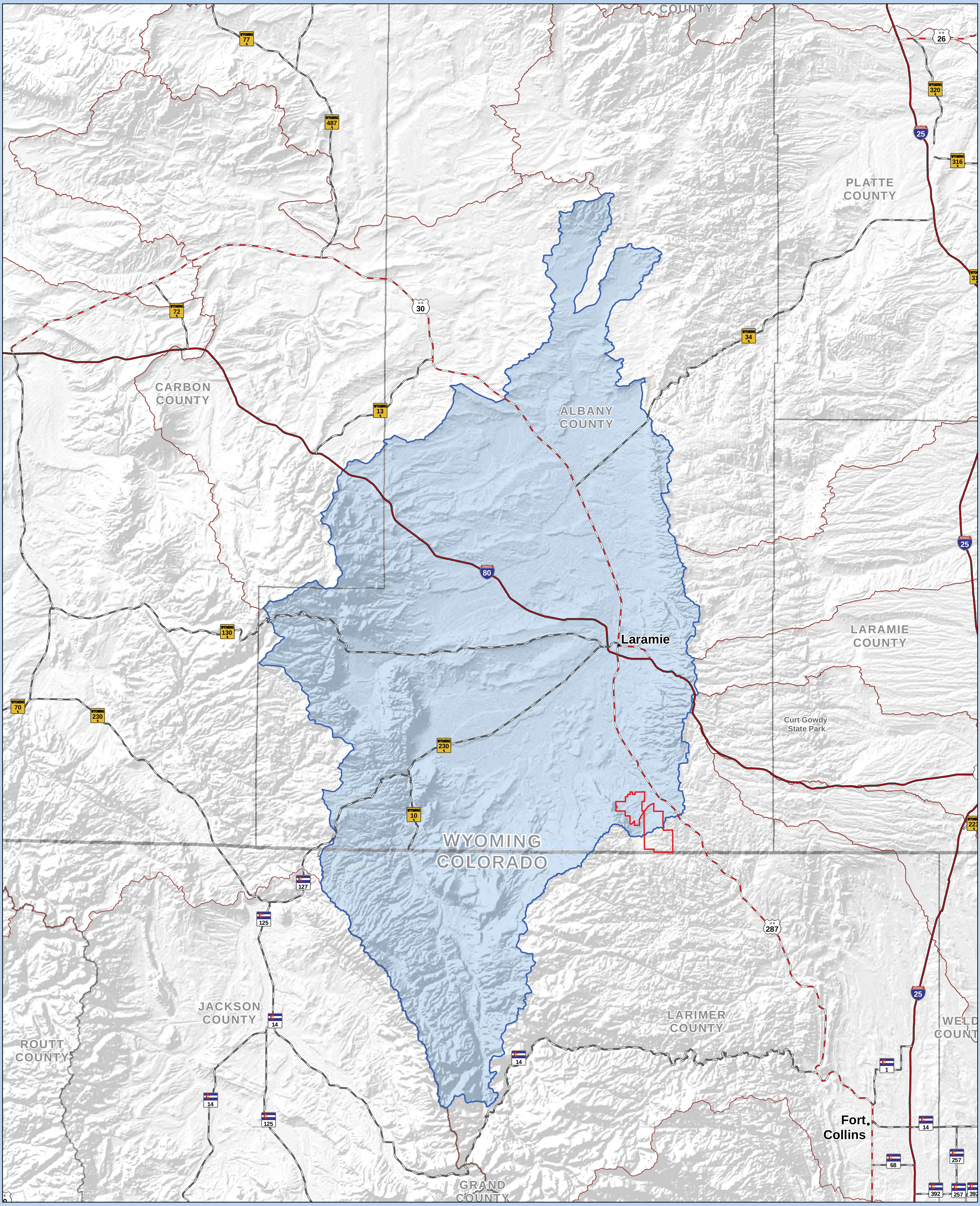

Study Area Watersheds

Hermosa West Wind Energy Project Area

Watersheds

Sub Basin Watershed Boundary

Upper Laramie Sub Basin Watershed

0 3.75 7.5 15 Miles

Scale 1:256,000 when printed at 22"X34".

Source: ESRI, BTS, WyGISC, WYFG, and USGS
Revised: March 25, 2011
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Hermosa West Wind Energy Project

Figure 3.3-2: Study Area Wetlands

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Table 3.3-1:
Drainage Areas Within the Project Area

Stream name	Approximate Drainage Area (square miles)	Drainage Area (acres)
Government Creek (at Project boundary)	2.3	1,472
Forest Creek (at Boulder Creek)	1.7	1,088
Boulder Creek (at Project boundary, including Forest Creek)	4.6	2,944
Willow Creek (at Project boundary, excluding Forest and Boulder Creeks)	8.1	5,180
Fish Creek (at State line)	17.1	10,944

3.3.1.4.3 Surface Water Quality

The USEPA is charged with administering the CWA. States are encouraged, however, to develop their own programs to prevent, reduce, and eliminate water pollution. Section 303(d) of the CWWA requires that States provide a list of the impaired waters requiring TMDLs. Section 303(d) further requires that States identify and list waters for which the effluent limits outlined in Section 301 of the CWA that are not effective in attaining designated uses. The CWA also requires that States develop a separate TMDL for each pollutant/segment combination on the 303(d) List. These TMDLs are to be completed on impaired waters to ensure the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife and allow recreational activities in and on the water. Section 305(b) of the CWA requires that each State provide a report of surface water quality every 2 years (during even numbered years). Wyoming's 2010 Integrated 305(b) and 303(d) Report combines the requirements of both sections into a single document (WYDEQ 2010).

In 2010, the WYDEQ did not list any impaired waters in the southeastern corner (Willow Creek watershed) of the Upper Laramie River sub-basin (WYDEQ 2010). In 2010, the WYDEQ did not list any 303(d) impaired waters in the Fish Creek watershed (part of Cache la Poudre sub-basin) (WYDEQ 2010)

Extensive water quality assessments by universities, the USFS, and the WYDEQ in the Little Laramie drainage above Millbrook indicate that the majority of the streams and lakes are meeting their aquatic life uses (WYDEQ 2010).

No National Water-Quality Assessment Program (NAWQA) water quality stations are located in the Project area or in the North Platte River Basin in Wyoming. Within the rest of Wyoming, there are 50 NAWQA stations, primarily in the western end of the State. Similarly, the USGS does not have any water quality monitoring stations in its stream database within the study area or within Albany County.

3.3.1.4.4 Surface Water Quantity

There are no established surface water gaging stations located on streams within the proposed Project site (WWDO 2006). It was determined that streamflow conditions at the site may be comparable to those at USGS gauging station #06659580 on Sand Creek at the Colorado-

Wyoming border. Flow at Sand Creek (drainage area = 29.2 square miles) in 2009 ranged from below 1 cfs to 60 cfs, or 0.03 to 2.05 cfs/square miles (USGS 2009). These values can be proportioned by drainage-area size to each of the drainage basins within the site to estimate the range of streamflows expected at each location.

3.3.1.4.5 Surface Water Rights

Data on surface water rights were obtained from the SEO website (SEO 2010) for the proposed Project site. Data were located for Willow Creek, Boulder Creek, and Fish Creek.

The water rights database returned a single permit for Willow Creek within the proposed Project site. This permit facility name was A.C. Maxwell No. 2 Ditch. It is located in T13N, R73W, Sec. 25, NE¼, SW¼.

The water rights database returned four permits for Boulder Creek within the proposed Project site. These permits include two listings for the Henry Sage #4 Ditch (T13N, R73W, Sec. 26), one listing for the Harnden Ditch (T13N, R73W, Sec. 26, NW¼, NE¼), and one listing for the Boulder Creek No. 1 Stock Reservoir (T13N, R73W, Sec. 26, NW¼, NE¼).

There is a water right on Forest Creek with a facility name of Forest Ditch. It is located in T13N, R73W, Sec. 33, SE¼, NE¼. This water right is in close proximity to, but just outside, the proposed Project site.

The water rights database returned three permits for Fish Creek (within Cache la Poudre sub-basin) within the proposed Project site. Two of these permits were issued for T12N, R72W, Sec. 7, SW¼, SE¼. The facility names were Knight #6 North Ditch and Knight # 6 South Ditch. The other water right was in T12N, R72W, Sec. 7, NW¼, SW¼. This water right had the facility name Knight Ditch #5.

There are no documented community public water supplies that rely entirely on surface water resources in the Upper Laramie Sub-basin (WWDO 2006). No data for public water supplies that rely entirely on surface water resources of the Cache la Poudre Sub-basin could be documented in the Wyoming State Water Plan (WWDO 2006). This sub-basin includes Fish Creek and the southern portion of the Project site and is very lightly populated.

3.3.1.5 Wetlands

Field delineations conducted by ERM (2010h) identified a total of nine palustrine emergent wetlands (PEM) within the surveyed portion of the proposed Project site. One of these features, WBAL002 (0.13 acre), was an isolated depressional wetland and showed no significant nexus to a water of the United States. The remaining eight wetlands (6.05 acres) were associated with stream corridors and exhibit a significant nexus to a TNW. As a result, these eight wetlands are likely to be jurisdictional based upon USACE criteria. Only the USACE and the USEPA can make the final jurisdictional determination for wetlands and other waters of the United States in the proposed Project site. Table 3.3-2 describes the wetland features delineated by ERM (ERM

2010h,i; appendix D); wetlands are identified in figure 3.3-3. None of the wetlands identified during the delineation are fen wetlands.

Table 3.3-2:
Wetlands within the Survey Area

Feature ID	Latitude	Longitude	Type	Acreage[1]	Connection to Significant Nexus
WAAL001	41.056410	-105.573166	PEM	1.29	Associated with Forest Creek
WAAL002	41.047740	-105.560374	PEM	0.90	Associated with Boulder Creek
WAAL003	41.050119	-105.535957	PEM	0.33	Associated with Willow Creek
WAAL004	41.038912	-105.535552	PEM	1.52	Associated with Willow Creek
WBAL001	41.068691	-105.545779	PEM	0.20	Associated with Boulder Creek
WBAL002	41.082437	-105.546098	PEM	0.13	Isolated depressional wetland
WBAL003	41.058457	-105.553990	PEM	0.43	Associated with Boulder Creek
WBAL004	41.058491	-105.523914	PEM	0.16	Associated with Willow Creek
WBAL005	41.020996	-105.516327	PEM	1.22	Associated with Fish Creek
			Total	6.18	
			Total Potentially Jurisdictional Wetlands	6.05	

PEM Palustrine emergent
1 Wetland acreages are based on GPS boundaries surveyed by ERM (2010h,i).

There are anticipated to be 30 surface water crossings within the proposed Project site (ERM 2010h,i). Of these 30 crossing sites, 12 are perennial streams, 8 are intermittent streams, and 10 are ephemeral streams. The wetland assessment (ERM 2010h,i) concluded that all of these natural waterbodies likely have a connection to the North or South Platte Rivers, both of which are TNWs. The USACE would likely qualify these surface water features as jurisdictional waters of the United States. The desktop study also identified several intermittent or ephemeral waterbodies that were field verified and deemed to be swales or erosion features that do not meet USACE criteria for definition as waters of the United States. The USACE is not likely to take jurisdiction over these swales or erosion features.

A series of maps illustrating wetlands and other water features in the proposed Project site are provided in the wetland assessment (ERM 2010h). That document is included in the EIS as appendix D.

3.3.1.6 Floodplains

The typical landscape of the region is low mountain slopes and nearly level floodplains (Chapman et al. 2004). The FEMA website was queried for available flood rate insurance mapping for the proposed Project site. Community Panel #560001-0046A was reviewed (FEMA 1986). No 100-year floodplains were mapped within the bounds of the site. A 100-year floodplain is documented on Willow Creek from Sportsman Road, extending to the north through Willow Creek Reservoir, but it is outside the proposed Project site. Mr. Doug Bryant (Albany County Planning Director) was contacted to discuss the potential for floodplains to exist within the proposed Project site. Mr. Bryant felt that FEMA floodplain mapping in the area was accurate, but he conditioned this statement by noting that even very small streams, such as the examples in this watershed, can be floodways under extreme conditions (Bryant 2010).

3.3.2 Vegetation Resources

This section describes the characteristics of the vegetation resources present in and near the approximately 11,125-acre proposed Project site, including cover types, noxious weeds, and special status plant species. The study area for vegetation extends beyond the boundary of the proposed Project site to the extent that vegetation is described in terms of ecoregional vegetation and site-specific vegetation cover types.

Ecoregional vegetation data were obtained from *Ecoregions of Wyoming* (Chapman et al. 2004). Site-specific vegetation was evaluated and mapped by Western EcoSystems Technology Inc. (WEST 2010b) and was field-verified during the site reconnaissance conducted in August 2010 (Tetra Tech 2010). Botanical nomenclature follows Dorn (2001).

3.3.2.1 Regulatory Setting

3.3.2.1.1 Federal

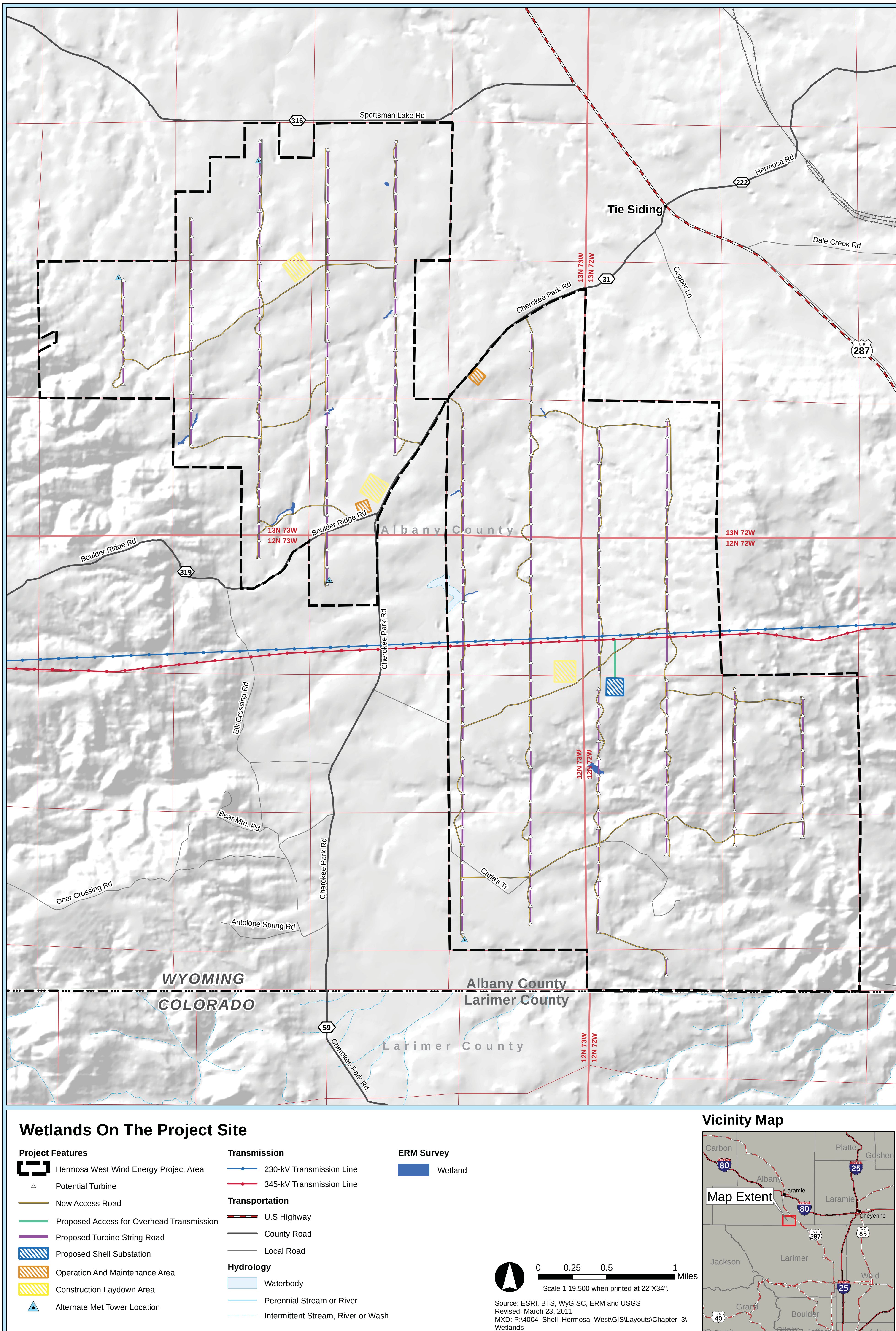
3.3.2.1.1.1 U.S. Fish and Wildlife Service

The ESA, as amended, protects plant and animal species that are listed by the USFWS as endangered or threatened. Under Section 7 of the ESA, Federal agencies are required to consult with the USFWS to ensure that any action the lead agency authorizes, funds, or carries out does not adversely affect a federally listed species or its designated critical habitat. The USFWS is required under the ESA to designate critical habitat for a species at the time of its listing that constitute the physical or biological features “essential to the conservation of the species,” or that may require “special management consideration or protection” (16 USC § 1533(a)(3).2; 16 USC § 1532(a)). Designated critical habitat is afforded the same protection under the ESA as individuals of the species, requiring issuance of an Incidental Take Permit prior to any activity that results in “the destruction or adverse modification of habitat . . . determined . . . to be critical” (16 USC § 1536(a)(2)). Through consultation and a Biological Opinion, the USFWS may issue an Incidental Take Permit allowing take of the species that is incidental to another otherwise legal activity, provided the action will not jeopardize the continued existence of that species. The USFWS Mountain-Prairie Region (Region 6) maintains a list of Federal endangered, threatened, candidate, and proposed plant species for Wyoming. Western will consult only on its proposed Federal Action, but will include the entire Project in the consultation documentation, with SWE being responsible for reasonable and prudent measures or terms and conditions for its Project.

3.3.2.1.2 State

3.3.2.1.2.1 Wyoming Department of Agriculture

Noxious weeds are species of non-native plants that can alter habitat structure, increase fire frequency and intensity, decrease forage (including for special-status species), exclude native plants, and decrease water availability for both plants and wildlife. Noxious weeds are included on the Wyoming State-listed noxious weeds lists (WDA 2003).



HERMOSA WEST WIND ENERGY PROJECT

FIGURE 3.3-3: WETLANDS OF THE PROJECT SITE

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3.3.2.1.3 Local Regulations

At the county level, noxious weeds are listed on the Albany County weed and pest list (WDA 2012).

3.3.2.2 Existing Environment

3.3.2.2.1 Ecoregional Vegetation

The Project site lies within two distinct USEPA Level III ecoregions, the Southern Rockies Ecoregion and the Wyoming Basin Ecoregion (Chapman et al. 2004). Within the Southern Rockies Ecoregion, the Project site is associated with the Level IV Mid-Elevation Forests and Shrublands subregion. This subregion area is characterized by low mountain slopes and outwash fans with moderate to high gradient perennial streams. The potential natural vegetation in this subregion includes lodgepole pine (*Pinus contorta*) forest and Douglas-fir (*Pseudotsuga menziesii*) forest with some limber pine (*Pinus flexilis*). Aspen forests occur in the Snowy Range on the western side of the Project site, while ponderosa pine (*Pinus ponderosa*) woodlands occur in the Laramie Mountains on the eastern side of the proposed Project site.

The Wyoming Basin Ecoregion includes the USEPA Level IV Laramie Basin subregion. The Laramie Basin varies in elevation from 7,100 to 7,900 feet and is characterized by nearly level floodplains and terraces. This ecoregion is dominated by mixed-grass prairie. The potential natural vegetation for the Laramie Basin subregion includes needleandthread (*Stipa comata*), western wheatgrass (*Elymus smithii*), blue grama (*Bouteloua gracilis*), and Indian ricegrass (*Oryzopsis hymenoides*). The majority of the Project site lies within the Laramie Basin subregion.

3.3.2.2.2 Site Cover Types

Vegetation cover types were determined by WEST (2010b) through analysis of aerial imagery for the Project site, followed by ground verification. Six general vegetation cover types were verified for the proposed Project site, including mixed-grass prairie, mixed conifer forest, riparian, mountain mahogany, shrub steppe, and riparian willow. These vegetation cover types are depicted in figure 3.3-4 and summarized by percentage in table 3.3-3. The following discussion describes each cover type and the associated dominant plant species for the proposed Project site and immediately adjacent lands.

Table 3.3-3:
Hermosa Project Site Land Cover Types

Land Cover Type	Acres in the Project Site	Approximate Percentage of Overall Project Site
Mixed Grass Prairie	9,735	88
Mixed Conifer Forest	661	6
Riparian	397	4
Mountain Mahogany	131	1
Shrub Steppe	106	1
Riparian Willow	86	1
Total	11,118	100

3.3.2.2.2.1 Mixed-Grass Prairie

Mixed-grass prairie constituted 9,735 acres, or approximately 88 percent of the vegetation on the proposed Project site. Species identified in upland grasslands included spineless horsebrush (*Tetradymia canescens*), big sagebrush (*Artemisia tridentata*), waxcurrant (*Ribes cereum*), Timothy grass (*Phleum pratense*), blue wildrye (*Elymus glaucus)*, Canada goldenrod (*Solidago canadensis*), big bluestem (*Andropogon geradii*), little bluestem (*Schizachyrium scoparium*), and several other species of upland grasses (ERM 2010h). During subsequent field surveys, common species observed on the proposed Project site included fringed sage (*Artemisia frigida*), sulphur flower (*Eriogonum umbellatum*), western wheatgrass, green gentian (*Frasera speciosa*), sixweeks fescue (*Vulpia octoflora*), prairie junegrass (*Koeleria macrantha*), gayfeather (*Liatris punctata*), western yarrow (*Achillea millefollium* var. *lanulosa*), needleandthread, desert mallow (*Sphaeralcea coccinea*), rabbitbrush (*Chrysothamnus viscidiflorus*), silver sagebrush (*Artemisia cana*), Sandberg's bluegrass (*Poa secunda*), owl clover (*Orthocarpus luteus*), blue grama (*Bouteloua gracilis*), bluebunch wheatgrass (*Elymus spicatus*), and ground lichen (*Xanthoparmelia chlorochroa*) (Tetra Tech 2010).

3.3.2.2.2.2 Mixed Conifer Forest

Mixed conifer forests constitute 661 acres, or approximately 6 percent of the vegetation on the proposed Project site (WEST 2010b). The dominant trees observed in these forests were limber pine, ponderosa pine, Douglas fir, and lodgepole pine (Tetra Tech 2010).

3.3.2.2.2.3 Riparian

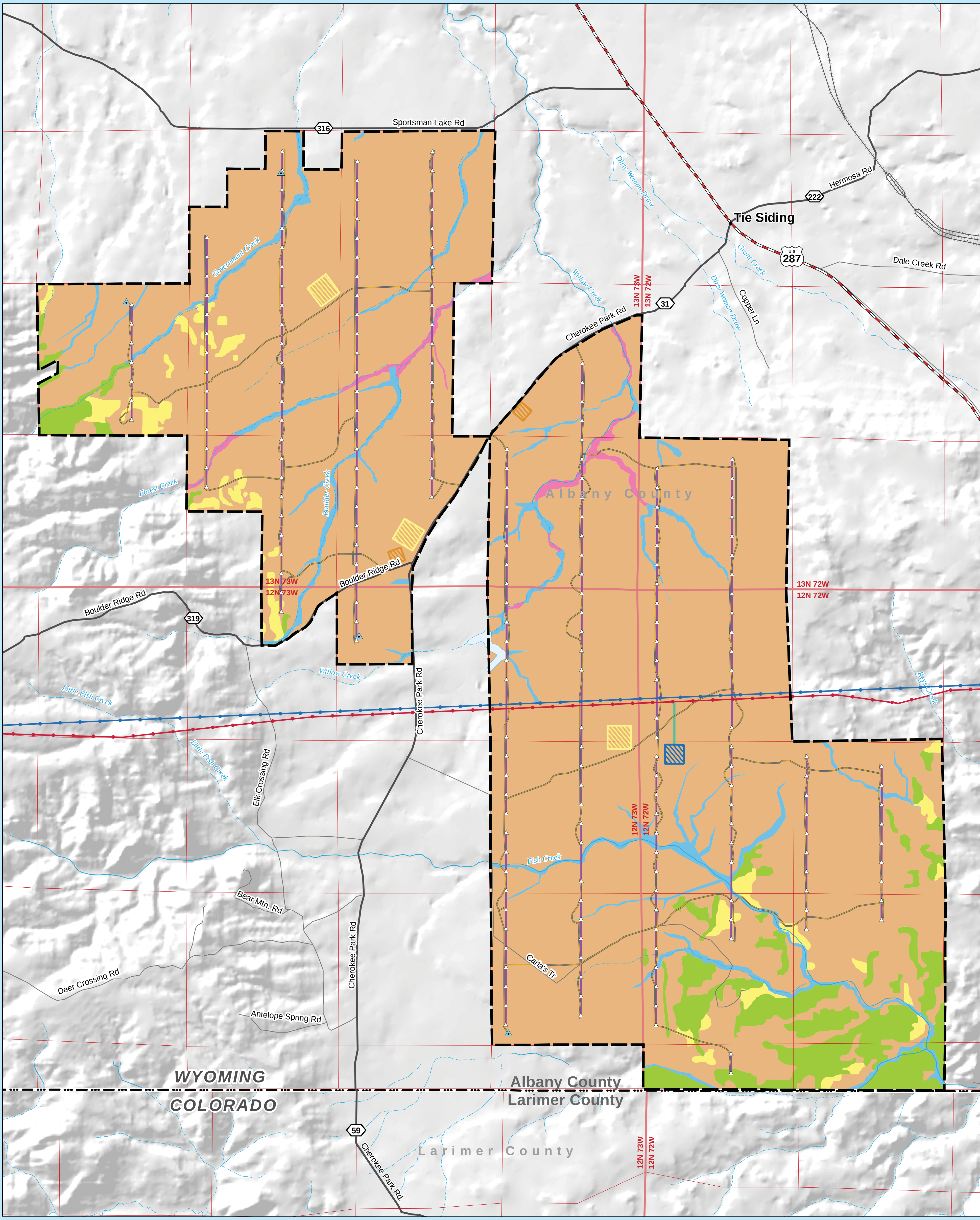
Riparian cover types constituted 3,980 acres, or approximately 4 percent of the vegetation on the proposed Project site (WEST 2010b). Riparian communities are typically situated adjacent to stream courses. These systems are influenced by the availability of surface water and near-surface groundwater. Soils tend to be moist or saturated. Dominant plant species are highly variable, but normally include a mix of tree, shrub and herbaceous vegetation. Field reconnaissance documented water birch (*Betula occidentalis*), quaking aspen (*Populus tremuloides*), narrowleaf cottonwood (*Populus angustifolia*), water sedge (*Carex aquatilis*), beaked sedge (*Carex utriculata*), and Baltic rush (*Juncus balticus*) (Tetra Tech 2010), among many other species.

3.3.2.2.2.4 Mountain Mahogany

Mountain mahogany (*Cercocarpus montanus*) constituted 131 acres, or approximately 1 percent of the vegetative cover on the Project site (WEST 2010b). Mountain mahogany can form dominant stands on rocky, dry, coarse soils of mountain slopes. Associated species may include skunkbrush (*Rhus aromatica* var. *trilobata*) and bitterbrush (*Purshia tridentata*).

3.3.2.2.2.5 Shrub Steppe

Shrub steppe constituted 106 acres, or approximately 1 percent of the vegetative cover on the proposed Project site (WEST 2010b). The dominant shrubs observed in this cover type were wax current (*Ribes cereum*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyanum*), and common juniper (*Juniperus communis*) (Tetra Tech 2010).



Vegetation Cover Types

Project Features

- Hermosa West Wind Energy Project Area
- Potential Turbine
- New Access Road
- Proposed Access for Overhead Transmission
- Proposed Turbine String Road
- Proposed Shell Substation
- Operation And Maintenance Area
- Construction Laydown Area
- Alternate Met Tower Location

Transmission

- 230-kV Transmission Line
- 345-kV Transmission Line

Transportation

- U.S Highway
- County Road
- Local Road

Hydrology

- Waterbody
- Perennial Stream or River
- Intermittent Stream, River, or Wash

Vegetation Type

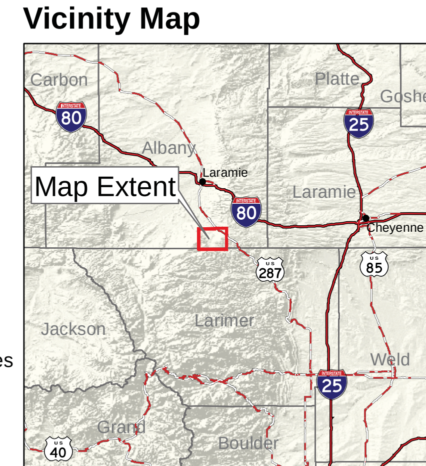
- Mixed Conifer Forest
- Mixed-grass Prairie
- Palustrine Emergent
- Riparian Willow Wetlands
- Shrub Lands

0 0.25 0.5 1 Miles

Scale 1:19,500 when printed at 22"X34".

Source: ESRI, BTS, WyGISC, ERM and USGS
Revised: March 23, 2011
MXD: P:\4004_Shell_Hermosa_West\GIS\Layouts\Chapter_3\Vegetation.mxd

Vicinity Map



HERMOSA WEST WIND ENERGY PROJECT
FIGURE 3.3-4: VEGETATION COVER TYPES

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3.3.2.2.2.6 Riparian Willow

The riparian willow cover type constituted 86 acres or approximately 1 percent of the vegetation on the proposed Project site (WEST 2010b). Bebb willow (*Salix bebbiana*), Rocky Mountain willow (*Salix monticola*), and coyote willow (*Salix exigua*) dominated in these riparian willow systems (WEST 2010b).

3.3.2.2.2.7 Noxious Weeds

Several Wyoming State-listed noxious weeds were identified within the proposed Project site (Tetra Tech 2010). Most notable among these species were Canada thistle (*Cirsium arvense*), houndstongue (*Cynoglossum officinale*), and leafy spurge (*Euphorbia esula*). Incidental observations were also made for field bindweed (*Convolvulus arvensis*) and quackgrass (*Elymus repens*). Table 3.3-4 is a complete listing of Wyoming State-listed noxious weeds and Albany County declared weeds and pests.

Table 3.3-4:
Wyoming State Listed Noxious Weeds and County Declared Weeds and Pests

Common Name	Scientific Name[1]	Observed in Project Site	Where Listed
Canada thistle	*Cirsium arvense*	Yes	State
Common burdock	*Arctium minus*	No	State
Common St. Johnswort	*Hypericum perforatum*	No	State
Common tansy	*Tanacetum vulgare*	No	State
Dalmatian toadflax	*Linaria dalmatica*	No	State
Diffuse knapweed	*Centaurea diffusa*	No	State
Dyers woad	*Isatis tinctoria*	No	State
Field bindweed	*Convolvulus arvensis*	Yes	State
Hoary cress	*Cardaria draba and C. pubescens*	No	State
Houndstongue	*Cynoglossum officinale*	Yes	State
Leafy spurge	*Euphorbia esula*	Yes	State
Musk thistle	*Carduus nutans*	No	State
Ox-eye daisy	*Chrysanthemum leucocanthemum*	No	State
Perennial pepperweed	*Lepidium latifolium*	No	State
Perennial sowthistle	*Sonchus arvensis*	No	State
Plumeless thistle	*Carduus acanthoides*	No	State
Purple loosestrife	*Lythrum salicaria*	No	State
Quackgrass	*Elymus repens*	Yes	State
Russian knapweed	*Centaurea repens*	No	State
Russian olive	*Elaeagnus angustifolia*	No	State
Saltcedar (Tamarisk)	*Tamarix* spp.	No	State
Scotch thistle	*Onopordum acanthium*	No	State
Skeletonleaf bursage	*Ambrosia tomentosa*	No	State
Spotted knapweed	*Centaurea maculosa*	No	State
Yellow toadflax	*Linaria vulgaris*	No	State
Black henbane	*Hyoscyamus niger*	No	County

Table 3.3-4:
Wyoming State Listed Noxious Weeds and County Declared Weeds and Pests

Common Name	Scientific Name[1]	Observed in Project Site	Where Listed
Plains larkspur/Geyer larkspur	*Delphinium geyeri*	No	County
Locoweed	*Oxytropis* spp.	Yes	County
Cheatgrass	*Bromus tectorum*	Yes	County

Source WDA (2012

1 Botanical nomenclature follows Dorn (2001).

3.3.2.3 Special Status Plant Species

3.3.2.3.1 Federally Listed Plant Species

The USFWS Mountain-Prairie Region (Region 6) maintains a list of federal endangered, threatened, candidate, and proposed plant species for Wyoming. This listing is also subdivided by county. The only federal listed plant species for Albany County is the threatened Ute ladies'-tresses orchid (*Spiranthes diluvialis*). Informal discussion with USFWS in Cheyenne field office (Covington 2010) verified that Ute ladies'-tresses orchid is not likely to be found based on a site elevation of approximately 7,900 feet because the orchid is not typically found above 7,000 feet.

In addition to the species identified by the USFWS (2010a) as occurring in Albany County, informal discussions were held on the potential occurrence of habitat for the endangered blowout penstemon (*Penstemon haydenii*) (Covington 2010) and the potential impact from the proposed Project to the threatened western prairie fringed orchid (*Platanthera praeclara*). The blowout penstemon is only found on sand blowouts or sand dunes, neither of which occurs in the proposed Project site. The western fringed prairie orchid occurs downstream of the proposed Project site in the Platte River watershed, but it is included on USFWS's Albany County species list (USFWS 2011) because of concerns about projects based in Albany County that may cause depletions to downstream flows in the Platte River that would impact this species' habitat (as discussed in section 3.3.1.2.2). Based on the information provided by the USFWS, the western prairie fringed orchid is the only federally listed plant species that could be indirectly affected by the Project. This species is not known to occur in this part of Albany County, and no suitable habitat for western fringed prairie orchid was identified within the proposed Project site during field surveys or field reconnaissance (ERM 2010f, WEST 2010, Tetra Tech 2010).

3.3.3 Wildlife and Habitat Resources

This section describes the avian and terrestrial wildlife present in the 11,125-acre proposed Project site, including common wildlife species, rare species and migratory bird species, and threatened and endangered species. For the purposes of the EIS, the proposed Project site is fully contained within the study area, which extends beyond the site boundary and varies depending on the species being discussed.

A variety of means were used to determine the species present within the proposed Project site, including desktop studies and field confirmation. Desktop surveys reviewed existing Federal and State agency data, data from the Project-specific field surveys, a review of existing published literature, such as the *Atlas of Birds, Mammals, Reptiles, and Amphibians in Wyoming* (Orabona et al. 2009), and written and verbal consultation with the USFWS and the WGFD. The desktop review of wildlife was limited to wildlife known to occur or having the potential to occur in the proposed Project site.

Project-specific surveys conducted by SWE's consultants are as follows:

- Threatened and Endangered Species Report: Hermosa West Wind Farm Project (ERM 2010f)
- Bat Acoustical Studies for the Hermosa West Wind Resource Area Albany County, Wyoming (WEST 2010a)
- Wildlife Baseline Studies for the Hermosa West Wind Resource Area, Albany County, Wyoming (WEST 2010b)
- Wildlife Baseline Studies for the Hermosa West Wind Resource Area, Albany County, Wyoming Final Report April 2010-April 2011 (WEST 2011).

The proposed 11,125-acre Project site was surveyed from April 2009 through April 2011 (WEST 2010a, 2010b, 2011), and approximately 2,198 acres of private- and State-owned land located within the proposed Project site was subjected to additional survey (ERM 2010f) (figures 3.3-5 through 3.3-8).

Additionally, a general wildlife and habitat desktop study was prepared to establish a baseline of existing biological resources across the proposed Project site and a site reconnaissance conducted on August 18, 2010 (Tetra Tech 2010). The purpose of the reconnaissance was to validate the findings of the desktop analysis and confirm and expand on earlier survey results (WEST 2010b; ERM 2010f).

3.3.3.1 Regulatory Setting

3.3.3.1.1 Federal

3.3.3.1.2 U.S. Fish and Wildlife Service

The ESA is discussed in section 3.3.2.1.1.1.

More than 1,000 native birds are currently protected under the Migratory Bird Treaty Act (MBTA) of 1918, as amended, which implements international treaties between the United States and other nations to protect migratory birds, any of their parts, eggs, and nests (50 CFR 10.13). Under the MBTA, it is unlawful to "pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product." The USFWS issues permits for a variety of intentional activities such as hunting, falconry, certain import and export activities, depredation control, taxidermy, and scientific research; however there is no permitting framework (i.e., incidental take permits) for the incidental take of protected birds during otherwise lawful activities. The regulations governing migratory bird permits can be found in 50 CFR Part 13, General Permit Procedures, and 50 CFR Part 21, Migratory Bird Permits.

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA). The BGEPA prohibits the take of any bald or golden eagle, alive or dead, including any part, nest, or egg. “Take” is defined as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb” a bald or golden eagle. “Disturb” means to agitate or bother an eagle to a degree that causes, or is likely to cause, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. The USFWS has begun the process of incidental take permits for bald and golden eagles under the Draft Eagle Conservation Plan Guidance review. The USFWS released final Land-based Wind Energy Guidelines, effective March 23, 2012 (USFWS 2012), and Draft Eagle Conservation Plan Guidance in January 2011 (USFWS 2011) for use in evaluation of proposed wind energy developments.

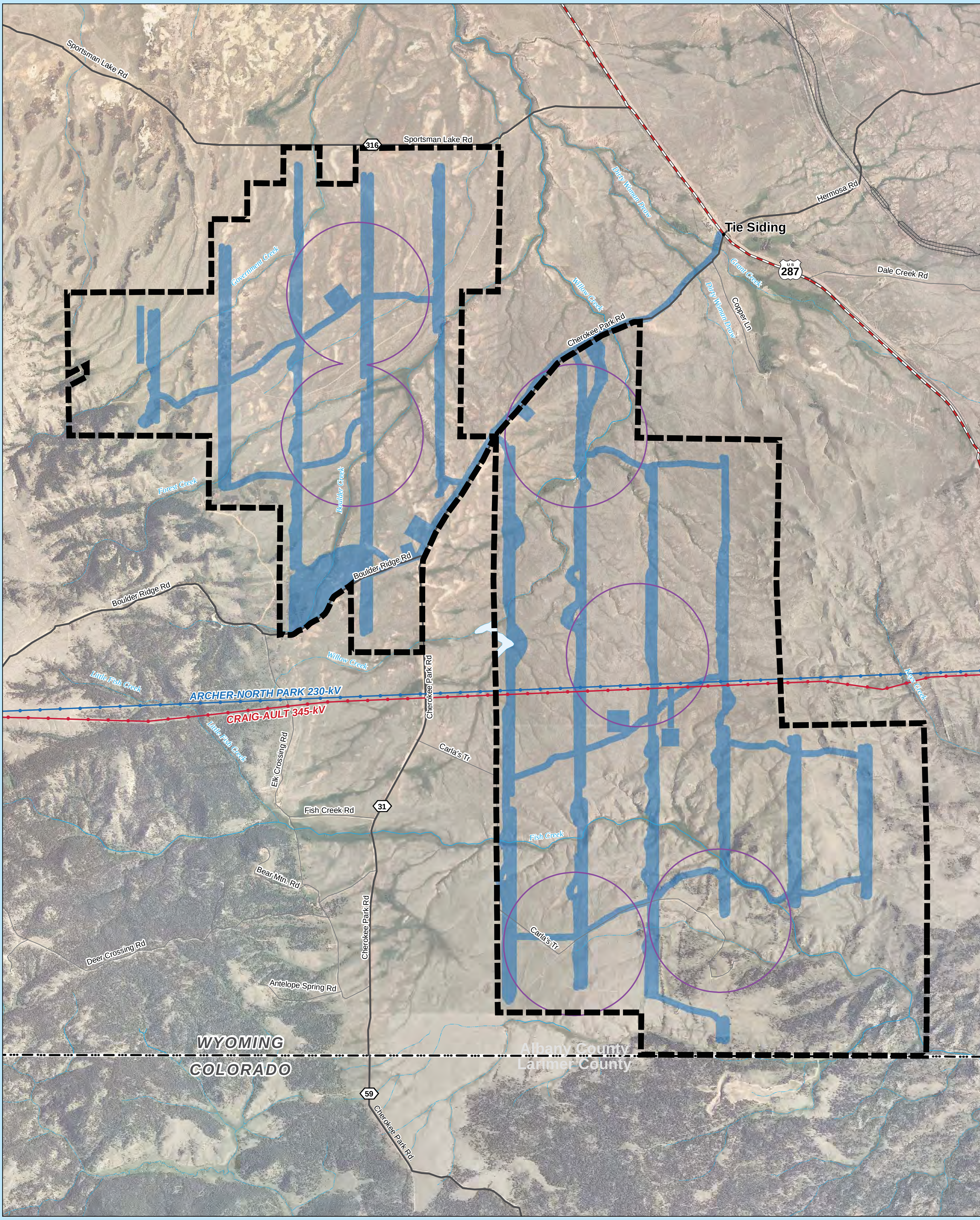
3.3.3.1.3 State Regulations

In November 2010, the Wyoming Game and Fish Commission approved recommendations for wind energy development in Wyoming (“Wildlife Protection Recommendations for Wind Energy Development in Wyoming”, WGFD 2010j). In June 2011, the State issued an Executive Order regarding Greater Sage-Grouse (State of Wyoming Executive Department Executive Order 2011-5, “Greater Sage-Grouse Core Area Protection”, signed June 2, 2011).

3.3.3.2 Existing Environment

The study area encompasses suitable habitat for a diverse assemblage of terrestrial and aquatic wildlife species, including seven species listed under the ESA. Wildlife common throughout the study area include large, medium, and small mammals; raptors; passerine birds; fish; amphibians; and reptiles.

As described in section 3.3.2, the proposed Project site is 88 percent mixed-grass prairie, approximately 6 percent mixed conifer forests (primarily in the southeastern extent), and approximately 2 percent shrublands (mountain mahogany plus shrub steppe cover types). Riparian and riparian willow cover types account for another 3.6 percent of the proposed Project site (ERM 2010f; appendix B). An estimated 30 surface water crossings (including 12 perennial streams, 8 intermittent streams, and 10 ephemeral streams) are projected within the proposed Project site. Approximately 65 miles of minimally maintained ranch roads currently dissect the proposed Project site and fragment the natural vegetation communities.



Wildlife Survey Areas

Project Features

Hermosa West Wind Energy Project

Wildlife Survey Area

WEST Observation Area

ERM Wildlife Survey Area

Transmission

230-kV Transmission Line

345-kV Transmission Line

0 0.25 0.5 1 Miles

Scale 1:20,500 when printed at 22"X34".

Source: ESRI, BTS, WyGISC, WYFG, ERM, WEST and USGS
Revised: March 25, 2011
MXD: P:\4004_Shell_Hermosa_West\GIS\Layouts\Chapter_3\Wildlife_Survey_Areas.mxd

Vicinity Map

HERMOSA WEST WIND ENERGY PROJECT
FIGURE 3.3-5: WILDLIFE SURVEY

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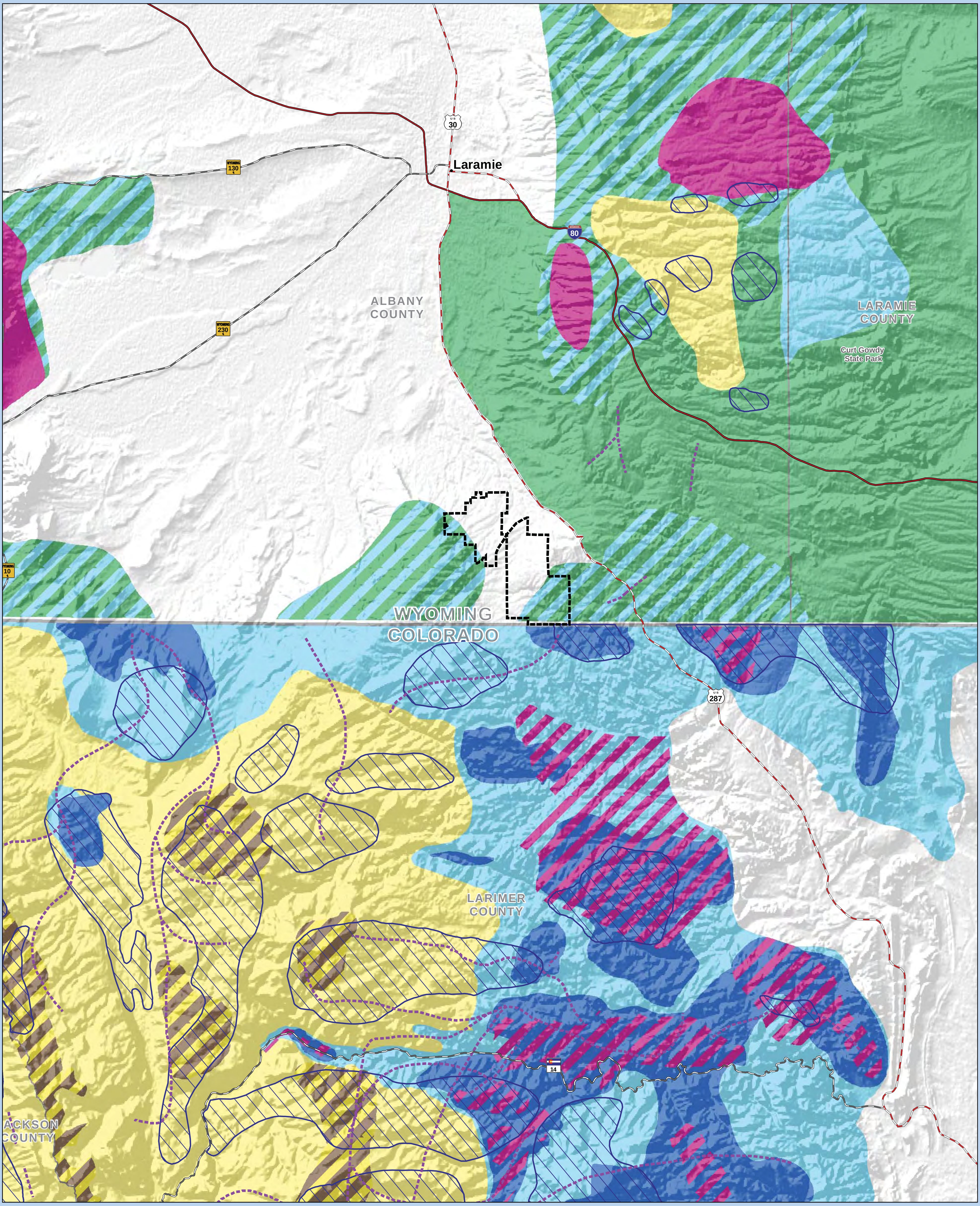


Elk Habitat

Hermosa West Wind Energy Project Area

Wyoming Elk Habitat
- Migration Route
- Parturition Area
- Winter
- Crucial Winter
- Spring Summer Fall
- Winter Yearlong
- Yearlong

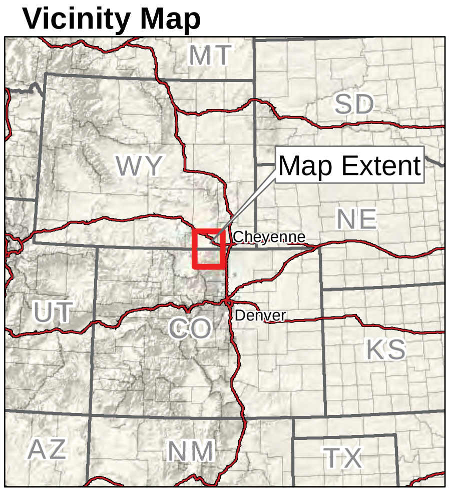
Colorado Elk Habitat
- Migration Pattern
- Production Area
- Winter Range
- Severe Winter Range
- Winter Concentration
- Summer Range
- Summer Concentration

0 1.5 3 6 Miles

Scale 1:256,000 when printed at 22"X34".

Source: ESRI, BTS, WyGISC, WYFG, and USGS
Revised: March 23, 2011
MXD: P:\4004_Shell_Hermosa_West\GIS\Layouts\Chapter_3\Elk_Habitat.mxd

Vicinity Map



Hermosa West Wind Energy Project

Figure 3.3-6: Elk Habitat

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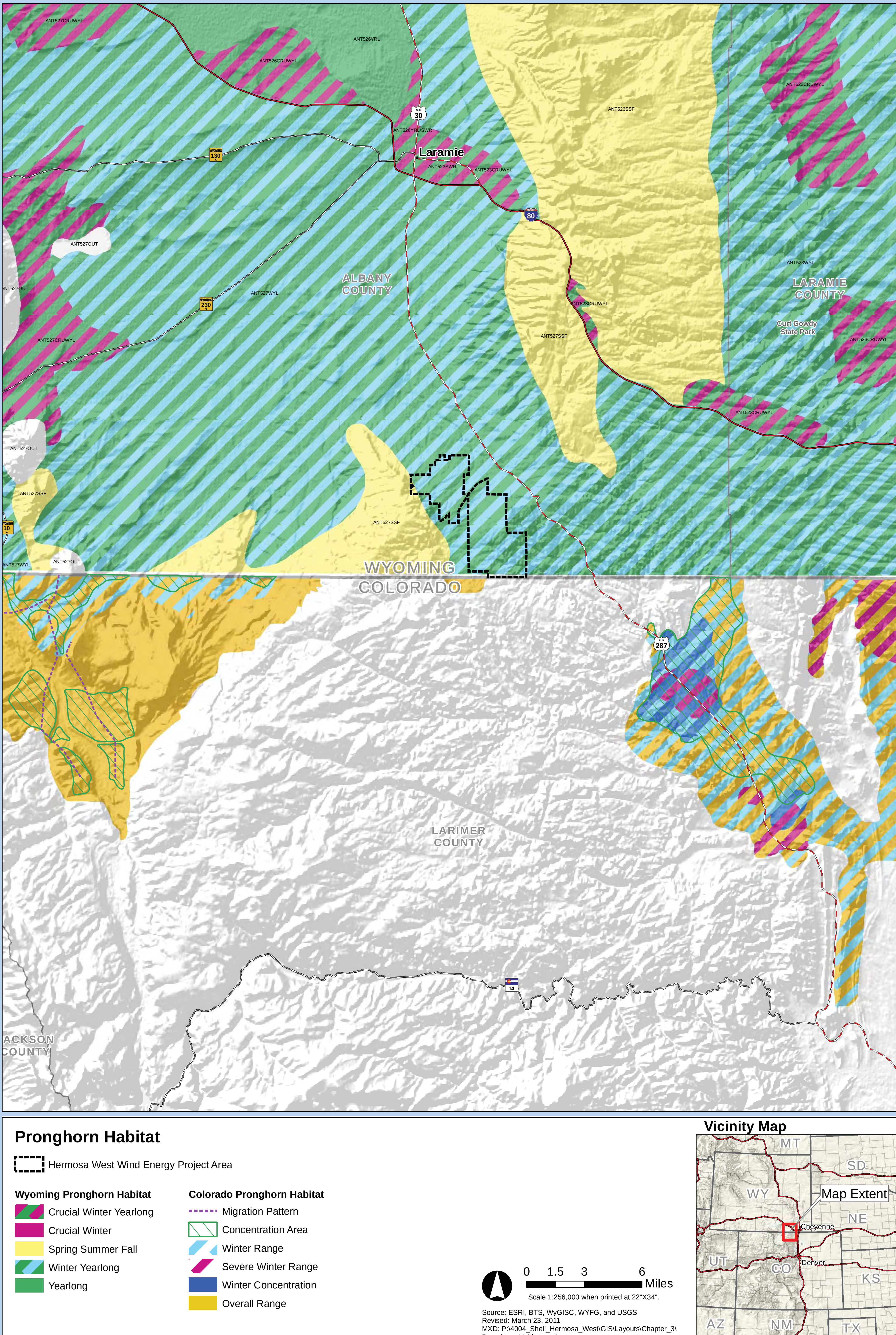

Hermosa West Wind Energy Project

Figure 3.3-7: Pronghorn Habitat

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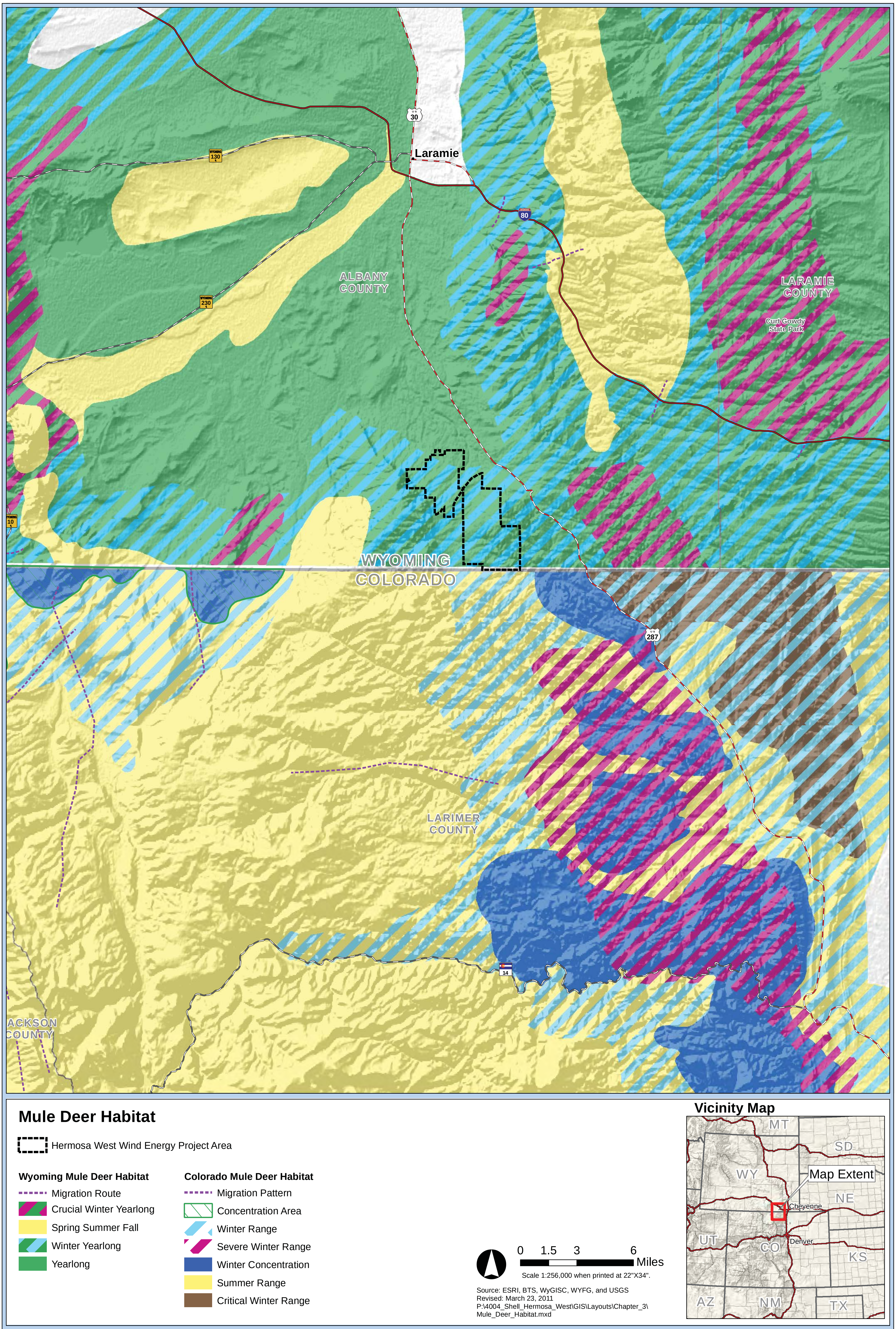

Hermosa West Wind Energy Project

Figure 3.3-8: Mule Deer Habitat

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Surveys were conducted and wildlife resources monitored in the proposed Project site to estimate the impacts of facility construction and operations on wildlife (WEST 2010a, 2010b, 2011; appendix E). Baseline surveys were conducted from April 29, 2009, through April 11, 2011 at the proposed Project site, and consisted of fixed-point bird use surveys, golden eagle observations, ground-based raptor nest surveys, acoustic bat surveys, vegetation and habitat mapping, and incidental wildlife observations. Additionally, golden eagle observation surveys were conducted for a third year through April 2012.

The principal objectives of the baseline wildlife studies were to (1) collect site-specific bird and bat data that would be useful in evaluating potential impacts from the proposed Project, (2) provide information being used in Project planning and design of the facility to minimize impacts to birds and bats, and (3) recommend further studies or potential mitigation measures if warranted.

3.3.3.2.1 Non-Listed Wildlife Species

3.3.3.2.1.1 Mammals

Based on the vegetation types discussed in section 3.3.2 and occurrence data from the WGFD, numerous common wildlife species are expected to be present in the proposed Project site (WGFD 2004). Common wildlife species were noted as incidental observations during the course of specific survey protocols (table 3.3-5).

Table 3.3-5:
Common Mammal Species Observed within the Proposed Project Site (April 2009–April 2011)

Mammal Type[1]	Common Name	Scientific Name
Large Mammals	Elk	*Cervus elaphus*
	Mule deer	*Odocoileus hemionus*
	Pronghorn[2]	*Antilocapra americana*
Medium Mammals	Coyote	*Canis latrans*
	North American badger	*Taxidea taxus*
Small Mammals	Least chipmunk[2]	*Tamias minimus*
	Wyoming ground squirrel[2]	*Spermophilus elegans*
	Thirteen-lined ground squirrel[2]	*Spermophilus tridecemlineatus*
	Richardson's ground squirrel	*Spermophilus richardsonii*
	White-tailed prairie dog	*Cynomys leucurus*

Source: WEST (2010b, 2011)

1 Bat species likely to occur at the proposed Project site are described in table 3.3-6.

2 Tetra Tech (2010) field reconnaissance observations.

3.3.3.2.1.1.1 Large Mammals

Large mammals, including big game species such as elk, mule deer, and pronghorn are known to occur in the proposed Project site foraging on the mixed-grass prairie. Elk and mule deer utilize the mixed conifer forests for cover (WEST 2010b, 2011; WGFD 2004). Mountain lions are also likely to occur in the proposed Project site based on suitable habitat and the presence of mule deer herds. Elk, mule deer and pronghorn were observed in the proposed Project site (WEST 2010b, 2011). Mule deer were also observed in the mountain mahogany cover type during the reconnaissance (Tetra Tech 2010).

The WGFD and Colorado Division of Wildlife (CDOW) have mapped habitats for large mammals to understand how these species are using available habitat in the region (figure 3.3-5). Only winter and yearlong elk ranges within the study area were mapped by the WGFD, while the CDOW mapped winter, winter concentration, and production areas along with a migration route immediately adjacent to the proposed Project site (figure 3.3-6). Nearly the entire proposed Project site is mapped by the WGFD as winter and yearlong habitat for pronghorn; only a small area near the western proposed Project boundary is mapped as spring/summer/fall range (figure 3.3-7). The WGFD has mapped mule deer winter and yearlong habitat over the entire study area, and the CDOW has mapped winter, summer, and winter concentration areas in the study area (figure 3.3-8). The WGFD does not map mountain lion habitat, but the CDOW has mapped mountain lion habitat in the study area.

The proposed Project site is not located within any designated big game crucial winter range or identified parturition areas (ERM 2010f).

3.3.3.2.1.1.2 Medium Mammals

Medium-sized mammals, such as swift and red fox, raccoon, badger, and coyote, are likely to inhabit all the vegetation types within the proposed Project site, because there is suitable habitat and distribution and abundance of prey, such as ground squirrel, rabbit, and prairie dog (WGFD 2004). These opportunistic species excavate burrows and den sites primarily in grasslands with either rolling or flat topography. A probable fox burrow (9 inches in diameter) was observed in an embankment in the proposed Project site during the reconnaissance (Tetra Tech 2010). Coyote and badger were also observed in the proposed Project site during the baseline surveys (WEST 2010b, 2011).

3.3.3.2.1.1.3 Small Mammals

Small mammals, including Wyoming ground squirrel, desert cottontail, shrew, mouse, and white-tailed prairie dog, are likely to inhabit the majority of the mixed-grass prairie area (WGFD 2004), while least chipmunk is more likely to occur in the shrublands and mixed conifer forest stands. Three small white-tailed prairie dog colonies, totaling approximately 0.5 acres, occur in the northern part of the proposed Project site in mixed-grass prairie (ERM 2010f, WEST 2010b, 2011). Concentrations of Richardson's ground squirrel were identified at five locations in the central and northwestern portions of the proposed Project site (WEST 2011). Two of these locations coincide with white-tailed prairie dog locations (Figure 6 in WEST 2011).

Small game species, such as desert and mountain cottontail, red squirrel, gray squirrel, and fox squirrel, all have suitable habitat within the proposed Project site. Cottontail is likely present throughout the proposed Project site, while the three species of tree squirrel would generally be confined to the mixed conifer forests of the proposed Project site. Least chipmunks, a thirteen-lined ground squirrel, and Wyoming ground squirrels were observed in the proposed Project site during the site reconnaissance (Tetra Tech 2010).

3.3.3.2.1.1.4 Bats

This section contains a general description of bat habitat and results of bat surveys conducted in the proposed Project site (WEST 2010a, 2011). Additional information regarding special status bats is located in section 3.3.3.1.5.2.

Eighteen bat species can be found in Wyoming (Hester and Grenier 2005) in all areas of the State and constitute 15 percent of all of Wyoming's mammal species, thus contributing extensively to Wyoming's biological diversity. Bats travel longer distances from their roosts to their foraging areas than most other small mammals and birds. Bats frequently forage in high-productivity environments (such as near water), roost in nutrient-poor environments, and consume up to 100 percent of their body mass per night (Hester and Grenier 2005).

Bats need roosts for day shelter, raising young, hibernation (for those species that hibernate), and night roosts. Roosting environments may vary widely, both between and within species. Natural roosts include caves, rock crevices, cliffs, tree cavities, loose bark, and foliage. Bats also roost in man-made structures such as abandoned mines, buildings, bridges, culverts, and bat houses. Some bat species are roost specialists and are restricted to only one or a few types of roosts, while other species are generalists, using a variety of roost types at any time of the year (Hester and Grenier 2005).

Foraging habitat requirements are complex and vary greatly among species and even seasonally and spatially within species (Hester and Grenier 2005). Although bats may travel long distances between roosting and foraging sites, proximity to appropriate roosts may influence the suitability of a particular area for bat foraging. Also, the availability of night roosts near a foraging area may increase bat usage (Hester and Grenier 2005).

Surface water for drinking is another critical component of bat habitat; most bats must find roosts and foraging areas that have water within close proximity (Hester and Grenier 2005).

Most western species probably migrate short distances from their summer roosts to their hibernacula (Hester and Grenier 2005). However, some species migrate long distances to areas where temperature and insect populations remain high enough for continued activity. Species that undergo long-distance seasonal migrations usually do not hibernate (Hester and Grenier 2005).

3.3.3.2.1.1.5 Bat Survey Results

Surveys were initiated in July 2009 designed to assess bat use within the proposed Project site (WEST 2010a, 2011). Acoustic surveys for bats using Anabat™ SD1 ultrasonic detectors at six stations were conducted from July 15 to November 3, 2009, to estimate the seasonal and spatial use of the proposed Project site by bats (WEST 2010a, appendix F). Two of the stations were fixed and four of the stations were temporary. Two detectors were paired at a

meteorological tower in mixed-grass prairie; one was placed near the ground and the other was raised to 45 meters. A third detector was moved among four temporary ground stations located in different habitats. In 2010 a second year of acoustic surveys was conducted at seven stations (two fixed and five temporary), from April 26 to October 31 (WEST 2011). In 2010, the temporary stations were placed in areas representative of proposed turbine locations.
Table 3.3-6 lists the bat species determined from range maps (Harvey et al. 1999; BCI 2010) as likely to occur within the proposed Project site, sorted by call frequency.

In 2009, the AnaBat detectors recorded 1,167 bat passes during 252 detector-nights. A mean of 14.11 bat passes per detector-night was recorded across the four temporary stations (WEST 2010a). The one fixed raised station in the proposed Project site recorded an average of 2.05 bat passes per detector-night. The fixed ground station recorded 2.22 bat passes per detector-night and was the activity estimate used to assess risk, because it was the only location suitable for comparison with data from other wind-energy facilities that have recorded both bat activity and fatality rates (WEST 2011). In 2010, the AnaBat detectors recorded 1,065 bat passes during 407 detector-nights. There was a mean of 3.24 bat passes per detector-night across all stations. The fixed ground station recorded 2.66 bat passes per detector-night.

Table 3.3-6:
Bat Species Likely to Occur Within the Proposed Project Site, Sorted by Call Frequency

Call Frequency	Common Name	Scientific Name
High Frequency (≥ 40 kilohertz [kHz])	western small-footed myotis	*Myotis ciliolabrum*
	long-legged myotis[1]	*Myotis volans*
Mid Frequency (30-40 kHz)	eastern red bat[1,2,3]	*Lasiurus borealis*
	long-eared bat	*Myotis evotis*
	little brown myotis[2]	*Myotis lucifugus*
Low Frequency (< 30 kHz)	pallid bat[3]	*Antrozous pallidus*
	Townsend's big-eared bat	*Corynorhinus townsendii*
	big brown bat[2]	*Eptesicus fuscus*
	silver-haired bat[1,2]	*Lasionycteris noctivagans*
	hoary bat[1,2]	*Lasiurus cinereus*
	fringed myotis	*Myotis thysanodes*

Source: Harvey et al. (1999), BCI (2010)
1 Long-distance migrant.
2 Species known to have been found dead at wind-energy facilities.
3 Species occurrence based upon a single source.

Bat activity was greater at temporary stations than at fixed stations, likely due to habitat differences. Most bat passes were recorded at temporary stations located near water, which may attract bats for foraging and drinking opportunities. Activity was moderate (relative to other sampling stations within the proposed Project site) within mixed conifer vegetation cover types, and was lowest within mixed-grass prairie and mountain mahogany cover types. In general, weekly bat activity was relatively steady between mid-July and mid-September, with most passes recorded in August. In 2010, the first week of September had a prominent spike in activity, with more than double the activity of any other week.

Only two species, hoary and eastern red bats, were positively identified to species within the proposed Project site. Remaining calls were identified to species-group based on echolocation call frequencies. In 2009, low-frequency bats (<30 kHz; e.g., big brown bat, hoary bat, silver-haired bat) comprised 48.2 percent of recorded bat passes, while high-frequency bats comprised 35.9 percent (>40 kHz in frequency; e.g., *Myotis* spp.). The remaining passes were determined to be mid-frequency bat species (30-40 kHz; e.g., eastern red bat). In 2010, low-frequency bats comprised 55 percent of all bat passes, while high-frequency bats comprised 31 percent, and mid-frequency bats comprised 14 percent.

Recorded bat activity likely represents a combination of foraging activity by resident bats and commuting activity by bats migrating through the proposed Project site. In 2009, bat activity was similar between the ground and the raised detector on the meteorological tower in the proposed Project site; however, in 2010, activity at the ground detector was approximately three times greater than the activity at the raised detector.

The mean number of bat passes per detector-night from a fixed ground station within the proposed Project site was compared to existing data from nine wind-energy facilities where both bat use and mortality levels have been measured, as well as to publicly available bat activity levels recorded at facilities in Wyoming (WEST 2010a, 2011; Arnett et al. 2005; Fiedler 2004; Young et al. 2009; Gruver 2002, 2008; Jain 2005, and Johnson et al. 2004). The levels of bat use documented at the proposed Project site in 2009 and 2010 were similar to the Foote Creek Rim Facility in Carbon County, Wyoming (Gruver 2002 in WEST 2010a, 2011), where reported bat mortalities are low, and was much lower than at facilities in the eastern United States, where reported bat mortality is highest (WEST 2010a, 2011).

3.3.3.2.1.2 Birds

This section contains a general description of bird habitat and results of the avian studies conducted in the proposed Project site (WEST 2010b, 2011). Additional information regarding special status birds is located in section 3.3.3.2.2.3.

3.3.3.2.1.2.1 Bird Survey Results

Fixed-point bird use surveys were conducted over a period of 2 years and were concluded in April 2011. Baseline surveys for Year One were conducted from April 29, 2009, through April 13, 2010, within the proposed Project site, and consisted of fixed-point bird use surveys, ground-based raptor nest surveys, and vegetation and habitat mapping (WEST 2010b; appendix E). Year Two surveys were conducted from April 20, 2010 through April 11, 2011, and are documented in *Wildlife Baseline Studies for the Hermosa West Wind Resource Area, Albany County, Wyoming, Final Report, April 2010–April 2011*(WEST 2011; appendix E). A third year of additional data collection for raptors, including nest surveys, usage surveys, and incidental observations of other species was completed in April 2012. The report for these surveys is currently in preparation and will not be available for inclusion as an appendix in this

Draft EIS, but will be completed for inclusion in the Final EIS. These reports will be provided to the WGFD and USFWS.

The principal objectives of the avian studies are to (1) provide site-specific bird occurrence data with which to analyze potential impacts from the proposed wind-energy facility, (2) provide information that will be used in Project planning and design of the facility to minimize impacts to birds, and (3) recommend further studies or potential mitigation measures if warranted.

Ground-based raptor nest surveys were conducted in spring 2009 and 2010 (WEST 2010b, 2011). The objective of the raptor nest surveys was to record raptor nests that may be subject to disturbance and/or displacement by wind-energy facility construction and/or operation. To the extent possible, the surveys were conducted prior to leaf-out to improve the chances of finding nests.

During the Year One survey, 194 twenty-minute fixed-point bird surveys were completed at 6 point count locations during 34 visits to the Project site. Forty-five unique bird species were documented (table 3.3-7). A total of 1,903 individual birds were observed in 848 separate groups, of which 156 were raptors. Ten raptor species were documented from the 45 overall species recorded (WEST 2010b). During Year Two, an additional 194 surveys were completed at the 6 locations. Forty-two bird species were identified in Year Two, including a total of 1,421 individuals in 697 separate groups (table 3.3-7). This included 10 species of raptors and 201 individuals. A total of 54 species of birds were observed during the two-year study.

Table 3.3-7:
Avian Species Observed at Proposed Project Site (April 2009–April 2011)

Species Group	Common Name	Scientific Name
Waterbirds	American white pelican	*Pelecanus erythrorhyncos*
	sandhill crane	*Grus canadensis*
Waterfowl	Canada goose	*Branta canadensis*
	mallard duck	*Anas platyrhynchos*
Raptors	sharp-shined hawk	*Accipiter striatus*
	ferruginous hawk	*Buteo regalis*
	red-tailed hawk	*Buteo jamaicensis*
	rough-legged hawk	*Buteo lagopus*
	Swainson's hawk	*Buteo swainsoni*
	northern harrier	*Circus cyaneus*
	bald eagle	*Haliaeetus leucocephalus*
	golden eagle	*Aquila chrysaetos*
	American kestrel	*Falco sparverius*
	prairie falcon	*Falco mexicanus*
Vultures	turkey vulture	*Cathartes aura*
Doves/Pigeons	mourning dove	*Zenaida macroura*

Table 3.3-7:
Avian Species Observed at Proposed Project Site (April 2009–April 2011)

Species Group	Common Name	Scientific Name
Large Corvids	American crow	*Corvus brachyrhynchos*
	black-billed magpie	*Pica pica*
	common raven	*Corvus corax*
Passerines	American pipit	*Anthus rubescens*
	American robin	*Turdus migratorius*
	American tree swallow	*Spizella arborea*
	barn swallow	*Hirundo rustica*
	black-capped chickadee	*Poecile atricapilla*
	black-headed grosbeak	*Pheucticus melanocephalus*
	Brewer's sparrow	*Spizella breweri*
	Brown-headed cowbird	*Molothrus ater*
	Cassin's kingbird	*Tyrannus vociferans*
	chestnut-collared longspur	*Calcarius ornatus*
	chipping sparrow	*Spizella passerina*
	Clark's nutcracker	*Nucifraga columbiana*
	cliff swallow	*Petrochelidon pyrrhonota*
	dark-eyed junco	*Junco hyemalis*
	grasshopper sparrow	*Ammodramus savannarum*
	green-tailed towhee	*Pipilo chlorurus*
	horned lark	*Eremophila alpestris*
	Lapland longspur	*Calcarius lapponicus*
	lark bunting	*Calamospiza melanocorys*
	lark sparrow	*Chondestes grammacus*
	lazuli bunting	*Passerina amoena*
	loggerhead shrike	*Lanius ludovicanus*
	McCown's longspur	*Calcarius mccownii*
	mountain bluebird	*Sialia currucoides*
	rock wren	*Salpinctes obsoletus*
	savannah sparrow	*Passerculus sandwichensis*
	snow bunting	*Plectrophenax nivalis*
	vesper sparrow	*Pooecetes gramineus*
	western kingbird	*Tyrannus verticalis*
	western meadowlark	*Sturnella neglecta*
	white-breasted nuthatch	*Sitta carolinenis*
Other Birds	broad-tailed hummingbird	*Selasphorus platycercus*
	Unidentified tern	*Sterna spp.*
	Unidentified gull	---
	northern flicker	*Colaptes auratus*

Source: WEST (2010b, 2011)

3.3.3.2.1.2.2 Waterbirds

In general, waterbirds do not have suitable habitat within the proposed Project site, but pass through as they travel during migration between their southern wintering grounds and northern summer habitat. In Year One, waterbirds had the highest use in spring compared to other times of the year. The majority of spring waterbird use was by sandhill crane, and this species accounted for all waterbird use in fall. Sandhill crane use consisted of 1 group of 19 individuals in the spring and 1 group of 17 individuals in the fall. American white pelican was the only waterbird species observed in the summer with one group of two individuals observed. Waterbirds comprised 34.7 percent of overall large bird use in spring and 19.3 percent in fall, compared to only 3.8 percent of overall large bird use in summer. In Year Two, the American white pelican was the only waterbird observed, and this species was only observed in the spring. This species comprised 3.2 percent of the overall large bird use for the season.

3.3.3.2.1.2.3 Waterfowl

In Year One, mallard was the only waterfowl species observed, and this species was only observed in fall. In Year Two, the Canada goose was the only waterfowl species observed and this species was only observed in the spring. This species comprised less than 2 percent of the overall large bird use for the season.

3.3.3.2.1.2.4 Raptors

Year One surveys indicated that raptor use in the proposed Project site was highest in the summer and fall. Red-tailed hawk, Swainson’s hawk, ferruginous hawk, and prairie falcon were commonly observed during spring, summer, and fall. All raptors observed are likely to use the entire proposed Project site to hunt small mammals from the air and from the few perches available. In Year Two, raptor use was highest in the spring and summer. In the spring, red-tailed hawk and golden eagle were the raptors with the highest site use, and in the fall, ferruginous hawk had the highest site use. Rough-legged hawk was the raptor with the highest site use in the winter, and ferruginous hawk and golden eagle had the highest site use in the fall.

In Year One, bald eagles were rarely observed and golden eagles were more frequently observed within the proposed Project site. These eagle species were observed flying within what would be the rotor-swept height of turbines (between 115 and 427 feet above ground level) within the proposed Project site during the majority of the observations (75 percent and 63 percent, respectively). In Year Two, no bald eagles were observed, whereas, twelve golden eagles were observed in the spring, nine in the summer, twelve in the fall, and one in the winter. Golden eagles were observed flying within the rotor-swept height during approximately 69 percent of the Year Two observations.

3.3.3.2.1.2.5 Raptor Nests

In Year One, seventeen raptor nests (0.38 total nests/square mile; 0.15 total nests/square kilometer), including six active nests (0.13 active nests/square mile; 0.05 active nests/square kilometer), were identified within the study area (including a one-mile buffer around the site).

Species observed at active nests within the study area included Swainson's hawk (one nest), prairie falcon (one nest), red-tailed hawk (two nests), great horned owl (one nest), and golden eagle (one nest). Access issues limited the survey coverage outside the proposed Project site, but it is likely that additional nests exist within the 1-mile buffer surrounding the site. Of the six active nests, four nests were successful (67 percent). Eight chicks were observed from the four successful nests resulting in a productivity estimate of 2.00 chicks/successful nest in 2009 for the proposed Project site and a surrounding 1-mile buffer. As in Year One, seventeen raptor nests were identified in Year Two of the surveys. Year Two raptor nests included four active nests (0.09 active nests/square mile; 0.04 active nests/square kilometer), ten inactive nests (0.22 inactive nests/square mile; 0.09 inactive nests/square kilometer), and three of undetermined status. Species on the four active nests included Swainson's hawk, prairie falcon, an unidentified buteo, and common raven. In Year One, one active golden eagle nest was located in the coniferous forest near the southeastern corner of the proposed Project site and biologists observed golden eagles soaring at each established avian survey point within the proposed Project site. The golden eagle nest that was active in Year One was inactive during Year Two of the survey. One of the inactive nests is considered a possible golden eagle nest due to the size of the nest, but no golden eagles were observed in the vicinity of the nest during the two years of surveys.

3.3.3.2.1.2.6 Vultures

In Year One, turkey vulture was the only vulture species observed and mean use by this species was much higher in the summer compared to other times of the year. In summer, the turkey vulture accounted for 24.5 percent of overall large bird use, and in other seasons, this species accounted for less than 6 percent of overall use. In Year Two, turkey vulture was again the only vulture species observed and site use was fairly even in summer, with lower use in the spring, and no use in the winter. This species accounted for 8.4 percent of overall large bird use in fall, 1.9 percent in the spring, and 9.5 percent in the summer.

3.3.3.2.1.2.7 Corvids

In Year One, large corvids use the proposed Project site most frequently during the winter and accounted for 67.4 percent of the overall large bird use in that season. The American crow was observed during all seasons throughout the proposed Project site, while the black-billed magpie was only observed in spring and winter and the common raven was observed only during spring. In Year Two, large corvid use of the site was higher in the fall and spring compared to the winter and summer. However, large corvid use as a percent of overall large bird use was highest in the winter (39.6 percent) and lowest in the summer (14.3 percent). Across all seasons, the American crow had the highest site use of the large corvids.

3.3.3.2.1.2.8 Passerines

In Year One, passerine use of the proposed Project site was highest in the fall, likely as a result of migration. Species such as horned lark, sparrow, and western meadowlark, inhabit the mixed-grass prairie on the Project site, while white-breasted nuthatch, mountain bluebird, and Clark's nutcracker inhabit the mixed conifer and riparian woodlands. Horned lark had the highest mean use of all passerine species observed during all seasons. In Year One, passerine use was highest in the fall, followed by summer, winter, and spring. In Year Two, passerine use was highest in the fall, with lower use in spring and summer, and the lowest use in winter.

3.3.3.2.1.3 Fish

Named surface waters in the proposed Project site include Government Creek, Forest Creek, Boulder Creek, Willow Creek, Fish Creek, and Grant Creek. Of these, Government Creek, Forest Creek, and Boulder Creek flow throughout most of the year, but may not flow during the driest parts of the year. Willow Creek, Fish Creek, and Grant Creek are perennial streams and therefore are likely to support a more diverse fish population than the intermittent streams in the proposed Project site. The WGFD currently categorizes streams based on an admittedly subjective and limited measure of pounds of sport fish per mile (ERM 2010d). This system does not include factors such as the ecological importance of cool/warm water sport fish or nongame fish. Table 3.3-8 lists the categories of streams per WGFD guidelines.

Table 3.3-8:
WGFD Stream Classification

Category	Pounds of Sport Fish Per Mile
Blue Ribbon	≥600
Red Ribbon	≥300 and <600
Yellow Ribbon	≥50 and <300
Green Ribbon	≥1 and <50
Orange Ribbon	Any cool/warm water game fish present

Source: (ERM (2010d)

Fish Creek is a Yellow Ribbon trout stream and contains brook trout. Willow Creek is a Green Ribbon trout stream and contains brook trout, creek chub, and longnose dace. The WGFD has not classified Government Creek, Forest Creek, Boulder Creek, or Grant Creek.

The WYDEQ uses a different classification method for streams than that of WGFD. The uses that are protected on Wyoming waters are listed and described in Section 3 of the Surface Water Quality Standards and include Agriculture, Fisheries, Aquatic Life other than Fish, Industry, Drinking Water, Fish Consumption, Recreation, Scenic Value and Wildlife (WYDEQ 2001). There are also numerous classifications for surface waters of the State. Except for Class 1, waters are classified according to their designated uses. Class 1 waters are specially designated waters on which the existing water quality is protected regardless of the uses supported by the water. The allowable uses for each classification are summarized in table 3.3-9.

Table 3.3-9:
Surface Water Classes and Use Designations

Class	Drinking Water	Game Fish	Non-Game Fish	Fish Consumption	Other Aquatic Life	Recreation	Wildlife	Agriculture	Industry	Scenic Value
1[a]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2AB	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2A	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
2B	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2C	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3A	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
3B	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
3C	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
4A	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
4B	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
4C	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes

Source: WYDEQ (2001)

[a] Class 1 waters are not protected for all uses in all circumstances. For example, all waters in the National Parks and Wilderness are Class 1; however, all do not support fisheries or other aquatic life uses (e.g., hot springs, ephemeral waters, wet meadows etc.). For stormwater permitting, 401 Certification, and water quality assessment purposes, the actual uses on each particular water must be determined independently.

The named surface waters within the Project site as listed above are classified under WYDEQ's method as follows:

- Boulder Creek and Fish Creek—2AB
- Government Creek, Forest Creek, Willow Creek, and Grant Creek—3B

Both of these designations allow use for industrial purposes.

3.3.3.2.1.4 Amphibians and Reptiles

Numerous common amphibians and reptiles are known to occur or have the potential to occur within the mixed-grass prairie and riparian areas of the Project site. Table 3.3-10 lists the reptiles and amphibians that occur in Albany County (WGFD 2004). A survey of reptiles and amphibians was not conducted for the study area.

Table 3.3-10:
Reptiles and Amphibians within Albany County

Common Name	Scientific Name	Habitat
Tiger salamander	*Ambystoma tigrinum*	Most habitat types with a body of nonflowing water nearby for breeding. Overwinters in rodent burrows, cellars, or other suitable moist habitat.
Wyoming toad	*Bufo baxteri*	Floodplains, ponds, and small seepage lakes in the shortgrass prairie of the Laramie basin.
American bullfrog	*Rana catesbeiana*	Permanent water below 6,000 feet on the eastern plains. Specimens collected at warm springs in western and northwestern Wyoming were probably introduced by humans.

Table 3.3-10:
Reptiles and Amphibians within Albany County

Common Name	Scientific Name	Habitat
Northern leopard frog	*Rana pipiens*	Swampy cattail marshes and beaver ponds in the plains, foothills, and montane zones up to 9,000 feet.
Boreal chorus frog	*Pseudacris maculata*	Marshes, ponds, small lakes, up to 12,000 feet.
Western spiny softshell	*Apalone spinifera hartwegi*	Permanent lakes, ponds, large streams, below 6,000 feet.
Ornate box turtle	*Terrapene ornata ornata*	A terrestrial species; prefers grasslands, sandhills.
Northern sagebrush lizard	*Sceloporus graciosus graciosus*	Rock outcrops in sagebrush, juniper, semi-arid shrublands, and mountain foothills shrublands, usually below 6,000 feet. Occurs in association with geothermal features in Yellowstone National Park at 7,500 feet.
Red-lipped plateau lizard	*Sceloporus undulatus erythrocheilus*	Restricted to rock cliffs and large areas of boulders along the hogback on the eastern edge of the Laramie Range in Laramie, Platte, and Converse Counties.
Eastern yellow-bellied racer	*Coluber constrictor flaviventris*	Woodlands and scarp woodlands within the plains and foothills zones, often near water.
Pale milksnake	*Lampropeltis triangulum multistriata*	Grasslands, sandhills, scarp woodlands, usually below 6,000 feet.
Bullsnake	*Pituophis catenifer sayi*	Plains grasslands, sagebrush grasslands, sandhills, riparian shrub, marshes, rocky canyons, mountain foothills shrub, agricultural areas, urban areas.
Intermountain wandering gartersnake	*Thamnophis elegans vagrans*	Found in all habitat zones except alpine, usually near water.
Prairie rattlesnake	*Crotalus viridis viridis*	Plains, foothills, and scarp woodlands, especially near granite or limestone outcrops.

Source: WGFD (2004)

3.3.3.2.2 Special Status Species

Special status species assessed in this report include species that are protected by the ESA and Wyoming species of special concern (SSC). Table 3.3-11 lists special status species that are known to occur or potentially occur in Albany County, their listing status, and their habitat.

The American white pelican (*Pelecanus erthyrorhynchos*) was reported by WEST (2010b, 2011) as a sensitive species and observed flying over the Project site. However, it is no longer considered a sensitive species in the State Wildlife Action Plan (SWAP) prepared by the Wyoming Game and Fish Department. It was considered a Species of Greatest Conservation Need in the 2005 SWAP, but was removed in the 2010 SWAP with the following explanation, “Naturally restricted Wyoming population, but regionally secure”. Therefore, this species is not considered a special status species and is not included in Table 3.3-11.

Table 3.3-11:

Special Status Species Potentially Occurring in the Study Area

Common Name	Scientific Name	Federal Status	State Status	Habitat
Mammals				
Wolverine	*Gulo gulo*	—	NSS3, SP	Edge habitat associated with dense, continuous stands of coniferous forests.
River otter	*Lutra canadensis*	—	NSS4, SP	Requires permanent waterbodies and uses naturally occurring shelters, beaver lodges, or animal burrows for dens.
Canada lynx	*Lynx canadensis*	FT	NSS1, SP	High elevation, edge habitat associated with dense coniferous forests.
Black-footed ferret	*Mustela nigripes*	FE, FX	NSS1, SP	Typically associated with prairie dog colonies.
Hayden's shrew	*Sorex haydeni*	—	NSS4	Grasslands, marshes, riparian areas, wet meadows.
Southern Rocky Mountain pygmy shrew	*Sorex hoyi montanus*	—	NSS2	Engelmann spruce/subalpine fir forest near wet areas.
Dwarf shrew	*Sorex nanus*	—	NSS3	Coniferous forests, aspen, shrublands, grasslands, rock outcrops, talus fields.
Olive-backed pocket mouse	*Perognathus fasciatus*	—	NSS3	Shrublands, sagebrush-grasslands, grasslands; prefers sandy soils.
Swift fox	*Vulpes velox*	—	NSS3	Grasslands, agricultural areas, irrigated meadows, road/railroad right-of-way; use dens year-round.
White-tailed prairie dog	*Cynomys leucurus*	—	NSS4	Grasslands and shrub grasslands.
Bats				
Western small-footed myotis	*Myotis ciliolabrum*	—	NSS3	Found throughout Wyoming. General observations and hibernacula in Albany County. Year-round resident. Associated with arid, rocky areas. Forages along cliffs and rocky slopes in dry areas.
Long-eared myotis	*Myotis evotis*	—	NSS2	Found throughout Wyoming. Year-round resident. Associated with coniferous forest and woodland. Forages over waterbodies within forest-woodland habitats.
Little brown myotis	*Myotis lucifugus*	—	NSS3	Most common species in Wyoming. General observations in Albany County. Year-round resident. Occupies variety of habitat, but generally avoids hot arid lowlands and areas far from open water. Forages over water, in open woodlands and in forest openings.
Fringed myotis	*Myotis thysanodes*	—	NSS2	Appears restricted to eastern Wyoming. General observations and roost sites in Albany County. Assumed to be year-round resident. Occupies a variety of habitats, but most common in xeric woodlands. Forages over water, along forest edges, and within forests and woodlands.
Long-legged myotis	*Myotis volans*	—	NSS2	Found throughout Wyoming. General observations and roost sites in Albany County. Assumed to be year-round resident. Associated with montane forest between 1,500 and 3,300m in elevation. Forages over open areas, over waters, and within, above, and under the forest canopy.
Eastern red bat	*Lasiurus borealis*	—	NSS3	Extremely rare in Wyoming, and restricted to eastern side of State. General observations in Albany County Summer resident. Associated with deciduous trees. Forages over within, above, and under the forest canopy.
Hoary bat	*Lasiurus cinereus*	—	NSS4	Found throughout Wyoming. General observations in Albany County. Summer resident. Associated with forested habitats, both deciduous and coniferous. Forages in areas associated with forests, including forest openings, edges, and canopies.
Silver-haired bat	*Lasionycteris noctivagans*	—	NSS4	Found throughout Wyoming. General observations in Albany County. Summer resident. Occurs in a variety of habitat, but most commonly associated with forested and montane habitats near water. Forages over water and in forest openings.
Big brown bat	*Eptesicus fuscus*	—	NSS3	Found throughout Wyoming. Hibernacula, maternity roosts, and general observations in Albany County. Year-round resident. Occurs in variety of habitats, and is readily adapted to human habitations. Forages in variety of habitats with no apparent preference.

Table 3.3-11:
Special Status Species Potentially Occurring in the Study Area

Common Name	Scientific Name	Federal Status	State Status	Habitat
Spotted bat	*Euderma maculatum*	—	NSS2	Assumed to occur throughout Wyoming. General observation in Albany County. Assumed to be year-round resident. Occurs in variety of habitats, but all occurrences in Wyoming were associated with canyons, high bare rock walls, and rock edges near a water source. Forages over open water.
Townsend's big-eared bat	*Corynorhinus townsendii*	—	NSS2	Found throughout Wyoming but concentrated in southeastern and north-central areas. Hibernacula, maternity roosts, general roosts and general observations in Albany County. Year-round resident. Occurs in a variety of habitat, but found most commonly in xeric habitats in Wyoming near open water. Forages along forest and woodland edges, riparian corridors, and in open areas near woodlands.
Pallid bat	*Antrozous pallidus*	—	NSS2	Found throughout Wyoming but concentrate in eastern plains and basins. General observations in Albany County. Year-round resident. Occurs in variety of habitats, but most common in low arid regions with rocky outcroppings near water. Forages for prey on the ground.
Birds				
Greater sage-grouse	*Centrocercus urophasianus*	FC	NSS2	Sagebrush communities.
Mountain plover	*Charadrius montanus*		NSSU	Grasslands and prairie dog towns.
Interior least tern	*Sternulla antillarum*	FE	—	Downstream and riverine habitat of the Platte River system.
Piping plover	*Charadrius melodus*	FT	—	
Whooping crane	*Grus americana*	FE	—	
McCown's longspur	*Calcarius mccownii*	—	NSS4	Mixed-grass and grazed mixed-grass prairie.
Ferruginous hawk	*Buteo regalis*	—	NSS3	Lightly grazed grassland and shrubland with varied topography.
Sandhill crane	*Grus canadensis*	—	NSS3	Wetlands and wet meadows for breeding
Swainson's hawk	*Buteo swainsoni*	—	NSS4	Grassland and agricultural areas with scattered trees and shrubs.
Brewer's sparrow	*Spizella breweri*	—	NSS4	Sagebrush and mountain mahogany.
Grasshopper sparrow	*Ammodramus savannarum*	—	NSS4	Prairie and pasture.
Chestnut-collared longspur	*Calcarius ornatus*	—	NSS4	Mesic areas of mixed-grass prairie.
Lark bunting	*Calamospiza melanocorys*	—	NSS4	Grassland prairie and grazed pasture interspersed with taller vegetation.
Bald eagle	*Haliaeetus leucocephalus*	—	NSS2	Major river drainages and lakes.
Golden eagle	*Aquila chrysaetos*	—	—	Open shrub steppe and grassland habitats.
Fish				
Pallid sturgeon	*Scaphirhynchus albus*	FE	—	Large rivers with high turbidity; occurs in Platte River System downstream of Albany County.
Hornyhead chub	*Nocomis biguttatus*	—	NSS1	Laramie River downstream of Wheatland Reservoir 2, North Laramie River; medium to large clear gravely streams.
Common shiner	*Luxilus cornutus*	—	NSS3	Tributaries of North and South Platte Rivers; clear gravely streams and small lakes.
Iowa darter	*Etheostoma exile*	—	NSS4	Tributaries of North and South Platte Rivers; clear gravely streams and small lakes.

Table 3.3-11:
Special Status Species Potentially Occurring in the Study Area

Common Name	Scientific Name	Federal Status	State Status	Habitat
Amphibians				
Wyoming toad	*Bufo baxteri*	FE	NSS1	Historically found within floodplains, ponds, small lakes in the Laramie basin short grass prairie. Believed to be extirpated in Wyoming.
Northern leopard frog	*Rana pipiens*	—	NSS4	Cattail marshes, beaver ponds up to 9,000 feet.
Wood frog	*Rana sylvatica*	—	NSS3	Beaver ponds, small lakes, slow moving streams, wet meadows, willow thickets around 9,000 feet.
Tiger salamander	*Ambystoma tigrinum*	—	NSS4	Wide range of habitats with non-flowing water nearby for breeding; overwinter in rodent burrows or other moist areas.
Boreal Western toad (Southern Rocky Mountain population)	*Bufo boreas boreas*	(1)	NSS1	Wet areas at 8,000 to 11,000 feet in elevation.
Reptiles				
Eastern yellowbelly racer	*Coluber constrictor flaviventris*	—	NSS4	Woodlands in plains and foothills zone; typically near water.

Source: adapted from ERM (2010f), Kingery (1998), USFWS (2011).
Key:
FT = Federally Threatened under the ESA
FE = Federally Endangered under the ESA
FX = Federal Nonessential/Experimental Population (no added protection)
FC = Federal Candidate Species
SP = State Protected
NSS1–4 = WGFD Native Species Status of Special Concern; 1 = most sensitive, 4 = least sensitive (no protection) (Source: University of Wyoming [2011])
- NSS1 = Populations greatly restricted or declining, extirpation possible. -OR- Ongoing significant loss of habitat.
- NSS2 = Populations declining, extirpation possible; habitat restricted or vulnerable but no recent or ongoing significant loss; species likely sensitive to human disturbance. -OR- Populations declining or restricted in numbers or distribution, extirpation not imminent; ongoing significant loss of habitat.
- NSS3 = Populations greatly restricted or declining, extirpation possible; habitat not restricted, vulnerable but no loss; species not sensitive to human disturbance. -OR- Populations declining or restricted in numbers or distribution, extirpation not imminent; habitat restricted or vulnerable but no recent or ongoing significant loss; species likely sensitive to human disturbance. -OR- Species widely distributed; population status or trends unknown but suspected to be stable; ongoing significant loss of habitat.
- NSS4 = Populations greatly restricted or declining, extirpation possible; habitat stable and not restricted. -OR- Populations declining or restricted in numbers or distribution, extirpation not imminent; habitat not restricted, vulnerable but no loss; species not sensitive to human disturbance. -OR- Species widely distributed, population status or trends unknown but suspected to be stable; habitat restricted or vulnerable but no recent or ongoing significant loss; species likely sensitive to human disturbance. -OR- Populations stable or increasing and not restricted in numbers or distribution; ongoing significant loss of habitat.
- NSSU = NSS Unknown. Like NSS1-4 species, NSSU species were recommended to receive the Species of Greatest Conservation Needs designation because obtaining a greater understanding regarding population numbers and distributions of these species is necessary in determining their conservation status.

(1) The USFWS has recently completed its evaluation of a petition to list the Eastern or Southern Rocky Mountain population as a threatened or endangered Distinct Population Segment. The Eastern population includes portions of Wyoming, Colorado, New Mexico, Idaho, Utah, and Nevada. The Southern Rocky Mountain population is contained within the Eastern population and includes New Mexico, Colorado, and southeastern Wyoming. The Service has determined that there is substantial information to warrant a more in-depth examination of the status of the Eastern population, and that there was not substantial information presented in the petition to warrant listing the Southern Rocky Mountain population. The Service will conduct a full status review of the Eastern population and determine whether to propose adding the population as a Distinct Population Segment to the list of Federal endangered and threatened species.

Based on surveys and consultation with USFWS, three federally listed threatened or endangered wildlife species and one federal candidate wildlife species potentially occur within the propose Project site as designated by the federally threatened (FT), federally endangered (FE), and federal candidate (FC) notations in table 3.3-11 In addition, there are four FT and FE species in table 3.3-11 (least tern, piping plover, whooping crane, and pallid sturgeon) that occur downstream of Wyoming in the Platte River system (USFWS 2011). The Project will not result in depletions of water flows to the Platte River system and water used for Project construction will be obtained from non-tributary sources. These species are not expected to occur on the Project site due to lack of suitable habitat, therefore, are not evaluated in this EIS. Additional wildlife species listed by WGFD as SSC potentially occur within the proposed Project site based on suitable habitat (table 3.3-11). While these species are listed by WGFD, effects to these species and their habitat are not prohibited under Wyoming law.

ERM conducted an analysis of threatened and endangered species including a desktop assessment of the 11,125-acre proposed Project site and a ground survey of an approximately 2,198-acre survey area within it (ERM 2010d, 2010f). Field investigations were performed in August and October, 2009, to identify the presence or absence of Federal and State listed threatened and endangered species, WGFD-listed species of concern and their associated habitats within the survey area. ERM evaluated the presence or absence of suitable habitat, species-specific agency information, and the identification of species found within the survey area during field investigations. Results of this evaluation are included in section 4.2 of this EIS.

3.3.3.2.2.1 Mammals

The Canada lynx is federally listed as threatened and is listed for State protection in Wyoming. The WGFD classifies it as an SSC because there is ongoing significant loss of habitat and localized extinction (extirpation) appears possible (WGFD 2009b). It is known to occur in the western mountains of Wyoming, but has been observed in the Laramie Mountains (ERM 2010f). Canada lynx inhabit steep mountain ranges with dense stands of spruce and fir trees and den in areas with an understory of young trees and shrubs. No suitable habitat exists in the proposed Project site; however, the surrounding coniferous forest to the south and west of the proposed Project site may provide suitable habitat as dispersal corridors for Canada lynx.

The black-footed ferret is listed by the USFWS as endangered and by WGFD as an SSC. The WGFD classifies the black-footed ferret as an SSC because populations are greatly restricted, making extirpation possible, and there is ongoing significant loss of habitat (WGFD 2009b). Historically, black-footed ferret inhabited grasslands and shrublands, living in prairie dog burrows and primarily feeding on small burrowing mammals, as well as birds, reptiles, and insects (Fitzgerald et al. 1994). The only known black-footed ferret population in Wyoming occurs in the Shirley Basin, approximately 100 miles north of the proposed Project site (ERM 2010f). Three small white-tailed prairie dog colonies exist on the northern part of the proposed Project site, but due to their small size are not likely to provide suitable black-footed ferret habitat.

The wolverine is listed for State protection in Wyoming, as well as an SSC, and is found in Wyoming's western mountains. The WGFD classifies the wolverine as an SSC because its populations are restricted in numbers; its habitat is vulnerable, although there is no ongoing significant loss of habitat; and it may be sensitive to human disturbance (WGFD 2009b). This species inhabits coniferous forests, preferring continuous, dense tree stands in remote mountainous sites. Wolverine dens can be found in thickets, within fallen trees, in caves and rock crevices within old-growth or mature spruce-fir stands. They may use established tree stands as corridors between optimal habitats. Territory sizes are approximately 290 square miles for females and 350 square miles for males (WGFD 2010b). No wolverines or dens were found within the survey area, and no suitable habitat exists in the proposed Project site. The surrounding coniferous forest to the south and west of the proposed Project site, however, may provide suitable habitat as dispersal corridors for wolverine (ERM 2010f).

The river otter is listed for State protection in Wyoming. Otters are scattered along the western portion of Wyoming and are rarely seen. The WGFD classifies it as a species of special concern because population status and trends are unknown, although they are suspected to be stable, and because its habitat is vulnerable, although there is no ongoing significant loss of habitat (WGFD 2010a). The river otter inhabits permanent waterbodies and riparian habitats. Riparian and wetland areas account for approximately 5 percent of the proposed Project site and less than 1 percent of the survey area. Slightly more than half of these features are intermittent or ephemeral streams. The remaining perennial features are small and do not provide suitable supporting habitat for the river otter. No evidence of river otter presence was seen in the survey area (WGFD 2009b; ERM 2010f).

The Hayden's shrew is classified as SSC by WGFD because populations are restricted in distribution and habitat is vulnerable, although there is no ongoing significant loss of habitat (WGFD 2009b). This shrew occurs in the Black Hills and the Bighorn Mountains and is considered rare in Wyoming. The Hayden's shrew inhabits grasslands, prairies, marshes, riparian areas, and wet meadows (WGFD 2009b). There is suitable habitat for the Hayden's shrew based on documented mixed grass prairie and riparian cover types within the proposed Project area (WEST 2010b). However, the atlas of birds, mammals, amphibians, and reptiles in Wyoming (WGFD 2004) does not document observations or historical evidence for this species in the Project site area.

The Southern Rocky Mountain pygmy shrew is classified as an SSC because populations are greatly restricted and habitat is restricted (WGFD 2009b). The pygmy shrew occurs in the Medicine Bow Mountains in Wyoming and extends south to central Colorado; it is isolated by hundreds of kilometers from any other population north and west of Wyoming. The pygmy shrew is considered rare in Wyoming. It is known in the State from only eight specimens taken in the Medicine Bow Mountains. The pygmy shrew inhabits Engelmann spruce/subalpine fir forest near sphagnum moss bogs and other wet areas. It nests in old decaying logs and root wads. These habitat components are generally associated with mature and old-growth forests that are protected from timber harvest (WGFD 2009b). There is documentation of a mixed conifer forest vegetation cover type on the Project site (WEST 2010b), but field reconnaissance did not document subalpine spruce/fir, or old growth stands within the proposed Project site. WGFD (2004) does not document observations or historical evidence for this species in the Project site area.

The dwarf shrew is classified as an SSC because populations are restricted in numbers, and habitat is vulnerable, although there is no ongoing loss of habitat (WGFD 2009b). The dwarf shrew probably occurs throughout most of Wyoming except the Bighorn Mountains, the basins of northeastern Wyoming, and the southeastern grasslands. The dwarf shrew is considered rare in Wyoming, and probably occurs in relatively small isolated populations. The dwarf shrew occupies a variety of habitats, from alpine tundra through subalpine forests and rock-slides, and, at lower elevations, from montane forests and foothills to arid shortgrass prairie. It appears to be relatively tolerant of arid situations and often occurs at greater distances from permanent water than other small shrews. It often inhabits rocky areas such as talus slopes, especially in alpine and subalpine habitats (WGFD 2009b) Of the habitat types suitable for dwarf shrew, the Project site is documented to have mixed-grass prairie and limited mixed conifer forest cover types (WEST 2010b).

The olive-backed pocket mouse is classified as an SSC because populations are restricted in distribution, and because its habitat is vulnerable, although there is no ongoing significant loss of habitat (WGFD 2009b). Distributed across most of the eastern two thirds of Wyoming, the olive-backed pocket mouse is considered common in Wyoming. The olive-backed pocket mouse occupies a variety of arid and semi-arid upland habitats, primarily sparsely vegetated grasslands and sagebrush-grasslands. It prefers loose sandy to clay soils for burrowing (WGFD 2009b). The Project site is documented to have mixed-grass prairie cover type (WEST 2010b).

The swift fox is classified as an SSC because population status and trends are unknown, although they are suspected to be stable, and because its habitat is vulnerable, although there is no ongoing significant loss of habitat (WGFD 2009b). The swift fox occurs primarily east of the Continental Divide, and is considered common in Wyoming. The species was removed from the ESA Candidate List in 2002 because of conservation efforts of western states and the Swift Fox Conservation Team. The swift fox primarily inhabits shortgrass and mixed-grass prairies, although it often uses highway and railroad right-of-ways, agricultural areas, and sagebrush-grasslands. It is closely associated with prairie dog colonies and uses underground dens year-round. It selects habitat with low-growing vegetation, relatively flat terrain, friable soils, and high den availability (WGFD 2009b). The Project site is documented to have mixed-grass prairie cover type (WEST 2010b).

The white-tailed prairie dog is classified as an SSC because population status and trends are unknown, and because its habitat is vulnerable (WGFD 2009b).This prairie dog inhabits primarily the western two-thirds of the State, much of which is dominated by sagebrush. The white-tailed prairie dog is considered common in Wyoming. Mapping conducted by the WGFD in the late 1980s and early 1990s indicated approximately 138,000 hectares (340,000 acres) of white-tailed prairie dog towns. The white-tailed prairie dog inhabits arid grassland and shrub/grassland habitats, usually with slopes of less than 12 to 15 percent. It lives primarily at higher elevations than the black-tailed prairie dog, in intermountain valleys, benches, and plateaus with diverse grass and forb cover. Where it occurs east of the Continental Divide in Wyoming, it probably occupies areas that are too dry for the black-tailed prairie dog (WGFD 2009b). Three white-tailed prairie dog colonies were mapped within the Project site boundary (ERM 2010f). Each of the colonies was approximately 50 to 150 feet in diameter, for a total of approximately 0.5 acres for the three colonies.

3.3.3.2.2.2 Bats

The Western small-footed myotis is classified as an SSC because, although it is widely distributed, it is experiencing ongoing significant loss of habitat (WGFD 2009b). This species is a year-round resident in Wyoming and occurs throughout most of the State at elevations between 3,000 and 8,000 feet, but it is rarely reported in high mountains. The western small-footed myotis is considered uncommon in Wyoming. The western small-footed myotis inhabits a wide variety of habitats in Wyoming, primarily at lower and intermediate elevations. It is most commonly associated with arid rocky areas (such as canyons, cliffs, rock outcrops, and badlands) within a variety of habitats, such as montane forest, juniper woodlands, sagebrush steppe, and shortgrass prairie. During summer, the small-footed myotis roosts in a variety of settings, although it is usually associated with rock shelters (such as crevices, overhangs, cliffs, and under rocks), caves, and/or abandoned mines. It also will occasionally roost in buildings, bridges, or under loose tree bark. During winter, it hibernates in caves and abandoned mines, and its reliance on these sites is significant (WGFD 2009b). The bat acoustical studies report (WEST 2010a, 2011) states that the western small-footed myotis is likely to occur on the Project site based upon available range maps (Harvey et al. 1999, BCI 2010) and the call frequencies detected in the AnaBat survey. This species was the fourth most common species in 1,280 specimens from Wyoming that were evaluated by Bogan and Cryan (2000), however based on habitat and range maps as well as the frequencies of calls recorded within the project site, the potential for occurrence of fringed myotis can’t be ruled out (WEST 2010a, 2011).

The long-eared myotis is classified as an SSC because populations are restricted in distribution and there is ongoing significant loss of habitat (WGFD 2009b). This species is scattered throughout most of the State at elevations between 5,000 and 9,800 feet, but it is considered uncommon. The long-eared myotis primarily inhabits coniferous forest and woodland, including juniper, ponderosa pine, and spruce-fir. It typically forages over rivers, streams, and ponds within the forest-woodland environment. During summer, it roosts in a wide variety of structures, including cavities in snags, under loose bark, stumps, buildings, rock crevices, caves, and abandoned mines. During winter, it probably hibernates primarily in caves and abandoned mines (WGFD 2009b). The long-eared myotis is uncommon in Wyoming, based on information in Bogan and Cryan (2000), however based on habitat and range maps as well as the frequencies of calls recorded within the project site, the potential for occurrence of fringed myotis can’t be ruled out (WEST 2010a, 2011).

The little brown myotis is classified as an SSC because, although it is widely distributed, it is experiencing ongoing significant loss of habitat (WGFD 2009b).This myotis is a year-round resident in Wyoming and is found throughout the State. The little brown myotis is considered common in Wyoming. The little brown myotis occupies coniferous forest, riparian areas in the mountains and lower valleys, woodlots, shelterbelts, and urban areas up to about 11,000 feet in Wyoming. It is seldom found far from open water and is usually absent from hot arid lowlands. It primarily forages over water, but also forages in open woodlands and forest openings. During summer, the little brown bat exploits a wide variety of natural and man-made roost sites, including buildings, tree cavities, loose tree bark, bridges, rock crevices, caves, and abandoned mines. It is one of the species most commonly found in human structures. During winter, it hibernates primarily in caves and abandoned mines (WGFD 2009b). The bat acoustical studies report (WEST 2010a) states that little brown myotis is likely to occur on the Project site based upon available range maps (Harvey et al. 1999; BCI 2010) and the call frequencies detected in the AnaBat survey. This species was the most common species in 1,280 specimens from Wyoming that were evaluated by Bogan and Cryan (2000).

The fringed myotis (or “fringed bat”) is classified as an SSC because populations are restricted in distribution and there is ongoing significant loss of habitat (WGFD 2009b). It occurs in suitable habitat over much of Wyoming. However, there have been no current sightings of the fringed myotis in the northwestern portion of the State, where there are several historical records. Although its winter range is poorly known, it is probably a year-round resident in Wyoming. The fringed myotis is considered rare in Wyoming. There have been fewer than 20 specimens of this species documented in the State, and it is possible that populations have become smaller and more isolated in recent decades. The fringed myotis is found in a wide range of habitats, including coniferous forests, woodlands, grasslands, and shrublands, although it is probably most common in xeric woodlands, such as juniper, ponderosa pine, and Douglas-fir. It typically forages over water, along forest edges, or within forests and woodlands. During summer, it uses a variety of roosts, including rock crevices, tree cavities, caves, abandoned mines, and buildings. During winter, it hibernates in caves, abandoned mines, and buildings (WGFD 2009b). The fringed myotis is uncommon in Wyoming, based on information in Bogan and Cryan (2000), however based on habitat and range maps as well as the frequencies of calls recorded within the project site, the potential for occurrence of fringed myotis can’t be ruled out (WEST 2010a, 2011).

The long-legged myotis is classified as an SSC because populations are restricted in distribution and there is ongoing significant loss of habitat (WGFD 2009b). This myotis occurs in suitable habitat throughout most of the State. The abundance of the long-legged myotis is unknown in Wyoming. The long-legged myotis inhabits open mature forest with standing dead trees, including montane and subalpine forest and ponderosa pine and juniper woodlands, primarily from 5,000 to 11,000 feet (1,500 to more than 3,300 meters). It usually forages over open areas such as campgrounds and small forest clearings; over vegetated riparian areas; and within, above, and under the forest canopy. During summer, it roosts in tree cavities, buildings, rock crevices, caves, abandoned mines, and under loose bark. During winter, it hibernates primarily in caves and abandoned mines (WGFD 2009b). The bat acoustical studies report (WEST 2010a) states that long-legged myotis is likely to occur on the Project site based upon available range maps (Harvey et al. 1999; BCI 2010) and the call frequencies detected in the

AnaBat survey. This species was the fifth most common species in 1,280 specimens from Wyoming that were evaluated by Bogan and Cryan (2000).

The eastern red bat is classified as an SSC because population status is unknown but suspected to be restricted because it has spotty distribution in Wyoming (WGFD 2010i). It is a seasonal resident in Wyoming, is found primarily in the eastern third of the State, and is considered rare. The eastern red bat is primarily associated with forested areas, particularly deciduous forests with large-diameter trees in the interior of forests. However, riparian corridors and shelter belts may provide important foraging habitats. It roosts primarily in the foliage of mature hardwoods, but has been observed roosting on the ground in leaf litter, and utilizes shrubs and conifers occasionally. The eastern red bat is extremely tolerant of cold temperatures and has been found roosting in tree cavities and leaf litter in the winter. The bat acoustical studies report (WEST 2010a, 2011) states that Eastern red bat was identified during acoustic bat surveys at the Project site.

The hoary bat is classified as an SSC because, although it is widely distributed, it may be sensitive to human disturbance (WGFD 2009b). Hoary bats may occur Statewide during summer; they occupy the Black Hills and surrounding areas of the Great Plains; but the bat is considered rare in Wyoming. The hoary bat is highly associated with forested habitats, both deciduous and coniferous. It can be found in montane forests, cottonwood riparian forests, shelterbelts, tree rows, juniper woodlands, and urban parks. Diverse forest habitats with a mixture of forest and small open areas that provide edges are ideal habitat. The hoary bat roosts primarily in the foliage of both deciduous and coniferous trees (WGFD 2009b). The bat acoustical studies report (WEST 2010a) states that hoary bat was identified during acoustic bat surveys at the Project site.

The silver-haired bat is classified as an SSC because population status and trends are unknown, although they are expected to be stable, and because it may be sensitive to human disturbance (WGFD 2009b). The silver-haired bat may occur throughout Wyoming during summer, but is generally considered uncommon in Wyoming. The silver-haired bat inhabits coniferous and mixed deciduous-coniferous forests and woodlands, including juniper, subalpine fir, Engelmann spruce, limber pine, Douglas-fir, aspen, cottonwood, and willow. It is most commonly associated with forested and montane habitats adjacent to lakes, ponds, and streams; occurs most frequently in stands of late-successional forest; and may be reliant on older forests for roost trees. It roosts almost exclusively in trees, usually in cavities in live trees or snags, but also under loose bark or within tree cracks or crevices (WGFD 2009b). The bat acoustical studies report (WEST 2010a) states that silver-haired bat is likely to occur on the Project site based upon available range maps (Harvey et al. 1999; BCI 2010) and the call frequencies detected in the AnaBat survey. The silver-haired bat is relatively common in Wyoming; it was the third most common species in 1,280 specimens that were evaluated by Bogan and Cryan (2000). The big brown bat is classified as an SSC because, although it is widely distributed, it is experiencing ongoing significant loss of habitat (WGFD 2009b). The species is a common year-round resident in Wyoming and is found throughout the State, from the eastern plains to over 10,000 feet (3,050 meters) in the mountains. The big brown bat occupies a wide variety of habitats and elevations, including cottonwood riparian woodlands, sagebrush-steppe, juniper woodlands, conifer forests, and aspen woodlands. It is better adapted to human habitation than most bat species, and can often be found in urban areas and around manmade structures. Although the big brown bat is well known for its tendency to roost in buildings, it also uses a wide variety of other man-made and natural roosts, including tree cavities, rock crevices, caves, abandoned mines, and bridges. During winter, it hibernates primarily in caves, buildings, and abandoned mines (WGFD 2009b). The bat acoustical studies report (WEST 2010a) states that big brown bat is likely to occur on the Project site based upon available range maps(Harvey et al. 1999; BCI 2010) and the call frequencies detected in the AnaBat survey. The big brown bat is common in Wyoming; it was the second most common species in 1,280 specimens that were evaluated by Bogan and Cryan (2000).

The distribution of the spotted bat in Wyoming is still unknown, although it may be expected to rarely occur throughout western Wyoming and perhaps Statewide in suitable habitat. The WGFD classifies it as an SSC because populations are restricted in distribution and there is ongoing significant loss of habitat (WGFD 2009b). The spotted bat occupies a wide variety of habitats, from desert scrub to coniferous forest, although it is most often observed in low deserts and basins and juniper woodlands. It roosts in cracks and crevices in high cliffs and canyons. It also may occasionally roost in buildings, caves, or abandoned mines, although cliffs are the only roosting habitat in which reproductive females have been documented (WGFD 2009b). Within the proposed Project site, there is limited suitable habitat for the spotted bat.

The Townsend’s big-eared bat is classified as an SSC because populations are restricted in distribution and there is ongoing significant loss of habitat (WGFD 2009b). Concentrated in the southeastern and north-central portions of the State, the Townsend’s big-eared bat is a rare year-round resident that may be found throughout most of Wyoming. The Townsend’s big-eared bat occupies a variety of xeric to mesic habitats, including coniferous forests, juniper woodlands, deciduous forests, basins, and desert shrublands, and is absent only from the most extreme deserts and highest elevations. However, this species requires caves or abandoned mines for roost sites during all seasons and stages of its life cycle, and its distribution is strongly correlated with the availability of these features (WGFD 2009b). The Townsend’s big-eared bat is uncommon in Wyoming, based on information in Bogan and Cryan (2000), however based on habitat and range maps as well as the frequencies of calls recorded within the project site, the potential for occurrence of Townsend’s big-eared bat can’t be ruled out (WEST 2010a, 2011).

Although records of the pallid bat are patchy in Wyoming, it probably inhabits suitable habitat Statewide, most commonly in the lower elevations of the eastern plains and basins of the State. Although it is a rare year-round resident in much of its range, it probably migrates out of Wyoming during winter. The WGFD classifies it as an SSC because populations are restricted in distribution and there is ongoing significant loss of habitat (WGFD 2009b). The pallid bat generally inhabits low desert shrublands, juniper woodlands, and grasslands, and occasionally cottonwood-riparian zones in those habitats. It is most common in low arid regions with rocky outcroppings, particularly near water. During summer, it usually roosts in rock crevices and buildings, but also uses rock piles, tree cavities, shallow caves, and abandoned mines (WGFD

2009b). The pallid bat is uncommon in Wyoming, based on information in Bogan and Cryan (2000), however based on habitat and range maps as well as the frequencies of calls recorded within the project site, the potential for occurrence of fringed myotis can't be ruled out (WEST 2010a, 2011).

3.3.3.2.2.3 Birds

No federally listed threatened or endangered bird species were observed within the proposed Project site during the avian surveys conducted from April 2009 to April 2011 (WEST 2010b, 2011). The federally protected bald and golden eagles and two federally monitored species of concern, loggerhead shrike and prairie falcon, were observed during fixed-point bird use surveys (WEST 2010b, 2011). State sensitive or SSC species were observed within the proposed Project site, including: eight bird species with native species status (NSS) rankings one through four (sandhill crane, ferruginous hawk, Swainson's hawk, Brewer's sparrow, chestnut-collared longspur, grasshopper sparrow, lark bunting, and McCown's longspur). Five of the NSS species are also Wyoming sensitive passerine species (Brewer's sparrow, chestnut-collared longspur, grasshopper sparrow, lark bunting, and McCown's longspur). Federally-listed, federally-protected or federal candidate species, and State sensitive bird species, are described below.

The greater sage-grouse is listed by the USFWS as a candidate species. It is managed by the WGFD as an SSC (populations are restricted in distribution and there is ongoing significant loss of habitat [WGFD 2009b]) in cooperation with regional working groups in an attempt to increase population numbers and avoid a threatened or endangered status listing under the ESA. Greater sage-grouse are rounded-winged, ground-dwelling birds with pointed tails, and at maturity are up to 30 inches long and 2 feet tall, weighing from 2 to 7 pounds. Core areas, which preclude wind energy development, have been designated by WGFD throughout known greater sage-grouse distribution areas in Wyoming. Based upon greater sage-grouse distribution areas and version 3 core areas as defined in State of Wyoming Executive Department Executive Order 2011-5 (Greater Sage-Grouse Core Area Protection) signed on June 2, 2011, the proposed Project site is outside both distribution and designated core areas. No greater sage-grouse or leks were observed in the proposed Project site (WEST 2010b, 2011). The nearest designated core area is approximately 10 miles north of Laramie, and the nearest occupied lek (as of 2008) is near the Laramie River approximately 25 miles west of the Project site (WyGISC 2011). Approximately 106 acres or 1 percent of the Project site was mapped as shrub-steppe habitat distributed among numerous small parcels, primarily in the southeastern portion of the site (West 2010b). These parcels may provide some sagebrush habitat for sage grouse but are likely of limited use given their significant distance from known lek areas. The mountain plover is listed as an SSC by the WGFD (population status is unknown but suspected to be restricted (WGFD 2009a). Mountain plover are approximately 9 inches tall, have sandy brown coloring, a white wing stripe and wing linings, and black band near the tip of their tail. Suitable habitat includes areas of mixed-grass prairie, shrub-steppe, and prairie dog towns (WGFD 2009a). The suitability of the habitat within the Project site is considered low for mountain plovers, with small isolated patches of potentially suitable habitat (WEST 2011). No mountain plover were observed during the point count surveys conducted from April 2009 to April 2011 (WEST 2010b, 2011). There are three federally protected bird species, least tern, piping plover, and whooping crane that are listed in Albany County because they occur downstream of Wyoming in the Platte River system (USFWS 2011). The Project will not result in depletions of water flows to the Platte River system and water used for Project construction will be obtained from non-tributary sources. These three bird species are not expected to occur on the Project site due to lack of suitable habitat and, therefore, are not evaluated in this EIS.

The Rocky Mountain population of greater sandhill crane is classified as an SSC because its breeding population is restricted in number and distribution, habitat is restricted and vulnerable but no recent or ongoing significant loss, and the species is sensitive to human disturbance (WGFD 2004). The crane can be found throughout Wyoming during the spring, summer, or fall and is considered a common summer resident. This species exhibits high fidelity to its breeding sites. Typical nesting habitat occurs in river valleys, marshes, and wet meadows of western and central Wyoming, particularly in ranching country where human populations are low. Omnivorous, sandhill cranes feed on cultivated grains whenever possible, but also eat roots, tubers, seeds, berries, small vertebrates, and invertebrates. It occupies wet-moist meadow grasslands, sedge meadows, irrigated native and introduced meadows, and marshes. Necessary components of fall pre-migration staging habitat are grain or alfalfa fields in close proximity to roosting sites in shallow lakes, marshes, or river bottoms (WGFD 2004). Thirty-six sandhill cranes were observed flying over grassland habitat at the Project site during the spring and fall seasons of fixed-point avian surveys conducted between April 2009 and April 2010 (WEST 2010b); no individuals were observed during the April 2010 to April 2011 survey period (WEST 2011). The wet perimeters of the emergent wetlands identified on the project area (ERM 2010h,i) could provide marginal foraging habitat.

The bald eagle is federally protected under the BGEPA and classified as an SSC by the WGFD because breeding populations are restricted in numbers and distribution, there is ongoing significant loss of nesting habitat, and it is sensitive to human disturbance (WGFD 2004). The bald eagle is considered an uncommon resident in Wyoming, although the number of nesting pairs in the State has increased to more than 100 in 2002 from 20 in 1978. The populations in Wyoming increases during winter as individuals that breed farther north arrive. Bald eagles nest along major river drainages and lakes throughout Wyoming with the most significant concentrations in Teton, Sublette, and Carbon Counties (WGFD 2004). Significant numbers also nest in Grand Teton and Yellowstone national parks. The bald eagle nests near large lakes and rivers in forested habitat where adequate prey and old large-diameter cottonwood or conifer trees are available for nesting. Highly productive nesting areas in the greater Yellowstone area were found to have open water available in winter, early spring weather that is not severe, limited human activity, and high sinuosity and an abundance of islands, riffles, runs, and pools in the river (WGFD 2004). Migrating and wintering eagles congregate near open water areas where concentrations of prey are available, such as carcasses of ungulate species, and spawning areas for kokanee salmon, trout, and other fish (WGFD 2004). Four bald eagle observations over grassland habitat were documented at the Project site during the fall and winter seasons of fixed-point avian surveys that took place between April 2009 and April 2010

(WEST 2010b). No bald eagles were observed during the April 2010 to April 2011 point count survey period, however, there was one incidental observation (WEST 2011). The golden eagle is federally protected under the BGEPA, but is not classified as an SSC by the WGFD. A common resident in Wyoming, it is found in most habitats with open areas for foraging (WGFD 2004). Golden eagles are an aerial predator, eating small to mid-sized reptiles, birds, and mammals up to the size of a mule deer fawn and coyote pups (Bloom and Hawks 1982). Golden eagles tend to nest in high densities in open to semi-open habitat, and may also nest in lower densities in coniferous habitats which have open patches such as fire breaks, or clear cuts. They are found from the tundra down into lower elevation grasslands, in forestlands, and in deserts (Kochert et al. 2002). Golden eagles may nest in the upper 1/3 of deciduous or coniferous trees, on cliff sides, and on artificial structures (Kochert et al. 2002). Golden eagles have been documented to be active and nesting on the Project site (WEST 2010b, 2011), therefore, suitable habitat is present on the Project site. Twenty-eight golden eagle observations were documented during the point count surveys conducted from between April 2009 and April 2010 (West 2010b), and 34 observations were documented during the point counts conducted between April 2010 and April 2011 (West 2011). Observations of golden eagles occurred across all four seasons, with 21 in fall, 11 in winter, 17 in spring, and 13 in summer.

The ferruginous hawk is classified as an SSC because populations are restricted in distribution, and because it is sensitive to human disturbance (WGFD 2004). The ferruginous hawk occurs and breeds throughout most of Wyoming, and is considered a common resident in Wyoming. The ferruginous hawk inhabits semi-arid open country, primarily grasslands, basin prairie shrublands, and badlands. It requires large tracts of relatively undisturbed rangeland and nests on rock outcrops, the ground, cutbanks, cliff ledges, or trees (WGFD 2004). Seventy-five ferruginous hawk observations were documented during the spring, summer, fall, and winter seasons of fixed-point avian surveys that took place between April 2009 and April 2011 (WEST 2010b, 2011). All observations occurred in grassland habitat. Given that grassland habitat comprises 88 percent of the site and that this species was observed onsite across all seasons, it is likely that the Project site provides suitable foraging and nesting habitat although no ferruginous hawk nests have been identified during surveys (WEST 2010b). The Swainson's hawk is classified as an SSC because population status and trends are unknown, although they are suspected to be stable, and because its habitat is restricted and vulnerable, although there is no ongoing significant loss of habitat (WGFD 2004). The Swainson's hawk is a common summer resident, and it breeds throughout most of Wyoming during summer. The Swainson's hawk inhabits semi-open and open areas below 9,000 feet, including prairies, plains, shrub-steppe, large mountain valleys, savannahs, open pine-juniper woodlands, and cultivated lands with scattered trees. It nests in trees that are either isolated or in riparian areas or shelterbelts. Nesting trees may be almost any species of suitable size—taller than 10 feet with a diameter at breast height of at least 2 inches (WGFD 2004). Swainson's hawks were observed during the spring, summer and fall seasons of fixed-point avian surveys that took place between April 2009 and April 2011, and nests were located during raptor nest surveys (WEST 2010b, 2011). Forty of the forty-two Swainson's hawk observations were in grassland habitat, the other two observations were within forested habitat. It has been confirmed that this species is actively using the Project site.

The chestnut-collared longspur is classified as an SSC because ongoing habitat loss and degradation are expected to increase and negatively affect population status (WGFD 2010i). During the summer the chestnut-collared longspur is scattered across the grasslands of Wyoming, mainly in the eastern half of the State, and is considered an uncommon summer resident (WGFD 2010i). The chestnut-collared longspur inhabits shortgrass and open mixed-grass prairies. It avoids excessively shrubby areas, although it uses scattered shrubs and other low elevated perches for singing. Within arid habitats, it often prefers relatively more mesic areas; low, moist areas and wet-meadow zones around wetlands may provide suitable habitat (WGFD 2004). Two chestnut-collared longspurs were observed in grassland habitat during the spring 2009 season of fixed-point avian surveys that took place between April 2009 and April 2010 (WEST 2010b), and no individuals were observed between April 2010 and April 2011 (WEST 2011). Although there is potentially suitable habitat on the Project site, this species appears to be only a casual visitor. The Brewer's sparrow is classified as an SSC because breeding populations are declining, and because its nesting habitat is vulnerable (WGFD 2004). The sparrow occurs throughout most of Wyoming as a common summer resident. Brewer's sparrow is closely associated with sagebrush shrublands (i.e., sagebrush obligate) that have abundant scattered shrubs and short grass. It can also be found in mountain mahogany, rabbitbrush, pinyon-juniper, or bunchgrass grasslands. It is positively correlated with shrub cover, above-average vegetation height, bare ground, and horizontal habitat heterogeneity (patchiness) (WGFD 2004). The Brewer's sparrow was observed in low numbers during the spring, summer, and fall seasons of fixed-point avian surveys that took place between April 2009 and April 2011; nine observations were documented during the 2009-2010 survey and 15 observations were documented during the 2010-2011 survey (WEST 2010b, 2011). Approximately 38 percent of the observations were within shrubland habitat and approximately 62 percent of the observations were within grassland habitat. The low occurrence of this species is likely due to the limited suitable habitat on the Project site (shrub 1 percent and mountain mahogany 1.2 percent).

The grasshopper sparrow is classified as an SSC because populations are restricted in distribution, and because its habitat is vulnerable, although there is no ongoing significant loss of habitat (WGFD 2004). A common summer resident, the grasshopper sparrow is scattered across the grasslands of Wyoming, although it breeds mainly in the eastern half of the State. The grasshopper sparrow inhabits shortgrass prairies, mixed grasslands, meadows, open sagebrush-grasslands, and agricultural areas. It requires herbaceous cover and conspicuous perches, and avoids areas containing more than 35 percent shrubs (WGFD 2004). The grasshopper sparrow was observed in low numbers (five observations) during the spring, summer, and fall seasons of fixed-point avian surveys that took place between April 2009 and April 2010 (WEST 2010b), and no observations were recorded between April 2010 and April 2011 (WEST 2011). All observations were recorded in grassland habitat. Although a large portion of the Project site contains suitable habitat (grassland 88 percent) this species was observed in low numbers.

The lark bunting is classified as an SSC because ongoing habitat loss and degradation are expected to increase and negatively affect population status (WGFD 2010i). The bunting is an abundant summer resident throughout Wyoming. The lark bunting primarily inhabits shortgrass and mixed-grass prairies, as well as disturbed grasslands, sagebrush-grassland and shrub-steppe habitats, mountain-foothill shrublands, and agricultural areas. It prefers grasslands of low to moderate height 24 inches (60 centimeters) or less with high (45 percent) vegetative cover and 10 percent to 15 percent bare ground, often with a shrub component in the overstory (WGFD 2004). Only 2 lark buntings were observed during the fixed-point avian surveys that took place between April 2009 and April 2010 (WEST 2010b), and these were restricted to the fall season. During the April 2010 to April 2011 surveys, only 4 lark buntings were observed, and these were in the summer (WEST 2011). All observed individuals were in grassland habitat. Although a large portion of the Project site contains potentially suitable habitat (grassland 88 percent) this species was observed in very low numbers and only in the summer and fall seasons.

The McCown's longspur is classified as an SSC because ongoing habitat loss and degradation are expected to increase and negatively affect population status (WGFD 2010i). The McCown's longspur occurs across most of Wyoming, except for the western edge of the State, as a common summer resident. The McCown's longspur is found in open, dry, and sparsely vegetated areas. It prefers shortgrass prairie and basin-prairie shrubland habitats, and also inhabits plowed and stubble fields, grazed pastures, dry lakebeds, and other sparse, bare, dry ground. It prefers 45 percent to 80 percent grass cover and 15 percent to 25 percent bare ground (WGFD 2004). The McCown's longspur was one of the most commonly observed species on the Project site (166 observations; third most abundant of all species observed) during the spring, summer, and fall seasons of fixed-point avian surveys that took place between April 2009 and April 2010 (WEST 2010b). It was also commonly observed (185 observations) during the April 2010 to April 2011 surveys (WEST 2011). All observations (351) were recorded in grassland habitat.

3.3.3.2.2.4 Fish

The pallid sturgeon is a federally listed Platte River species, listed in Albany County because it occurs downstream of Wyoming in the Platte River system (USFWS 2011). The Project will not result in depletions of water flows to the Platte River system and water used for Project construction will be obtained from non-tributary sources. The pallid sturgeon does not occur on the Project site due to lack of suitable habitat and, therefore, are not evaluated in this EIS.

The hornyhead chub is classified as an SSC because populations are greatly restricted in distribution (WGFD 2004). The chub occurs in a small section of the lower Laramie River and North Laramie River as they pass through the Laramie Mountains in northeastern Albany County and Platte County (WGFD 2010i). Hornyhead chub are typically found in clear streams, with riffle habitat and gravel substrate (WGFD 2010i). This species has not been documented in streams of the Project site (ERM 2010f). The Project site is outside the known range of this species and thus it is not expected to occur. In addition, based on the findings of the stream surveys (appendix A in ERM 2010h), suitable habitat does not appear to be present on the Project site.

The common shiner is classified as an SSC because populations are declining on subdrainage, stream, and site scales. The common shiner occurs in tributaries of the North and South Platte Rivers in Wyoming (WGFD 2004). They are habitat generalists and can be found in a variety of habitats. In Wyoming they were found in a variety of habitats but usually were found in clear water with gravel substrates (WGFD 2010). This species has not been documented in streams of the Project site (ERM 2010f). However, based on the findings of the stream surveys (appendix A in ERM 2010h), suitable habitat is likely present in some of the streams on the Project site.

The Iowa darter is classified as an SSC because populations are declining and habitat is becoming severely limited due to increasing turbidity (WGFD 2010i). The Iowa darter occurs in the drainages of the Niobrara, North Platte, and South Platte Rivers in Wyoming. The Iowa darter prefers cool, slow moving vegetated waters with little to no turbidity and sand or gravel substrates, but it will use a variety of available habitats. In Wyoming, they were found at sites with slow moving water, with light to heavy vegetation and cobble to silt substrates (WGFD 2010i). This species has not been documented in streams of the Project site (ERM 2010f). However, based on the findings of the stream surveys (appendix A in ERM 2010h), suitable habitat is likely present in some of the streams on the Project site.

3.3.3.2.2.5 Amphibians

The Wyoming toad is listed by the USFWS as endangered and classified as an SSC by WGFD and ongoing significant loss of habitat and localized extinction (extirpation) appears possible. The toad is known to occur in the Laramie Basin in Albany County at the Hutton Lake and Mortenson Lake National Wildlife Refuges (USFWS 2010i). It is a brown toad covered with warts and measures only 2 inches long at maturity. Wild populations with decreasing numbers have been supplemented by the release of captive bred toadlets (Hammerson 2004). The Wyoming toad inhabits ponds, small seepage lakes, floodplains, and adjacent meadows and uses rodent burrows for shelter (Hammerson 2004; ERM 2010f). There are approximately 397 acres of riparian vegetation cover type and another 86 acres of riparian/willow cover type scattered through the Project site, much of which could be suitable habitat for the Wyoming toad.

The Northern leopard frog is classified as an SSC because populations are declining throughout its range (WGFD 2004). The leopard frog can be found in or near permanent water in the plains, foothills, and montane zones. The Northern leopard frog habitat ranges up to 11,000 feet in the mountains. Its preferred habitats are swampy cattail marshes on the plains, and beaver ponds in the foothills and montane zones. In Wyoming, this species is common throughout the State except in Teton County, Park County, and Yellowstone National Park (WGFD 2004). Riparian zones within the Project site may be suitable habitat for this species.

The wood frog is classified as an SSC because habitat fragmentation and other anthropogenic factors have resulted in declines of habitat quality and resulted in increased mortality (WGFD 2010i). The wood frog occurs in the Medicine Bow and Bighorn Mountains, but both of these populations are considered glacial relict populations (WGFD 2010i). Wood frog habitat includes beaver ponds, slowly moving streams, small lakes, wet meadows, and willow thickets in the montane zones. Populations are usually found around 9,000 feet in elevation (WGFD 2010h). Riparian and willow-dominated habitats within the Project site could be suitable habitat for the wood frog. Suitable habitat does not occur on the Project site since the elevation of the Project site is approximately 7,700 feet and this species' preferred habitat is around 9,000 feet. In addition, its known distribution in Wyoming does not include latilong 27 where the Project site is located (WGFD 2004).

The tiger salamander is classified as an SSC because populations are declining (WGFD 2004). The salamander occurs in all counties in Wyoming from lowlands to about 10,000 feet in elevation. Although tiger salamanders have been known to utilize upland habitats in other parts of its range, Wyoming's arid climate generally restricts this species to areas with more permanent moisture (WGFD 2004). The tiger salamander requires a moist environment and can be found in rodent burrows, cellars, window wells and manure heaps, where they can escape desiccation. The adult form is primarily terrestrial except during breeding season in the spring and summer. Larvae may be found in intermittent streams, ponds, lakes, and stock troughs (WGFD 2004). Riparian and willow-dominated habitats within the Project site could be suitable habitat for the tiger salamander.

The western (boreal) toad (Southern Rocky Mountain population) is classified as an SSC largely on the basis of disease issues (WGFD 2004). There are historical records for occurrence of this species in the southeastern part of the State (Albany, Carbon, and Laramie Counties), inhabiting wet areas in foothills and montane and subalpine zones from 6,500 to 12,000 feet in elevation. The western (boreal) toad has been observed in the central and western Wyoming mountain ranges, but there is no direct evidence of breeding populations (WGFD 2004). They range from Alaska to northern New Mexico in the Rocky Mountains and west to the Pacific Coast. Suitable habitat occurs on site, but there are only historical records of this species' occurrence in latilong 27 where the Project site is located.

3.3.3.2.2.6 Reptiles

The Eastern yellowbelly racer is classified as an SSC because population status and trends are unknown (WGFD 2004). The racer occurs in woodlands and scarp woodlands of the plains and foothills zones, often near water (WGFD 2004). The WGFD atlas (2004) does indicate observation of this species in the southeastern portion of the State of Wyoming, but no direct record of occurrence exists for the Project site. Suitable habitat may occur in the southeastern portion of the Project site where there are coniferous forests along riparian areas.

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3.4 Cultural Resources and Native American Concerns

3.4.1 Overview

Cultural resources are places that have important associations with the heritage of the American nation or its constituent communities and political subdivisions. They include archeological and historical sites, buildings and structures, objects, districts, landscapes, and locations of traditional cultural activities. If significant and possessing integrity, they receive consideration during Federal planning, policy development, and program and Project implementation under NEPA, the National Historic Preservation Act of 1966, as amended (NHPA), and other Federal laws and regulations. This section describes the existing cultural and archaeological environment within the proposed Project site, which consists of the wind farm site and the Western interconnection facilities. For the purposes of analyzing impacts associated with Western's Proposed Action under Section 106 of the NHPA, the action is limited to Western's interconnection facilities including the generation-tie line and the substation and switchyard.

3.4.2 Regulatory Setting

3.4.2.1 Federal Regulations

Cultural resources can be broadly grouped into archeological resources, architectural resources, and traditional cultural properties (TCPs). Such resources are regarded as having standing for purposes of Federal regulatory review if they are listed on or determined to be eligible for listing on the National Register of Historic Places (NRHP) by a Federal agency, a state historic preservation office (SHPO), or the Keeper of the NRHP. As defined at Title 36 CFR 60.4, to be eligible for the NRHP a resource must generally be over 50 years old, possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meet at least one of four criteria:

- *Criterion A: associated with events that have made a significant contribution to the broad patterns of our history; or*
- *Criterion B: associated with the lives of persons significant in our past; or*
- *Criterion C: embodying the distinctive characteristics of a type, period, or method of construction, or representing the work of a master, or possessing high artistic values, or representing a significant and distinguishable entity whose components may lack individual distinction; or*
- *Criterion D: have yielded, or may be likely to yield, information important in prehistory or history.*

Regulations for the listing of properties on the NRHP are provided by 36 CFR 60, while the process of formally determining the eligibility of properties defined by 36 CFR 63.

3.4.3 Affected Environment – Synopsis of Project Area Cultural History

Owing to the varied characteristics of the different kinds of cultural resources, undertakings such as the construction of a wind energy project or provision of an interconnection to a power grid, can potentially affect different categories of resources in different ways. Consequently, the study area is defined separately for three categories of cultural resources including archaeological resources, historic architectural resources, and TCPs, so the affected environment considered here differs from one resource category to the next. Since this EIS considers only a Build and a No-Build Alternative, within the discussion of each resource category, there are no geographic subdivisions of the affected environment. The study area under consideration is defined at the beginning of each section that follows.

Information summarized in this section is derived primarily from the January 2010 report of the Class III investigation at the proposed Project site (ERM 2010a). This investigation included review of historical contexts, site file check of online records of the Wyoming SHPO, and three weeks of field investigation in October 2009. The field investigation included walkovers of all proposed turbine, gen-tie line, and access road corridors, as well as the proposed footprints of laydown areas, operations and management facilities, and substations. In July 2010, ERM prepared a report in support of Western's Section 106 review of the planned interconnect between the Project and the 345-kV Craig to Ault Line, including a proposed adjoining substation (ERM 2010b).

3.4.3.1 Prehistory

According to ERM (2010a:7-17), human history in southeastern Wyoming extends back at least 12,000 years to visits by the first bands of Native American hunters. Archeologists refer to these early native peoples as Paleoindians (12,000 to 8,500 years ago). Investigations of their sites have established that they lived in small mobile groups comprised of several families whose lifeway emphasized the hunting of large game animals. Initially, Paleoindians hunted now-extinct Pleistocene (Ice Age) megafauna, such as mammoth, camel, and giant bison, but as these species disappeared with environmental changes, the hunting bands shifted their attention to the ancestral herds of modern bison. Over time, these early native peoples also expanded the territory they covered to include not just plains areas, but mountains and foothills, as well as the range of animals they exploited to include small game animals like sheep and deer.

In response to the ongoing environmental changes of the post-glacial epoch, prehistoric Native American subsistence and settlement patterns continued to evolve during the next major period of culture history in the region, the Archaic period (8,500 to 1,500 years ago). Broadly speaking, the Native American lifeways during the Archaic period in southeastern Wyoming was characterized by the use of diverse animal and plant resources and occupation of a wide variety of environmental zones, including, in some instances, high mountain areas. Extensive use of plant materials is attested by the recovery of grinding tools like manos and metates, and the occurrence of pithouse dwellings indicates that at certain periods, the people of these ancient cultures were less involved in regular, long-distance travel for game hunting as compared to their earlier predecessors. Nonetheless, native peoples of the Archaic period in southeastern Wyoming also seem to have used portable skin tents at certain time, for some rock circles or teepee rings have been identified and dated to the period in the region. By the later portion of the Archaic period, the archeological record demonstrates the modest influence or occasional presence in eastern Wyoming of native peoples from the high plains of Kansas, Nebraska, and the Dakotas. Evidence of these influences includes the presence of pottery and projectile point styles like those found to the east, distinctive burial practices, and the use of elaborate structures for driving and trapping bison during communal hunts.

Bison were an important food resource for Native Americans of the Plains Archaic, and these peoples employed various methods for hunting them. One widely employed method was the communal hunt, in which a panicked herd of animals was driven over a steep declivity into enclosed corral or impoundment. Animals not killed by the stampede or fallen into the trap were dispatched by hunters at the walls of the pound. Situated less than 1 mile outside the boundaries of the leased property for the Project, the Willow Springs Bison Pound (48AB130) (also called the Willow Springs Buffalo Jump Site) is a classic example of a bison kill site where this method was employed by successive groups of Native Americans for roughly two millennia. The earliest diagnostic artifacts from this site are associated with the Late Plains Archaic (3,000 to 1,500 years ago), while the most recent artifacts are estimated to date to circa AD 1700 during the Protohistoric Period. This site provides the earliest available evidence of prehistoric Native American use of the Project area and its immediate vicinity (Bupp 1981, Frison 2004:83-84).

The Late Prehistoric Period (1,500 to 450 years ago) in Wyoming is marked by the appearance of new forms of hunting implements, small projectile points that indicate the adoption of bow and arrow armaments for hunting. In addition, cultural contacts or influences from several directions can be demonstrated in the pottery found at archeological sites. Pottery made or influenced by peoples in the Great Basin, Upper Missouri, Central Plains, and Southwest are all found at sites in the region dating to this time period. The exploitation of a broad range of plants and animals found in a variety of habitats continued during this period. In addition to evidence of Native American use of the Project area from the multicomponent Willow Springs Bison Pound, archeological field research undertaken in October 2009 in conjunction with permitting for the present Project also yielded evidence of Late Prehistoric occupancy of the area. This evidence consisted of an Avonlea projectile point recovered from a newly identified archeological resource, Site 48AB1933, situated between the southern ends of Turbine Strings C and D.

3.4.3.2 Protohistory: The Arapaho and Cheyenne Native Peoples

Archaeologists designate the period from AD 1550 to 1850 as the Protohistoric Period to signify the increasing influence and encroachment of Euroamerican explorers, trappers, traders, and settlers. As a result of Euroamerican economic expansion, Native peoples began to obtain European trade goods and weapons and later participated directly in the fur trade. Europeans introduced horses into North America, and by the 18th century Native Americans had rapidly evolved new wide-ranging and nomadic lifeways throughout the Plains and parts of the Rockies to take advantage of the mobility these animals provided. The arrival of Europeans also exposed Native Americans to many new diseases, which took a terrible toll on some tribal groups and significantly reduced their populations, and the pressure of colonization to the east and south either induced or accelerated widespread movements of native populations in the Great Plains and Mountain West. By the early 1800s, southeastern Wyoming lay within territory frequented by the Arapaho and the Cheyenne, who by this time had adopted the lifeways of highly mobile horse-mounted Plains buffalo hunting cultures (Fowler 2001, Moore et al. 2001).

According to Fowler (2001), at the beginning of the 19th century, the Arapaho were divided into five linguistic and socio-political divisions, which together occupied the northeastern two-thirds of Wyoming and adjoining areas in southern Montana. By the middle of the century, as a result of pressure from the westward expansion of Euroamerican trappers, traders, and settlers and concomitant intertribal competition, these groups had largely merged and shifted into southeastern Wyoming, eastern Colorado and neighboring parts of Nebraska and Kansas. During this period, the Arapaho depended on buffalo herds as their chief source of food, clothing, and other necessities. They were organized into residential bands comprised of groups of extended-family households, and these bands moved together, coalescing for major summer hunts and trade fairs into multi-band camps. In addition, ceremonial groups, or lodges, especially for men, crosscut residential groups and lineages, and knit the Arapaho together for religious and political activities. After the middle of the 19th century, Euroamerican occupation of Indian lands and the destruction of buffalo herds forced the Arapaho onto reservation lands and resulted in the adoption of farming, ranching, and other non-traditional economic pursuits.

As the 19th century progressed, the Arapaho allied themselves with the Cheyenne, another group of horse-mounted buffalo hunters (Moore et al. 2001). Both groups spoke languages that had descended many centuries earlier from proto-Algonquian stock, but which by the Protohistoric period belonged to distinct branches of the Algonquian language family (Goddard 2001). According to Moore et al. (2001), the Cheyenne of the 17th century lived in western Minnesota. Over the succeeding two centuries, they were uprooted and pushed westward by Euroamerican expansion, eventually coming to range over much of the Plains. They were centered in southeastern Wyoming and parts of Colorado and Montana in the early 19th century. Like the Arapaho, the economic life of the early 19th-century Cheyenne was based primarily on the use of buffalo. Buffalo hunting was supplemented by hunting of other game, such as deer, elk, wild sheep, and pronghorn, trapping or hunting smaller mammals for food and furs, and exploitation of wild plants, including prairie turnips, Jerusalem artichokes, groundnuts, and various kinds of berries and fruits. Cultivation of corn, beans, and squash, important subsistence activities in 17th-century Minnesota was largely abandoned as the Cheyenne were pushed into fully nomadic Plains lifeways. Cheyenne social organization included family camps and residential bands, men’s ceremonial societies, and a tribal council of chiefs. Like the Arapaho, Euroamerican expansion forced the Cheyenne onto reservation lands and into the adoption of non-traditional economic pursuits after the middle of the 19th century.

3.4.3.3 Euroamerican Expansion and Settlement

Euroamerican trappers and traders probably began to enter southeastern Wyoming by the 1820s, and with the construction of Fort William (later Fort Laramie) some 95 miles northeast of the Project area, they established a permanent presence in the region in 1834. In the 1840s, the great overland migrations of Americans from the eastern states to Oregon, California, and Utah brought tens of thousands along the Oregon Trail through southern Wyoming. The Oregon Trail passed 95 to 120 miles north of the Project area, but in this same period other trails that passed quite close to the Project were coming to be. The most important of these was the Cherokee Trail (1849 Evans/Cherokee Trail), established by travelers headed for the California goldfields in 1849. From the region of Fort Collins, Colorado, this trail roughly followed the route of U.S. Highway 287 into Wyoming, running up to Laramie about 18 miles north of the Project area. One branch of the trail, known as the South Branch, turned off the Laramie-bound section near Tie Siding, about 1 mile west of the Project area. This branch, also known as the North Park Road because of its ultimate terminus in North Park, Colorado, passed slightly north of the Project area, curving southwest to reach the main stem of the Laramie River just south of the Colorado border. It is unknown how long the Cherokee Trail–South Branch/North Park Road remained in regular use, but the main route from Fort Collins to Laramie (the Cherokee Trail–North Branch) remained in use as part of the Overland Trail until the 1880s. The Overland Trail was also an important stagecoach route in the 1860s until about 1869, when the Union Pacific built a line over Sherman Hill, about 8 miles northeast of the Project area, and past the Project area at Tie Siding as part of its transcontinental railroad. The Union Pacific continues to operate a rail line in the Project vicinity, but about 1901 replaced the original line with a new route that significant reduced its grade between Cheyenne and Laramie. Since then, the new line has been upgraded several times.

Land use patterns in the area today reflect those established in the last decades of the 19th century. Albany County was established in 1868 as part of Dakota Territory, and became part of Wyoming when it was organized as a territory the following year. Since that time, the area in and around the Project area has been used primarily for sheep and cattle ranching, except for a few businesses along the Fort Collins-Laramie highway. Though prospecting has taken place, the region offers little in the way of gas, coal, or mineral ores. However, over the last 35 years diamond-bearing kimberlites have been discovered in the Project vicinity, and between 1996 and 2003, an open-pit commercial diamond mine operated at Kelsey Lake in Colorado, about 0.25 mile south of the Project boundary (Coopersmith et al. 2003, Sutherland 2010). Population densities in the area have historically been low and remain so today. Ranches and the occasional business or residence are spread far apart.

3.4.4 Archeological Resources

Archeological resources are places containing physical traces of past human activities such as artifacts, features, or ruins. Most commonly, such resources lie on the surface of the ground or within it. They can be subject to Project impacts resulting primarily from earthmoving and similar construction activities. With wind energy developments, such activities commonly include foundation work for turbines and transmission poles, trenching for below-ground electrical collection and control system cables, construction of temporary and permanent roadways and paths, equipment movements over open ground, operation of temporary laydown and staging areas, and erection of permanent facilities for operations, maintenance, and electric grid connection (substations and switches). The Project site with respect to archeological resources thus consists of areas where direct ground disturbances would occur as a result of Project construction.

ERM (2010a:18-19) conducted a background study of the Project site to ascertain whether there were any previously inventoried sites in the Project area or vicinity and to analyze past human occupation of the region to identify possible geographic patterns of archeological site distribution. Review of records on the SHPO Wyoming Cultural Resource Office (WYCRO) database determined that there were no known archeological sites located within the Project area (SHPO 2009). The nearest previously recorded archeological sites are:

- The Willow Springs Bison Pound Site (Wyoming Site Number 48AB130), a bison trap and kill site used repeatedly by Native Americans over two millennia (Late Archaic possibly through Protohistoric periods), which is situated approximately 1 mile northwest of the northern end of Turbine String A
- The Overland Trail (48AB157), a western migration and stagecoach route active from ca. 1849 until the 1880s, now marked by rut patterns worn into the landscape, which approximates the alignment of U.S. Highway 287 about 1 to 3 miles to the east of the Project
- The Tie Siding Stage Station Site (48AB359), a mid-19th century commercial-transportation site containing remnants of dugouts and corrals and historic artifact scatters, situated about 1.1 miles northeast of the northern end of Turbine String G
- The South Branch of the Cherokee Trail (North Park Road) (48AB1447), a western migration route active from 1849 until the 1850s or later, now marked by rut patterns worn into the landscape, whose alignment curves just north of the Project area from the vicinity of Tie Siding, northeast of the Project area, to past Boulder Ridge, northwest of it

Review of SHPO WYCRO database records indicates that each of these sites, or portions thereof, has been evaluated by consultants for their eligibility to the NRHP (SHPO 2009). Both the Willow Springs Bison Pound and the Tie Siding Stage Station Site have been recommended as eligible for the NRHP by consultants; the SHPO has received these recommendations without comment as to concurrence or non-concurrence. The SHPO has determined that both the Overland Trail and South Branch of the Cherokee Trail are generally eligible for the NRHP, with determinations made on a case-by-case basis as to whether a particular field-mapped segment retains sufficient integrity to be eligible. The SHPO has concurred that two field-mapped segments of the Overland Trail (48AB157) 2 to 3 miles east of the proposed Project site are NRHP-eligible. No field-mapped segments of the Cherokee Trail (48AB1447) in the vicinity of the Project have been identified as NRHP-eligible.

In addition to this background review, ERM conducted a Class III archeological pedestrian survey of the Project site in October 2009 (ERM 2010a). The Class III archaeological survey did not include the entire 11,125-acre site. The survey included walkovers of all proposed turbine strings, the gen-tie line, and access road corridors, as well as the proposed footprints of laydown areas, operations and management facilities, and substations. Also included is the approximately 20-acre proposed Federal action (gen-tie line and substation location).

Potential or anticipated site types included open campsites, rock alignments, stone cairns, lines, and circles, game drives, processing sites, travel camps, overland trail rut patterns and related features, and ranches. On the other hand, sites related to geographically transient and ephemeral activities, such as those associated with sheepherding and cattle operations on grazing ranges, were expected to be rare or absent. The ground surfaces of the surveyed areas were systematically observed by teams of archeologists walking the corridor or footprint at 50-foot (15-meter) intervals. Ground visibility was reported to be typically very good to excellent (generally above 70 percent). No subsurface testing took place, and any artifacts discovered were left in place after being recorded (ERM 2010a:3-4, 16, 30).

ERM's archeological survey identified 10 archeological resources in the Project site, including three prehistoric sites, four prehistoric isolates, and three historic sites (table 3.4-1). As defined by Wyoming SHPO policy, the distinction between sites and isolates is one of size, artifact density, and potential significance. Isolates are finds of a few artifacts over a limited area, while sites represent more intensively occupied locations containing more and/or a higher density of artifacts (Nissley 2005). The resources identified by ERM's archeological survey are distributed across the Project site (ERM 2010a: figure 6-1).

Table 3.4-1:
Archeological Resources in Project Area

Resource Identifier	Location	Resource Type and Period	Description	Recommended Evaluation*
48AB1932	South end of String C	Farmstead / Ranch—Historic Euroamerican (post-1867)	Four features, including a cellar, foundation, possible privy, and possible sign post; scatters of bottle glass, ceramics, metal (including stove pieces), and animal bone fragments also present. Dimensions: 260 feet in diameter.	NRHP eligibility undetermined
48AB1933	String C–D connector route (at south end of strings)	Lithic Cluster—Prehistoric Native American (including one Late Prehistoric period artifact)	Abundant chert debitage with occasional projectile points and bifaces in various stages of reduction. One Late Prehistoric Avonlea-type projectile point recorded. Dimensions: 200 feet by 330 feet.	NRHP eligibility undetermined
48AB1934	South section of String G	Possible Exploratory Mine—Historic Euroamerican (post-1867)	Two features, consisting of a mine shaft of unknown depth adjoined by rubble or discard piles and a circular pit; scatter of bottle glass and whiteware ceramic fragments with two bottle caps also present. Dimensions: 180 feet by 260 feet.	Not NRHP eligible
48AB1935	South section of String H	Lithic Scatter—Prehistoric Native American (unknown period)	Seven pieces of chert debitage. 50 feet diameter.	Not NRHP eligible
48AB1936	String H–I connector (at north of strings)	Lithic Scatter—Prehistoric Native American (unknown period)	Four artifacts of chert and quartzite, including one early-stage biface fragment, one uniface, and two modified flakes. Dimensions: 35 feet by 130 feet.	Not NRHP eligible
48AB1937	String H–I Connector (at south end of strings)	Quarry or Exploratory Mine—Historic Euroamerican (possibly late 20th century)	Narrow pit approximately 40 by 160 feet up to 15 feet deep with adjoining rubble or discard piles; thin scatter of metal and glass fragments on surrounding surface. Dimensions: 300 feet by 330 feet.	Not NRHP eligible
A-1I	South end of String A	Isolate—Prehistoric Native American (unknown period)	One chert flake, possibly used as an expedient tool.	Not NRHP eligible

Table 3.4-1:
Archeological Resources in Project Area

Resource Identifier	Location	Resource Type and Period	Description	Recommended Evaluation*
A-2I	South end of String A	Isolate—Prehistoric Native American (unknown period)	One chert flake	Not NRHP eligible
B-1I	North section of String B	Isolate—Prehistoric Native American (unknown period)	One chert flake	Not NRHP eligible
CB-2I	South end of String C	Isolate—Prehistoric Native American (unknown period)	Three chert flakes	Not NRHP eligible

Source: ERM 2010a *Pending Wyoming SHPO comment.

ERM evaluated two of the sites as possibly eligible for the NRHP:

- Site 48AB1932 comprises the remnants of an abandoned farmstead or ranchhouse complex covering approximately 1.2 acres at the southern end of Turbine String C. The site includes building foundations and other features, as well as a scatter of historic artifacts such as pottery sherds and bottle glass fragments. It apparently dates to the Territorial Period of Wyoming history or later (post-1867).
- Site 48AB1933 is a prehistoric Native American site covering approximately 1.5 acres on a connector route at the southern end of Turbine Strings C and D. It contains abundant debris from the manufacture of stone tools, as well as occasional tools discarded as manufacturing rejects and finished tools. One projectile point identified at the site is of the Avonlea type, indicating that the site includes a Late Prehistoric Period (1,500 to 450 years ago) component; it is unknown whether additional time periods are also represented.

The survey team recommended the other four sites and the four isolates as not NRHP-eligible. The team noted, however, that the two isolates near the southern end of Turbine String A, Isolates A-1I and A-2I, may be displaced outliers from a larger site of unknown dimensions and possible NRHP eligibility, situated upslope and outside the Project site (ERM 2010a:29). The Wyoming SHPO has not yet commented upon or concurred with the consultant recommendations about NRHP eligibility.

3.4.5 Historic Architectural Resources

Architectural resources are buildings, structures, districts, landscapes, sites, and objects associated with historically significant events, patterns of events, or people, or that include historically significant architectural or design features. Such resources are generally 50 years old or older. Wind energy projects have the potential to affect architectural resources in several ways. Rarely, construction of a wind energy project results in the alteration, damage, or demolition of an architectural resource, but such effects are usually avoided as a result of building setbacks and best-practice design work and project execution. Wind energy projects may also alter the setting of an architectural resource by introducing new visual, auditory, or atmospheric elements into the environment of the resource. The study area for architectural resources thus includes the land occupied by the proposed Project, as well as a surrounding zone up to several miles wide within which significant visual, auditory, or atmospheric effects might occur. The extent of this zone of potential effects depends on the size, extent, prominence, and other aspects of project elements.

No systematic architectural inventory of the study area has been completed. There are two ranches within the leased boundaries of the proposed Project site and several other buildings within 1 or 2 miles of these boundaries. The age, integrity, potential historical significance, and NRHP eligibility (if any) of such architectural resources are unknown.

Based on a review of the online NRHP Focus database (NPS 2010a), there are no NRHP-listed properties situated inside the proposed Project boundaries. There are four listed properties located within 10 miles of the Project:

- Dale Creek Crossing (48AB145) (constructed between 1868 and1885), a set of stone piers and abutments that supported the Dale Creek Bridge (removed after 1901), which carried the Union Pacific Railroad’s original transcontinental line over a deep gorge, located approximately 4.6 miles northeast of the northern end of proposed Turbine String G
- Barn at Oxford Horse Ranch (constructed 1887), a massive English-influenced vernacular log barn and one of the oldest, largest, and best-preserved barns in Albany County, located approximately 7.0 miles north of the northern end of proposed Turbine String C
- Virginia Dale Stage Station (constructed 1862), a hand-hewn log building in Larimer County constructed as a stagecoach stop on the Overland Trail between Fort Collins and Laramie, approximately 7.0 miles east-southeast of the southern end of Turbine String K
- Ames Monument (constructed 1882), a massive pyramidal stone monument erected by the Union Pacific Railroad Company to honor the contributions of financiers Oakes and Oliver Ames of Massachusetts to the construction of transcontinental railroad, located approximately 8.1 miles northeast of the northern end of proposed Turbine String G

3.4.6 Traditional Cultural Properties/Native American Concerns

TCPs are localities where long-standing social groups who typically trace their ancestry to native peoples engage in activities that are significant for the economic, social, or cultural continuity of the group or have a strong ceremonial, ritual, or religious aspect. Wind energy projects have the potential to affect these resources in several ways. Construction of a project can physically disturb or destroy areas of landscape containing significant resources. In addition, development of a project may introduce visual, auditory, or atmospheric intrusions into these places or may produce incompatible changes in land use, such as increases in traffic or visitation. The study area with respect to TCPs is therefore generally similar to that for architectural resources and includes the land occupied by the proposed Project, as well as a surrounding zone up to several miles wide within which significant visual, auditory, or atmospheric effects might occur.

No information is available on the presence or absence of TCPs in the study area. On February 5, 2010, Western sent letters to several federally recognized Native American tribes, inviting comment on the proposed Project and soliciting information about TCPs in the study area (Western letter of February 5, 2010, to tribal representatives, appendix G). Tribes to whom these requests were sent are listed below:

- Crow Nation, Crow Agency, Montana
- Eastern Shoshone Nation, Fort Washakie, Wyoming
- Northern Arapaho Nation, Fort Washakie, Wyoming
- Northern Cheyenne Nation, Lame Deer, Montana

To date, no information on TCPs or tribal concerns has been received.

3.5 Paleontology

3.5.1 Overview

Paleontological resources, for the purposes of NEPA, may be defined as remains or other indications (trace fossils) of prehistoric organisms such as animals and plants; also included are the accompanying data that provide taphonomic, taxonomic, phylogenetic, ecologic, and stratigraphic information. Paleontological analysis cannot be accomplished without: (1) establishing the relative ages of geologic horizons that contain them, (2) reconstructing the ancient environments that these organisms inhabited, and (3) detecting the existence, distribution, and evolutionary trends of diverse types of organisms, many of which are now extinct. This section describes the existing paleontological environment within the proposed Project site, which consists of SWE's wind farm site and the Western interconnection facilities. For the purposes of this EIS the study area and the proposed Project site are the same, recognizing that only a small percentage of the proposed Project site area would actually be disturbed.

3.5.2 Regulatory Setting

3.5.2.1 Federal Regulations

The Antiquities Act of 1906 is used as the basis for Federal protection of paleontological resources on Federal lands. The act authorizes the Census to regulate the disturbance of objects of antiquity on Federal lands through the responsible managing agency and to prosecute unauthorized damage or removal. NEPA requires that important natural aspects of our national heritage be considered in assessing the environmental consequences of any proposed project. Paleontological resources are also afforded Federal protection under 40 CFR 1508.27 as a subset of scientific resources.

The Paleontological Resource Preservation Act (PRPA) of 2009 specifically protects paleontological resources on Federal lands, specifies which agencies are in charge of these resources, provides for casual collecting and permitting of scientific collecting, provides for the curation of these resources, specifies which activities are violations, and establishes penalties for those activities. These regulations apply to paleontological resources on Federal lands, and to projects subject to Federal authority or jurisdiction. PRPA is not applicable to SWE's proposed Project because Western has no authority or jurisdiction over SWE's proposed Project, and no Federal land is involved. Western's switchyard and the short interconnection line do, however, fall under PRPA.

3.5.2.2 State Regulations

The Wyoming Antiquities Act (Section 36-1-114 through Section 36-1-116) protects archaeological and paleontological material on State lands. Any excavation of paleontological deposits in the State of Wyoming on any State or Federal lands requires a permit to be obtained from the State Board of Land Commissioners.

3.5.2.3 Local Regulations

The Albany County Comprehensive Plan (Albany County 2008) does not specifically address paleontological resources.

3.5.3 Affected Environment

A paleontological review was conducted for the proposed Project (EVG 2010; appendix H). The review included a geological map, a literature review, and fossil locality records search. The records search was conducted at the University of Wyoming. No existing fossil localities within the proposed Project site were revealed as a result of the records search. Based on the results of the geological map and literature review, a spot field inspection for fossils of any kind was conducted for geological outcrops mapped as the Pennsylvanian/Permian Fountain and Casper Formation within the proposed Project site.

The proposed Project site is located in the Rocky Mountain Foreland Structural Province, an area characterized by broad intermontane basins surrounded by massive reverse fault-bounded uplifts with Precambrian rocks exposed in their cores. The proposed Project site overlies the southern end of the Laramie Range, which is composed chiefly of granite monadnocks (isolated mountains) that rise above a broad erosion surface and form extensive unwooded parks with surfaces generally at about 7,000 feet in elevation. Eastward-north eastward drainages from south to north that cross the area include Fish Creek, Willow Creek, Boulder Creek, Forest Creek, and Government Creek.

As mapped by Ver Ploeg et al. (2000) and Love and Christiansen (1985), rocks of Precambrian and Pennsylvanian/Permian age and sediments of Quaternary age (Pleistocene and Holocene) occur in the proposed Project site.

3.5.3.1 Precambrian Rocks

Granite that comprises the bulk of the Laramie Range is part of the Sherman Batholith that was emplaced about 1.4 billion years ago. The Sherman Granite forms the core of the range and underlies most of the proposed Project area at depth. It is exposed at the surface in the southeastern part of the proposed Project site, east of Cherokee Park Road. The Laramie Range is composed of lesser amounts of metasedimentary and metavolcanic rocks including pelitic schist, marble, granite gneiss, layered amphobolite, and felsic gneiss. These rocks are exposed in the northeastern part of the proposed Project site along Willow Creek, east of Cherokee Park Road.

The Precambrian rocks, including the Sherman Granite and metasedimentary and metavolcanic rocks forming the Laramie Range and exposed in the proposed Project site, have no paleontological potential.

There is a profound non-conformity separating the Precambrian rocks forming the core of the Laramie Range from Pennsylvanian and Permian sedimentary rocks that overlie them. This unconformity represents a long period of erosion associated with the episodic uplift of the

Ancestral Rocky Mountains (Maughan 1990), a complex of northwesterly uplifts of Late Paleozoic age. The Ancestral Rocky Mountains occur in approximately the same region as the much younger Late Cretaceous-early Tertiary uplifts of the Laramide Orogeny that formed most of the basins and ranges seen in Wyoming today, including the present-day Laramie Range, but they were oriented differently. As a result of this uplift of the Ancestral Rocky Mountains, all Paleozoic-aged rocks older than Pennsylvanian age were eroded from the proposed Project site.

Precambrian rocks forming the core of the Laramie Range are overlain in the proposed Project site by rocks of the Fountain Formation and overlying Casper Formation of Pennsylvanian and Permian age.

3.5.3.2 Fountain Formation

The Fountain Formation in the proposed Project site consists wholly of arkosic (feldspar-rich) red sandstone. This sandstone originated from the feldspar-rich uplifted part of the Ancestral Rocky Mountains that shed sediments basinward that accumulated chiefly in large alluvial fans and braided streams proximal to the uplifts. The formation is not known to be fossiliferous in the proposed Project site. Fossils fusulinids (i.e., any of a family [Fusulinidae] of extinct marine order Foraminifera) attributed to the Fountain Formation (Mallory 1966), probably originated from limestone of the Casper Formation that interfingers with the Fountain Formation. However, in parts of Colorado, where the formation is exposed distal to the Ancestral Rocky Mountain highlands, the formation includes rock types other than arkose (i.e., limestones and shales) and is fossilferous. These rocks have produced trace fossils and fossils of invertebrates and plants, but these rock types are absent from the proposed Project site (Jennings 1980; Maples and Suttner 1990; Hasiotis et al. 2002).

The Fountain Formation has a Probable Fossil Yield Classification of 2, a ranking that indicates that the formation is not likely to contain vertebrate fossils or scientifically significant non-vertebrate fossils.

3.5.3.3 Casper Formation

The Casper Formation is mapped together with the Fountain Formation on the Wyoming State Geologic Map and the Laramie 30 x 60 geologic map (Ver Ploeg et al. 2000). The two formations actually have a complex stratigraphic relationship. The lower parts of the Casper Formation interfingers with the Fountain Formation, and its upper parts overlie the formation unconformably. The Casper Formation consists of gray, tan, and red thick-bedded sandstone underlain by interbedded sandstone and pink and gray limestone. These deposits accumulated laterally to sediments of the Fountain Formation in areas distal to the Ancestral Rockies during periods of low sea levels and above the Fountain Formation during periods of higher sea levels. As a result, sediments of the Casper Formation accumulated in a variety of continental and marine environments. The lower parts of the formation accumulated chiefly in marine environments, whereas the upper part of the formation, including the sediments of the formation in the proposed Project site, accumulated chiefly in eolian environments of an ancient erg (sand sea). The abundant and striking cross-bedded sandstones that characterize the formation south of Laramie document the accumulation of sands in the migrating sand dunes of that era.

The Casper formation is known to be fossiliferous along the flanks of the Laramie Range, but not specifically in the proposed Project site. In widely scattered localities throughout southeastern Wyoming, the Casper Formation has produced fossils of invertebrates, conodonts, and trace fossils at widely scattered localities.

For example, Miller and Thomas (1936) reported on fusulinids, nautiloid cephalopods, and a trilobite from the formation along the flanks of the Laramie Range. Hensley (1956) noted the occurrence of marine invertebrate macrofossils along the western flank of the Laramie Range in Albany County, including more than 400 specimens representing 15 species of four phyla. Hoyt and Chronic (1962) noted the occurrence of fusulinids at a section of the formation at Granite Canyon on the eastern flank of the Laramie Range. Rare, but well preserved conodonts of Late Pennsylvanian and Early Permian age are known from the formation at the southern end of the Laramie Basin, where Heiman (1972) recovered fossils of 10 genera and 20 species from 10 limestone units interbedded with sandstones. Sando and Sandberg (1987) noted the occurrence of brachiopod, gastropod, ostracod, and crinoid debris, as well as abundant conodonts in the formation on Casper Mountain. In addition, Hanley et al. (1971) described two trace fossils from the formation that demonstrated that the sands of the formation could not have been completely dry or completely wet during deposition.

The Casper Formation has Probable Fossil Yield Classification of 3, a ranking that indicates that the fossil content of the formation varies in significance, abundance, and predictable occurrence. This ranking also includes sedimentary units of unknown fossil potential.

3.5.3.4 Quaternary Sediments (Pleistocene and Holocene) and Natural Animal Traps

Love and Christiansen (1985) mapped terrace debris of Quaternary age along the northwestern edges of the proposed Project site at a scale of 1:500,000. In their mapping at a scale of 1:100,000, Ver Ploeg et al. (2000) document the presence of older fan deposits (Qof) in broad areas along Government and Forest Creeks and both north and south of the Cherokee Park Road. In addition, mapping of adjacent areas by Workman (2008) of the Eaton Reservoir Quadrangle and Braddock et al. (1989) of the Diamond Peak Quadrangle, at a scale of 1:24,000, document the presence of alluvium and colluvium of Holocene (Recent) age as well as colluvium and pediment deposits of Pleistocene age.

Hager (1972) described the Chimney Rock natural animal trap in Larimer County, which is located along Sand Creek, about 15 miles to the southwest of the proposed Project site. The natural animal trap is a circular depression in the Casper Sandstone approximately 65 feet in diameter and 10 feet deep with an overhang of 4 to 25 feet. Four to 6 feet of fine sand in the depression contain late Pleistocene to recent age fauna. The fossils from the trap include 33 vertebrate species, 7 of which show boreal affinities and whose extant representatives presently inhabit higher altitudes and latitudes. Three extinct species are present, including the noble marten (*Martes nobilis)*, American lion (*Panthera atrox)*, and an extinct eagle (*Neogyps errans)*. Dental variations in the lower first molar of red fox (*Vulpes vulpes)* preserved in the paleofauna are thought to indicate a cold climate because of dental differences from the same species inhabiting temperate zones. Bone from the 48-inch level of the deposit yielded a radiometric date of about 11,980 years. The animal trap had formed and major sedimentation occurred by the late Wisconsin glaciations, and as a result, more recent faunas were added to and mixed into the deposit.

Holocene-age deposits are by definition too young to contain fossils. Pleistocene deposits could be fossil bearing, because such deposits yield the remains of “Ice Age” vertebrates at widely scattered locations throughout Wyoming and Colorado. Such discoveries, however, are very rare. The paleontology potential of the Pleistocene deposits in the proposed Project site is therefore thought to be low. In addition, the likelihood of another natural animal trap is also considered low because the topography developed above the Casper Formation across the area is generally low. The circular depression at Chimney Rock is relatively steep.

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3.6 Noise

3.6.1 Overview

The discussion of noise considers the existing acoustic environment in the study area, which, for the purposes of the analysis presented in section 4.6, is defined as an area within approximately 2 miles of the proposed Project site boundary. As part of the discussion, the terminology associated with sound and the metrics used to describe sound is presented below. The characterization of the acoustic environment is based on information presented in the original noise assessment and the updated noise assessment prepared for the proposed Project (ERM 2010c, ERM 2012, appendix I).

3.6.2 Regulatory Setting

A review of noise regulations and guideline criteria applicable to the Project was completed at the Federal, State, and county levels. At the Federal level, the USEPA noise requirements were considered. The State and local noise requirements are assumed to be absolute and independent of the existing acoustic environment.

3.6.2.1 Federal Regulations

In 1974, the USEPA published its “Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with and Adequate Margin of Safety.” This document provides information for State and local governments to use in developing their own ambient noise standards. The USEPA has determined that a day-night sound level (L_{dn}) of 55 decibels on the A-weighted scale (dBA) protects the public from indoor and outdoor activity noise interference. OSHA has developed regulations for standards for occupational noise exposure (29 CFR 1910.95). These standards include protection against the effects of noise exposure when the sound levels exceed those in table 3.6-1.

Table 3.6-1:
OSHA Permissible Noise Exposures

Duration Per Day, Hours[1]	Sound Level dBA Slow Response[1]
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25 or less	115

Source: OSHA (no date)

1 When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions C(1)/T(1) + C(2)/T(2) C(n)/T(n) exceeds unity, then the mixed exposure should be considered to exceed the limit value. Cn indicates the total time of exposure at a specified noise level, and Tn indicates the total time of exposure permitted at that level. Exposure to impulsive or impact noise should not exceed 140 [decibels] peak sound pressure level.

3.6.2.2 State Regulations

Wyoming has adopted the Federal OSHA regulations on noise (WCWR 025-120-001). No additional State requirements apply.

3.6.2.3 County Regulations

The Albany County Wind Energy Siting Regulations (Albany County 2011), Article G.3, Design and Installation—Noise, provides maximum permissible noise levels applicable to the Wind Energy Conversion System (WECS) operation in the county as follows:

> 3. *Noise. Noise associated with WECS operation shall not exceed fifty-five (55) [dBA] as measured at any point along the common property lines between a non-participating property and a participating property.*
>   a. *This level may be exceeded during short-term events such as utility outages, severe weather events, and construction or maintenance operations.*
>   b. *This standard shall not apply along any portion of the common property line where the participating property abuts state or federal property.*
>   c. *Noise levels may exceed the fifty-five (55) dBA limit along common property lines if written permission, as recorded with the Albany County Clerk, is granted by the affected adjacent non-participating property owners.*

3.6.3 Terminology and Metrics

Sound waves are created by a rapid fluctuation of air pressure above and below atmospheric pressure. Properties of sound waves include frequency, wavelength, period, amplitude, and velocity. Noise is considered to be an unwanted sound. Just when sound becomes noise is a subjective determination, largely dependent on the magnitude or intensity of the noise, its duration, the proximity of noise-sensitive receptors, and time of day (higher sensitivities can be expected during the quieter overnight periods and the perspective of the individual receptor).

The frequencies that humans can hear ranges from 20 to 20,000 Hertz (Hz). Humans, however, have varying sensitivities to noise at different frequencies. Some frequencies are perceived to sound louder than other frequencies, even though the energy content is the same.

The amplitude of a sound wave is measured in terms of its sound pressure level (SPL) where a logarithmic decibel scale is used. To reflect the sensitivity of the human ear across the audio spectrum, the SPL readings are given in what is termed the “A-weighted scale,” denoting that a standard weighting system that accounts for human hearing response is being used. The measurements used for the A-weighted scale are decibels, and are reported as dBA. Humans are exposed to a broad range of SPLs over the course of a typical day. A level of 0 dBA is the lowest perceptible sound by a person with good hearing. A change of 3 dBA represents a physical doubling of SPLs, but is barely perceptible as a change in an outdoor environment.

Most individuals would notice a change of 5 dBA, and would perceive an increase of 10 dBA as a doubling of sound level (ERM 2012).

Regarding typical dBA levels, very quiet environments, such as a still night in a remote setting, may fall well below 40 dBA. Typical conversation is in the range of 50 to 60 dBA. Sources such as loud equipment and trucks passing by on a busy road may be approximately 85 dBA. Eighty-five dBA is also the threshold that hearing protection may be required in the workplace, depending on the duration of exposure. Examples of noise levels from various sources are listed in table 3.6-2.

Table 3.6-2:
Examples of Noise Levels on a dBA Scale

dBA[1]	Typical Noise Source
0	"Threshold of hearing"—lowest sound an average person can hear
20	Standard required in a broadcasting or recording studio—just audible
30	Library or soft whisper at 5 feet—this is very quiet
40	Bedroom or living room
50	Conversational speech at 3 feet
60	Busy general office or air conditioning unit at 20 feet
70	Traffic on freeway at 50 feet
80	Pneumatic drill at 50 feet
90	Heavy truck at 50 feet
140	"Threshold of Pain"—maximum tolerable noise level such as very close to a jet engine or similar

Source ERM (2010c)

1 The dB(A) scale is a particular way of measuring the different frequencies in sound, designed to match how the human ear perceives sound, called the "A" weighting.

The acoustic environment can be degraded by the presence of unwanted sound (noise) that can potentially detract from the enjoyment of a quiet atmosphere. In severe cases, noise can cause sleep disturbance, anxiety, and consequent health effects. From another perspective, noise can also affect the natural environment by disturbing wildlife populations. Impulse or irregular noises are most disruptive, while responses to low level steady-state noise are expected to be somewhat reduced due to varying degrees of acclimatization.

Noise in areas with elevated background sound levels may be obscured through a mechanism referred to as acoustic masking. Acoustic masking is created by seasonal effects such as crickets chirping and wind-generated ambient noise as airflow interacts with foliage and cropland.

To take into account sound fluctuations, environmental noise is commonly described in terms of equivalent sound level (L_{eq}). The L_{eq} value, conventionally expressed in dBA, is the energy-averaged, A-weighted sound level for the measured time period. It is defined as the steady, continuous sound level, over a specified time, that has the same acoustic energy as the actual varying sound levels over that same time. Another common noise descriptor used when assessing environmental noise is the L_{dn} level, which is calculated by averaging hourly L_{eq} levels at a given location for a 24-hour period and adding 10 decibels to noise emitted during the nighttime period (10:00 p.m. to 7:00 a.m.) to account for the increased sensitivity of people to noise occurring at night. The L_{max} is the maximum instantaneous sound level as measured during a specified time period. It can also be used to quantify the time-varying maximum instantaneous sound pressure level as generated by a piece of equipment or an activity, or a manufacturer maximum source level. The noise impact assessment conducted for the proposed Project presented in Section 4.6, Noise, was evaluated against criteria based on the abovementioned noise descriptors.

3.6.4 Affected Environment

There are two residences located on the proposed Project site. The surrounding study area is sparsely populated with homes (four within one mile of the Project boundary) located east and directly west of the proposed Project site. The homes west of the site are located along a ridgeline.

Variations in an acoustic environment are due, in part, to surrounding land uses, population density, and proximity to transportation corridors. The proposed Project site is located approximately 1 mile west of U.S. Highway 287, a highly traveled highway that was widened from two lanes to four lanes near the site in 2009. A line of the Union Pacific Railroad (UPRR) is located approximately 2 miles northeast of the proposed Project site. Other baseline acoustic conditions in the study area include aircraft, local traffic, and wind. According to the National Renewable Energy Lab, the average wind speed at 30 meters in the study area is approximately 17 mph (ERM 2010c). Diurnal effects result in sound levels that are typically quieter during the night than during the daytime, except during the warmer seasons, when evening and nighttime insect noise dominate.

A baseline sound survey was initiated by SWE to document the existing acoustic environment in the study area. Baseline sound measurements were undertaken at eight locations between November 17 to 25, 2010 and June 2 to 15, 2011. The sound level meters were generally placed on relatively flat areas which mainly consisted of rangeland located away from reflective surfaces and roads by at least 15 to 30 meters (50 to 100 feet) and away from any trees and streams. The measurements recorded sound level metrics (e.g., L_{eq}) in 10-minute increments. This sample period was selected to correspond with the wind speed data recorded at SWE's meteorological tower located on-site.

The overall ambient L_{eq}, 24hr noise level average for the Project site was 49 dBA. A summary of the measured L_{eq}, 24hr noise levels (the logarithmic average of all valid samples during all 24 hour periods) for each location is summarized in table 3.6-3 below. At location 6 the measured ambient L_{eq} noise levels were determined to be invalid for the purposes of the assessment potentially due to equipment malfunction or extraneous local noise sources that were not typical of the area.

Table 3.6-3:
Summary of Measured Ambient L_{eq} Noise Levels

Location[1]	L_{eq}, 24hr Ambient Noise Levels
1	47
2	50
6	86 (not used in assessment)
7	45
8	46
9	48
10	53
15	48

Source ERM (2010c)

1 The dB(A) scale is a particular way of measuring the different frequencies in sound, designed to match how the human ear perceives sound, called the "A" weighting.

It was noted that the measured noise levels at locations 1, 2, 7, 8, 9, 10 and 15 were below the Albany County Standard, and therefore, there was little justification for adopting a higher assessment criterion.

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3.7 Visual Resources

3.7.1 Overview

This section describes the visual resources of the proposed Project site and the study area. The study area for the analysis presented in section 4.7 is defined as the landscapes up to 15 miles from the proposed Project in all directions. The proposed Project site is defined as the area within the delineated boundary for the proposed Project components, including the Western interconnection facilities that constitute the agency’s proposed action.

Visual resources include everything that can be seen on a landscape. This includes man-made objects both stationary and moving, such as residences or trains, as well as natural features such as mountains, vegetation, or rivers. The visual impression created by the unique combination of these features makes up the character of a landscape (BLM 1984). When describing visual resources, the landforms (including water), vegetation, and structural features currently in the landscape are analyzed using the basic landscape character elements of form, line, color, and texture. Descriptions of each character element are listed below:

- Form—The shape and mass of landforms or structures
- Line—The edge of shapes or masses, silhouettes, or bands
- Color—The property of reflecting light of a particular intensity or wavelength that the eye can see
- Texture—The nature of the surface of landforms, vegetation, or structures

When the visual resources of an area are described, the distance between objects or landforms and any potential viewer has a direct influence on that description. Objects or features that are closer to a viewer's location will appear more detailed than those that are further away. When describing visual resources, the Bureau of Land Management (BLM) has identified three primary distance zones (BLM 1986a).

- Foreground/Middleground—Areas within 5 miles of a viewer location, with foreground objects and features typically located immediately adjacent to the viewer
- Background—Areas 5 to 15 miles from a viewer
- Seldom Seen—Areas beyond the background or areas unable to be seen

The concepts and terms described above are used in the following discussion of existing conditions in the study area and proposed Project site. Assessing scenic values and determining visual impacts can be a subjective process. Objectivity and consistency can be greatly increased by using the basic design elements of form, line, color, and texture, which have often been used to describe and evaluate landscapes, to also describe proposed projects (BLM 2011a).

3.7.2 Regulatory Setting

3.7.2.1 Federal Regulations

The federal government has not adopted laws or regulations that provide specific protection for visual resources on privately-owned lands, or specific direction for assessment of impacts to such resources. NEPA and its implementing regulations include visual resources as an element of the human environment to be considered in assessing the impacts of an action, but do not specify how that assessment is to be conducted. While various federal laws, regulations and guidelines address treatment of visual resources on federal lands, those measures are specific to the federal lands under the jurisdiction of federal land management agencies such as the BLM and the U.S. Forest Service (USFS).

To provide a systematic basis for the visual resources component of this EIS, the description of existing visual resources and the assessment of potential impacts to those resources are based on the Visual Resource Management (VRM) System developed by the BLM. Although the BLM does not manage any lands within the proposed Project site, the agency manages hundreds of thousands of acres in the western United States, and many areas within their jurisdiction have similar landscapes to those in the study area. Consequently, the VRM System provides a suitable framework for this EIS and is applied in the following discussion of existing visual resources.

The BLM is one of the few Federal agencies that have developed a system to assess the quality of visual resources of an existing landscape. To minimize subjectivity that would undermine the results of a visual resource analysis, the BLM uses consistent terms and concepts developed for the VRM System to describe the visual character of a landscape accurately and objectively.

The USFS Scenery Management System also provides an overall framework for the orderly inventory, analysis, and management of scenery. However, since the BLM VRM System is widely used and many BLM landscapes are similar to those in the study area, the visual analysis for this EIS is accomplished using the BLM VRM System.

3.7.2.2 State Regulations

The State of Wyoming does not have regulations or guidelines for impacts to the visual character of a landscape.

3.7.2.3 County Regulations

The Albany County Wind Energy Siting Regulations has the following provisions for visual impacts (Albany County 2011, Chapter V, Section 8G):

> *2. Color. Towers and blades shall be painted white or gray or another non-reflective, unobtrusive color as agreed to by the County Planner and the applicant that will help the project blend with the natural visual character of the area.*

7. Setbacks

j. Setback distances may be modified at the discretion of the Board of County Commissioners to minimize degradation, if any, of the visual, environmental or acoustic character of the area, additional performance standards may be adopted by the Board of County Commissioners upon formal consideration, review and public hearings.

3.7.3 Affected Environment

3.7.3.1 Landscape Conditions

The proposed Project site lies along the eastern edge of the Laramie Basin division of the Wyoming Basin Ecoregion (figure 3.7-1). The Laramie Basin, a wide, gently sloping intermontane valley between 7,100 and 7,900 feet in elevation, is characterized by low rolling hills and nearly flat floodplains. Gently sloping streams, including the Laramie River and the Little Laramie River, meander from the south to north through the valley along cottonwood-lined river channels, collecting at several small reservoirs that dot the valley floor. The dominant vegetation in the region is mixed-grass prairie and rabbitbrush, and seasonal livestock grazing is the primary land use. Surrounding the basin on three sides is the Mid-Elevation Forests division of the Southern Rocky Mountains Ecoregion. These forests are found at elevations between 7,500 and 9,000 feet and contain a dense mix of aspen, lodgepole pine, Douglas fir, and ponderosa pine. The landscape in this region is characterized by low mountain ridges and rugged hills. Outwash fans created by the moderate to high gradient perennial streams can also be found at the toe of the ridge slopes. The headwaters of many of the streams in the study area can be found in the high alpine terrain of the Medicine Bow Mountains, which lie on the western edge of the Laramie Basin and extend south into Colorado. The exposed rocky peaks of these mountains, at elevations between 8,500 and 12,000 feet, are snow covered most of the year; the slopes are dominated by Engleman spruce, lodgepole pine, and sub-alpine forests (Chapman et al. 2004).

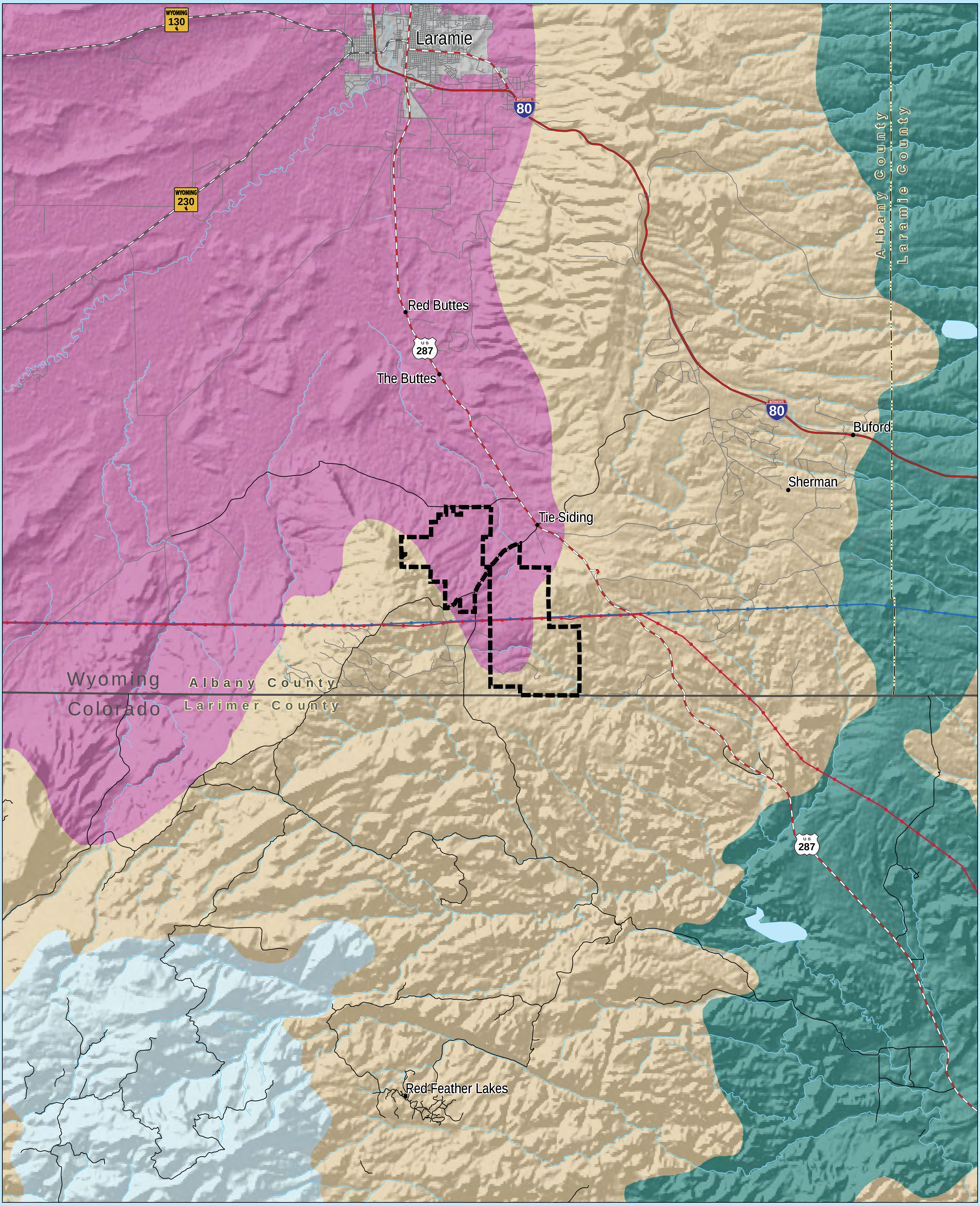
The proposed Project site may generally be characterized as a panoramic smooth valley with gently rolling hills and minimal changes in elevation. The slopes of the hills are subtle, and from most viewing locations, foreground views of the valley are not obstructed by topography. In middleground views, Boulder Ridge, a moderately steep horizontal ridge to the west, and the low undulating series of hills of the Laramie Mountains to the east, enclose the valley. The hills of the Laramie Mountains rise gently from west to east, steadily gaining in elevation until they crest around 8,300 feet. There are small areas of exposed rock surrounded by a spotty covering of short evergreen trees, but in general the landscape is open and expansive, having a short, smooth covering of light green grasses and rabbitbush. Diamond Peak, a bold pyramidal rock outcrop, is prominent in middleground views to the south from the proposed Project site. Background views to the south and north reveal an angular horizon of snow-capped peaks that make up the Medicine Bow Mountains. In the southeastern portion of the proposed Project site, the landscape is slightly different. The slopes of the hills and stream drainages become slightly steeper, and some foreground views are obscured by topography, but the middleground and background views remain intact. Figure 3.7-2 shows locations of representative photos taken for the Project. Photographs 1 through 3 on figure 3.7-3 present typical views of the proposed Project site.

Several narrow curvilinear streams flow through the proposed Project site and surrounding landscape. These streams are shallow and generally flow out of Boulder Ridge, west of the proposed Project site, to lower elevations north and south of the site. Fish Creek, Willow Creek, and Keys Creek all flow through the proposed Project site. Willow Creek is the biggest of the three creeks, collecting in Willow Creek Reservoir before it flows into the Laramie River southwest of Laramie, Wyoming. The Laramie River is a narrow river that meanders from south to north along the eastern side of the Medicine Bow Mountains towards Laramie. Its wide floodplain contains several small lakes and reservoirs called the Laramie Plains Lakes. Lake Hattie Reservoir, the largest of these lakes, covers an area of approximately 3,000 acres.

The proposed Project site is characterized by a uniform coverage of short grass and rabbitbrush vegetation that appears in varying hues of light green, brown, and yellow in the spring and summer. In the fall and winter, when not covered by snow, these grasses turn a dull grayish yellow color. In low-lying areas around perennial streams, the grasses appear to be a much darker hue of green. Large deciduous trees also dot the landscape along the streams and provide a contrast to the low grasses. As vegetation moves up the slopes of Boulder Ridge, west of the proposed Project site, a complex irregular line denotes the transition to dense patches of evergreen forest. The color of the forest is predominantly dark gray and green, but irregular patches of dull red and brown can be seen in areas that have been affected by the spread of the mountain pine beetle. Based on the continual spread of the pine beetle infestation to the south, these beetle kill areas are expected to increase along Boulder Ridge in the future. While the change will be partially mitigated by removal of infected trees by property owners, the loss of trees is expected to result in the ridge looking more rocky and barren as viewed from the proposed Project site.

Patches of bare soil can be observed on the crowns of a small number of hills within the proposed Project site. The soil is light brown and buff in color. Exposed rock can be seen on the slopes of some hills within the proposed Project site and on the steep slopes of Boulder Ridge as well as on the peaks of the mountains in the background. This rock is primarily dark gray in color, with speckles of red and brown mixed in.

The open grass-covered hills of the valley within the study area are primarily used as rangeland for livestock grazing. The slopes of Boulder Ridge, west of the proposed Project site, primarily serve as rural residential areas and wildlife habitat. The study area is predominantly characterized by a mix of land uses at a small-scale, including livestock grazing, recreational fishing, quarry operations, and scattered rural residences. Laramie, approximately 18 miles north of the proposed Project site, is more urban in nature, with heavy industrial, commercial, and high-density residential land uses.



Ecoregions

Hermosa West Wind Energy Project

Transmission

230-kV Transmission Line

345-kV Transmission Line

Ecoregions (Level 3 - Level 4)

Southern Rockies - Crystalline Mid-Elevation Forest

Southern Rockies - Crystalline Subalpine Forest

Southern Rockies - Foothill Shrubland

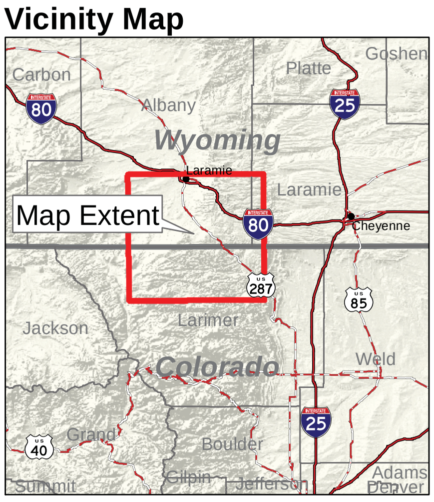
Wyoming Basin - Laramie Basin

0 1.5 3 Miles

Scale 1:98,213 when printed at 22"X34".

Revised: August 3, 2011
File Name: Ecoregions
MXD: P:\4004_Shell_Hermosa_West\GIS\Layouts\chapter_3
PDF: P:\4004_Shell_Hermosa_West\GIS\Maps\chapter_3
Sources: ESRI, Western, BTS, WyGISC, USGS

Vicinity Map



HERMOSA WEST WIND ENERGY PROJECT
FIGURE 3.7-1: ECOREGIONS

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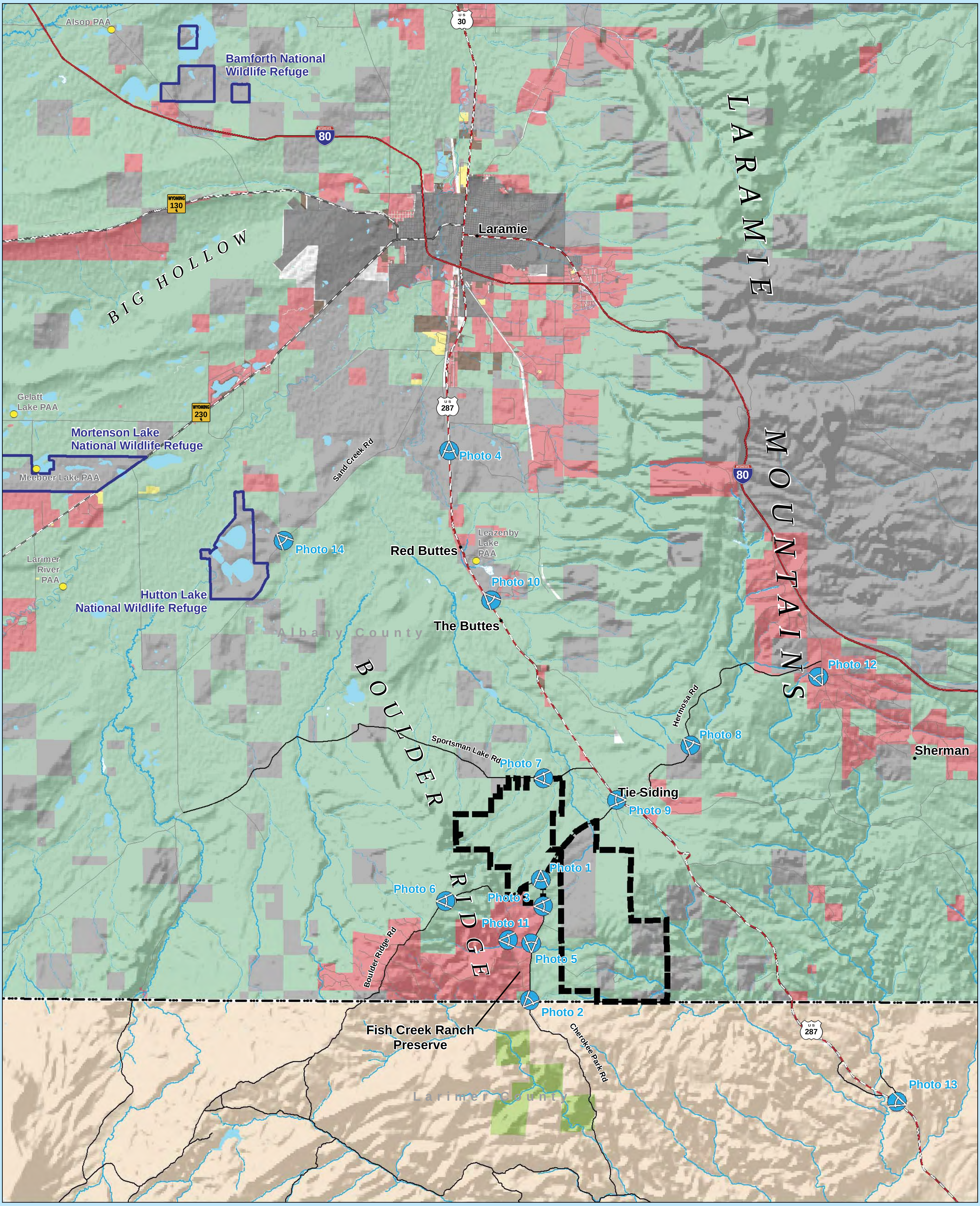


Representative Photo Locations

Project Features

- Hermosa West Wind Energy Project Area
- National Wildlife Refuge Boundary
- Incorporated City or Town
- Photo Location
- Wyoming Game & Fish Public Access Area

Land Uses

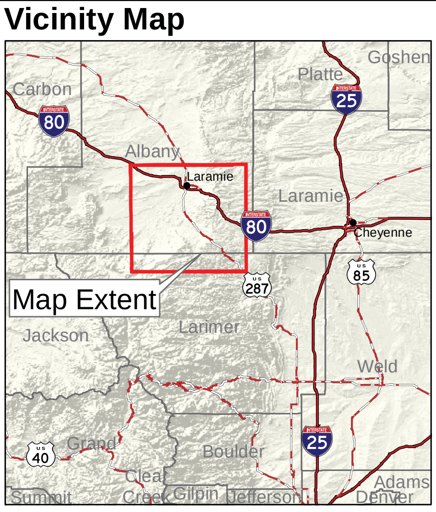
- Exempt
- Agricultural
- Commercial Vacant Land
- Commercial
- Industrial
- Residential
- Open
- Forestry

0 1.25 2.5 5 Miles

Scale 1:20,500 when printed at 22"X34".

Revised: January 3, 2011
File Name: Rep_Photo_Location
MXD: P:\4004_Shell_Hermosa_West\GIS\Layouts\chapter_3
PDF: P:\4004_Shell_Hermosa_West\GIS\Maps\chapter_3
Sources: ESRI, Western, BTS, WyGISC, USGS, WYFG, Albany co., and Larimer co.

Vicinity Map



HERMOSA WEST WIND ENERGY PROJECT
FIGURE 3.7-2: REPRESENTATIVE PHOTO LOCATIONS

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Photo 1 - View from intersection of Cherokee Park Road and Boulder Ridge Road - Looking South

Photo 2 - View from Cherokee Park Road north of Wyoming - Colorado State Line - Looking Northeast

Photo 3 - View from Cherokee Park Road - Looking East

FIGURE 3.7-3: TYPICAL PROJECT SITE LANDSCAPE

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Man-made alterations to the proposed Project site include two parallel high-voltage transmission lines, communication towers, two rural home sites, improved but unpaved roads, barbed-wire fences, snow fences, and various outbuildings related to ranching. The two transmission lines generally run in an east-west direction and bisect the proposed Project site into a northern and southern half. The transmission line structures are made of dark grayish blue galvanized steel in a lattice arrangement and are approximately 90 to 125 feet tall. The transmission line structures are the tallest structures within the proposed Project site. There are several communications towers in the surrounding study area that are estimated to be more than 300 feet tall and share the same general construction method as the transmission structures. The towers are generally evenly spaced along U.S. Highway 287 and are not clustered in groups. Their thin, vertical profiles can typically be seen from far distances because they commonly rise above the landscape horizon. Additionally, electrical distribution lines and phone lines are carried on evenly distributed smaller wooden poles that generally parallel both paved and unpaved roads.

Organic-looking unpaved roads and fences made from natural wood cross the proposed Project site. The roads are characterized by wide bands of the light-brown and buff-colored soil. They generally follow a curvilinear path across the landscape and conform to the terrain of the valley. The fence posts, relatively short and often made from trunks of trees and bushes, are light gray to tan in color. Their texture is rough, often still exhibiting the stubs where branches were cut off. The many horizontal snow fences placed along the western side of roads within the proposed Project site are considerably less organic in design. These fences can be quite large and can limit foreground and middleground views to the west.

Beyond the proposed Project site, a wider variety of man-made alterations to the landscape are visible. The wide dark-colored band of U.S. Highway 287 and the variety of cars and trucks traveling on it are visible in views to the northeast from most locations within the proposed Project site. A rail line running parallel to U.S. Highway 287 carries a large amount of traffic, and freight trains stretching over a mile in length have been observed passing through the area once or twice an hour. Approximately 8 miles northeast of the study area, I-80 runs in a primarily east-west direction between Cheyenne and Laramie, Wyoming. The interstate is located in a seldom-seen area on the eastern slopes of the undulating hills east of the proposed Project site. A small quarry operation is located approximately 5 miles north of the proposed Project site and 1 mile east of U.S. Highway 287. It covers an area of approximately 50 acres and is characterized by a large rectangular shape of smooth light tan- and buff-colored sand and rock.

Two small residential sites lie within the proposed Project site, although dispersed residential sites are located in the rolling hills to the northeast, as well as several large residential sites on the slopes of Boulder Ridge to the west. These homes are typically more than 1 mile away from the proposed Project site and are not dominant elements on the landscape. The landscape between the proposed Project site and Laramie is dotted with several rural residences and subdivisions generally concentrated along the U.S. Highway 287 corridor. The scale of these developments is small and they are not dominant elements on the landscape.

3.7.3.2 Viewing Areas and Viewer Groups

When the visual characteristics of an existing landscape are analyzed, it is important to identify specific locations that would be particularly sensitive to changes to the visual character of a landscape. Identifying groups of individuals that use these locations and who would be sensitive to visual changes is an important part of this process as well. These sensitive viewing areas and viewer groups provide specific locations from which to assess the visual character of a landscape.

For this analysis, sensitive viewing areas and viewer groups have been identified and grouped into the following categories: travel routes, developed areas and residences, and recreation and historic sites. These categories are described below.

3.7.3.2.1 Travel Routes

U.S. Highway 287 is located between approximately 1 to 3 miles to the north and east of the proposed Project site and is the main thoroughfare between the cities of Fort Collins and Laramie (figure 3.7-2). Given an average of 3,400 cars and 710 trucks travelling on U.S. Highway 287 past the proposed Project each day (WYDOT 2008), travelers on U.S. Highway 287 represent the majority of viewers of the proposed Project. These travelers include local residents, tourists, and recreational travelers; business travelers; and commercial drivers. The wide open vistas of the Laramie Basin, adjacent to the highway, provide panoramic views of the landscape with little to no topographic enclosure to limit visibility. Photograph 4 on figure 3.7-4 presents a representative landscape along U.S. Highway 287.

Other major travel routes in the study area include Interstate 80 (I-80) and Wyoming State Highways 130 and 230 (WY 130/230). These three routes primarily follow an east-west path across the State and are nearest to the proposed Project site in Laramie, approximately 15 miles to the north. I-80 connects the cities of Cheyenne to the east and Rawlins to the west. It crosses a variety of landscapes, ranging from the flat and rolling terrain of the High Plains around Cheyenne to the wide open vistas of the Wyoming Basin and to the steep slopes of the Southern Rockies. WY130/230 provides a more scenic, less-traveled route between the cities of Saratoga, Wyoming, and Laramie. WY130/230, also known as Snowy Range Road, has been designated by the USFS as a Scenic Byway. Immediately west of Laramie, it traverses the northern edge of Big Hollow, the largest wind-eroded deflection basin in North America (NPS 2004). Further west, the road crosses the rugged snow-capped peaks of the Medicine Bow Mountains and provides access to many high alpine lakes and associated recreation activities, including hiking, camping, and skiing. When WY 130 closes in the winter, motorists have the option of taking WY 230, which also connects the cities of Saratoga and Laramie, but does so by following a more southerly route around the Medicine Bow Mountains. Both of these highways approach Laramie from the low-lying river valleys of the Little Laramie and Laramie Rivers, which are characterized by open, panoramic landscapes that provide unobstructed views of the Laramie Basin. Many wind farms have been developed in southern Wyoming and may also be visible from these travel routes.

Photo 4 - View from U.S. Highway 287, Looking South

Photo 5 - View from Cherokee Park Road - Looking North

Photo 6 - View from Boulder Ridge Road - Looking East

Photo 7 - View from Sportsman Lake Road - Looking East

HERMOSA WEST WIND ENERGY PROJECT
FIGURE 3.7-4: LANDSCAPES ADJACENT TO SENSITIVE VIEWING AREAS

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Cherokee Park Road intersects U.S. Highway 287 in Tie Siding and would be the main access road to the proposed Project site. This improved gravel road serves as the main access route to the residential development of Fish Creek Ranch Preserve and provides access to rural residences south of the Wyoming-Colorado border and various trailheads in Colorado in the Arapaho-Roosevelt National Forest, which abuts the southern boundary of the proposed Project. While it is an improved road, it remains unpaved, as are the majority of roads in the study area without state or federal highway designation. Cherokee Park Road traverses the proposed Project site over the rolling hills of the valley dominated by short mixed-grass prairie and rabbitbrush vegetation. Views of the surrounding landscape from the road are open and are not limited by topographic or vegetative enclosure. Photograph 5 on figure 3.7-4 shows a representative landscape adjacent to Cherokee Park Road.

Boulder Ridge Road is an improved gravel road that intersects Cherokee Park Road approximately 3 miles southwest of Tie Siding in the center of the proposed Project site. It winds its way up and over Boulder Ridge through moderately steep hills and patchy stands of evergreen trees and provides access to several rural residences and ranches on the western side of the ridge. In areas of dense forest or steep terrain, views of the surrounding landscape would be enclosed and limited to the immediate foreground. The area near the top of Boulder Ridge is characterized by a gently rolling hilltop covered with short grasses and rabbitbrush and other sage brush species. Views of the landscape from this area are more panoramic and there are few natural features limiting visibility. Photograph 6 on figure 3.7-4 shows the landscape near the higher elevation portion of Boulder Ridge Road.

Sportsman Lake Road, an improved gravel road that intersects U.S. Highway 287 approximately 1 mile northwest of Tie Siding, forms the northern border of the proposed Project site. The road generally follows an east-west path across the open, gently rolling valley of the Laramie Basin and abuts the northernmost portion of Boulder Ridge. The road provides access to several ranches and several small reservoirs and streams northwest of the ridge. The road also serves as a southern access route to the Hutton Lake National Wildlife Refuge from Sand Creek Road, which intersects Sportsman Lake Road approximately 13 miles west of U.S. Highway 287. Mixed-grass prairie and rabbitbrush are the dominant vegetation types along the road. Typical views of the landscape to the north from the road are open and unobstructed by topography or vegetation, although background views to the south from locations west of the proposed Project site are blocked by the moderately steep slopes of Boulder Ridge. Photograph 7 on figure 3.7-4 shows the landscape adjacent to Sportsman Lake Road.

Hermosa Road is an improved gravel road connecting the town of Tie Siding to I-80, which is approximately 10 miles to the northeast. It crosses the undulating hills east of the Laramie Mountains and rises approximately 600 feet above the proposed Project site. The landscape along the road is characterized by patches of exposed rock, scattered evergreen trees, and short grasses used primarily as grazing for livestock. The landscape adjacent to the road is panoramic, and views of the surrounding landscapes are generally unobstructed. Middleground views to the Laramie Basin below, and background views of the peaks of the Medicine Bow

Mountains to the west, dominate the view. Photograph 8 on figure 3.7-5 shows the landscape adjacent to Hermosa Road.

An extensive network of unimproved private roads in the study area primarily serves to connect the scattered rural residential sites and ranches to the more heavily traveled improved roads in the area. The landscapes surrounding these roads do not differ from the landscapes along the improved roads described above.

3.7.3.2.2 Developed Areas and Residences

The proposed Project site and study area are predominantly rural in character with limited areas of residential, commercial and/or other urbanized land uses.

Laramie, approximately 13 miles north of the proposed Project site, is the largest incorporated city within the study area. The estimated population of Laramie in the year 2006 was 25,688 (U.S. Census 2010). The University of Wyoming is located in Laramie, and the city is a regional hub for outdoor recreation activities, including mountain biking, hiking, hunting, and fishing. I-80 and U.S. Highway 287 intersect in the southern portion of the city limits.

Laramie is located in the eastern portion of the Laramie Basin. The landscapes around the periphery of Laramie are characterized by a gently sloping valley with low hills and minimal changes in elevation. The natural vegetation in the area is dominated by mixed-grass prairie and rabbitbrush, although occasional tall deciduous trees can be found along the valleys of the Little Laramie and Laramie Rivers that converge within the city limits. Views to the surrounding landscapes are typically open and background views are enclosed by the Medicine Bow and Laramie Mountains.

Approximately 1 mile northeast of the proposed Project site boundary along U.S. Highway 287 is the unincorporated area of Tie Siding. There are fewer than five individual home sites within the general vicinity of Tie Siding, although there is a U.S. Post Office. The landscape around Tie Siding is typical of the study area: low rolling hills and a dominant coverage of mixed-grass prairie vegetation. Photograph 9 on figure 3.7-5 shows a typical view from Tie Siding.

Approximately 5 miles north of the proposed Project site on U.S. Highway 287 is the entrance to the small community of The Buttes. The 20 to 25 residences in the community are situated on 20-acre parcels and are nestled around small red-colored sandstone outcrops. Photograph 10 on figure 3.7-5 shows a typical landscape of The Buttes community. The landscape to the south of The Buttes is characterized by a wide open plain that slopes toward low rolling hills to the south. A uniform coverage of mixed-grass prairie is the dominant vegetation type. This development does not exhibit a uniform arrangement of homes toward a common view, but most are oriented generally to the west or southwest.

Photo 8 - View from Hermosa Road - Looking Southeast

Photo 9 - View from Tie Siding - Looking West

Photo 10 - View from The Buttes - Looking Southeast

Photo 11 - View from Fish Creek Ranch Preserve - Looking East

HERMOSA WEST WIND ENERGY PROJECT

FIGURE 3.7-5: LANDSCAPES ADJACENT TO SENSITIVE VIEWING AREAS

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Approximately 1 mile west of the proposed Project site and 1.5 miles north of the Wyoming-Colorado State line is the Fish Creek Ranch Preserve, a large-parcel residential development reached by traveling south on Cherokee Park Road from Tie Siding. The entrance to the preserve is approximately 1 mile west of the proposed Project site and 1.5 miles north of the Wyoming-Colorado State line. There are fourteen 40-acre lots in the preserve, and residences have been constructed on 12 of the 14 lots. The preserve lies on the border of two distinct landscapes: the open plain of the Laramie Basin and the steeper slopes of the mid-elevation forests of the southern Rockies, which as described above, contain a dense mix of aspen, lodgepole pine, Douglas fir, and ponderosa pine. Nine of the 12 residences in the preserve are on the eastern slopes of Boulder Ridge, directly west of the proposed Project site, rising 300 to 400 feet above the plain to the east, while the other three residences are located further west in the steep hills of the ridge. The mix of pine and fir trees that would be expected around these nine residences is absent in areas, apparently to make way for entrances to the houses and to provide the residents views of the plain below where the Project would be located, and low hills to the east. Photograph 11 on figure 3.7-5 shows a typical view from the Fish Creek Ranch Preserve.

3.7.3.2.3 Recreation and Historic Sites

There are several recreation areas and historic sites in study area whose visual character could be affected by the proposed Project. They are described briefly below.

Near the crest of the hills of the Laramie Mountains, approximately 7.5 miles northeast of the proposed Project site, is the Ames Monument, which is a large, 60-foot-high stone pyramid dedicated to the Ames brothers of Massachusetts. The Ames brothers, Oakes and Oliver, were two major contributors to the construction of the first transcontinental railroad in the United States. The monument, which marks the highest point of the railroad, was constructed in 1882. It is listed in the NRHP and is located on private land near the intersection of Hermosa Road and Monument Road, about 1.5 miles southwest of I-80. Visitation to the site is not recorded. Based on the National Register status and proximity to I-80, it is assumed that many people visit the site each year, stopping for a few minutes to read the historical marker and take photographs. There are no visitor facilities on the site itself. The landscape around the monument is panoramic and views to the Laramie Basin and Medicine Bow Mountains are unobstructed by topography or vegetation. The vegetation primarily consists of a short prairie grass that is light green to yellow in color during the summer months. There are short evergreen trees scattered in views to the west, but these are not dominant elements on the landscape. There are many unpaved roads providing access to the monument from Hermosa Road and Monument Road. These roads are characterized by light tan, curvilinear bands and they break up the uniform coverage of short grasses. Photograph 12 on figure 3.7-6 shows the landscape around Ames monument.

Virginia Dale, which was the site of a famous stage station on the Overland Trail, is located along U.S. Highway 287 13 miles southeast of the proposed Project site in Larimer County. The town was founded in 1862 by Jack Slade and served as a refuge from Indian attacks for travelers and local residents. The location of the stage station is currently marked by a historical marker along the side of U.S. Highway 287, and the few remaining structures from the original settlement are located on private land 3 miles east of the highway (VDCC 2007). The stage station was added to the NRHP in 1985. The landscape around the historical marker adjacent to U.S. Highway 287 is characterized by moderately steep hills with patches of rough light brown rock exposed on the hillsides. Various species of dark green evergreen trees dot the hillsides, but they do not restrict foreground or middleground views of the landscape. Background views from the historical marker are limited by the steepness of the surrounding hills and the marker's location near the bottom of a small stream valley. Photograph 13 on figure 3.7-6 shows the landscape around the Virginia Dale historical marker.

The WGFD administers and manages several public access areas (PAAs) in the study area, which allow the public to access small bodies of water, such as small lakes and rivers. These areas area used for a variety of outdoor recreation activities, including fishing, waterfowl hunting, boating, and camping. Leazenby Lake located 9 miles north of the Project site at the Buttes, Laramie River-Monolith located 21 miles northwest of the Project site, and Meeboer Lake located 33 miles northwest of the Project site, are the three PAAs closest to the proposed Project site. The landscapes surrounding the lakes are generally treeless and are dominated by short stands of rabbitbrush and prairie grasses. Foreground and middleground views from these lakes are unobstructed by topography or vegetation, and background views to the higher elevations are enclosed by Boulder Ridge, Medicine Bow Mountains, and Laramie Mountains. The landscape along the Laramie River is slightly different: dense stands of tall cottonwood trees line the banks of the meandering river and can obscure middleground views of the surrounding Laramie Basin.

Hutton Lake NWR is located approximately 9 miles northwest of the proposed Project site and is managed by the USFWS. Limited recreation activities are available in the Refuge, and they include wildlife observation, environmental education, and photography. Views in all directions from the Refuge are open and unobstructed by topography or vegetation. The low smooth hills are covered with rabbitbush and short grasses, although short round dark gray-green bushes dot landscape on the eastern slopes of hills in the surrounding area. Few man-made structures or alterations to the landscape are visible in views to the surrounding landscape. The low, horizontal ridges of Boulder Ridge and the Laramie Mountains are visible in background views to the southeast. Photograph 14 on figure 3.7-6 shows the view from Hutton Lake NWR.

Photo 12 - View from Ames Monument - Looking Northwest

Photo 13 - View from Virginia Dale Historical Marker - Looking Northwest

Figure 3.7-6: Landscapes Adjacent to Sensitive Viewing Areas

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3.8 Air Quality

3.8.1 Overview

Regional climate and meteorology influence the transport, concentration, and dispersion of air pollutants. For the purposes of this air quality analysis, the study area includes the proposed Project site and surrounding area located within the WDEQ Air Quality Division (WDEQ-AQD), Region 1, which includes Albany, Laramie, Platte, Goshen, and Niobrara Counties. Spatial variations in meteorology and air quality conditions in the study area are minimal and are influenced by regional climate.

3.8.2 Regulatory Setting

In addition to the National Ambient Air Quality Standards (NAAQS), there are Federal and State Census air quality regulations that are applicable to the proposed Project. Most air quality programs originate with the Clean Air Act (CAA) and are delegated by USEPA to a state to implement. The information below explains the regulations applicable to the proposed Project.

3.8.2.1 Federal Regulations

3.8.2.1.1 Prevention of Significant Deterioration

Procedures have been established for Federal pre-construction review of certain large proposed projects in attainment areas versus non-attainment areas. Federal pre-construction review in attainment areas, called Prevention of Significant Deterioration (PSD), is intended to prevent a new source from causing air quality to deteriorate beyond acceptable levels. Federal pre-construction review in non-attainment areas is called New Source Review and would not apply to SWE’s proposed Project because Region 1 is in attainment for all criteria pollutants.

PSD thresholds apply to pollutant emissions from large stationary sources. The proposed Project gen-tie line, substation and switchyard, and other aboveground facilities would not be classified as stationary sources emitting pollutants during facility operation, so they would not be subject to the PSD regulations.

3.8.2.1.2 New Source Performance Standards

There are no Federal New Source Performance Standards (NSPS) governing allowable emissions from construction activities associated with wind farms, transmission lines, or electrical substations. NSPS do apply to emergency electrical generators (diesel engines), however. If emergency electrical generators are used during Project operation, SWE would need to obtain appropriate air quality permits from the WDEQ.

3.8.2.1.3 National Emission Standards for Hazardous Air Pollutants

There are no National Emission Standards for Hazardous Air Pollutants applicable to construction activities associated with wind farms, gen-tie lines, or electrical substations.

3.8.2.1.4 Title V Operating Permits

Title V operating permit regulations are not applicable to construction activities associated with wind farms, transmission lines, or electrical substations.

3.8.2.1.5 General Conformity

The 1990 amendments to the CAA required USEPA to promulgate rules to ensure that Federal undertakings will not (1) cause or contribute to any new air quality standard violations, (2) increase the frequency or severity of any existing air quality standard violations, or (3) delay the timely attainment of any air quality standard, interim emission reduction, or other milestone. General conformity only applies to Western's proposed Federal action—the switchyard and substation—not the entire Project. Because the study area is in attainment for all criteria pollutants, a conformity analysis is not required.

3.8.2.2 State Regulations

State requirements applicable to SWE's proposed Project under the WDEQ include a general operating permit and implementation of fugitive dust mitigation measures. The fugitive dust mitigation measures (Wyoming Air Quality Standards and Regulations, Chapter 3, Section 2(f)) are listed in table 3.8-1.

Table 3.8-1:
WDEQ Fugitive Dust Mitigation Measures

Wyoming Air Quality Standards and Regulations, Chapter 3, Section 2(f)
(f) Fugitive Dust. Sources operating within the State of Wyoming are required to control fugitive dust emissions. The following control measures or any equivalent method approved by the Division Administrator shall be considered appropriate for minimizing fugitive dust: (i) Construction/Demolition Activities. (A) Any person engaged in clearing or leveling of land, earthmoving, excavation, or movement of trucks or construction equipment over access haul roads or cleared land shall take steps to minimize fugitive dust from such activities. Such control measures may include frequent watering and/or chemical stabilization. (B) Any person engaged in demolition activities including razing of homes, buildings, or other structures; or removing paving material from roads and/or parking areas shall take steps to minimize fugitive dust from such activities. Such control measures may include frequent watering and/or chemical stabilization. (C) Any person who is engaged in construction or demolition activities which tracks earth or other materials onto paved streets shall promptly remove such material by water or other means. (D) Any person engaged in sandblasting or similar operations shall take steps to minimize fugitive dust from such activities. Such control measures may include the installation and use of hood, fans and fabric filters to enclose and vent the handling of dusty materials. (ii) Handling and Transporting of Materials. (A) Any person owning, operating or maintaining a new or existing material storage, handling and/or hauling operation shall minimize fugitive dust from such an operation. Such control measures may include the application of asphalt, oil, water or suitable chemicals on unpaved roads, material stockpiles and other surfaces which can give rise to airborne dusts. Control measures for material handling may also include installation and use of hoods, fans and fabric filters to enclose and vent dusty materials. (B) When transporting materials likely to give rise to airborne dust, open bodied trucks shall be covered when in motion.

3.8.3 Affected Environment

3.8.3.1 Regional Climate and Meteorology

The climate in the study area is predominantly classified as continental and semi-arid. Because of differences in geographical location and topographic features, surface wind direction and precipitation in the study area vary significantly. The annual average wind direction is predominantly from the southeast and west, with less frequent winds from the north and east. Table 3.8-2 presents climate data from stations in or near the study area. The annual average wind speeds range from 12.8 to 15.8 mph. Winds are calm typically less than 1 percent of the year.

Table 3.8-2:
Summary of Climate Data

Site Name	Site #	Average Maximum Temperature (Fahrenheit)	Average Minimum Temperature (Fahrenheit)	Average Annual Rainfall (inches)	Average Annual Snowfall (inches)
Laramie	485415	54.6	27.1	10.6	48.5
Foxpark	483630	47.2	20.0	16.12	167.2
Centennial 1N	481610	52.6	27.7	15.15	114.6
Hohnholz Ranch	054054	55.1	22.7	14.71	106.6

Source: WRCC (2010)

Wyoming is located far away from the moderating influence of oceans, resulting in long winters and mild summers. In winter, the jet stream is either directly above or to the north of Wyoming, which accounts for the frequent strong winds, blasts of arctic air, and sudden precipitation events that occur in the State. In summer, the jet stream retreats northward over Canada, leaving the State's weather mild and pleasant. Generally, summer daytime temperatures range from the 70s to the 80s (degrees Fahrenheit [°F]). Temperatures ranging from 90˚F to 100˚F are infrequent anywhere in the State, and daily temperatures above 100˚F are rare.

3.8.3.2 Regional Ambient Air Quality

The CAA, 42 USC 7401 et seq. as amended in 1977 and 1990, is the Federal statute that regulates air pollution. It empowers USEPA to promulgate NAAQS for six criteria air pollutants. The standards include primary standards designed to protect human health and secondary standards to protect public welfare, such as those related to visibility. States are generally delegated implementation of CAA requirements by the USEPA, and in Wyoming, WDEQ is the implementing State agency. The list of criteria pollutants includes ozone (see definition under section 3.7.3.1), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter based on a particle size of 10 microns or less (PM_{10}) and particle size of 2.5 microns or less ($PM_{2.5}$), and lead.

In addition to establishing NAAQS, the CAA and its implementing regulations categorize airsheds as either attainment or non-attainment with the NAAQS based on air quality monitoring results. Limited ambient air quality monitoring data are available for the study area. Air quality in Region 1 is classified as in attainment for all NAAQS criteria pollutants. Table 3.8-3 summarizes the Federal and State of Wyoming NAAQS for the six criteria air pollutants and the averaging time used to determine compliance with the standards. Concentrations of the criteria pollutants are calculated as parts per million (ppm) and micrograms per cubic meter of air ($\mu g/m^3$).

Table 3.8-3:
Ambient Air Quality Standards

Pollutant	Averaging Time	Wyoming Standards (Concentration)	Federal Standards (Concentration)
Ozone	1 hour	no data	no data
	8 hours	0.08 ppm	0.075 ppm (147 $\mu g/m^3$) (3-year average of annual 4th-highest daily maximum)
CO	8 hours	9 ppm	9 ppm (10,000 $\mu g/m^3$)
	1 hour	35 ppm	35 ppm (40,000 $\mu g/m^3$)
NO_2	Annual Average	0.05 ppm	0.053 ppm (100 $\mu g/m^3$)
	1 hour	no data	0.10 ppm (188 $\mu g/m^3$)
SO_2	Annual Average	60 $\mu g/m^3$	0.03 ppm (80 $\mu g/m^3$)
	24 hours	260 $\mu g/m^3$	0.14 ppm (365 $\mu g/m^3$)
	3 hours	1,300 $\mu g/m^3$	0.5 ppm (1,300 $\mu g/m^3$)
	1 hour	no data	no data
PM_{10}	24 hours	150 $\mu g/m^3$	150 $\mu g/m^3$
	Annual Arithmetic Mean	50 $\mu g/m^3$	no data
$PM_{2.5}$	24 hours	65 $\mu g/m^3$	35 $\mu g/m^3$ (3-year average of 98th percentiles)
	Annual Arithmetic Mean	15 $\mu g/m^3$	15 $\mu g/m^3$ (3-year average)
Lead	Calendar Quarter	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$

3.8.3.3 Ozone

Ozone is a photochemical oxidant and a major contributor to smog. While ozone in the upper atmosphere is beneficial to shield the earth from harmful ultraviolet radiation from the sun, high concentrations at ground level can cause health problems from lung irritation.

Ozone is generated by a complex series of chemical reactions between volatile organic compounds (VOCs) and nitrogen oxides (NO_x) in the presence of ultraviolet radiation. VOCs and NO_x are emitted from a variety of sources that include motor vehicles and industry. Ozone levels are typically highest on hot summer afternoons.

3.8.3.4 Nitrogen Dioxide

NO_2 is a by-product of NO_x. NO_x emissions are primarily generated from the combustion of fuels. NO_x consists mostly of the chemical compounds nitric oxide (NO) and NO_2. Because NO_x converts to NO_2 in the atmosphere over time, and the latter is the more toxic of the two, it is the listed criteria pollutant. The control of NO_x also is important because of its role in the formation of ozone.

3.8.3.5 Carbon Monoxide

CO is a product of inefficient combustion, principally from cars and other mobile sources of pollution, such as trains, airplanes, or construction equipment. Emissions from wood-burning stoves and fireplaces also can be measurable contributors of CO. Peak levels of CO typically occur during winter months because of a combination of higher emission rates and stagnant weather conditions.

3.8.3.6 Sulfur Dioxide

SO_2 is produced when any sulfur-containing fuel is burned. It also is emitted by chemical plants and refineries that treat or refine sulfur or sulfur-containing chemicals. Natural gas contains trace amounts of sulfur, while fuel oils contain much larger amounts.

3.8.3.7 Particulates

Particulates are a combination of wind-blown fugitive dust, particles emitted from combustion sources (usually carbon particles), and the organic, sulfate, and nitrate aerosols formed from emitted hydrocarbons, sulfur oxides (SO_x), and NO_x. In 1987, USEPA adopted standards for PM_{10} (particle size aerodynamic diameter) and phased out the total suspended particulate standards that had been in effect at the time.

In 1997, USEPA added new fine particle standards, $PM_{2.5}$, to the existing PM_{10} standards. The “2.5” in $PM_{2.5}$ refers to the particle size (aerodynamic diameter) measured in microns and is considerably smaller than PM_{10}.

3.8.3.8 Lead

Lead gasoline additives, non-ferrous smelters, and battery plants were historically the most significant contributors to atmospheric lead emissions. Legislation in the early 1970s required gradual reduction of the lead content of gasoline over time, which dramatically reduced lead emissions from mobile and other combustion sources. Unleaded gasoline was introduced in the United States in 1975 and it essentially eliminated violations of the lead standard for ambient air in urban areas.

Table 3.8-4 presents a summary of the air quality monitoring data available for the study area. Few monitoring data are available for the Laramie and Cheyenne metropolitan areas. The monitoring data below were measured at the Wamsutter and Laramie monitoring stations, which are the closest monitoring stations to the study area. The data represent the most recent 3-year period of monitoring.

There were two exceedances of the PM_{10} 24-hour air quality standard at the Wamsutter air quality monitoring station in 2007. The area continues to be considered in attainment for the most recent 3 years of air quality monitoring data because there were only two measured exceedances in 2007, and no exceedances in 2006 or 2008.

Table 3.8-4:
Summary of Regional Air Quality Monitoring Data

Pollutant	Site	Average Time	2006 (Average)	2007 (Average)	2008 (Average)
Ozone	Wamsutter	8-hour	0.071 ppm	0.066 ppm	0.064 ppm
NO_2	Wamsutter	1-hour	no data	no data	no data
		Annual	0.0065 ppm	0.006 ppm	0.005 ppm
SO_2	Wamsutter	3-hour	0.008 ppm	0.0063 ppm	0.008 ppm
		24-hour	0.005 ppm	0.0022 ppm	0.0025 ppm
		Annual	0.0 ppm	0.0005 ppm	0.0006 ppm
PM_{10}	Wamsutter	24-hour	90 µg/m^3	228 µg/m^3	57 µg/m^3
		Annual	17 µg/m^3	19 µg/m^3	15 µg/m^3
	Laramie	24-hour	57 µg/m^3	67 µg/m^3	73 µg/m^3
		Annual	19 µg/m^3	23 µg/m^3	25 µg/m^3

3.9 Transportation

3.9.1 Overview

The discussion of transportation facilities considers facility conditions and quantitative analysis (where data are available) of traffic volumes in the study area, which is defined as transportation facilities surrounding the proposed Project site, including Albany County, Wyoming State and county roadways, and I-80 and I-25 near Cheyenne. Planned or potential roadway upgrades are also considered. Sources of information for transportation facilities include Wyoming Department of Transportation (WYDOT) traffic counts, the WYDOT Draft Long Range Transportation Plan (2010), and the data, modeling, and findings of the Transportation Analysis for the Hermosa West Wind Farm Project (ERM 2010g; appendix J).

3.9.2 Regulatory Setting

3.9.2.1 Federal Regulations

3.9.2.1.1 Federal Aviation Administration Notice of Proposed Construction or Alteration

The FAA must be notified of any construction that may affect the National Airspace System under provisions of 14 CFR 77. If a proposed development is more than 200 feet tall and/or less than 200 feet tall but near an airport, a Notice of Proposed Construction or Alteration form (FAA 7460-1) must be completed and submitted to the appropriate office prior to beginning construction. This notice ensures that wind turbines, meteorological towers, and construction cranes will not interfere with aviation and provides certainty that proper lighting will be installed to ensure aviation safety. Temporary or permanent structures that exceed an overall height of 200 feet, or exceed any obstruction standards contained in 14 CFR 77, should normally be marked and/or lighted. In some cases, marking or lighting may not be required, as determined by an FAA aeronautical study, if it does not impair aviation safety. Siting near a military or civilian airfield also may trigger an analysis of possible impact of turbine towers on radar from airfields.

3.9.2.2 State Regulations

3.9.2.2.1 Access Permit

When widening or building an approach from land joined to a State highway ROW, an access permit is required from the WYDOT. The application includes the submittal of a site plan. SWE is responsible for the costs of construction, maintenance, and removal (if necessary) of the approach. The State only allows so many approaches per mile, depending on the location and road.

3.9.2.2.2 Utility Permit

If constructing a cable in a State highway ROW, which includes crossing overhead, underground, or adjacent and parallel to a State road ROW, a utility permit is required from the WYDOT. The application includes the submittal of a site plan.

3.9.2.2.3 Oversize/Overweight Permits

Operators of vehicles exceeding legal size and/or weight limits must obtain oversize/overweight permits from the WYDOT before making any movement on Wyoming highways. Permits may be requested and obtained from the Ports of Entry within the State. Generally, this permit is required if the load exceeds the legal limits of 15 feet wide, 15 feet tall, 75 feet long, and/or over 80,000 pounds, but this requirement can vary based on the number of truck axles.

3.9.2.2.4 Fuel Permit/Registration Permit

A Fuel Permit would be required to travel and work in Wyoming if the trucking company currently does not have an International Fuel Tax Agreement License. A Registration Permit would be required to travel and work in Wyoming if the trucking company does not currently have a registration number for the State.

3.9.2.3 County Regulations

3.9.2.3.1 Road Access Permit

When building an approach from land joined to a county road ROW, a road access permit is required from Albany County. The application includes the submittal of a site plan. SWE is responsible for the costs of construction, maintenance, and removal (if necessary) of the approach.

3.9.2.3.2 Above- and Below-Ground Utility Permit

An above- and below-ground utility permit is required from Albany County for occupancy of the county road ROW by all utility facilities, including private lines. There are specific requirements for underground and overhead utilities being placed in the county road ROW.

3.9.2.3.3 Road Maintenance Agreement

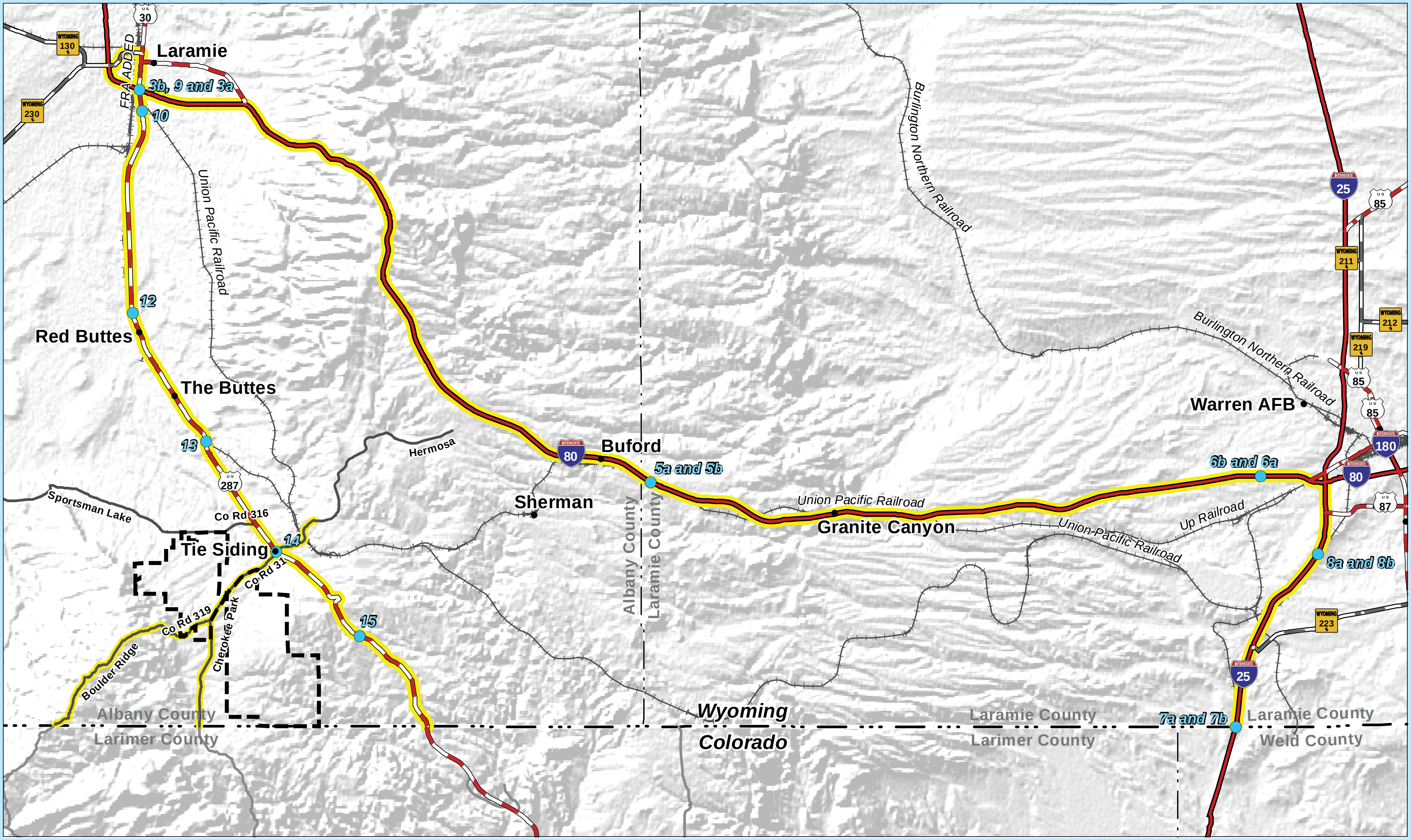
The Albany County Road and Bridge Department may require a Road Maintenance Agreement if they feel the roads will be impacted. Typically, the department will meet with SWE to discuss plans. Then the county engineer will determine how those plans will impact his/her roads. Both parties will meet again and discusses what the county would like to see, and then negotiate the Agreement from that point forward. This is a legal document. Additionally, the county may need to hire a traffic engineer to do a traffic study; this study would be paid for by SWE.

3.9.3 Affected Environment

3.9.3.1 Regional Transportation Infrastructure

The regional transportation infrastructure for the proposed Project is considered to be the following transportation corridors (figure 3.9-1):

- I-25 from the Colorado State line to I-80 in Cheyenne
- I-80 to WY130/230, also known as Snowy Range Road, west of Laramie
- U.S. Highway 287 from I-80 to the Colorado State line
- Portions of Laramie in the vicinity of the UPRR yard



Regional Transportation Infrastructure

Project Features

- Hermosa West Wind Energy Project
- Affected Roadway
- AADT Measure Location

Transportation

- Interstate Highway
- U.S. Highway
- State Highway
- Local Road
- Railroad

0 1.5 3 6 Miles

Scale 1:276,000 when printed at 8.5x11".

Revised: December 23, 2010
File Name: Transportation
MXD: P:\4004_Shell_Hermosa_West\GIS\Layouts\chapter_3
PDF: P:\4004_Shell_Hermosa_West\GIS\Maps\chapter_3
Sources: ESRI, Western, BTS, WyGISC, USGS

Vicinity Map

FIGURE 3.9-1: REGIONAL TRANSPORTATION INFRASTRUCTURE

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- Cherokee Park Road on the proposed Project site
- Boulder Ridge Road on the proposed Project site
- Hermosa Road east of the proposed Project site in the vicinity of the UPRR

The transportation corridors were determined by the anticipated activities associated with construction, operation and maintenance, and eventual decommissioning of the proposed Project. It is anticipated, for example, that major components (wind turbine tower sections, nacelles, blades, transformers, etc.) would be delivered to the proposed Project site by truck from Colorado or other areas outside Wyoming. The components would be transported to the site via I-25 and I-80 through Cheyenne and then via U.S. Highway 287 from Laramie to the proposed Project site. Alternatively, the components would be transferred to trucks from the UPRR in Laramie. To avoid heavy truck traffic through Laramie, the trucks likely would be routed from WY130/230 to I-80 and then south on U.S. Highway 287 to the proposed Project site. There also is potential for components to be offloaded from the UPRR at Hermosa Road, east of the proposed Project site. The U.S. Highway 287 transportation corridor between Fort Collins and the site likely would be used by construction personnel accessing the site from lodging to the south. This transportation corridor, however, would be expected to receive truck travel for major Project components only in the event of road closures or other problems on I-25 or I-80.

The roadways associated with the transportation corridors are described further below. Table 3.9-1 summarizes the roadway use types and number of lanes.

Table 3.9-1:
Affected Roads in the Study Area

Road, Location		Type	Lanes
I-80		Interstate	4 (divided)
I-25		Interstate	4 (divided)
U.S. Highway 287	I-80 to Laramie Southern Urban Limits	Arterial	4
	Laramie Southern Urban Limits to Tie Siding	Arterial	2
	Tie Siding to Pumpkin Vine Hill Road	Arterial	4 (divided)
	Pumpkin Vine Hill Road to Colorado State Line	Arterial	2
WY130/230 (Snowy Range Road)		Arterial	2–4
Cherokee Park Road (CR 31)		Local	Unpaved
Boulder Ridge Road (CR 319)		Local	Unpaved
Hermosa Road (CR 222)		Local	Unpaved

Source: ERM (2010g)

3.9.3.2 Interstate Highways

I-80 and I-25 are major components of the nation's interstate highway system. I-80, which stretches from New Jersey to San Francisco via Cheyenne and Laramie, is a major national freight route. Semi-trucks comprise more than half the traffic volume on I-80 in Wyoming (ERM 2010g). I-25 stretches from New Mexico to Buffalo, Wyoming, via Denver and Cheyenne.

3.9.3.2.1 Federal Highways

U.S. Highway 287 is a significant arterial route linking Laramie to Fort Collins. Although not as heavily traveled as an interstate highway, U.S. Highway 287 is a significant truck route within Albany County. The WYDOT classifies the road surface condition of U.S. Highway 287 from Pumpkin Vine Road (County Road [CR] 241) to Laramie as "good."

For most of its length between Laramie and Fort Collins, U.S. Highway 287 is a two-lane undivided highway. Given the high truck volumes and concerns about the safety of this configuration in both Colorado and Wyoming, WYDOT recently upgraded the segment of U.S. Highway 287 in the vicinity of Tie Siding to a four-lane divided highway, and has long-range plans to complete similar upgrades to the entirety of U.S. Highway 287 from the Colorado State line to Laramie (ERM 2010g). The Colorado Department of Transportation (CDOT) is also evaluating safety upgrades for the portion of U.S. Highway 287 between Fort Collins and the Wyoming State line (ERM 2010g).

3.9.3.2.2 State Highways

WY130/230 is a principal arterial roadway and is, together with I-80, the primary entrance to Laramie from the west.

3.9.3.2.3 County Roads

There are three CRs—Cherokee Park Road (CR 31), Boulder Ridge Road (CR 319), and Hermosa Road (CR 222)—that provide access to privately owned rangeland, a limited number of residential properties, State-owned land, and the UPRR. They are unpaved and carry low traffic volumes. The roadways are maintained, including blading, placement of aggregate, snow plowing, and de-icing, by Albany County.

3.9.3.2.4 Bridges

There are no posted weight restrictions on bridges for major roadways in the study area. The I-80 bridges at the U.S. Highway 287 and WY130/230 interchanges have posted clearances of 18 feet 5 inches and 17 feet 5 inches, respectively. The bridge over the UPRR approximately 4 miles north of Tie Siding is classified as "deficient" by the WYDOT Draft Long Range Transportation Plan (ERM 2010g). This designation does not impose a weight restriction and does not indicate a structural deficiency (ERM 2010g). Rather, WYDOT has identified the need to replace the bridge's decking.

3.9.3.3 Traffic Volumes

WYDOT records annual average daily traffic (AADT) on a regular basis at points throughout the State. AADT count locations are shown on figure 3.9-1. AADT traffic counts for 2008 are listed in table 3.9-2. AADT data are not collected on county roads, where traffic volumes are considered to be light.

The highest traffic volumes generally are found on the arterials within Laramie, followed by the interstates. Truck traffic comprises nearly 50 percent of all traffic on I-80 in Laramie, and 15 to 20 percent of all traffic on U.S. Highway 287 in the vicinity of the proposed Project site.

Table 3.9-2:
Baseline Traffic Volumes

Road	Map Key	Location	2008 AADT Total	2008 AADT Trucks	Share of Trucks
I-80 Eastbound	1a	Curtis Street	3,440	2,040	59.3%
	2a	Snowy Range Road	8,570	3,190	37.2%
	3a	Third Street/U.S. Highway 287	6,670	2,820	42.3%
	4a	Grand Avenue/I-80 Business	6,810	2,920	42.9%
	5a	Albany/Laramie County Line	6,290	2,920	46.4%
	6a	Cheyenne Western Urban Limits	6,000	2,840	47.3%
I-80 Westbound	1b	Curtis Street	3,710	2,810	75.7%
	2b	Snowy Range Rd	8,530	3,270	38.3%
	3b	Third Street/U.S. Highway 287	6,800	2,870	42.2%
	4b	Grand Avenue/I-80 Business	6,880	2,960	43.0%
	5b	Albany/Laramie County Line	6,310	2,950	46.8%
	6b	Cheyenne Western Urban Limits	6,220	2,950	47.4%
I-25 Northbound	7a	Colorado State Line	8,590	1,790	20.8%
	8a	Cheyenne Southern Urban Limits	9,420	1,980	21.0%
I-25 Southbound	7b	Colorado State Line	8,600	1,800	20.9%
	8b	Cheyenne Southern Urban Limits	8,530	1,810	21.2%
U.S. Highway 287	9	I-80	7,700	1,150	14.9%
	10	Blackfoot Street	6,180	1,000	16.2%
	11	Laramie Southern Urban Limits	3,620	720	19.9%
	12	Red Buttes	3,580	710	19.8%
	13	UPRR Bridge	3,580	710	19.8%
	14	Tie Siding	3,400	710	20.9%
	15	6 Miles South of Tie Siding	3,400	710	20.9%
WY130/230 (Snowy Range Road)	16	Junction I-80	17,260	450	2.6%

Source: ERM (2010g)

3.9.3.4 Level of Service

Level of service (LOS) is a term used throughout the United States to characterize the performance of roads, intersections, interchanges, and other transportation facilities. LOS ratings range from “A” (ideal conditions with free-flowing traffic) to “F” (complete failure or gridlock).

Table 3.9-3 lists LOS thresholds designated by WYDOT for various types of roads. A proposed project that would cause the road to exceed these thresholds in its design year (the year of complete build-out) would need to provide capacity improvements, typically in the form of roadway widening or other improvements.

Table 3.9-3:
LOS Thresholds Warranting Capacity Improvements

Road Type	LOS Thresholds		
	Overall	Urban Segments	Rural Segments
Interstate Highway Mainline	C	N/A	N/A
Interstate Highway Ramp	D	N/A	N/A
National Highway System Arterials (e.g., U.S. Highways)	N/A	D	C
Other State Highways	N/A	D	C

Source: ERM (2010g)
N/A Not applicable

Table 3.9-4 shows the results of the analysis of the existing LOS for Project-area roadways using Highway Capacity Software, Version 5.4, and the AADT data in table 3.9-2.

Table 3.9-4:
Baseline LOS

Road	Location	2008 LOS
I-80 Eastbound	Curtis Street	A
	Snowy Range Road	A
	Third Street/U.S. Highway 287	A
	Grand Avenue/I-80 Business	A
	Albany/Laramie County Line	A
	Cheyenne Western Urban Limits	A
I-80 Westbound	Curtis Street	A
	Snowy Range Rd	A
	Third Street/U.S. Highway 287	A
	Grand Avenue/I-80 Business	A
	Albany/Laramie County Line	A
	Cheyenne Western Urban Limits	A
I-25 Northbound	Colorado State Line	A
	Cheyenne Southern Urban Limits	A
I-25 Southbound	Colorado State Line	A
	Cheyenne Southern Urban Limits	A
U.S. Highway 287	I-80	A
	Blackfoot Street	A
	Laramie Southern Urban Limits	B
	Red Buttes	B
	UPRR Bridge	B
	Tie Siding	A
	6 Miles South of Tie Siding	B
Snowy Range Road (WY130/230)	Junction I-80	B

Source: ERM (2010g)

In 2008, all of the roads analyzed in the study area performed at LOS-A or LOS-B, indicating relatively low traffic volumes relative to the capacity of the roadway. Interstate LOS may be slightly worse than estimated in table 3.9-4 given the truck volumes that exceed the parameters available in the Highway Capacity Software.

3.9.3.5 Planned or Potential Road Upgrades

WYDOT's State Transportation Improvement Program (STIP) is an annual list of State-funded transportation projects for a 6-year period. The 2010 STIP lists the following transportation projects with the potential to affect regional transportation infrastructure (ERM 2010g):

- I-25: Construction of a new interchange at Speer Road, south of Cheyenne (targeted for fiscal year 2010).
- U.S. Highway 287: Reconstruction from the Colorado State line to the current southern extent of the four-lane divided section of highway south of Tie Siding (targeted for fiscal year 2014). The upgrade would consist of construction of a new two-lane section of roadway alongside the existing portion of U.S. Highway 287 and is expected to require minimal disruption to the existing roadway. Further highway upgrades would consist of reconstructing and widening the portion of highway north of Tie Siding to Laramie and refurbishing the decking on the U.S. Highway 287 bridge over the UPRR north of Tie Siding (no targeted date).
- WY130/230: Rehabilitation of the bridge over the UPRR yard (targeted for fiscal year 2012).
- WY130/230: New construction in the vicinity of the UPRR bridge (targeted for fiscal year 2013).

3.9.3.6 Other Transportation Facilities

3.9.3.6.1 Railroad

Figure 3.9-1 shows the location of railroad infrastructure in the study area. The UPRR's Central Corridor passes through Laramie and Hermosa (approximately 1 mile east of Tie Siding). The UPRR Central Corridor consists of approximately 824 miles of track in Wyoming. Approximately 60 trains per day pass through Laramie (ERM 2010g).

UPRR also operates a freight yard in Laramie. South of the UPRR yard, the UPRR mainline splits. A single line runs south, parallel to U.S. Highway 287. Two lines, operating side by side, take a parallel path further to the east. The three lines rejoin each other just north of Hermosa. There are no at-grade railroad crossings along U.S. Highway 287. Hermosa Road and other low-volume county and local roads do cross the UPRR at grade.

3.9.3.6.2 Aviation

Laramie Regional Airport is located approximately 4 miles west of central Laramie and approximately 18 miles northwest of the proposed Project site. The airport hosts three daily commercial flights to Denver International Airport, serving approximately 10,000 passengers per year (ERM 2010g). It also hosts private aircraft. There are no other public airports in southern

Albany County. No private airfields or airstrips in Albany County have been identified at this time.

3.9.3.6.3 Non-Motorized Travel

Wyoming's Draft Long-Range Transportation Plan designates WY130/230 as part of its "Cheyenne/Laramie/Snowy Range" long-distance bicycle touring route. While there are no designated bicycle lanes on WY130/230, the road does have wide shoulders that can accommodate bicycle traffic. The Laramie Greenbelt Trail follows the Laramie River and crosses under WY130/230 approximately 0.5 mile from I-80.

3.10 Recreational Resources

3.10.1 Overview

The discussion of recreational resources considers activities conducted both on the Project site and in the surrounding study area. Activities include walking and hiking on private and State-owned land, wildlife viewing, hunting, and fishing. The study area used to describe recreational resources surrounding the Project site includes an area extending 50 miles from the Project site in Albany County, Wyoming, and Larimer County, Colorado, because construction workers and permanent employees of the proposed Project would be expected to live in Albany County near Laramie, and northeast Larimer County near Fort Collins. There is also discussion of recreational resources in Carbon County and Laramie County, Wyoming, where individual resources potentially could be accessed by construction workers and permanent employees. The discussion below is focused by proposed Project site first, then by study area.

The characterization of recreational resources is based on the recreational and land use assessment prepared for the proposed Project (ERM 2010d; appendix K), recreational atlases, local tourism websites, websites of land management agencies, and Project participants. County, forest, and municipal planning documents were also reviewed to identify any planned recreational facilities that may be impacted by the proposed Project.

The study area is recognized for its diverse recreational opportunities. Figure 3.10-1 identifies major recreational areas in southern Albany County, and figure 3.10-2 identifies major recreational areas in northern Larimer County.

3.10.2 Regulatory Setting

There are no designated recreation areas within the proposed Project site.

3.10.3 Affected Environment

The predominant recreational activities within the proposed Project site are walking and hiking on private and State-owned land, wildlife viewing, hunting, and fishing. Recreational resources found on the proposed Project site are shown on figure 3.10-3.

3.10.3.1 Walking, Hiking, Wildlife Viewing

The proposed Project site is adjacent to private residential land. Landowners have indicated that they use the area for walking, hiking, and wildlife viewing (Western 2010c). More detailed information about the frequency and specific uses is not available.

3.10.3.2 Hunting

Public access for hunting is permitted on 3,070 acres of Wyoming State Trust Land south of Cherokee Park Road on the proposed Project site (figure 3.10-2). Revenue generated by Wyoming State Trust Land is reserved for the benefit of public schools and certain other designated public institutions in Wyoming, such as the Wyoming State Hospital. In 1988, the State Board of Land Commissioners adopted rules allowing hunting, fishing, and general recreational use on Wyoming State Trust Land that is publicly accessible, unless specifically restricted by the State Board of Land Commissioners (Wyoming Office of State Lands and Investments undated).

The State Trust Land accessible from Cherokee Park Road was acquired through a land exchange between the State of Wyoming and private landowners to enhance public access while consolidating private lands. The parcels acquired by the State provide access for hunting elk, mule deer, pronghorn, and small game (WGFD 2010d). According to WGFD, however, while pronghorn and elk hunting is possible in the area, the sparse vegetative cover limits the quality of big game hunting because the game will tend to scatter at a disturbance (ERM 2010d).

All three private landowners on the proposed Project site allow hunting on their properties, according to WFGD (ERM 2010d). The private lands are not open to the public without permission from the landowners. No data are available on the actual number of hunters using private lands within the proposed Project site.

3.10.3.3 Fishing

There are five named streams on the proposed Project site. According to WGFD, among the five streams, Government Creek, Forest Creek, and Boulder Creek are intermittent waterbodies and do not support fisheries. Among the remaining two streams, Fish Creek is a Yellow Ribbon trout stream of regional importance containing brook trout, and Willow Creek is a Green Ribbon trout stream of local importance, containing brook trout, creek chub, and longnose dace (WGFD 2010d). Characteristics of Fish Creek and Willow Creek are listed in table 3.10-1. The WGFD Stream Classification Ranking Criteria for fisheries productivity are provided in table 3.10-2.

Table 3.10-1:
Characteristics of WGFD-Classified Streams in the Project Site

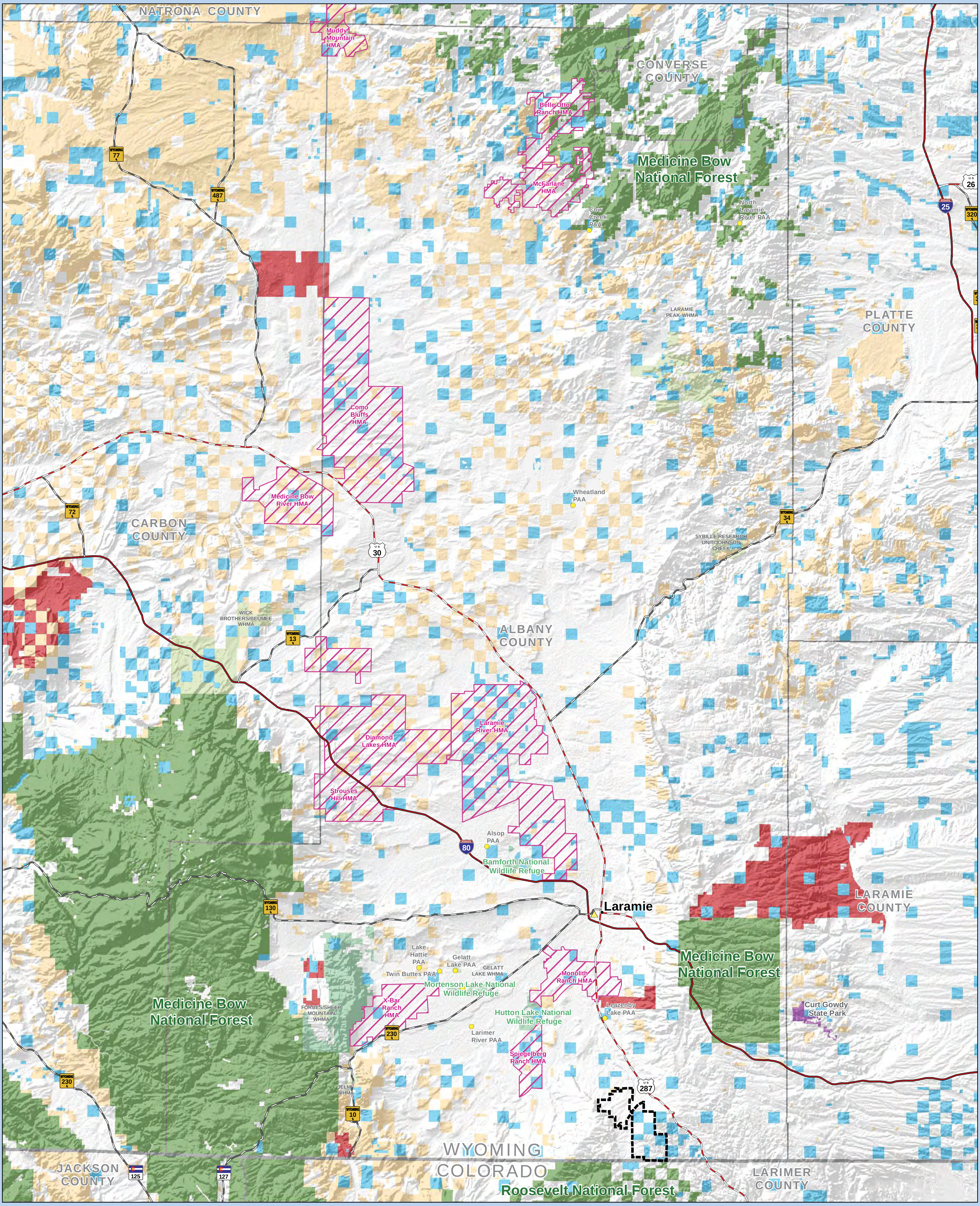
Stream	Length Within County	Length within Project Site	Public Access Length within County	Public Access Length within Project Site
Fish Creek	9.4	4.1	0.5	0.3
Willow Creek[1]	17	3.1	3.1	2.7

[1] Willow Creek is impounded approximately 4.7 miles north of the Project area; the 0.9-mile linear flowline through this impounded area is included in these calculations.

Table 3.10-2:
WFGD Stream Classification Ranking Criteria

Category	Percent of Streams	Pounds of Sport Fish per Mile
Blue Ribbon	3	Greater than 600
Red Ribbon	6	Greater than 300 and Less than 600
Yellow Ribbon	28	Greater than 50 and less than 300
Green Ribbon	63	Greater than one and less than 50
Orange Ribbon	Unknown	Any Cool/Warm Water Game Fish Present

Source: ERM (2010e)



Study Area Recreational Resources - Albany County

Project Features

- Hermosa West Wind Energy Project

Jurisdiction

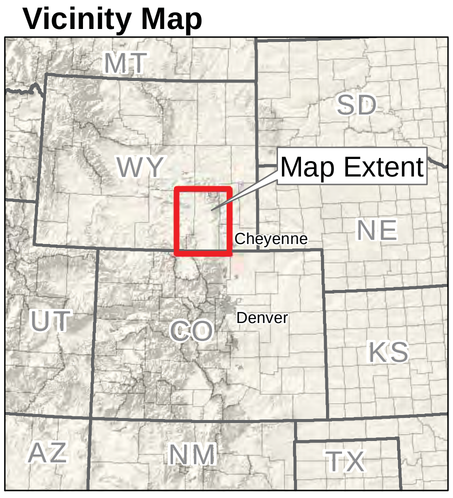
- U.S. Forest Service
- U.S. Fish and Wildlife Service
- Bureau of Land Management
- State Land
- State Park
- Wildlife Habitat Management Area
- Nature Conservancy Easement
- Hunter Management Area
- Public Access Area
- KOA Campground

0 3 6 12 Miles

Scale 1:256,000 when printed at 22"X34".

Source: ESRI, BTS, WyGISC, CSU, KOA, TNC WYFG, and USGS
Revised: December 23, 2010
MXD: P:\4004_Shell_Hermosa_West\GIS\Layouts\chapter_3\Recreation_Albany.mxd

Vicinity Map



HERMOSA WEST WIND ENERGY PROJECT

FIGURE 3.10-1: STUDY AREA RECREATIONAL RESOURCES - ALBANY COUNTY

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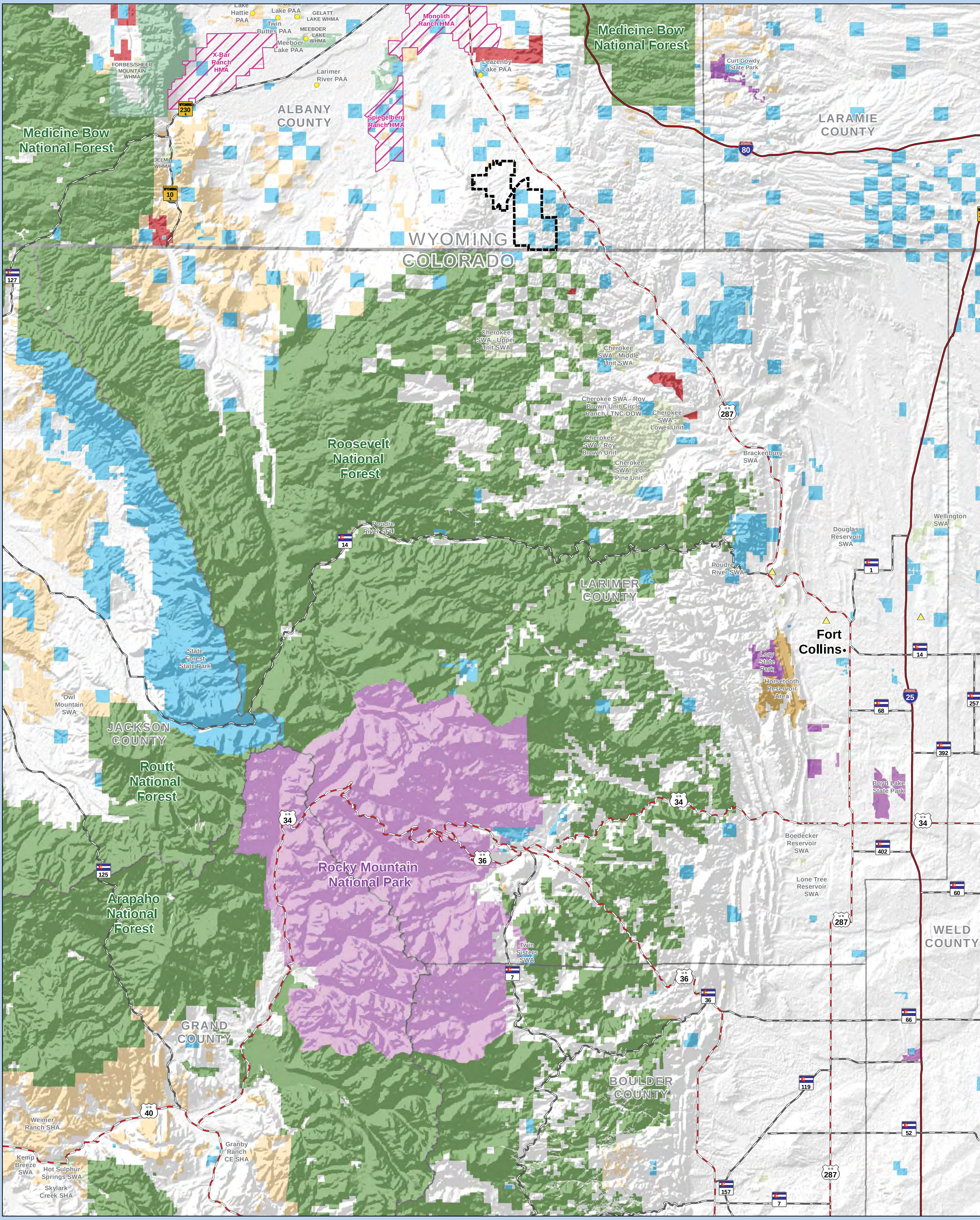

Study Area Recreational Resources - Larimer County

Project Features

Hermosa West Wind Energy Project

Jurisdiction

- Bureau of Land Management
- Colorado Divison of Wildlife
- U.S. Fish and Wildlife Service
- State Park
- State Land
- National Park Service
- U.S. Forest Service
- County Park
- Nature Conservancy Easement
- Hunter Management Area
- Public Access Area
- KOA Campground

0 3 6 12 Miles

Scale 1:211,000 when printed at 22"X34".

Source: ESRI, BTS, WyGISC, CSU, KOA, TNC WYFG, and USGS
Revised: December 23, 2010
MXD: P:\4004_Shell_Hermosa_West\GIS\Layouts\chapter_3\Recreation_Larimer.mxd

Vicinity Map

HERMOSA WEST WIND ENERGY PROJECT

FIGURE 3.10-2: STUDY AREA RECREATIONAL RESOURCES - LARIMER COUNTY

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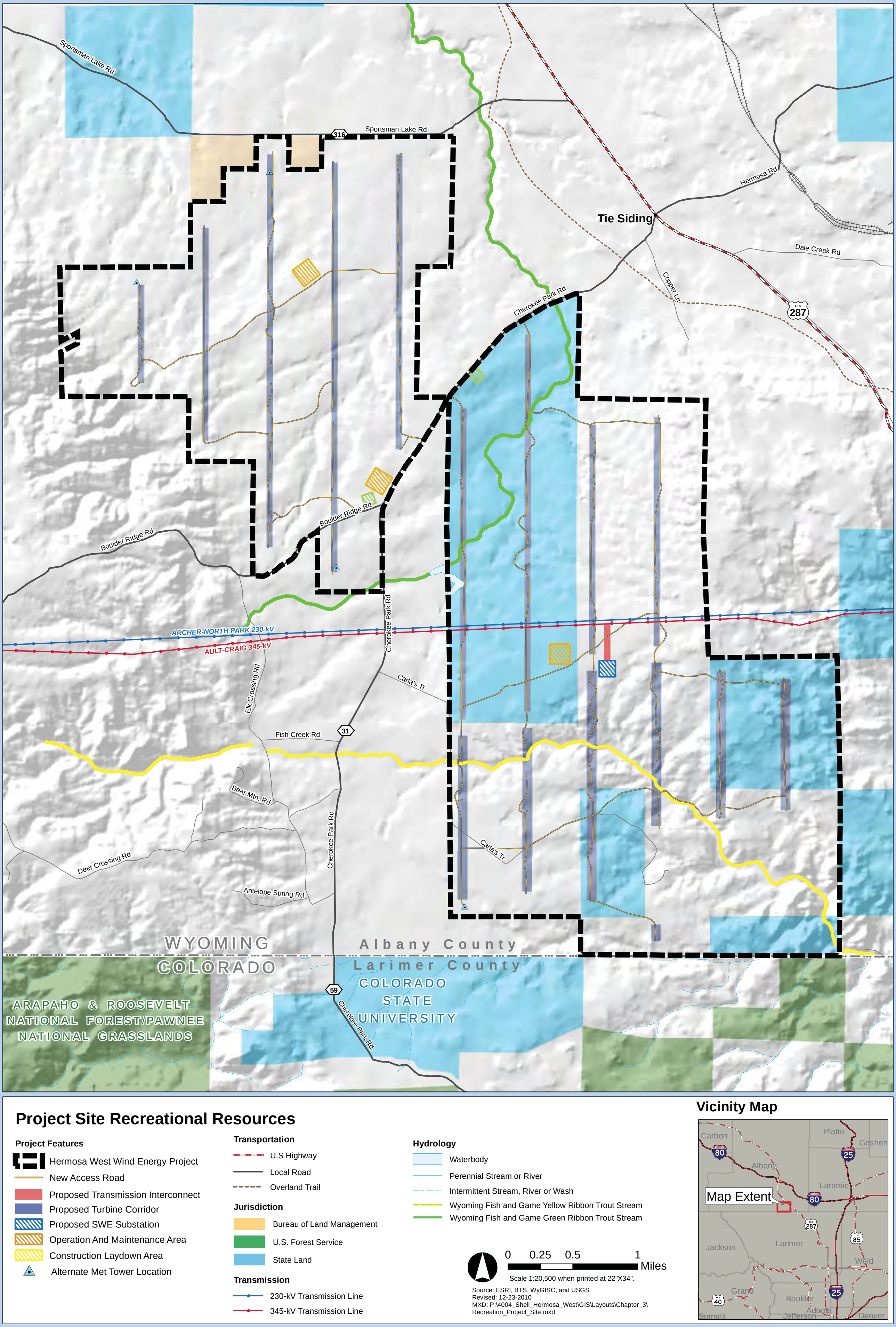

HERMOSA WEST WIND ENERGY PROJECT

FIGURE 3.10-3: PROJECT SITE RECREATIONAL RESOURCES

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Because the amount of surface water in the portions of Fish Creek and Willow Creek located on the proposed Project site is limited, game fish populations are expected to be low compared to upstream areas with greater amounts of surface water (ERM 2010d). The WGFD confirms that there are no significant fishing resources on the proposed Project site (ERM 2010d).

3.10.4 Project Area

3.10.4.1 Albany County, Wyoming

The further development of recreational opportunities is a goal for Albany County, according to the Albany County Comprehensive Plan (2008). Recreation is an important source of income for some Albany County communities. Recreational opportunities in Albany County are predominantly outdoor activities on public lands. Approximately 34 percent of Albany County's land base is public land managed by the BLM, USFS, USFWS, State of Wyoming, University of Wyoming, and Laramie. Developed municipal recreational opportunities such as swimming pools and public parks are limited to Laramie. Recreation in Albany County is described below by agency jurisdiction.

3.10.4.1.1 U.S. Forest Service

Two areas of the Medicine Bow National Forest are located in southern Albany County; the Snowy Range is in the southwestern corner of the county, and the Laramie Range is east of Laramie (which includes the Vedauwoo area). These areas are managed by the USFS Medicine Bow-Routt National Forest[1], Laramie Ranger District.

The Medicine Bow National Forest attracts an estimated 1.4 million visitors annually (ERM 2010d). Recreational activities available in the Medicine Bow National Forest include scenic driving on the Snowy Range Scenic Byway, camping, picnicking, rock climbing, wildlife viewing, motorized trail use with off-highway vehicles [OHVs] and snowmobiles, and non-motorized trail use (hiking, mountain biking, and horseback riding). The Vedauwoo area, approximately 20 miles northeast of the Project site, is a popular destination for hiking, biking, camping, and rock climbing. Several campgrounds are located in the Laramie Ranger District and impose a 14-day limit on overnight camping.

3.10.4.1.2 U.S. Fish and Wildlife Service

The USFWS manages the following three wildlife refuges in Albany County: Hutton Lake NWR, Mortenson Lake NWR, and Bamforth NWR. Mortenson and Hutton Lake NWRs are located within 30 miles of the proposed Project site; Bamforth NWR is located north of Laramie. Mortenson Lake and Bamforth NWRs are closed to the public and do not offer recreational activities.

Hutton Lake NWR offers limited recreational activities, including environmental education, wildlife observation, and photography (USFWS 2010d).

[1] The Medicine Bow-Routt National Forest is the managing unit for the Medicine Bow National Forest located in Wyoming, and the Routt National Forest located in Colorado.

3.10.4.1.3 Wyoming Game and Fish Department

The WGFD owns and manages two Wildlife Habitat Management Areas (WHMAs) in southern Albany County. The Laramie River-Jelm WHMA is located along the Laramie River south of Woods Landing, Wyoming, and provides opportunities for hunting and fishing. The Forbes-Sheep Mountain WHMA is a 950-acre area approximately 22 miles west of Laramie, and provides opportunities for hiking, wildlife viewing, and hunting (WGFD 2010f).

There are 10 PAAs in southern Albany County that offer a variety of recreational opportunities. The Aslop, Laramie River-Monolith, Gelatt Lake, Twin Buttes Reservoir, Lake Hattie, Meeboer Lake, and Leazenby Lake PAAs are located near Laramie. The Diamond Lake and Rock Creek PAAs are located on the Laramie County-Carbon County border near U.S. Highway 30. Activities available at all PAAs in Albany County are listed in table 3.10-3.

Table 3.10-3:
Public Access Areas in Southern Albany County

Public Access Area	Activities Available
Aslop	Fishing, Boating, Waterfowl Hunting
Laramie River-Monolith	Fishing
Gelatt Lake	Fishing, Hunting, Camping, Boating, Waterfowl Hunting
Twin Buttes Reservoir	Boating, Fishing, Waterfowl Hunting, Camping
Lake Hattie	Fishing, Camping, Boating
Meeboer Lake	Fishing, Camping, Boating, Waterfowl Hunting
Leazenby Lake	Fishing
Diamond Lake	Waterfowl Hunting, Camping
Rock Creek	Fishing

Source: WGFD (2010e)

Hunter Management Areas (HMAs) are “parcels of land where the [WGFD] facilitates management of hunters for access to hunt.” The areas may consist wholly of private lands, or be a combination of private, State Trust Land, and Federal land. Written permission is required to hunt in these areas. In 2008 there were 203,193 acres of HMAs in Albany County (WGFD 2008). No HMAs are located within the proposed Project site, but three HMAs—Spiegelberg Ranch, Monolith Ranch, and X-Bar Ranch (totaling approximately 29,833 acres)—are located in proximity to the proposed Project site and provide opportunities for hunting small and large game (WGFD 2010c). Additional HMAs are located in Carbon County to the west (approximately 123,722 acres), Laramie County to the east (approximately 17,000 acres), and in the remainder of Albany County (approximately 173,360 acres), where the HMAs Diamond Lake, Strouss Hill, and Laramie River are located northwest of Laramie (WGFD 2008).

3.10.4.1.4 Wyoming State Trust Land

In addition to the 3,070 acres of Wyoming State Trust Land located on the proposed Project site that are accessible to the public, additional State Trust Land exists in Albany County. No data are available on the percentage of State Trust Land that is publicly accessible (Wyoming Office of State Lands and Investments 2010).

3.10.4.1.5 Wyoming State Parks

There are no Wyoming State Parks in Albany County. While Curt Gowdy State Park is outside the study area, it is the nearest State park at approximately 50 miles from the proposed Project site. It has no electric hookups and imposes a 14-day limit on overnight camping (Wyoming State Parks undated).

3.10.4.1.6 Albany County Comprehensive Plan

The Albany County Comprehensive Plan (Albany County 2008) includes a suggested trails map that shows the historic Cherokee Trail traversing the proposed Project area. The Trail crosses mostly private land and public access may be limited to portions of the Trail that cross State land accessible from public roads. The Albany County Comprehensive Plan does not specify development plans for the Trail. The Cherokee Trail and other cultural resources are discussed in section 3.4.

3.10.4.1.7 City of Laramie

Municipal recreational resources in Laramie include athletic fields, a network of community parks, the Laramie Community Recreation Center, ice arena, historic sites, golf courses, trail systems, and other facilities. According to the City of Laramie Comprehensive Plan (2007), the City is deficient in acreage of community parks, neighborhood parks, and play lots according to National Recreation and Park Association standards, which are based on existing and future population levels.

3.10.4.1.8 Private Lands for Hunting and Fishing

Hunting is allowed on private lands enrolled in the WGFD Walk-In Areas (WIA) program. A WIA is “a tract of private land on which the [WGFD] has leased rights for public hunting enjoyment” (WGFD 2010g). In 2008, Albany County had 34,020 acres of WIAs. In 2008, Carbon County had 56,185 acres of private land enrolled in the WIA program, and Laramie County had 18,425 acres of WIAs enrolled in the WIA program (WGFD 2008).

The WGFD also designates private lands as WIAs for fishing. The South Platte River Area 2 is a WIA designated for fishing where brook trout occur, located approximately 20 miles southeast of Laramie and 3 miles east U.S. 287. North Platte River Drainage Walk-In Fishing Area 24 is approximately 21 miles west of Laramie along Wyoming Route 230 at Sodergreen Lake (WGFD 2010f).

3.10.4.1.9 Private Campgrounds

The Laramie KOA, the only private recreational vehicle (RV) park in Laramie, is approximately 23 miles north of the proposed Project site. The Laramie KOA is open year-round and offers 115 campsites with electric and water hookups (ERM 2010d). The Woods Landing Resort is a much smaller private campground near the town of Jelm, offering 10 recreational vehicle campsites with electric and water hookups.

3.10.4.2 Larimer County, Colorado

3.10.4.2.1 U.S. Forest Service

The Roosevelt National Forest is located in Larimer County, in the southern portion of the study area. This area is managed by the Canyon Lakes Ranger District of the Arapaho-Roosevelt National Forest. Recreational activities in this area are diverse and include wilderness recreation (hiking and backpacking), motorized trail use (on OHVs and motorcycles), fishing, hunting, boating, and other types of outdoor activities.

The Red Feather Lakes area, a popular destination for camping and hiking, is located approximately 15 miles south of the Project site. Two campgrounds with electric and water hookups are located in the Red Feather Lakes area. Camping in the Arapaho-Roosevelt National Forest is limited to 28 days in any 60-day period (USFS 2010). Dispersed camping is permitted in many locations in the Canyon Lakes Ranger District, but no electric or water hookups are available at dispersed camping sites.

3.10.4.2.2 National Park Service

Rocky Mountain National Park is partially located in Larimer County. Rocky Mountain National Park offers a wide variety of recreational opportunities, and facilities include five drive-in campgrounds, over 200 backcountry campsites, and 359 miles of trails. Activities include hiking, backpacking, camping, scenic driving, and wildlife watching. There are no electric, water, or sewer hookups at any campsites, and camping is limited to seven nights between June 1 and September 30, and 14 nights during the remainder of the year (NPS 2010b).

3.10.4.2.3 Colorado Division of Wildlife

The CDOW manages 27 State Wildlife Areas (SWAs) in Larimer County. Of these, several units of the Cherokee Park SWA are located within 20 miles of the proposed Project site totaling 20,662 acres. Units of the Cherokee Park SWA offer big and small game hunting, fishing, dispersed camping with unimproved sites, hiking, and wildlife viewing (CDOW 2010b).

CDOW also leases State Trust Land in Larimer County for protecting wildlife habitat and providing public access to hunting, fishing, and wildlife watching opportunities. According to CDOW there are 14 different parcels of public-access State Trust Land in Larimer County (CDOW 2010a).

3.10.4.2.4 Colorado State Parks

State Forest State Park and Lory State Park are located in Larimer County. Only State Forest State Park offers camping, but its location in northwestern Larimer County is not convenient to the proposed Project site. Lory State Park is located just west of Fort Collins, approximately 44 miles from the proposed Project site, and offers backcountry camping in addition to hiking and other activities.

3.10.4.2.5 Larimer County Parks

Larimer County Parks and Open Space manages several municipal, open-space, and reservoir-based parks between the proposed Project site and Fort Collins. Horsetooth Reservoir in Larimer County is located just west of Fort Collins approximately 45 miles from the proposed Project site, and has a campground with 115 electric-only sites and 8 full hook-up sites. Camping is limited to a maximum of 14 nights in any 30-day period (Larimer County 2010).

3.10.4.2.6 Private Campgrounds

There are three private campgrounds in the Fort Collins area. The Fort Collins KOA Lakeside is located approximately 38 miles from the proposed Project site, and offers 200 full hook-up sites and is open year-round. The Fort Collins North/Wellington KOA is located approximately 59 miles from the site in Wellington, northeast of Fort Collins, and offers 80 full hook-up sites and is also open year-round. The Fort Collins/Poudre Canyon KOA is located in La Porte, Colorado (west of Fort Collins), approximately 40 miles from the site, and offers 28 full hook-up sites between May 1 and September 30.

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3.11 Socioeconomics

3.11.1 Overview

This section describes the social and economic characteristics of the study area, which is defined as all of Albany County, including the 11,125-acre proposed Project site, and all of Larimer County. Larimer County is included in the analysis because it is assumed that a portion of the construction workers would originate in the area of Fort Collins, Colorado, in Larimer County. Socioeconomic information from Larimer County, therefore, is included in this analysis where it is relevant to analyzing potential effects that would result from the proposed Project.

The section summarizes significant trends for current and past levels of the following indicators: demographics, employment, income, housing, public services, and Census revenues. Detailed socioeconomic data are presented in tables 3.11-1 through 3.11-12. Data were collected from the Wyoming Economic Analysis Division in the Wyoming Department of Administration and Information, the Laramie Economic Development Corporation, the U.S. Census Bureau, and Social and Economic Impacts of the Proposed Hermosa West Wind Energy Project (BSR 2010; appendix L).

3.11.2 Affected Environment

3.11.2.1 Demographics

3.11.2.1.1 *Population*

Albany County contains approximately 6 percent of Wyoming's total population. This relationship has remained stable since 1980 (table 3.11-1). Unlike other counties in Wyoming, the population of Albany County has not been affected by the booms and busts of the oil and gas and coal industries (WDAI 2009). Laramie is the largest city in Albany County and accounts for approximately 85 percent of the county's population. The next largest incorporated area is Rock River, which accounts for less than 1 percent of the county's population. The remaining 14 percent of the population is dispersed across rural areas of the county. From 1980 to 2008, the population of Albany County increased just less than 12 percent, with much of this growth occurring during the 1980s and 1990s. After 2000, the population marginally increased (1.6 percent), primarily because birth rates surpassed death rates. The population of Albany County is projected to decline by 370 people, or 1.1 percent, between 2010 and 2020 (WDAI 2009).

Table 3.11-1:
Albany County Population Profile

Category	1980	1990	2000	2007/8
Wyoming	469,557	453,588	493,782	532,668
Albany County	29,082	30,797	32,014	32,553
Age 19 and Below	*30.9%*	*29.6%*	*26.4%*	*26.9%*
Age 20–34	*40.2%*	*35.1%*	*34.5%*	*33.8%*
Age 35–54	*15.7%*	*21.8%*	*24.0%*	*21.6 %*

Table 3.11-1:
Albany County Population Profile

Category	1980	1990	2000	2007/8
Age 55–64	*6.1%*	*5.6%*	*6.7%*	*9.2%*
Age 65 and above	*6.9%*	*7.6%*	*8.2%*	*8.2%*
City of Laramie	24,410	26,687	27,204	27,664
Town of Rock River	–	190	235	213

Source: BSR (2010)
— Data not available

The age distribution in Albany County has shown a relatively consistent decline since 1980. Younger age groups (19 and below and 20 to 34) have declined from 71.1 percent in 1980 to 60.7 percent in 2008, and there is a corresponding increase in the population of those in the higher age brackets. In comparison with the rest of the State, Albany County has a higher population in the 20-to-34 age bracket because the University of Wyoming is located in Laramie. The number of adults in the prime working age category of 20 to 54 rose from 16,282 in 1980 to 18,067 in 2008, but as a proportion of the county's total population the working age category declined from 59.5 to 55.4 percent over the same period.

3.11.2.1.2 *Race, Ethnicity, and Gender*

Racial and ethnic minorities comprise a small proportion of the total population of both Wyoming and Albany County (table 3.11-2). In the latest year for which information is available (2006-2008), residents classified as white made up 84.6 percent of the population, 7.8 percent of the population was Hispanic. The largest minority populations were as follows: 2.7 percent were classified as Asian, 1.4 percent as African American, and 1.7 percent as American Indian/Alaska Native. This racial and ethnic breakdown is consistent with that for the State and Laramie. Regarding gender, males account for just over 52 percent of the population in Albany County.

Table 3.11-2:
Albany County Race, Ethnicity, and Gender Profile

Category	1980	1990	2000	2008
Total Population	29,082	30,797	32,014	32,758
Percent				
White	90.7	87.2	87.5	84.6
Hispanic	6.4	6.5	7.5	7.8
Asian	1.2	2.1	2.1	2.7
African-America	1.0	0.9	1.4	1.6
Native American	0.5	0.7	1.9	1.1
Female	48	48	48	47

Source: BSR (2010)

3.11.2.1.3 *Employment*

From 2000 to 2008, the number of employed workers in Albany County increased by 3.3 percent, while the labor force grew by 2.3 percent (table 3.11-3). Employment in Laramie from 2000 to 2007 increased by 3.3 percent, while the labor force increased by 2.4 percent. During this same period, overall employment in Wyoming increased by over 10 percent. Unemployment rates decreased from 3.3 to 2.5 percent in Albany County from 2000 to 2008 and 3.3 to 2.4 percent in Laramie. Unemployment in the county is consistent with the State level of approximately 3 percent from 2000 to 2008. In 2009, however, the unemployment rate increased for both the county and state. The 2009 unemployment rate in Albany County was 4.3 percent (BSR 2010). Although this level was below the state-wide unemployment rate of 7.4 percent for the same period, the level represented a significant increase in the unemployment rate for Albany County during that year.

Table 3.11-3:
Albany County Employment and Industry Distribution

Category	1990	2000	2008
Total Employment	14,927	17,168	18,698
Education, Health Care, Social Services (State Government)	5,533	6,361	7,073
Arts, Entertainment, Accommodation, Hospitality	NA	1,899	2,034
Professional, Scientific, and Management	NA	1,150	1,666
Retail Trade	2,998	1,706	2,238
Construction	625	961	976
Manufacturing	827	713	710
Transportation	550	559	629
Agriculture, Forestry	501	598	699

Source: BSR (2010)

According to 2007 Census data, approximately 36 percent of the employed labor force in Albany County worked for the government, 58 percent worked in the private sector, and 6 percent were self-employed (U.S. Census 2010). When broken down by industry sector categories using 2008 Census data, approximately 25 percent of the employed labor force in Albany County worked for the State, 11 percent worked in retail trade, 9 percent worked in local government, 7 percent worked in health care and social assistance, 5.5 percent worked in construction, and 3.2 percent worked in manufacturing (table 3.11-3). The large percentage of the labor force employed by State Government is attributed to the University of Wyoming located in Laramie.

The number of construction jobs in Albany County increased by less than 100 between 2000 and the fourth quarter of 2008. However, employment in the construction industry declined by approximately 30 jobs as of March 2009 (BSR 2010). From October 2008 to October 2009, statewide employment in construction declined by nearly 17 percent, or approximately 5,000 jobs.

Table 3.11-4 lists major employers in Albany County and the approximate size of their workforces. As the table demonstrates, the government employs a large number of workers in Albany County, the most prominent of which is the University of Wyoming.

Table 3.11-4:
Major Employers in Albany County 2009

Major Employers	# of Employees	Major Employers	# of Employees
University of Wyoming	5,237	Albany County	247
Albany County Schools	513	ARK Regional Svcs.	200
Ivinson Memorial Hospital	490	Trihydro Corporation	172
Wal-Mart	400	Mountain Cement	121
City of Laramie	304	Altitude Brewery	100
Petro Shopping Center	300	Brown & Gold	100
WyoTech	250	New Albertson's	100

Source: BSR (2010)

Table 3.11-5 provides data on the pattern of workers flowing into Albany County for employment. Approximately 86 percent of those who work in the county are also residents of the county. This high percentage is attributed in part to the fact that the University of Wyoming is such a large employer. Inflows of workers to Albany County mostly originate from Laramie and Natrona Counties in Wyoming. A fairly large number of workers (157) commute from Larimer and Weld Counties in Colorado.

Table 3.11-5:
Place of Residence—Albany County Workforce (2006)

Residence	Number
Albany County	13,073
Laramie County	1,008
Natrona County	280
Freemont County	79
Platte County	79
Colorado	157
Larimer County, CO	114
Weld County, CO	43

Source: BSR (2010)

3.11.2.1.4 *Income*

The trend for average income in Albany County increased by nearly 50 percent from 2000 to 2008 (table 3.11-6). This increase is comparable to State statistics for the same period. However, Albany County's overall average income level is below the State's average income level. In Albany County, 43 percent of households earn less than $35,000 per year, and more than 40 percent of households earn more than $50,000 per year (BSR 2010). In addition, over the past two decades (BSR 2010), Albany County residents working outside the county have earned more than those working in the community but residing outside it, resulting in a positive balance of earnings flows for the county.

Table 3.11-6:
Average Income in Albany County

Year	Income	Year	Income
2000	$27,077	2005	$34,398
2001	$28,349	2006	$36,702
2002	$30,909	2007	$38,466
2003	$32,288	2008	$40,070
2004	$33,604		

Source: BSR (2010)

By industry, State government (32 percent) is the largest generator of income in Albany County, followed by local government (12 percent), health care and social assistance (8 percent), retail trade (6.5 percent), construction (5.6 percent), manufacturing, and leisure/hospitality and food services (3.3 percent) (BSR 2010). According to the statistics, mining and agriculture, which dominate the economies of many other counties in Wyoming, are not significant generators of income or employment in Albany County.

From 2006 to 2008, approximately 8 percent of all families, and 17 percent of all individuals in Albany County, were living below the official poverty line. Albany County and Laramie have one of the highest poverty rates in Wyoming (BSR 2010). As noted above, in Albany County 43 percent of households earn less than $35,000 per year (BSR 2010).

3.11.2.2 Housing

3.11.2.2.1 *Albany County*

According to data from 2008, the number of housing units in Albany County was 17,150. Of those, approximately 54 percent were single-family units, 36 percent were multi-family dwellings, and 9 percent were mobile homes (table 3.11-7). Most of Albany County's housing is located in Laramie. Data from the Albany County Comprehensive Plan suggest that approximately 15 percent (or 2,400 units) of the total housing stock is located in unincorporated areas of the county (BSR 2010). A significant proportion of the housing stock (21 percent) has been constructed since 1990, and more than 50 percent of all housing units were constructed after 1970.

Table 3.11-7:
Housing for Albany County (2008)

Type of Unit	Number of Units
Single Family Units	10,161
2 Units	1,507
3 or 4 Units	1,572

Table 3.11-7:
Housing for Albany County (2008)

Type of Unit	Number of Units
5 to 9 Units	1,063
10 to 19 Units	600
20 or More	656
Mobile Homes	1,591
Total	17,150

Source: BSR (2010)

According to the 2000 Census, just less than 20 percent of the total housing stock in Albany County was vacant, and a significant percentage of these were attributable to seasonal, recreational, or occasional use (BSR 2010). Owner-occupied units accounted for 56 percent of the total, and renter-occupied units account for 44 percent. Compared to other counties and to the State, the percentage of renter-occupied housing is high and is attributable to the large number of rental units that serve the student population at the University of Wyoming. Vacancy rates for rental units (almost all of which are in Laramie) remained below 5 percent for most of the period 2000 to 2010, but in the second quarter of 2008 the rate increased to more than 10 percent.

In 2008, the Wyoming Housing Database Partnership projected future demand for home ownership and rental units for the entire State and individual counties (BSR 2010). Based on the moderate growth scenario, the demand for home ownership will increase to roughly 8,300 units by 2015 and 9,000 units by 2020, which represent increases of 5.7 and 15.6 percent, respectively. Demand for rental units are expected to increase by to 6,561 and 6,821, respectively, over the same period (6.7 and 10.9 percent increases, respectively) (BSR 2010).

3.11.2.2.2 *Housing Prices*

The average price for residential property in Albany County showed relatively modest growth in the 1980s. The average price of a residence, however, increased 82 percent, from $112,000 to $222,000. As shown in table 3.11-8, the cost of rental units (houses and apartments) also increased since 2000, but the growth rate was considerably less than for that for buying a home. From 2000 to 2008, the cost of renting a house increased nearly 43 percent and that for an apartment increased 29 percent, but over the past 2 years, rental prices increased at a lower rate. Rental prices for mobile homes on lots in Albany County have tracked those of apartments for most of the past decade, and by the fourth quarter of 2008 they were approximately the same.

Table 3.11-8:
Rental Housing Monthly Prices Albany County

4th Quarter	Apartments ($)[1]	Houses ($)[1]	Mobile Homes ($)[1]	Mobil Home Lots ($)[1]
2000	460	609	462	198
2001	488	718	486	205
2002	498	694	518	221
2003	533	809	578	229
2004	594	849	541	229
2005	603	805	549	245
2006	602	834	550	252
2007	568	837	523	258
2008	597	870	599	261

Source: BSR (2010)
1 Average prices.

3.11.2.2.3 *Temporary Accommodations*

Laramie and Albany County have a large number of establishments and rooms to accommodate visitors and workers. Table 3.11-9 lists the establishments and the number of rooms available. Occupancy rates are closely tied to the tourism industry and events at the University of Wyoming. In general, the summer months have the highest levels of occupancy (approximately 80 percent). The occupancy rate drops to between 50 and 60 percent from November through April. The average daily room rate in the area increased from $55 in 2002 to $70 in 2008, with higher rates of approximately $80 during the summer season.

Table 3.11-9:
Hotels and Motels in Albany County

Name	# of Rooms	Name	# of Rooms
Albany Lodge	15	Holiday Inn	100
America's Best Value Inn	33	Howard Johnson Inn	112
Americinn Laramie	32	Motel 6	99
Baymont Inn and Suites	72	Motel 8	141
Best Western Inn	62	Quality Inn and Suites	55
Comfort Inn	55	Ramada Center Hotel	100
Days Inn	53	Ranger Motel	31
Econolodge	52	Sunset Inn	51
Fairfield Inn and Suites	82	Super 8	42
First Gold Inn	79	Thunderbird Lodge	21
Gas Lite Motel	30	Travel Inn Motel	28
Hampton Inn	84	Travelodge	30
Hilton Garden Inn	134		

Source: BSR (2010)

Albany County has one official recreational vehicle park located in Laramie, with 115 available sites. Although no information is available for vacancy rate, 5 percent is typical during the tourist season; a higher vacancy rate is typical during the off-season.

3.11.2.2.4 *Larimer County*

Larimer County's population is approximately 300,000 and Fort Collins, the largest city, is home to Colorado State University, which has approximately 24,000 students. As a result, the housing stock in Larimer County is large and diversified. Although there was a construction boom mid-decade (2005) that added considerably to the housing stock, new construction is limited. The total number of housing units in the county is approximately 130,000 according to a 2006–2008 Census Bureau estimate (BSR 2010). Forty percent of the housing units have been built since 1990. Rental units make up approximately 32 percent of all housing in the county. The level of vacancies fluctuates with economic conditions and stands at 5.1 percent (early 2010) for multi-unit properties Larimer County. There are more than 70 hotels and motels in the county of varying sizes and quality (BSR 2010). The total number of hotel and motel rooms in the county is greater than 2,000. Recreational vehicle parks in the county total 250 sites.

3.11.2.3 Public Services in the Study Area

3.11.2.3.1 *Albany County Fire*

Government-financed services in Albany County include fire, police, and medical emergency. Albany County has a total of 7 fire departments and 10 fire stations. Five of the departments are located in Laramie; the others are located in Rock River and Centennial (table 3.11-10). Except for the Laramie Fire Department, which has 39 full-time employees, all of the fire stations are staffed by volunteers. Emergency medical services are only provided by the Laramie Fire Department, and 27 of its 39 full-time employees are certified as advanced emergency medical technicians.

Table 3.11-10:
Fire Departments in Albany County

Name	Community	Stations	Paid	Volunteer	Emergency Medical Services
Albany County Volunteer Fire Department	Laramie	1	0	30	No
Big Laramie Valley Volunteer Fire Department.	Laramie	2	0	30	No
Centennial Valley Volunteer Fire Department	Centennial	2	0	12	No
Laramie Fire Department	Laramie	2	39	0	Yes
Little Laramie Fire Department	Laramie	1	0	20	No
Rock River Volunteer Fire Department	Rock River	1	0	14	No
Vedauwoo Volunteer Fire Department	Laramie	1	0	15	No

Source: BSR (2010)

The Rock River Volunteer Fire Department depends on 14 volunteers; 2 volunteers are certified as basic emergency medical technicians. The Centennial Valley Volunteer Fire Department has

2 stations and relies on 12 volunteers, 6 of whom are certified as basic emergency medical technicians.

3.11.2.3.2 *Albany County Law Enforcement*

Three different types of law enforcement officials serve the study area: sheriffs, police officers, and highway patrol. Sheriff departments are funded by counties, police departments are funded by municipalities, and the highway patrol is funded by the State. All three law enforcement branches have offices in Laramie from which their officers are dispatched (BSR 2010).

The county Sheriff's Office has 15 full-time officers and is the primary law enforcement entity within the unincorporated areas of the county, including the Project site. All officers are stationed in Laramie. Laramie has a municipal police force of approximately 35 members, including staff and patrol officers. The University of Wyoming has a police force of approximately 15 members. There are approximately 2.8 law enforcement officers per 1,000 residents in Albany County. Crime in Albany County has not increased substantially over the past decade, and the vast majority of incidents involve property and not violence against people (BSR 2010).

3.11.2.3.3 *Albany County Health Care*

Ivinson Memorial Hospital in Laramie is a State-certified Area Trauma Hospital and a designated acute care facility. It is the major medical care institution serving Albany County. The hospital provides 99 beds and approximately 50 full-time physicians. Services include inpatient and outpatient surgeries. The hospital handles approximately 40,000 outpatient visits and more than 4,000 emergency room visits annually. All registered nurses in the emergency department are nationally certified in trauma and advanced cardiac life support (BSR 2010).

Ivinson Memorial Hospital does not have a Medevac unit onsite, but does have the facilities to accept patients brought in by air ambulance. If necessary, air ambulance services also are provided by the Medevac unit in Greeley, Colorado, at the North Colorado Medical Center. More generally for Albany County, emergency services are provided to the entire area by the Laramie Fire Department. This service is partly supported by Ivinson Memorial Hospital, which pays the salaries of some of the firefighters. In all, there are approximately 125 certified emergency service providers, 51 certified ambulance attendants, and 6 ambulances in the county. Because most medical personnel and equipment are located in Laramie, response times and resources can be delayed for distant areas of the county.

In 2006, there were 18.8 physicians per 10,000 residents in Albany County, a ratio almost identical to that for the entire State. With respect to registered nurses, there were nearly 100 per 10,000 residents in 2006, a level of service ratio that is below that of the State (BSR 2010).

3.11.2.3.4 *Albany County Wastewater Treatment*

Wastewater treatment services are described here because of the potential for an influx of construction workers in Albany County associated with the proposed Project. There are five wastewater treatment facilities in the Albany County. The two largest treatment facilities are located in Laramie and Rock River. Capacities at these facilities are adequate to meet temporary population increases associated with construction and development activities, tourism, and the seasonal influx of students (BSR 2010).

3.11.2.3.5 *Albany County Water Supply*

Water supply services are described here because of the potential for an influx of construction workers in Albany County associated with the proposed Project. There are numerous water supply systems throughout the county serving users in unincorporated areas and small communities. The Laramie water supply system is the largest in the county. Long-term access to adequate water supplies is a key concern for the county, although existing water supply systems are adequate to serve temporary population increases associated with construction and development activities, tourism, and the seasonal influx of students (BSR 2010).

3.11.2.3.6 *Albany County Education*

The proposed Project has the potential to result in an influx of students who move to Albany County during construction of the wind farm. Two higher education schools are located in Albany County, including the University of Wyoming and Laramie County Community College located in Laramie and the surrounding areas, respectively. There is one K-12 school district in Albany County and it consists of 18 schools, 3 high schools, 2 middle schools, and 13 elementary schools. Enrollment trends for each type of school are shown in table 3.11-11. There are 316 total teachers for the district, resulting in a student/teacher ratio of 11:1, which is lower than for the State overall, as well as that of the United States (BSR 2010).

Table 3.11-11:
Public School Education Enrollment in Albany County

Year	Elementary	Jr. High School	High School	Laramie County Community College	University of Wyoming
2000	1,950	848	933	623	8,200
2001	1,930	924	898	628	8,400
2002	1,917	911	899	619	8,545
2003	1,925	875	850	704	8,612
2004	1,933	884	818	759	8,611
2005	1,845	828	803	800	8,416
2006	1,831	835	808	974	8,429
2007	1,834	827	810	1,012	8,419
2008	1,891	827	794	1,054	7,891

Source: BSR 2010

3.11.2.3.7 *Larimer County Fire*

Fire fighting for a major portion of Larimer County is provided by the Poudre Fire Authority, which is responsible for a territory of 235 square miles and 170,000 residents (BSR 2010). The Poudre Fire Authority has 166 full-time employees, 13 fire stations (three of which are manned by 30 volunteer fire fighters), 10 engines, 2 truck companies, and an office dedicated to fire prevention and public education.

3.11.2.3.8 *Larimer County Law Enforcement*

Larimer County is similar to Albany County in that law enforcement services are provided for incorporated areas (cities and towns) by local police departments and for unincorporated areas by the county sheriff's office. The Fort Collins Police Department consists of 178 full time patrol and investigative staff supported by more than 80 civilian personnel. The Larimer County Sheriff's office consists of 72 commissioned patrol officers and 12 investigators. Crime in the County has fallen significantly over the past decade, from a total of 5,972 crimes against property and people in 2000 to 4,989 in 2009. In 2009, there were approximately 18 crimes per 1,000 residents (BSR 2010).

3.11.2.3.9 *Larimer County Health Care*

The major health care needs of Larimer County are provided by the Poudre Valley Health System, based in Fort Collins (BSR 2010). The system provides a regional network of health care services and includes two major hospitals, Poudre Valley Hospital in Fort Collins and Medical Center of the Rockies in Loveland. The Poudre Valley Hospital is full-service and has 226 beds; the Medical Center of the Rockies has 136 beds. The northern part of the county is also served by the Health District of Northern Larimer County, which was created in 1960 and is a special tax district. Emergency medical care is provided by Poudre Valley Health System ambulance service for most of the county. It has at least three emergency medical services crews, including emergency vehicles and paramedics, in service at all times.

3.11.2.4 Government Finances

The main sources of revenue for Albany County are taxes (property, sales, use, and lodging) and transfers from the Federal Government and State of Wyoming. Taxes make up the majority of revenue for Albany County, of which property taxes are the largest percentage. Total property taxes levied in 2008 were $22.1 million, with residential (60 percent) and commercial (21 percent) land, and utilities, railroads, and airlines (12 percent) comprising more than 90 percent of total tax revenues (BSR 2010). Key services supported by property taxes are education, highways, police and fire protection, correctional facilities, hospitals, parks and recreation, and welfare.

The other main source of revenue for the county is excise taxes (sales, use, and lodging), a portion of which is distributed to the State. Cities, towns, and counties may impose an excise tax of up to 4 percent on all sleeping accommodations for guests staying less than 30 days. All tax collections, less State administrative costs, are distributed to the taxing jurisdiction, and at least 90 percent of the taxes collected must be used to promote travel and tourism. Laramie has a 6 percent sales and use tax that includes the State-wide base of 4 percent, a 1 percent optional county tax, plus a 1 percent capital facilities tax (applicable to the city only) (Laramie Economic Development Corporation 2010). Albany County levies a lodging tax of 4 percent. A use tax is imposed on purchases made outside a taxing jurisdiction for first time use, storage, or other consumption within that jurisdiction. Wyoming's use tax rate is 4 percent. Receipts are shared between State government and the county of origin on the same distribution basis as sales tax. Table 3.11-12 shows an increase in receipts for these taxes early in the decade, with a decline since 2006.

Table 3.11-12:
Albany County Tax Receipts

Year	Sales and Use (State 4%)	Optional 1% Levy (County)	Lodging	Total
2002	4,867,951	4,115,503	311,765	9,295,219
2003	4,958,375	4,312,313	369,136	9,639,824
2004	5,157,815	4,444,802	386,169	9,988,786
2005	5,495,356	4,706,688	446,992	10,649,036
2006	6,581,004	5,642,938	550,661	12,774,603
2007	5,746,422	4,989,926	607,223	11,343,571
2008	5,618,146	4,884,509	679,376	11,182,031

Source: BSR (2010)

3.11.2.5 Industrial Siting Impact Assistance Funds

Under the Industrial Development and Siting statutes, a town or county can be awarded industrial impact assistance tax payments. The Wyoming Department of Revenue administers the payment of impact assistance funds as specified in W.S.39-15-11(c) and (d) and W.S.39-16-111(c) and (d). The role of the Industrial Siting Council is to establish the distribution ratio of funds to counties, cities, and towns impacted by the facility. These payments are distributed to the county treasurer, and the county treasurer distributes the funds to the county, and cities and towns within the county, based on a ratio established by the Industrial Siting Council during a public hearing. Impact assistance payments allow cities, towns, and counties to mitigate the negative impacts major industrial projects may have on community resources. The level of assistance is determined by the increase in tax revenue caused by the industrial project and matches that increase with additional monies from the State General Fund to help communities respond to project-related impacts. This tax distribution is transferred from the State General Fund, via the office of the State Treasurer, directly to the county treasurers' offices (BSR 2010).

3.12 Environmental Justice

3.12.1 Overview

This section describes low income and minority populations in the Project area so that environmental justice concerns can be identified. For the purposes of this analysis, the Project area includes all of Albany County, where the proposed Project site is located, and Larimer County as well as two Census block groups (one in Wyoming and one in Colorado). U.S. Census Bureau data from the 2000 Census were used to identify income and race characteristics for the Project area. The block groups provide Census data for large geographic areas and are useful in this analysis because the Project area is very rural. The block group in Wyoming, for example, covers approximately half of Albany County. U.S. Census Bureau Quick Facts data (2010) were used to identify race and income characteristics throughout the Project area.

3.12.2 Regulatory Setting

EO 12898 and the Civil Rights Act, Title VI, require that Federal agencies identify and address disproportionately high or adverse human health or environmental effects of their programs, policies, and activities on low-income and minority populations.

3.12.3 Affected Environment

3.12.3.1 Income Data

Table 3.12-1 presents poverty status statistics by state, county, and block groups. Poverty status is measured by the U.S. Bureau of Census by income. A family is considered to be living in poverty when total family income is less than the Census Bureau threshold. Thresholds vary depending on family size and age of family members. They were originally derived from U.S. Department of Agriculture (USDA) food budgets.

Table 3.12-1:
Poverty Data (2000 Census)

Location	Number of Persons	Number Below Poverty Level	Percent below Poverty Level
Block Group 1 (FID-163) Wyoming	1,009	59	5.85%
Block Group 2 (FID-29) Colorado	828	51	6.16%
Total Overall Block Groups	1,837	110	5.99%
Albany County, WY	—	6,228	21%
Wyoming	—	54,777	11.4%
Larimer County, CO	—	22,600	9.2%
Colorado	—	388,952	9.3%
U.S.	—	—	12.40%

— County, State, and Federal data are available but not considered relevant to this analysis.
Source: U.S. Census Bureau (2000a)

The poverty rate in Wyoming is 11.4 percent. The poverty rate in Colorado is 9.3 percent. These poverty rates are both below the national average poverty rate of 12.4 percent calculated from data generated during the 2000 Census, the last national Census for which data are currently available.

Albany County's poverty rate is 21 percent, and is almost twice the rate of Wyoming. Larimer County's poverty rate of 9.2 percent is similar to the poverty rate for Colorado.

Some of the poverty statistics in table 3.12-1 were updated through U.S. Census Bureau estimates for 2006–2008. Using the most recent data, poverty rates decreased to 8.9 percent in Wyoming and to 17.5 percent in Albany County. Poverty rates increased to 11.9 percent in Colorado and to 12.9 percent in Larimer County. More recent estimates are not available by block groups.

3.12.3.2 Minority Populations Data

The predominant race measured in the Project area is white as shown in table 3.12-2. The white population in Wyoming is 92.1 percent according to the 2000 Census. This figure decreased to 91.6 percent based on estimates for 2006–2008. Similarly, the white population decreased from 91.3 percent to 89.7 percent using estimated data for 2006–2008. The block group estimate is higher at 96.6 percent. The most recent data for Albany County show a population of Hispanic origin of 7.8 percent, which is very similar to the 7.5 percent Hispanic population in Wyoming.

The white population in Colorado is 82.8 percent according to the 2000 Census. This figure increased to 83.7 percent based on estimates for 2006–2008. The white population decreased in Larimer County from 91.4 percent to 90.6 percent using 2006–2008 data. The block group estimate is higher at 95.8 percent. The most recent data for Larimer County show a population of Hispanic origin of 9.9 percent, which is considerably lower than the estimated 19.9 percent Hispanic population in Colorado.

Table 3.12-2:
Census Statistics in the Analysis Area (2000 Census)

Location	Year	Population	Percent Below Poverty	Percent White	Percent Black or African American	Percent American Indian or Alaska Native	Percent Asian	Native Hawaiian or Pacific Islander	Percent Other Race	Two or More Races	Percent Hispanic Origin	Per Capita Income	Median Household Income
Block Group 1 (FID 163) Wyoming	2000	1,009	5.85%	96.6%	0.0%	1.2%	0.2%	0.1%	0.3%	1.6%	1.5%	$23,354	$36,818
Block Group 2 (FID 29) Colorado	2000	828	6.16%	95.8%	0.1%	1.2%	0.4%	0.0%	0.1%	2.4%	1.8%	$30,306	$43,105
Wyoming	2000	493,782	11.4%	92.1%	0.8%	2.3%	0.6%	0.1%	2.5%	1.8%	6.4%	$19,134	$37,892
Wyoming	2006–2008 estimates	522,833	8.9%	91.6%	0.9%	2.2%	0.8%	0.0%	2%	2.5%	7.5%	$27,873	$53,096
Albany County	2000	32,014	21%	91.3%	1.1%	1%	1.7%	0.1%	2.6%	2.2%	7.5%	$16,706	$28,790
Albany County	2006–2008 estimates	32,553	17.5%	89.7%	0.8%	0.3%	2.2%	0.1%	4%	2.8%	7.8%	$27,327	$43,557
Colorado	2000	4,301,261	9.3%	82.8%	3.8%	1%	2.2%	0.1%	7.2%	2.8%	17.1%	$24,049	$47,203
Colorado	2006–2008 estimates	4,844,568	11.9%	83.7%	3.8%	0.9%	2.6%	0.1%	6%	2.8%	19.9%	$30,129	$56,574
Larimer County	2000	251,494	9.2%	91.4%	0.7%	0.7%	1.6%	0.1%	3.4%	2.2%	8.3%	$23,689	$48,655
Larimer County	2006–2008 estimates	286,832	12.9%	90.6%	0.8%	0.6%	1.9%	0%	3.3%	2.9%	9.9%	$30,735	$55,863

Source: U.S. Census Bureau (2000b)

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3.13 Agriculture

3.13.1 Overview

The discussion of agricultural resources considers irrigated and non-irrigated farmland, ranchland, and prime agricultural lands within the study area and in Albany County. The characterization of agricultural resources is based on aerial photographs and existing public inventories including the USDA Natural Resources Conservation Service (NRCS) and the National Agricultural Statistics Service (NASS) databases. It is also based on communication with relevant agencies and organizations including the USDA Farm Service Agency, WSGALT, TNC, and private landowners. The study area used to describe land uses surrounding the proposed Project site includes Albany County and Roosevelt National Forest in Larimer County. None of the Project area is currently commercially tilled.

3.13.2 Regulatory Setting

The Federally implemented Farmland Protection Policy Act of 1981 is a set of programs and policies designed to protect farmland from urban sprawl. It governs projects that may irreversibly convert farmland either directly or indirectly to non-agricultural uses and is administered by the USDA. The Farmland Protection Policy Act also created a system to classify farmland uses that includes prime farmland, unique farmland, and farmland of statewide or local importance.

3.13.3 Affected Environment

3.13.3.1 Farmland and Ranchland

There is no irrigated farmland within the Project site. Agricultural uses within the study area include non-irrigated, private cattle ranches and State of Wyoming trust land leased for cattle grazing (USDA Service Center, personal communication, 2010). There is no publicly available information identifying land on the proposed Project site as being enrolled in the Conservation Reserve Program. The program is administered by USDA to encourage landowners to convert erodible and environmentally sensitive land to stabilizing vegetation cover.

According to the 2007 Census of Agriculture (NASS 2007), 448 farms on 1.9 million acres of land comprise the agricultural land in Albany County. The median farm size is 265 acres. Livestock sales comprised 90 percent of the market value of farm products sold, and crop sales comprised the remaining 10 percent. The top livestock inventory items were cattle and calves (53,267), horses and ponies (3,551), sheep and lambs (3,224), and bison (881). The majority of crops harvested (81,824 acres) were forage, which is defined as land used for hay and haylage, grass silage, and greenchop (NASS 2007).

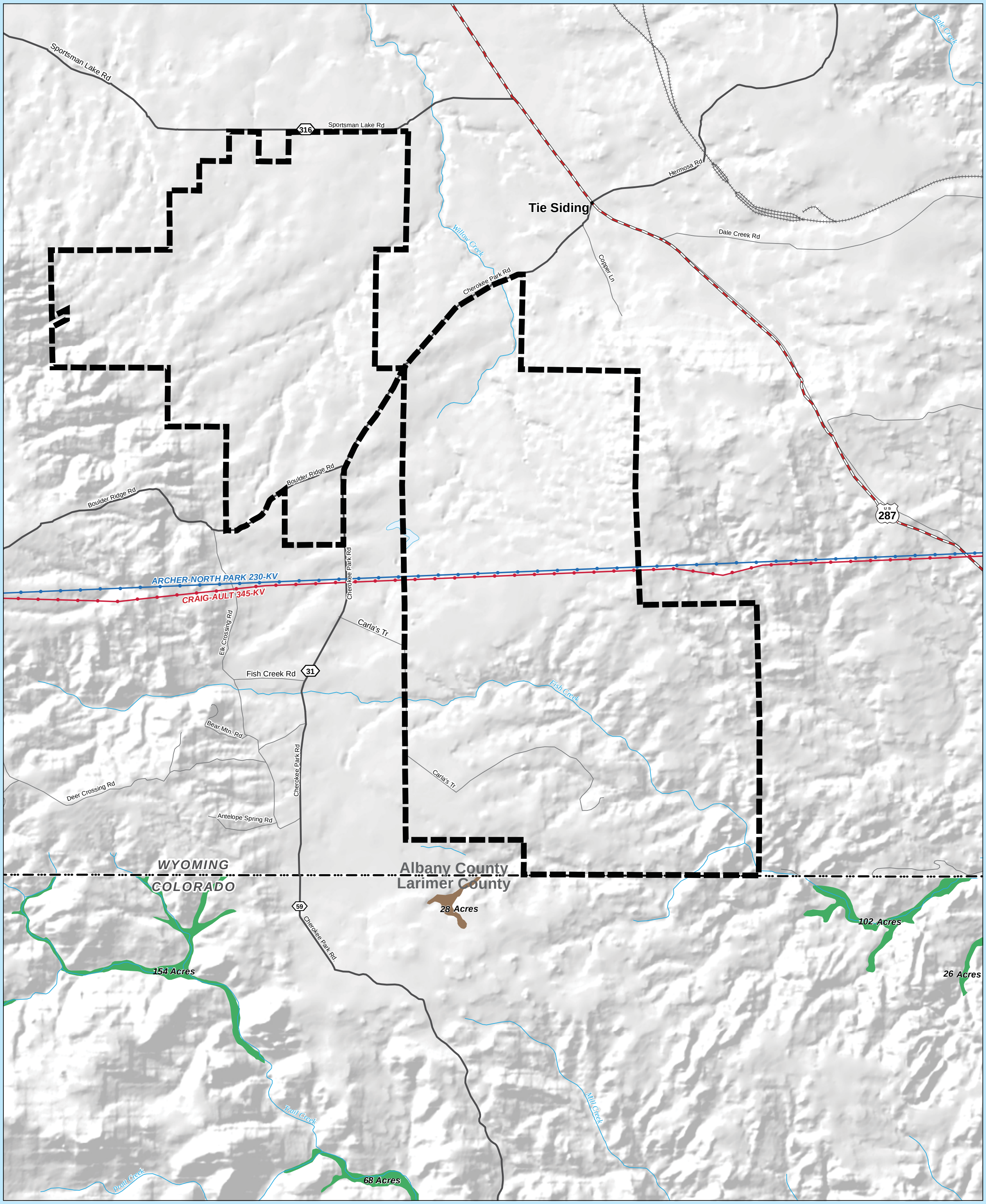
3.13.3.2 Prime Agricultural Lands

Prime farmland has the most suitable combination of physical and chemical characteristics for producing food and other agricultural crops. Unique farmland is land other than prime farmland that is used for production of specific high-value food and fiber crops. Farmland other than prime and unique farmland generally has less fertile and less productive soils that are more susceptible to wind and water erosion. The NRCS administers, regulates, and provides guidance to farmers and others regarding prime and unique farmlands.

The NRCS Soil Survey Geographic database for Albany County (NRCS 2009) identifies no prime or unique farmland or farmland of statewide or local importance on the Project site. None of the Project area is currently commercially tilled. Just seven soil units cover more than 90 percent of the site. Of those, bedrock outcrop soil associations cover more than 40 percent of the proposed Project site. Section 3.14 includes additional information regarding soil types.

Lands mapped as prime farmlands if irrigated, and farmlands of statewide importance, occur in the study area, primarily along drainage areas (figure 3.13-1) as follows:

- Twenty-eight acres of prime farmland if irrigated, located 0.33 mile south of the proposed Project site
- One hundred two acres of farmland of statewide importance, located 0.50 mile southeast of the proposed Project site
- Twenty-six acres of farmland of statewide importance, located 1.9 miles southeast of the proposed Project site
- One hundred fifty-four acres of farmland of statewide importance, located 1.6 miles southwest of the proposed Project site
- Sixty-eight acres of farmland of statewide importance, located 2.7 miles southwest of the proposed Project site



Prime Farmlands and Farmlands of Statewide Importance

Project Features

Hermosa West Wind Energy Project

Transmission

230-kV Transmission Line

345-kV Transmission Line

Farmland

Farmland of Statewide Importance

Prime Farmland if Irrigated

Not Prime Farmland

0 0.25 0.5 1 Miles

Scale 1:20,500 when printed at 22"X34".

Revised: December 7, 2010
File Name: Prime_Farmland
MXD: P:\4004_Shell_Hermosa_West\GIS\Layouts\Chapter_3
PDF: P:\4004_Shell_Hermosa_West\GIS\Maps\Chapter_3
Sources: ESRI, Western, NRCS, BTS, WyGISC, USGS

Vicinity Map

HERMOSA WEST WIND ENERGY PROJECT

FIGURE 3.13-1: PRIME FARMLANDS AND FARMLANDS OF STATEWIDE IMPORTANCE

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3.14 Geology and Soils

3.14.1 Overview

The discussion of geology and soils in the study area considers the general physiography of the region including geology, geographic hazards, minerals, and soils in the study area. For the purposes of this analysis of geology and soils, the study area includes the proposed Project site and a portion of Albany County surrounding it in southeastern Wyoming.

The study area is located in the Rocky Mountain Foreland structural province. This is an area characterized by broad basins surrounded by uplifts of exposed Precambrian rocks. The area also contains rocks of Pennsylvanian/Permian age and sediments of Quaternary (Pleistocene and Holocene) age. The study area is at the southern end of the Laramie Range, which is composed chiefly of granite with extensive unwooded parks generally at an elevation of approximately 7,000 feet (figure 3.14-1). Multiple drainages cross the proposed Project site in an easterly direction, including Fish Creek, Willow Creek, Boulder Creek, Forest Creek, and Government Creek (EVG 2010).

3.14.2 Regulatory Setting

3.14.2.1 Federal Regulations

The Federal law governing locatable minerals is the General Mining Law of 1872, which declared all valuable mineral deposits in land belonging to the United States to be free and open to exploration and purchase. This law provides citizens of the United States the opportunity to explore for, discover, and purchase certain valuable mineral deposits for public domain minerals (BLM 2011b).

The BLM manages the Federal mineral estate where the surface rights are in private ownership and the rights to development of the mineral resources are publicly held and managed by the Federal Census. The Mineral Leasing Act of 1920, as amended, guides the land use planning, leasing, bonding, operations, and reclamation associated with all development of Federal mineral resources.

3.14.2.2 State Regulations

Wyoming has a severed mineral estate. Entry to conduct oil and gas operations is described in W.S. 30-5-401 through 30-5-410. Under W.S. 30-5-402(a), any oil and gas operator having the right to any oil or gas underlying the surface of land may locate and enter the land for all purposes reasonable and necessary to conduct oil and gas operations to remove the oil or gas underlying the surface of that land.

The Office of State Lands and Investments provides administrative support to the Board of Land Commissioners for administration of oil and gas, metallic/non-metallic, and coal lease assignments on State lands in accordance with 2010 Wyoming Code Title 36 Chapter 6. The Wyoming Board of Land Commissioners leases land for oil and gas development in accordance with the Rules of the Board, Chapter 18, Leasing of Oil & Gas (Board of Land Commissioners 2007).

3.14.3 Affected Environment

3.14.3.1 Geologic Resources

For the purposes of evaluating impacts associated with geology and geologic hazards, the study area is the proposed Project site. Precambrian rocks forming the core of the Laramie Range are overlain in the study area by rocks of the Fountain Formation and overlying Casper Formation of Pennsylvanian and Permian age. Figure 3.14-1 provides a map of the study area bedrock geology (Daub & Associates, Inc. 2010; appendix M). The Precambrian rocks forming the core of the Laramie Range are separated from Pennsylvanian and Permian sedimentary rocks that overlie them by a major non-conformity. This unconformity represents a long period of erosion associated with the episodic uplift of the Ancestral Rocky Mountains (EVG 2010), a complex of northwesterly uplifts of Late Paleozoic age. The Ancestral Rocky Mountains occur in approximately the same region as the much younger later Late Cretaceous–early Tertiary uplifts of the Laramide Orogeny, which formed most of the basins and ranges that exist in Wyoming today. As a result of this uplift of the Ancestral Rocky Mountains, all Paleozoic-aged rocks older than Pennsylvanian age were eroded from the study area.

3.14.3.1.1 Precambrian Rocks

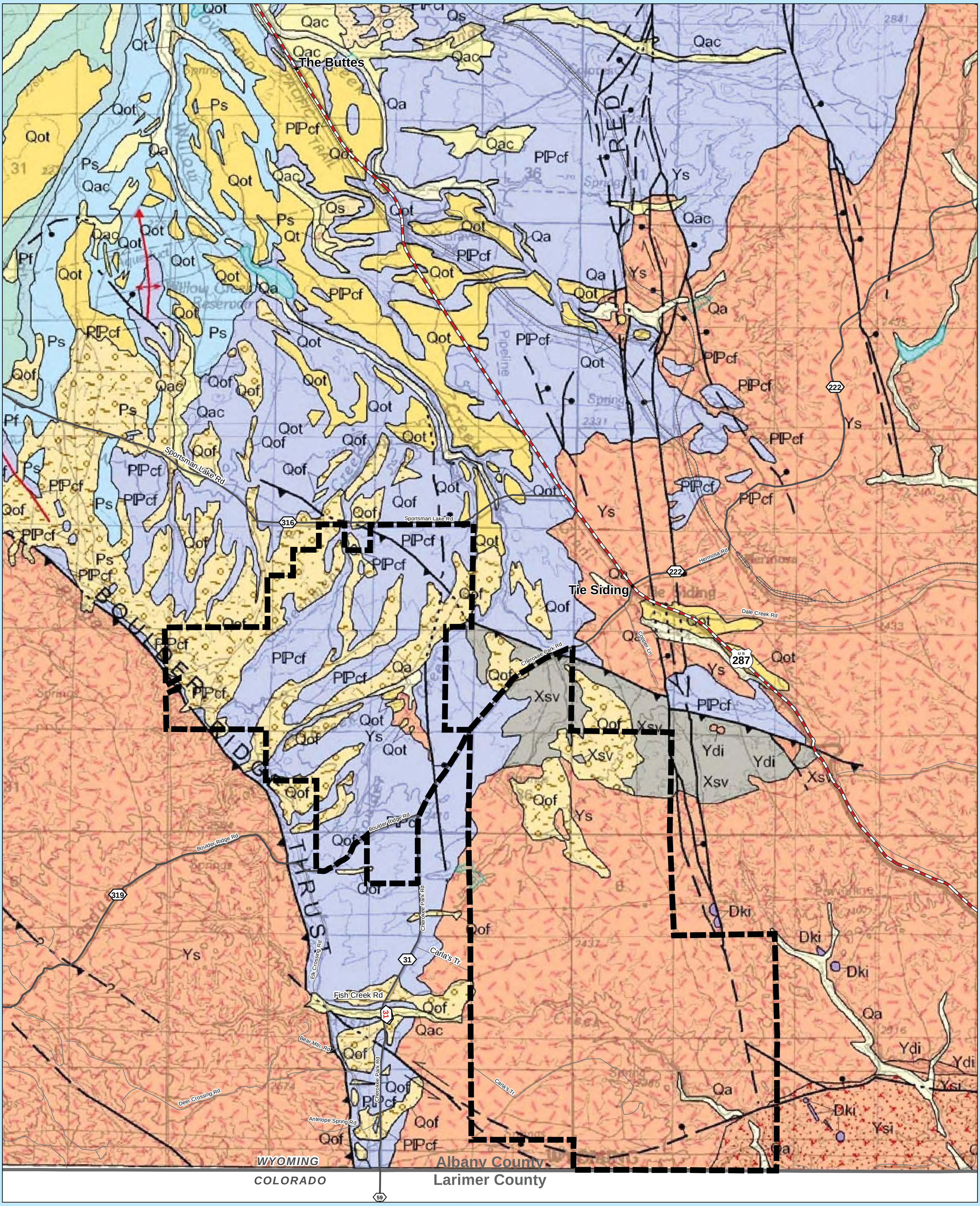
Sherman Granite forms the core of the Laramie Range and underlies most of the proposed Project site. It is exposed at the surface in the southeastern part of the proposed Project site. The Laramie Range also contains pelitic schist, marble, granite gneiss, layered amphobolite, and felsic gneiss that are exposed in the northeastern part of the proposed Project site (Daub & Associates, Inc. 2010).

3.14.3.1.2 Paleozoic Sedimentary Rocks

Paleozoic sedimentary rocks in the proposed Project site include the Fountain and Casper Formations in most of the northwestern portion of the site (EVG 2010). The Casper Formation is a well-cemented sandstone with interbedded limestone and dolomite deposits. It is gray, tan, and red in color and underlain by pink and gray limestone. The Fountain Formation underlies the Casper Formation and is a well-cemented conglomerate sandstone. This sandstone originated from the feldspar-rich uplifted part of the Ancestral Rocky Mountains that shed sediments basinward and accumulated chiefly in large alluvial fans and braided streams proximal to the uplifts (EVG 2010).

3.14.3.1.3 Quaternary Sediments (Pleistocene and Holocene)

Quaternary units in the study area include unconsolidated, fine to coarse alluvial sediments, older alluvial fans, and older terrace deposits. The unconsolidated alluvial sediments, the youngest materials in the study area, are between 0 and 50 feet thick. The older alluvial fan and terrace deposits are the oldest of the Quaternary deposits, and are between 0 and 10 feet thick (Daub & Associates, Inc. 2010).



Study Area Geology

Project Features

Hermosa West Wind Energy Project

Geologic Features

Symbol	Unit	Symbol	Unit
Qa	Alluvial Deposits	Ps	Satanka Shale(Permian)
Qs	Wind-blown Deposits	PIPcf	Casper and Fountain Formations
Qac	Mixed Alluvium and Colluvium	Dki	Kimberlitic Diatremes
Qt	Terrace Deposits	Ys	Sherman Granite
Qof	Older Alluvial Fan Deposits	Ysi	Sherman Granite Inner Cap Rock Phase
Qot	Older Terrace Deposits	Ydi	Dioritic Rocks of the Virginia Dale Ring
Pf	Forelle Limestone (Permian)	Xsv	Matasedimantary and Metavolcanic Rocks

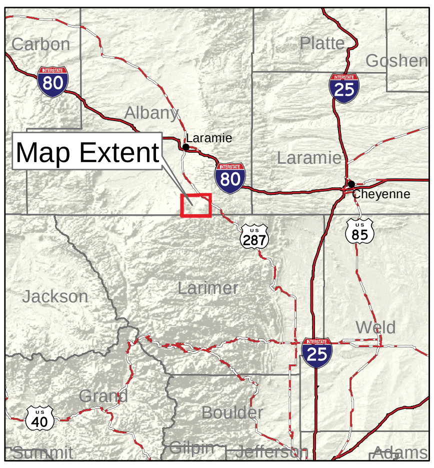
Fault
A planar fracture or discontinuity in a volume of rock, across which there has been significant displacement.

Thrust Fault
A type of fault in which rocks of lower stratigraphic position (older rocks) are pushed up and over higher strata (younger rocks).

0 0.5 1 Miles
Scale 1:28,500 when printed at 22"X34".

Revised: December 9, 2010
File Name: Study_Area_Geology
MXD: P:\4004_Shell_Hermosa_West\GIS\Layouts\chapter_3
PDF: P:\4004_Shell_Hermosa_West\GIS\Maps\chapter_3
Sources: ESRI, Western, BTS, WyGISC, USGS

Vicinity Map



HERMOSA WEST WIND ENERGY PROJECT
FIGURE 3.14-1: STUDY AREA GEOLOGY

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Quaternary alluvial, alluvial fan, and terrace deposits are more commonly found in the northwestern portion of the proposed Project site and are northeast to southwest trending deposits (figure 3.14-1). Mapped terrace debris of Quaternary age has been mapped along the northwestern edges of the proposed Project site (EVG 2010). The presence of older fan deposits is mapped in broad areas along Government and Forest Creeks and both north and south of Cherokee Park Road (EVG 2010). The presence of alluvium and colluvium of Holocene (Recent) age, as well as colluvium and pediment deposits of Pleistocene age, are also mapped within the proposed Project site (Daub & Associates, Inc. 2010).

3.14.3.2 Geologic Hazards

3.14.3.2.1 Faults and Seismicity

A number of thrust and reverse faults are present in the study area (figure 3.14-1). The faults are between 70 and 40 million years old. Quaternary and recent alluvial deposits overlie the faults in a number of areas, which suggests they have long been inactive (Daub & Associates, Inc. 2010).

According to USGS earthquake hazard maps, the study area has low earthquake potential (Daub & Associates, Inc. 2010). Earthquake records indicate that a magnitude 3.8 earthquake occurred on August 29, 2004, with an epicenter approximately 136 miles north of the proposed Project site. Additionally, ten earthquakes with magnitudes greater than 3.5 have occurred within 130 miles of the proposed Project. In 1984, a magnitude 5.4 earthquake took place 127 miles north of the proposed Project. A magnitude 6.6 earthquake occurred on November 8, 1882, with an epicenter generally located in the northern portion of Estes Park, potentially as close as 30 miles southwest of the proposed Project (Daub & Associates, Inc. 2010).

3.14.3.2.2 Subsidence and Landslides

Various processes can cause ground subsidence, including differential settlement of soil, withdrawal of groundwater, and solution of subsurface formations by groundwater. The loss of soil structure, whether by water erosion or dissolution of soluble minerals in the soil, causes piping or voids in the soil. When the voids collapse, unstable ground conditions and surface subsidence may occur. Ground subsidence also can occur when the overburden from shallow underground mining collapses into the mined voids. Areas of subsidence hazards have not been mapped or identified within the proposed Project site. Likewise, no landslide hazards have been mapped, or landslide incidents recorded, within the proposed Project site.

3.14.3.3 Mineral Resources

3.14.3.3.1 Oil and Gas

Petroleum reserves have been found in the Casper Formation in other areas of Wyoming. The Little Laramie and Herrick Fields, which contain heavy oil, are located approximately 30 miles from the proposed Project site (Daub & Associates, Inc. 2010). It is likely that any oil deposits that may have been present in the study area are now gone because the Casper Formation in the northwestern portion of the proposed Project site is so near the ground surface that any impermeable cap rock that might have trapped potential hydrocarbons has been eroded away.

3.14.3.3.2 Sand and Gravel

The Casper Formation is quarried locally for cement and gravel (Daub & Associates, Inc. 2010). The extensive alluvial deposits in the northwestern portion of the proposed Project site also contain aggregate materials (Daub & Associates, Inc. 2010). These deposits are up to 3,000 feet wide and between 0 and 50 feet thick. The presence of alluvial formations in this portion of the proposed Project site represents a potential source for aggregate development, although its economic viability is unknown. To economically develop the aggregate, the deposit requires a substantial amount of work as well as an end user fairly close to the deposit. There are no current aggregate, sand, or gravel operations in the proposed Project site, but future development of the alluvial formations is possible. SWE has identified existing facilities that mine sand and gravel and will obtain materials from one of these existing facilities.

3.14.3.3.3 Kimberlite Deposits

Devonian and Precambrian kimberlite pipes in the proposed Project site have the potential for economic development because they may contain diamonds and semi-precious indicator minerals. There are no historical or currently operating kimberlite mines identified within the study area, and kimberlite outcrops are rare and localized. Kimberlitic minerals exist within the project footprint, however studies indicate potential deposits are not of sufficient quality or quantity to be commercially mined and are not within the area of disturbance of the proposed Project. The Project would not interfere with kimberlite locations.

The closest known diamond-producing kimberlite mine, located within 0.5 mile of the southern Project site border, was located just across the Wyoming-Colorado border in northern Colorado (portions of southern parts of T12 N, R72 W, Sec. 19 and Sec. 20) (Daub & Associates, Inc. 2010). The kimberlite mine was known as the Kelsey Lake Diamond Mine and opened in 1996 as an open pit mine. Up to 65 percent of the diamonds recovered were of gem quality. After subsequent numerous changes in ownership, the mine was finally closed in 2002 due to a lack of financial viability.

3.14.3.3.4 Other Minerals

Uranium deposits have been identified approximately 3 miles east of the proposed Project site. Uranium is not currently mined in the area. Future uranium discoveries and mine development are considered unlikely.

Other mineral resources of economic value, including gypsum, natural gas, coal, coalbed methane, and carbon dioxide, are not thought to have the potential for being commercially produced from the formations in the study area (Daub & Associates, Inc. 2010).

Table 3.14-1 lists the mineral resources that may have development potential in the proposed Project site. Aggregate is considered the most probable resource for development, because alluvial deposits of aggregate are prevalent in the area, including the proposed Project site and surrounding area.

Table 3.14-1:
Potential Mineral Resources Development

Resource	Likelihood for Development	Formations	Comments
Aggregate	Likely	Quaternary alluvial sand and gravel and terraces	Substantial deposits located in T13N, R73W; minor deposits in T13N, R72W. Unconsolidated alluvial sediments are thicker (as much as 50 feet) and more continuous than older alluvial fan and terrace deposits, and have the greatest potential for development.
Diamonds/ Kimberlite Indicator Minerals	Not Likely/ Possible	Precambrian and Devonian kimberlites	State Line Kimberlite District and many of the known kimberlite pipes are located within the Project site. Currently inactive and not economically viable to exploit.
Cement	Not Likely/ Possible	Pennsylvanian Casper Formation	Carbonate interbeds of the Casper Formation are locally quarried for cement and gravel in the Laramie area. No cement mining operations currently exist on or around the Project site.
Uranium	Not Likely	Precambrian igneous and metamorphic basement of Laramie Mountains	No occurrences of uranium mineral deposits or mining operations identified in the Project site.
Oil	Not Likely	Pennsylvanian Casper Formation	Closest known resource of heavy oil found to the northwest in the Little Laramie and Herrick Fields located approximately 30 miles away from the proposed Project site. Any oil deposits that may have been present are likely gone.
Natural Gas	Not Present	Formations not in study area	Closest known resource is to the northwest at the Big Hollow Field located approximately 25 miles away from the proposed Project site. No Cretaceous units are present in either the surface or subsurface of the Project site.
Coal, Coalbed Methane, and Carbon Dioxide	Not Present	Formations not in study area	Closest known resources are in the Rock Creek Coal Field, located approximately 50 miles to the northwest of the proposed Project site.
Gypsum	Not Present	Formations not in study area	Mountain Cement has a gypsum quarry from Chugwater Formation south of Laramie.

Source: Daub & Associates, Inc. (2010)

3.14.3.3.5 Mining Activity

A list of active mines in Albany County was compiled in 2010 based on information available from the WDEQ database (Daub & Associates, Inc. 2010). The database indicated that a single active sand and gravel aggregate mine is located east of the proposed Project site, approximately 1 mile east of Highway 287. The mine is owned and operated by Connell Resources, Inc. One known inactive mine, a uranium placer operation, was located east of the proposed Project site.

3.14.3.3.6 Mineral Ownership

Mineral ownership information for the Project site was compiled from the Wyoming Albany County Assessor's Office and Office of State Lands and Investments electronic databases (Daub & Associates Inc. 2010). These databases contain information from 1997 to the present. Mineral ownership was identified to be a mixture of private owners and the State of Wyoming. A large portion of the mineral ownership on the Project site was not available from this database. A detailed book and page title search would be required to determine specific mineral ownerships for all properties in the Project site that pre-date the information contained in the databases. The likelihood of future development of mineral leases is dependent upon the owner, environmental laws, regulations, demand, and economic viability. Based on the mineral and mining information provided in this section of the EIS, the potential for future development on the Project site has been determined to be limited due to the current lack economic viability.

According to Title 30 (Section 30-1-119) of the Wyoming Constitution regarding Mines and Minerals (Wyoming 2010), surface property owners are protected via the right to demand security from a mineral rights owner. This protection would allow the property owner to develop the property without a potential future mineral rights conflict.

3.14.3.4 Soils

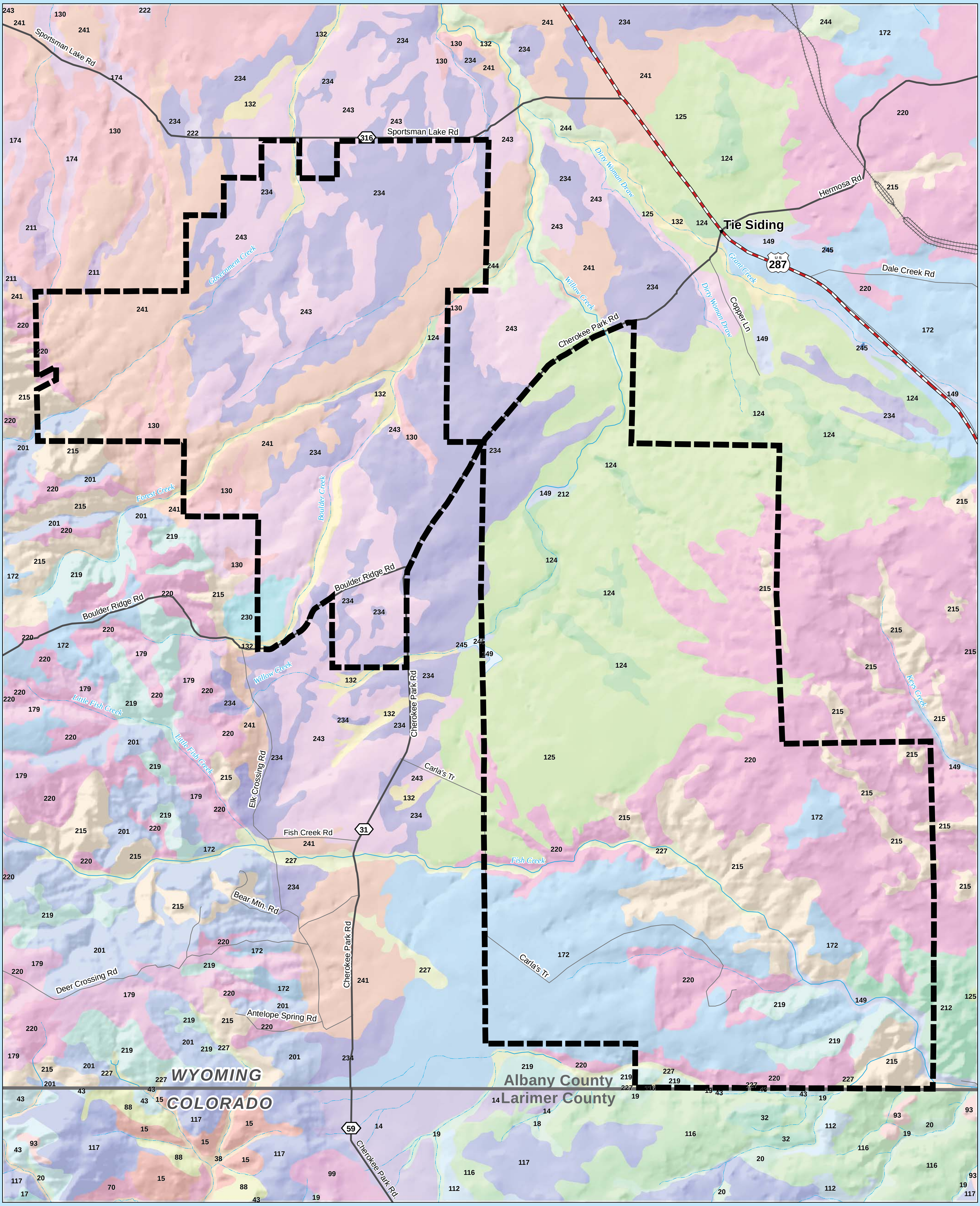
3.14.3.4.1 General Findings

Geotechnical studies were performed on the proposed Project site by SWE contractors (Black & Veatch 2009, appendix N; Black and Veatch 2010, appendix O). Soils encountered during the geotechnical studies were generally shallow, i.e., less than 40 inches to bedrock (Black & Veatch 2009). Nearly all soils on the proposed Project site are derived from weathered bedrock. Soils in the southeastern portion of the proposed Project site where granite bedrock is located are generally gravelly and thin in comparison to the sedimentary rocks and sandier soils in the northwestern portion of the site. Rock outcrops are common in most areas of the proposed Project site.

The geotechnical investigation concluded that subsurface conditions within the Project site are suitable to support development of the proposed Project (Black & Veatch 2010). Depth to bedrock appears sufficient, based on preliminary geotechnical investigations, to allow relatively easy excavation to the depths necessary for the wind turbine foundations.

3.14.3.4.2 Soil Types

Figure 3.14-2 shows the soil types mapped by NRCS (NRCS 2010a, b) in the proposed Project site; the units are listed by name in table 3.14-2. Just seven soil units cover more than 90 percent of the site. Of those, bedrock outcrop soil associations cover more than 40 percent of the proposed Project site.



Study Area Soil Types

Project Features

Hermosa West Wind Energy Project

- 112 Trag-Moen complex
- 116 Wetmore-Boyle-Moen complex
- 117 Wetmore-Boyle-Rock outcrop complex
- 124 Boyle-Rock outcrop complex
- 125 Boyle-Lininger association
- 130 Byrnie-Rock outcrop complex
- 132 Canburn loam
- 14 Boyle gravelly sandy loam
- 149 Dalecreek-Kovich complex
- 15 Boyle gravelly sandy loam
- 17 Boyle-Ratake gravelly sandy loams
- 172 Hapjack-Rogert-Amesmont complex
- 174 Joemre fine sandy loam
- 179 Lakehelen-Redfeather-Amesmont complex
- 18 Breece coarse sandy loam
- 201 Redfeather-Lakehelen-Rogert complex
- 211 Rock outcrop-Bruja-Byrnie complex
- 212 Rock outcrop-Cathedral complex
- 215 Rock outcrop-Rogert complex
- 219 Rogert-Lakehelen-Rock outcrop complex
- 220 Rogert-Rock outcrop-Amesmont complex
- 222 Rohonda-Tieside complex
- 227 Silas, gravelly substratum-Vensora loams
- 230 Stunner-Tisworth-Blazon complex
- 234 Tieside-Pilotpeak-Rock outcrop complex
- 241 Wycolo-Alcova complex
- 243 Wycolo-Tieside sandy loams
- 244 Wycolo-Thermopolis-Rock outcrop complex
- 245 Water
- 32 Farnuf-Boyle-Rock outcrop complex
- 38 Foxcreek loam
- 43 Haploborolls-Rock outcrop complex
- 70 Naz sandy loam
- 88 Redfeather sandy loam
- 93 Rock outcrop
- 99 Schofield-Redfeather-Rock outcrop

0 0.25 0.5 1 Miles

Scale 1:20,500 when printed at 22"X34".

Revised: December 23, 2010
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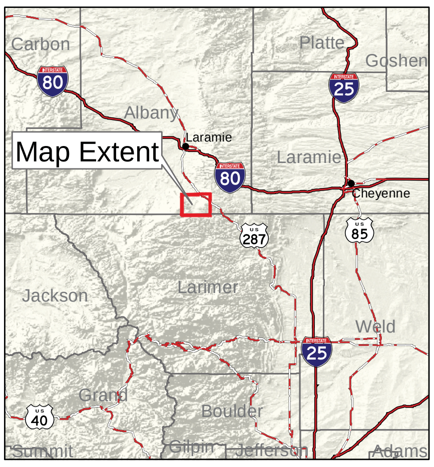
Sources: ESRI, Western, BTS, WyGISC, USGS

Vicinity Map



Hermosa West Wind Energy Project

Figure 3.14-2: Study Area Soil Types

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Table 3.14-2:
Soil Map Units within the Proposed Project Site

Map Unit Symbol	Map Unit Name	Acres in Proposed Project Site[1]	Percent of Proposed Project Site
125	Boyle-Lininger association, 1 to 15 percent slopes	2,306	21%
220	Rogert-Rock outcrop-Amesmont complex, 5 to 25 percent slopes	1,912	17%
234	Tieside-Pilotpeak-Rock outcrop complex, 3 to10 percent slopes	1,645	15%
172	Hapjack-Rogert-Amesmont complex, 3 to 25 percent slopes	1,259	11%
241	Wycolo-Alcova complex, 3 to 10 percent slopes	1,024	9%
215	Rock outcrop-Rogert complex, 25 to 99 percent slopes	816	7%
124	Boyle-Rock outcrop complex, 5 to 25 percent slopes	190	2%
130	Byrnie-Rock outcrop complex, 10 to 50 percent slopes	178	2%
132	Canburn loam, 1 to 4 percent slopes	170	2%
219	Rogert-Lakehelen-Rock outcrop complex, 8 to 40percent slopes	156	1%
212	Rock outcrop-Cathedral complex, 20 to 40 percent slopes	111	1%
149	Dalecreek-Kovich complex, 0 to 9 percent slopes	86	1%
227	Silas, gravelly substratum-Vensora loams, 0 to 6percent slopes	77	1%
230	Stunner-Tisworth-Blazon complex, 1 to 6percent slopes	50	<1%
201	Redfeather-Lakehelen-Rogert complex, 20 to50 percent slopes	26	<1%
244	Wycolo-Thermopolis-Rock outcrop complex, 10 to50 percent slopes	14	<1%
211	Rock outcrop-Bruja-Byrnie complex, 30 to 70 percent slopes	4	<1%
245	Water	<1	<1%
	Totals for Area of Interest	11,124	100%

1 The total acreage for each map unit has been rounded to whole numbers.
Source: NRCS (2010a, b)

Table 3.14-3 provides the profiles of the individual soil types in the proposed Project site. The predominant upper soils within the site are gravelly sandy loam, gravelly sandy clay loam, and sandy loam. These soils generally sit on top of unweathered bedrock.

Table 3.14-3:
Soil Profiles within the Proposed Project Site

Soil Name	Landform	Parent Material	Typical Profile
Alcova	Hills	Alluvium derived from igneous and metamorphic rock	0 to 4 inches: Gravelly sandy loam; 4 to 24 inches: Gravelly sandy clay loam; 24 to 60 inches: Very gravelly sandy clay loam
Amesmont	Mountain slopes	Residuum weathered from granite	0 to 4 inches: Sandy loam; 4 to 18 inches: Gravelly sandy clay loam; 18 to 36 inches: Very gravelly loamy sand; 36 to 60 inches: Unweathered bedrock
Blazon	Hills, ridges	Residuum weathered from shale	0 to 2 inches: Loam; 2 to 12 inches: Clay loam; 12 to 60 inches: Unweathered bedrock
Boyle	Hills, ridges	Residuum weathered from granite and gneiss	0 to 3 inches: Gravelly sandy loam; 3 to 17 inches: Very gravelly sandy clay loam; 17 to 60 inches: Unweathered bedrock
Bruja	Hills, ridges	Residuum weathered from limestone and sandstone and/or colluvium derived from limestone and sandstone	0 to 2 inches: Very cobbly fine sandy loam; 2 to 23 inches: Very cobbly very fine sandy loam; 23 to 60 inches: Unweathered bedrock
Byrnie	Hills, ridges	Residuum weathered from sandstone	0 to 2 inches: Sandy loam; 2 to 12 inches: Gravelly sandy loam; 12 to 60 inches: Unweathered bedrock
Canburn	Floodplains	Alluvium derived from igneous, metamorphic and sedimentary rock	0 to 23 inches: Loam; 23 to 50 inches: Loam; 50 to 60 inches: Coarse sandy loam
Cathedral	Mountain slopes	Colluvium and/or residuum weathered from granite	0 to 2 inches: Very stony coarse sandy loam; 2 to 13 inches: Very gravelly coarse sandy loam; 13 to 60 inches: Unweathered bedrock
Dalecreek	Floodplains, drainageways	Alluvium derived from granite	0 to 8 inches: Sandy loam; 8 to 32 inches: Loam; 32 to 60 inches: Stratified loamy coarse sand to sandy clay loam
Hapjack	Mountain slopes	Residuum weathered from granite and/or colluvium derived from granite	0 to 3 inches: Gravelly sandy loam; 3 to 10 inches: Gravelly sandy clay loam; 10 to 19 inches: Extremely gravelly sandy loam; 19 to 60 inches: Unweathered bedrock
Kovich	Floodplains	Alluvium derived from granite	0 to 8 inches: Loam; 8 to 31 inches: Loam; 31 to 60 inches: Stratified gravelly sand to gravelly sandy clay loam
Lakehelen	Mountain slopes	Residuum weathered from granite and/or alluvium derived from granite	0 to 1 inches: Slightly decomposed plant material; 1 to 2 inches: Moderately decomposed plant material; 2 to 20 inches: Fine sandy loam; 20 to 40 inches: Very gravelly sandy clay loam; 40 to 60 inches: Unweathered bedrock
Lininger	Hills, ridges	Residuum weathered from granite and/or alluvium derived from granite	0 to 7 inches: Loam; 7 to 14 inches: Gravelly sandy clay loam; 14 to 24 inches: Very gravelly sandy clay loam; 24 to 60 inches: Unweathered bedrock

Table 3.14-3:
Soil Profiles within the Proposed Project Site

Soil Name	Landform	Parent Material	Typical Profile
Pilotpeak	Hills, ridges	Residuum weathered from limestone and/or colluvium derived from limestone	0 to 1 inches: Cobbly fine sandy loam; 1 to 5 inches: Very channery fine sandy loam; 5 to 11 inches: Extremely channery fine sandy loam; 11 to 60 inches: Unweathered bedrock
Redfeather	Mountain slopes	Residuum weathered from granite and/or colluvium derived from granite	0 to 1 inches: Slightly decomposed plant material; 1 to 2 inches: Moderately decomposed plant material; 2 to 14 inches: Fine sandy loam; 14 to 19 inches: Very gravelly sandy clay loam; 19 to 60 inches: Unweathered bedrock
Rock Outcrop	NA	NA	0 to 60 inches: Unweathered bedrock
Rogert	Mountain slopes	Residuum weathered from granite and/or colluvium derived from granite	0 to 4 inches: Gravelly sandy loam; 4 to 18 inches: Very gravelly sandy loam; 18 to 60 inches: Unweathered bedrock
Silas, Gravelly Substratum	Mountain slopes	Alluvium derived from igneous, metamorphic and sedimentary rock	0 to 22 inches: Loam; 22 to 42 inches: Gravelly sandy clay loam; 42 to 60 inches: Stratified gravelly loamy sand to very gravelly sandy loam
Stunner	Alluvial fans, fan remnants	Alluvium derived from igneous, metamorphic and sedimentary rock	0 to 1 inches: Fine sandy loam; 1 to 10 inches: Clay loam; 10 to 32 inches: Clay loam; 32 to 60 inches: Sandy clay loam
Thermopolis	Hills, ridges	Residuum weathered from shale and siltstone	0 to 2 inches: Fine sandy loam; 2 to 14 inches: Silt loam; 14 to 60 inches: Unweathered bedrock
Tieside	Hills, ridges	Residuum weathered from limestone, sandstone and shale	0 to 4 inches: Sandy loam; 4 to 13 inches: Sandy loam; 13 to 19 inches: Sandy loam; 19 to 60 inches: Unweathered bedrock
Tisworth	Alluvial fans, fan remnants	Alluvium derived from sodic sandstone and shale	0 to 4 inches: Sandy loam; 4 to 19 inches: Sandy clay loam; 19 to 60 inches: Sandy clay loam
Vensora	Floodplains	Alluvium derived from granite	0 to 17 inches: Loam; 17 to 30 inches: Loam; 30 to 60 inches: Stratified very gravelly sandy clay loam to sandy loam
Wycolo	Hills, ridges	Residuum weathered from sandstone and shale and/or alluvium derived from sandstone and shale	0 to 6 inches: Fine sandy loam; 6 to 12 inches: Sandy clay loam; 12 to 25 inches: Loam; 25 to 36 inches: Clay loam; 36 to 60 inches: Unweathered bedrock

NA Not applicable
Source: NRCS (2010a, b)

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3.15 Hazardous Materials

3.15.1 Overview

This section describes the proposed Project site and surrounding study area with regard to current and historical uses of the site and the potential for pre-existing hazards or hazardous materials to be present within and adjacent to it. It describes infrastructure that is currently found within the proposed Project site as well as the findings of the Phase I ESA performed in 2009, which covered approximately 27,000 acres that included the 11,250-acre Project site (appendix P). Additionally, this section describes the regulatory environment with regard to proper handling and disposal of hazardous materials.

3.15.2 Regulatory Setting

The Federal and State laws and regulations listed below are those that apply to hazardous materials that would be used over the lifetime of the proposed Project. These laws and regulations provide the basis for the thresholds used in the analysis of potential impacts presented in section 4.15.

3.15.2.1 Federal Regulations

- Substances covered under the OSHA Hazard Communication (Hazcom) Standard (29 CFR 1910.1200). Materials and substances covered under the Hazcom Standard may be used in a variety of industrial and commercial activities and may also be subject to the regulations listed below.
- Hazardous materials as defined under U.S. Department of Transportation (DOT) regulations in 29 CFR, Parts 170–177.
- Hazardous substances as defined by the Comprehensive Environmental Response, Compensation, and Recovery Act (CERCLA) and listed in 40 CFR Table 302.4. CERCLA regulations also govern the cleanup of contaminated sites. Sites evaluated under CERCLA that pose serious threats to human health and the environment are placed on the USEPA National Priorities List and are commonly referred to as Superfund sites.
- Hazardous waste as defined in the Resource Conservation and Recovery Act.
- Hazardous substances and extremely hazardous substances as well as petroleum products such as gasoline, diesel, or propane that are subject to reporting requirements (Threshold Planning Quantities) under Sections 311, 312, and 313 of the Superfund Amendments and Reauthorization Act.
- Petroleum products and other “oil” products defined as “oil” in the Oil Pollution Act of 1990 and the Spill Prevention, Control and Countermeasure regulations under 40 CFR 112. These materials include fuels, lubricants, hydraulic oil, mineral oil, and transmission fluids.
- There are a number of other Federal regulations and programs that regulate substances such as asbestos and polychlorinated biphenyls.
- Handling of more than 1,320 gallons of petroleum products are required to prepare and observe a Spill Prevention, Control and Countermeasure Plan under the Clean Water Act 40 CFR 112.

3.15.2.2 State Regulations

For the purposes of this discussion, it is assumed that the proposed Project would be considered a conditionally exempt small quantity generator per Wyoming Hazardous Waste Management Rules and Regulations Chapter 1, Section 1 (f). A conditionally exempt small quantity generator is a generator that generates less than 100 kilograms of hazardous waste in a calendar month. The State laws and regulations listed below are those that apply to conditionally exempt small generators that would be used over the lifetime of the proposed Project:

- A conditionally exempt small generator must comply with all applicable requirements of the Wyoming Hazardous Waste Management Rules and Regulations Chapter 2, Section 1(e)

The State laws and regulations listed below are those that apply to transporters of hazardous waste:

- Wyoming Hazardous Waste Management Rules and Regulations Chapter 9

The following rules and regulations provide information regarding management requirements during transportation, storage, and use of particular hazardous chemicals, substances, or materials:

- The Consolidated List of Chemicals Subject to Emergency Planning and Community Right-to-Know Act and Section 112(r) of the CAA
- DOT listing of hazardous materials in 49 CFR 172.101
- State-specific regulatory definitions of solid waste, hazardous waste, and special waste as defined in the Wyoming Hazardous Waste Management Rules and Regulations, Chapter 1.

3.15.3 Affected Environment

The proposed Project is located in a rural area used as rangeland for cattle grazing, transportation, and stone aggregate quarrying. Two transmission line corridors pass through the proposed Project site. The remainder of the land not used for rangeland, transportation, and stone aggregate quarrying is undeveloped open land. Historical land use is the same or similar to the current land uses. The proposed Project site is made up of both private and State-owned lands.

The ESA was performed to identify the presence or absence of pre-existing hazards or hazardous materials within the proposed Project site (Ecology and Environment 2009). The activities performed as part of the ESA included site reconnaissance, database review, review of aerial photographs and topographic maps, and interviews with individuals having knowledge of the site. While it is possible that hazardous materials have been used in areas used for agricultural activities, quarrying, transportation, and electric transmission (e.g., petroleum products used in heavy equipment, pesticides, herbicides, and dump sites), no evidence was found during the Phase I ESA to indicate that there are pre-existing hazardous or environmental conditions in areas proposed for development.

Hazardous materials that may be used or disposed of in conjunction with the construction, operations and maintenance, and decommissioning of the proposed Project are listed in chapter 4 in table 4.15-1.

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3.16 Health and Safety

3.16.1 Overview

This section describes the proposed Project site and surrounding study area with regard to existing emergency services including law enforcement, fire departments, emergency medical services, and emergency responders. For the purposes of this discussion, the study area extends beyond the Project site and is defined as the residences and towns or cities that receive public services from Albany County or Laramie.

Safety concerns associated with the construction of a wind power project involve standard construction-related concerns. These include the potential for injuries to workers and the general public from (1) the movement of construction vehicles, equipment, and materials, (2) falling overhead objects, (3) falls into open excavations, and (4) electrocution. These types of incidents are well understood, and do not require extensive background information.

3.16.2 Regulatory Setting

Not applicable.

3.16.3 Affected Environment

The proposed Project site is located in Albany County, approximately 18 miles south of Laramie. Other towns near the proposed Project site include Tie Siding, located approximately 1 mile northwest of the site, and The Buttes, located approximately 6 miles north of the site. Access to private land within the proposed Project site is restricted by landowners, although State Trust Land within the proposed site is accessible to the public. Land use within the proposed Project site and the surrounding study area is rural and can be characterized as rangeland in vegetation type and sparse rural residential in usage. There are some small scattered commercial activities located along transportation corridors such as U.S. Highway 287. There are two residences within the proposed Project boundary and four residences within 1 mile of the site. Although two residences are currently located within the proposed Project site, wind turbines will be placed at least 0.25 mile away from occupied residences per Albany County wind development requirements.

3.16.3.1 Law Enforcement, Fire, and Emergency Medical Services

Law enforcement services are provided by the Albany County Sheriff's office and the Laramie Police Department. The Tie Siding Volunteer Fire Department responds to fires in the study area, and the Laramie Fire Department responds to fires in Albany County. These two fire departments, along with several other volunteer fire departments, work cooperatively throughout Albany County. Emergency medical services for Albany County are provided by the Laramie Fire Department. The closest hospital to the proposed Project is Ivinson Memorial Hospital in Laramie. The hospital has emergency medical evacuation (Medevac) receiving facilities onsite, although it does not have its own Medevac unit onsite. The hospital relies on the Medevac unit based at the North Colorado Medical Center in Greeley, Colorado.

3.16.3.1.1 Fire Services

The nearest fire departments that serve the Project area are the Tie Siding volunteer fire department and the Vedauwoo volunteer fire department. The Laramie Fire Department also serves the study area.

3.16.3.1.2 Emergency Medical Services

The Laramie Fire Department is responsible for providing EMS to all of Albany County and would be the principal responder to the proposed Project site. Emergency Medevac receiving facilities are available through Ivinson Memorial Hospital in Laramie, but the hospital does not have a Medevac unit onsite and instead relies on the unit based at the North Colorado Medical Center in Greeley, Colorado.

3.16.3.1.3 Emergency Response

In Albany County, the Albany County Emergency Management Office is coordinated by the Laramie Fire Department and is responsible for responding to natural disasters and hazardous materials spills and for implementing the county's Hazard Mitigation Plan.

3.16.3.2 Electric and Magnetic Fields

Electric magnetic fields (EMFs) are present in transmission lines and all household and electrical appliances, and are produced by voltage and current, respectively. In North America, electric fields are produced at a frequency of 60 Hz. All electric devices produce electric and magnetic fields.

Voltage on any wire (conductor) produces an electric field. The intensity of the electric field is proportional to the voltage of the gen-tie line. The flow of electrical current on a wire produces a magnetic field. The intensity of the magnetic field is proportional to the current flow through the conductors. EMF extend outward from the conductor and decrease rapidly with distance from the conductor. There is no federal or Wyoming state standard for transmission line EMF.

Because the use of electric power is so widespread, people frequently are exposed to EMF from secondary power lines, home wiring and lighting, and electric appliances and tools. EMF is highest closest to these types of electrical equipment or devices and falls rapidly with distance. Existing sources of EMF within the Project site include a 345 kV and 230 kV transmission lines and electric distribution lines.

Considerable research has been conducted over the last 30 years on the possible biological effects and human health effects from EMF. This research has produced many studies that offer no uniform conclusions about whether or not long-term exposure to EMF is harmful. In the absence of conclusive or evocative evidence, some states, California in particular, have chosen not to specify maximum acceptable levels of EMF. Instead, these states mandate a program of prudent avoidance whereby EMF exposure to the public would be minimized by encouraging electric utilities to use low-cost techniques to reduce the levels of EMF.

The greatest hazard from electric generating facilities is inadvertent contact with energized objects. Actual physical contact between a grounded object and the charged objects is not necessary for electrical contact to be made. An energized object only has to be brought close to an energized conductor for a hazard to exist. If there is adequate clearance between an energized object and a non-energized object (such as a person or animal) normal activities can be performed safely around electric facilities. Potential impacts can be avoided through communication with land users near energized equipment and by using the proper precautions when operating equipment near a transmission line.

Western has developed a series of literature regarding EMF which covers a variety of topics. The brochure developed by Western is available at:
http://ww2.wapa.gov/sites/western/newsroom/Documents/pdf/EMFbook.pdf

3.16.3.2.1 Corona

Corona is caused by the electrical breakdown of air at sharp points on conductors or suspension hardware, or irregularities on the surface of conductors, and can be reduced by using hardware and conductors with no nicks, scrapes, or burrs. Water droplets, dust particles, bugs, and loose hardware can also cause increased corona. Measures for eliminating or reducing corona generally are limited to carefully handling the conductor during construction to avoid damaging the surface. The construction contractor would be expected to treat the conductor with care to avoid creating irregularities (e.g., nicks, scrapes, and burrs) on the conductor surface, which is standard industry practice.

Corona in gen-tie lines can create radio and television interference, create a humming or buzzing sound that can be heard by those directly underneath the transmission line, and can be seen as a bluish glow surrounding the conductor at night under certain conditions.

Construction of the short gen-tie line is the only Project component for which corona could be produced.

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4.0 ENVIRONMENTAL CONSEQUENCES

This chapter describes the potential impacts of Western's proposed Federal action and SWE's proposed Project on the existing resources described in chapter 3 in accordance with NEPA regulations at 40 CFR 1502.16. Since Western's proposed Federal action is a very small part of the overall proposed Project, this environmental consequences section will focus on the effects of SWE's proposed Project. This chapter includes definitions of the significance criteria used to measure and analyze environmental impacts and presents recommendations for resource-specific mitigation measures that would be implemented to reduce impacts associated with the proposed Project.

For the purposes of this analysis, the term "Federal no action alternative" means that no interconnection agreement would be executed with SWE. The "no Project option" means that SWE's proposed Project would not be constructed. This interpretation of the no action alternative and no Project option will allow Western to provide a meaningful analysis of environmental impacts to existing baseline conditions based on a comparison of Western's proposed Federal action and SWE's proposed Project.

Under the Federal no action alternative, Western would not execute an interconnection agreement with SWE. The Federal no action alternative is considered to result in no interconnection with Western's transmission system. SWE could continue to pursue the proposed Project by applying for interconnection with another transmission provider in the vicinity. Such a decision would be a SWE business decision to respond to increasing market demand for sources of renewable energy, including wind-generated electricity. Presumably, a decision to interconnect with another transmission provider would result in a project having similar impacts as described for SWE's proposed Project herein, except for those associated with the switchyard and gen-tie line to the alternate interconnection point. A NEPA analysis would not be required if there was no Federal permit or Federal land involvement, but the project would still be subject to the State and local permitting requirements discussed in this EIS.

The chapter is organized by resource sections, consistent with chapter 3. Each resource section summarizes resource issues raised by the public or Project stakeholders during the public scoping and public meeting period for the Project. The sections then describe the methodology for acquiring information, the criteria used to determine the significance of environmental impacts, and overarching versus specific findings related to the wind farm facility and the electrical collection system.

To the extent each is applicable, the analysis considers direct versus indirect, short-term versus long-term, and beneficial versus adverse effects. As described in 40 CFR 1508.8, direct effects are "caused by the action and occur at the same time and place." Indirect effects are "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems." The Project must consider “the relationship between local short-term uses of man’s environment and the maintenance and enhancement of long-term productivity.” Short-term impacts refer to impacts that are by their very nature of short duration and resulting in no permanent impacts to the resources evaluated in this EIS. Examples would be impacts to traffic during construction, increases in dust from the movement of construction equipment, etc. Long-term impacts refer to changes to resources that will endure over a period of time during the life of the project. Examples would be new road construction, turbine pads, building pads and the like.

General construction and operation mitigation practices that are integrated into the proposed Project design are presented in chapter 2. These BMPs and design features are considered an integral part of the proposed Project and would be implemented by SWE as requirements in SWE's contract with their construction contractor. In addition, mitigation measures applicable to operation and maintenance activities would be incorporated in SWE's Operation and Maintenance Plan for the Hermosa West facility, and those related to decommissioning would be incorporated in SWE's Decommissioning Plan. Mitigation measures, apart from BMPs and design features, would also be required by law, regulation, or permit conditions, and compliance would be overseen by the responsible regulatory authorities. While Western has no authority or jurisdiction over SWE's proposed Project, Western's decision to execute an interconnection agreement would consider SWE's commitments to implement these BMPs, design features, and mitigation measures and the reduction in environmental impacts that would result.

This chapter provides specific mitigation measures to address potential impacts of the proposed Project on specific resources. To the extent that these mitigation measures are not built into the Project as proposed by SWE, they will have to be committed to in the Record of Decision, and a mitigation action plan prepared per DOE regulations.

Subsequent chapters of the EIS describe the environmental impacts to natural and human resources in terms of their cumulative impacts (chapter 5), unavoidable adverse impacts (chapter 6), relationship of short-term uses and long-term productivity (chapter 7), and any irreversible or irretrievable commitment of resources (chapter 9) in accordance with 40 CFR 1502.16.

4.1 Western's Proposed Federal Action

To simplify the discussion and reduce confusion, the impact analysis in sections 4.2 through 4.16 focuses on the much larger SWE proposed Project and this chapter focuses on the proposed Federal action. The impact analysis in sections 4.2 through 4.16 applies to and supports the impact findings presented for Western's proposed Federal action that are summarized below.

The impacts of Western's proposed Federal action are expected to be minor given the small footprint of the proposed interconnection facilities. Western's proposed Federal action consists of 10 acres of permanent disturbance and 2.8 acres of temporary disturbance, whereas, SWE's proposed Project consists of 140 acres of permanent disturbance and 409 acres of temporary disturbance. The impact analysis in this chapter provides a summary of potential impacts as they relate to all of the issue areas analyzed in this EIS. Western would comply with those mitigation measures applicable to its much smaller action as well as those listed in chapter 2. Western would also comply with the agency's Construction Standard 13. Table 4.1-1 provides a list of the resources analyzed, the anticipated level of impact after mitigation measures are implemented, and the mitigation measures that are proposed to be implemented.

Table 4.1-1:
Summary of Impacts of Western's Proposed Federal Action

Issue Area	Level of Impact after Implementing Mitigation	Proposed Mitigation Measures
Land Use	Less than significant	None proposed – impacts are less than significant without mitigation
Biological Resources – Water, Wetlands, and Floodplains	Less than significant	WAT-10: To protect water and wetland resources, a SWPPP that includes erosion control measures will be prepared and its requirements will be implemented onsite for the proposed Project. The SWPPP will be based on USEPA requirements.
		WAT-11: The SWPPP will require the use of water or other dust control measures on or near heavily used public roads and roads internal to the Project. Dust control measures will be included to protect water quality, minimize affects to local residents, and minimize affects to vehicles traveling along local roads.
		WAT-12: The proposed Project will obtain a General Stormwater Construction Permit from the WYDEQ.
		WAT-13: SWE will develop a restoration plan to minimize permanent effects to associated wetlands. Upon the completion of the proposed Project, disturbed portions of the Project site will be restored to pre-construction contours to the extent practicable, with exception of permanent facilities including the turbine foundations, access roads, and permanent Project facilities (i.e., operations and maintenance area and substation). Restoration will be done in accordance with the requirements of the permit.
Biological Resources – Vegetation	Less than significant	VEG-8: Upon completion of construction of the proposed project, SWE will conduct a Post-construction weed inventory survey to validate the effectiveness of the weed management program and insure that invasive weed level have not exceeded base levels.
		VEG-9: SWE will coordinate with the weed management contractor and project landowners regarding specific treatment methods for approval on their respective properties.
		VEG-10: Records, which track weed inventories, treatments, monitoring, and re-infestation trends will be kept.

Table 4.1-1:
Summary of Impacts of Western's Proposed Federal Action

Issue Area	Level of Impact after Implementing Mitigation	Proposed Mitigation Measures
		VEG-11: SWE will maintain appropriate weed management documentation, including the pre-disturbance weed inventory, management goals for invasive and noxious weeds, the annual weed inventory and weed management report, pesticide application records and pesticide use reports.
Biological Resources-Wildlife and Habitat	Less than significant	WL-7: BMPs listed in table 2.6-1, the SWPPP, and SPCCP such as silt fencing and placement of excavated material away from streams will be implemented to avoid or minimize potential impacts to fish species. Open-bottom culverts will be used where practicable during road construction to avoid changing stream morphology or removing suitable fish habitat.
		WL-8: Water quality BMPs will be implemented to minimize any unforeseen impacts to the Platte River System's watershed including the use of appropriate sediment and erosion control measures, such as silt fencing and/or hay bales near water bodies and wetlands and the installation of construction barriers and notices to identify sensitive receptors. Furthermore, construction work areas, turbines, access roads, and facilities will be sited outside of wetlands and water bodies, to all extents practicable, to further minimize impacts to the Platte River System watershed (ERM 2010f).
		WL-9: Individuals of threatened and endangered wildlife species passing through the Project site will be allowed to pass unharmed and unharassed, as required under the ESA. This will be accomplished by the implementation of a no approach, no kill policy for all threatened and endangered species by all onsite personnel during construction and operation activities.
		WL-10: Avian collisions with guy wires will be avoided by using self-supporting meteorological towers which do not use guy wires.
		WL-11: Wind turbines will be lighted using FAA requirements.
		WL-12: The USFWS will be notified within 24 hours of federally listed species mortality on the Project site.
		WL-13: As cited in WEST (2010b), impacts to raptor species may be minimized by not placing wind turbines inside spatial buffers (following the recommendations provided by the WGFD in a letter dated June 22, 2009) around the following: - Known raptor nest sites during siting of the wind-energy facility as well as avoiding the two small white-tailed prairie dog colonies identified. - The three small white-tailed prairie dog colonies, to help to minimize impacts to foraging raptors.
Cultural Resources	Less than significant	CUL-4: If the Project design cannot be modified to avoid impacts to sites 48AB1932 and 48AB1933, conduct additional studies to assess NRHP eligibility and, if necessary, conduct data recovery excavations to mitigate impacts.
		CUL-5: Develop an Unanticipated Discoveries Plan that describes procedures for responding to the discovery of archeological or other cultural resources, including unmarked graves, during construction
		CUL-6: Develop plans for ongoing protection and monitoring, as appropriate, of identified cultural resources during the operational life of the Project
Paleontological Resources	Less than significant	None proposed – through implementation of SWE's proposed BMPs, impacts are less than significant and no mitigation measures would be required. See Section 4.5 for a list of SWE's proposed BMPs.
Noise	Less than significant	None proposed – through implementation of SWE's proposed BMPs, impacts are less than significant and no mitigation measures would be required. See Section 4.6 for a list of SWE's proposed BMPs.

Table 4.1-1:
Summary of Impacts of Western's Proposed Federal Action

Issue Area	Level of Impact after Implementing Mitigation	Proposed Mitigation Measures
Visual	Less than significant	VIS-8: The building will be painted with earth-tone colors from the BLM Standard Environmental Colors palette or as required by Albany County to reduce visual contrasts from color.
		VIS-9: Outdoor facility lighting will be designed with light caps, and where practicable motion sensors, to minimize offsite glare.
		VIS-13: The towers will be composed of materials and colors that minimize reflectivity. The remaining length of the towers will either be unpainted galvanized steel and be grayish blue in color, or painted to conform to FAA specifications and Albany County requirements of either white or gray.
		VIS-14: Required obstruction lights will be synchronized to flash with obstruction lights of wind turbines.
		VIS-18: Turbine components will be painted with a light, non-reflective color such as white or gray in accordance with the Albany County Wind Siting Regulations (Albany County 2011).
Air Quality	Less than significant	AQ-14: Preparation of a Fugitive Dust Control Plan will be required for the Project pursuant to Wyoming Air Quality Standards and Regulations Chapter 3, Section 2(f).
		AQ-15: An onsite construction manager will be responsible for the implementation and compliance of the construction mitigation program, including the Fugitive Dust Plan. The documentation of the ongoing implementation and compliance with the proposed construction mitigation activities will be provided to WDEQ-AQD on a periodic basis as required.
		AQ-17: Maintenance vehicles subject to the State's motor vehicle registration and emissions compliance programs will be properly registered and comply with any and all motor vehicle "tailpipe" emissions standards and testing requirements based on model year and vehicle type.
		AQ-18: SWE will work with operations and maintenance contractors to use USEPA Tier 2/Tier 3 engine-compliant equipment where applicable, i.e., when equipment rated at more than 100 horsepower is required, to ensure periodic maintenance and inspections per the manufacturer's specifications, and to reduce idling time through equipment and maintenance scheduling.
		AQ-19: Any small or minor stationary sources of air pollutants that are subject to the WDEQ-AQD permitting regulations will be properly permitted prior to being brought onsite or utilized onsite. These sources would typically be emissions units including, but not limited to, emergency electrical generators, small maintenance shop degreaser units, etc.
Transportation	Less than significant	TRANS-12: No improvements are expected to be required for either the Federal highways (I-80, U.S. Highway 287) or State highways (WY 130/230) since the expected future traffic volumes and LOS during construction and decommissioning phases of the Project are acceptable. In addition, since these roads met WYDOT and Federal standards for highway design, the existing slopes, load capacities, vertical curves, and turning radii for these roads are assumed to be within the safety criteria for transport of the Project turbine components. Nonetheless, the I-80/WY 130/230 interchange and U.S. Highway 287/CR 31 intersection would be evaluated in greater detail during the detailed design phase of the Project. If deemed necessary, upgrades to these intersections would be addressed at that time.

Table 4.1-1:
Summary of Impacts of Western's Proposed Federal Action

Issue Area	Level of Impact after Implementing Mitigation	Proposed Mitigation Measures
		TRANS-13: Culvert and waterbody crossings would be designed in consultation with the WGFD and applicable professional engineering standards. In addition, such waterbody crossings and culverts would be constructed in a manner that prevents sediment erosion, deposition of sediment, and minimizes impacts to any wetlands, waterbodies, and other environmentally sensitive areas.
		TRANS-21: Transport of Project equipment and materials to the site would be performed by professional transportation companies familiar with the type of equipment, loads involved, and DOT, WYDOT, and Albany County regulations.
		TRANS-22: Road signs would be erected to notify travelers and local residents that construction is occurring in the area and provide information regarding the timing and route for oversized vehicle movements and deliveries. The erection/placement of road signs and the Project construction activities would be performed in accordance with the Albany County Zoning Resolution (Albany County 2011) and coordinated with the Albany County Road and Bridge Department.
		TRANS-23: The Project construction activities would not begin until SWE has received authorization and approval by the County Planning and Zoning Commission and County Board of Commissioners.
		TRANS-24: As required by applicable permits, SWE's transportation contractor(s) would utilize escort vehicles (or police vehicles if required by WYDOT) to escort large oversized loads and convoys of large vehicles and to give drivers additional warning.
		TRANS-25: The transportation contractor for the Project would obtain oversized vehicle permits in conjunction with the use of escort vehicles as required by Federal, State, and Albany County regulations.
		TRANS-26: On turbine access roads where cranes may be traveling fully rigged, overhead obstructions must be temporarily removed for the full width of the road to secure free passage of the cranes and possibly other transportation vehicles. The Project would invoke OSHA minimal interference from overhead power lines rules and necessary safety precautions would be applied in situations, if any, requiring temporary removal of overhead power lines.
Recreational Resources	Less than significant	None proposed – through implementation of SWE's proposed BMPs, impacts are less than significant and no mitigation measures would be required. See Section 4.10 for a list of SWE's proposed BMPs.
Socioeconomics	Less than significant	None proposed – impacts are less than significant without mitigation
Environmental Justice	Less than significant	None proposed – impacts are less than significant without mitigation
Agriculture	Less than significant	None proposed – impacts are less than significant without mitigation
Geology and Soils	Less than Significant	None proposed – through implementation of SWE's proposed BMPs, impacts are less than significant and no mitigation measures would be required. See Section 4.14 for a list of SWE's proposed BMPs.
Hazardous Materials	Less than significant	HAZ-6: If oil products are stored above ground in quantities greater than 1,320 gallons, a SPCC Plan developed in accordance with 40 CFR 112 will be implemented that will define procedures for storage, clean up, and disposal of materials associated with construction, operations and maintenance and decommissioning of the proposed Project. As defined in the SPCC Plan and the HSSE Plans, a spill response crew would respond to accidental releases
		HAZ-7: If an accidental spill of hazardous materials occurs as a result of improper handling or a transportation accident, the materials will be promptly cleaned up by trained spill response crews in accordance with the HSSE plans.

Table 4.1-1:
Summary of Impacts of Western's Proposed Federal Action

Issue Area	Level of Impact after Implementing Mitigation	Proposed Mitigation Measures
		HAZ-8: A certified waste disposal company will be contracted to properly dispose of wastes according to Federal, State, and local regulations.
		HAZ-9: Prior to construction, SWE will prepare a Decommissioning Plan for the proposed Project in accordance with Albany County Wind Energy Siting Regulations and in accordance with Section 10 of the WYDEQ Rules and Regulations of the Industrial Siting Council. The plan will be updated as necessary throughout the lifetime of the Project to reflect changes in local, State, and Federal regulations. The Plan will document hazardous waste management and disposal procedures.
		HAZ-10: Should previously unknown hazardous materials such as contaminated soils be encountered within the site during construction, operations and maintenance, or decommissioning, the materials will be identified and the appropriate agency will be informed. If this occurs during construction, construction will be halted at the location where the potentially hazardous material is identified.
		HAZ-11: All potentially hazardous materials will be handled, processed, treated, stored, and disposed of in accordance with Federal, State, and county rules and regulations and label instructions.
Health and Safety	Less than Significant	PHS-4: HSSE Plans will be prepared for worker protection, as required by OSHA, with emphasis on safety and health regulations for construction and operations and maintenance. During Project construction, operations, and maintenance, all employees would be required to conform to safety procedures and to receive appropriate training for their job responsibilities. The HSSE Plans will include requirements for first aid and other emergency medical material to be stored on site and in maintenance vehicles.
		PHS-5: Heavy equipment will be outfitted with OSHA-required safety devices. Hard hats, safety boots, ear and eye protective equipment, and other safety equipment will be used on the construction site.
		PHS-6: To minimize workplace dangers, all construction activities will comply with applicable State and Federal worker health and safety regulations which are the primary responsibility of the Wyoming Department of Employment, Occupational Health and Safety and OSHA, respectively. OSHA regulations that are applicable to the proposed Project include 29 CFR 1910 (general industry standards and 29 CFR 1926 (construction industry standards). Additionally, the State of Wyoming has an occupational safety and health program in accordance with Section 18 of the Occupational Safety and Health Act of 1970. Adherence to these regulations is mandatory and will minimize risk to workers.
		PHS-13: Wind turbines will be set back from residences, public roads, and railroads in accordance with Albany County Wind Energy Siting Regulations. This will minimize hazards associated with turbulence, ground blizzards, and drifting snow caused by wind turbines, and in the rare event of blade breakage or ice throw.

4.1.1 Federal No Action Alternative

Under the Federal no action alternative, Western would not execute an interconnection agreement with SWE and the proposed Project would not be interconnected with Western's transmission system. For the purposes of the analysis in this EIS, the Federal no action alternative is considered to result in SWE's Project not being constructed.

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4.2 Land Use

This section discusses the potential impacts to land use associated with the implementation of SWE's proposed Project. The proposed Project elements analyzed include SWE's construction and operation of the wind farm, including Western's associated interconnection facilities (proposed Federal action). For the purposes of this analysis, the study area includes Albany County, where the proposed Project site is located.

4.2.1 Methods

The impact evaluation provided below focuses on the following issues: (1) the conformity of the proposed Project with local land use plans, ordinances, and policies, and (2) the potential for the proposed Project to have direct and indirect land use conflicts with existing and planned uses. Comments received during public scoping and summarized in table 1.10-1, were considered in evaluating the impacts associated with the proposed Project. Sources of information consulted for this land use discussion are as follows:

- Albany County Comprehensive Plan (2008)
- Albany County Zoning Resolution (2011)
- Site visit (April 2010)
- Personal communication with Albany County Planning Department (Gertsch 2010)
- Aerial photos accessed via Google Earth (July 2010)

4.2.2 Significance Criteria

A significant impact to land use would result if any of the following were to occur from construction or operation of the proposed Project:

- Conflict with applicable land use plans, policies, goals, or regulations
- Unresolved conflict with existing utility rights-of-way
- Conflict with Federal or State or established, designated, or reasonably foreseeable planned special use areas (e.g., recreation, wildlife management area, game management areas, waterfowl production areas, scientific and natural areas, wilderness areas, etc.)
- Conflicts with any applicable habitat conservation plan or natural community conservation plan

The search for a site in southeastern Wyoming was begun by SWE in 2008. A variety of criteria were used to identify potential sites leading to the one currently proposed in SWE's application for interconnection. SWE's objectives were to find a location with favorable wind conditions that maximized the key environmental and physical criteria to increase compatibility and minimize conflict as follows: (1) avoid wildlife and critical habitat areas, (2) be proximate to existing high-voltage transmission line(s), (3) ease of access, and (4) favorable interest from landowners.

Other criteria that played a role in SWE's selection of the proposed Project site included the desire to locate the proposed Project on private land. An area where fewer landowners hold large tracts of land was important to SWE because it would result in negotiating fewer lease agreements. The topographic characteristics were also important in considering the proposed Project site. The selected site consists primarily of rolling prairie and does not have steep slopes that would result in increased construction costs.

During the public scoping meetings and public comment period for the Project from January 14, 2010, to March 1, 2010, Western received several comments specifically expressing concerns:

- Concern about how the proposed Project might affect the agricultural and residential nature of the current and future land use in the area
- Concern that the proposed Project may affect future land uses for the area, such as planned subdivisions, because a wind farm is incompatible with residential land use and falls into the industrial land use category
- Statement that wind development is preferable to residential subdivision development because subdivided land is associated with destruction of native flora, fauna, habitat, and ground cover; intensive water use; and negative effects on the viewshed, taxes, fire protection, law enforcement, and roads
- Statement that wind development is compatible with open space, habitat for wildlife, and agricultural activities, while subdivision development is not
- Statement that agricultural land in the area is not economically viable and is marginally productive, so wind development provides an additional opportunity to generate income for ranch or agricultural landowners
- Statement that the proposed Project location allows for interconnection to existing transmission lines and is, therefore, less land intensive with less impact to the environment compared to other potential wind farm locations

4.2.3 Impact Assessment of the Proposed Project

The proposed Project would consist of the construction and operation of between 100 and 200 wind turbines, access roads, four permanent meteorological towers, 34.5-kV power collection tie lines, a Project substation, an adjacent Western switchyard, a very short 345-kV gen-tie line, metering equipment, and an operations and maintenance building.

The Project site is designated as Agricultural (A, 40 acres or greater) in the Albany County Comprehensive Plan. The Albany County Zoning Resolution classifies the Project site as Agriculture. Commercial wind energy projects are considered a permitted use within the Agriculture zone. Albany County has adopted Wind Energy Siting Regulations (Albany County 2008, Zoning Resolution Chapter V, Section 8) to govern the siting of WECS, WECS projects, and substations that provide electricity to be sold to wholesale or retail markets (with certain exceptions). Implementation of the proposed Project establishing a wind farm on the site would be in conformance with existing Albany County Comprehensive Plan and zoning designations for the site, and would not represent a conflict with applicable land use plans, policies, goals, or regulations. No conflicts with any applicable habitat conservation plan or natural community conservation plan would be anticipated. Hence, there would be no conflicts with applicable plans and policies.

Temporary disturbances during construction would impact approximately 409 acres of land, or 4 percent of the total acreage within the Project site. Permanent facilities (access roads, wind turbines, and other permanent Project facilities) supporting the proposed Project would impact approximately 140 acres of land, or 1.25 percent of the total 11,125 acres. Together, the permanent and temporary disturbances would total approximately 4.5 percent of the total acreage. The 11,125-acre site is currently used for cattle grazing, a portion of which would be converted for energy generation for the duration of the proposed Project's operations. The proposed Project would not impede the use of the land for grazing or other activities such as recreation (e.g., hiking, birding, fishing, and hunting) or mineral extraction because the 10-acre substation and switchyard and 2-acre operations and maintenance building are the only proposed Project components that would be fenced. Current ranchland and agricultural land uses would continue except within these small fenced areas. A beneficial impact to lessees within the Project site would be an additional opportunity to generate income. This impact is addressed in more detail in section 4.10. The mineral resources found within the proposed Project site are limited to sand and gravel deposits, as described in section 4.13. These resources have limited economic viability, but extraction activities in the future could be impacted because of the presence of buried electrical cable. SWE would work with mineral lease holders to design the Project such that potential mining activities would not be impacted. Impacts associated with agricultural uses and mineral resources are expected to be minor.

The closest existing wildlife refuge area, Hutton Lake NWR, lies approximately 8 miles to the northwest of the Project site. A description of this wildlife refuge and potential impacts are presented in section 4.9. No conflicts with this or any other Federal or State established, designated, or reasonably foreseeable planned special use areas would be anticipated during construction, operation, and maintenance of the proposed Project.

Although the majority of the area would not be affected by the proposed Project, the entire 11,125 acres would occupy land leased from private landowners and the State of Wyoming. No eminent domain proceedings would be required, and no Federal or federally protected lands would be impacted. Lease agreements have been entered into between SWE and the landowners, so the landowners are aware of and comfortable with the proposed Project and the limitations it would place on future residential development or land use on their lands.

The closest existing residence outside the proposed Project site is approximately 2,750 feet, or 0.52 miles, from the nearest proposed turbine location. The privately owned Fish Creek Ranch Preserve, located just west of the proposed Project site, is situated on 4,242 acres and contains 14 home sites, most of which have been developed. Other residences nearby are to the north and south of Fish Creek.

One scoping comment (summarized in table 1.10-1) concerned land use impacts from the Project's proximity to existing transmission lines. Because the proposed Project site is adjacent to Western's existing Craig–Ault transmission line, land use impacts associated with constructing the interconnection line would be minimized compared to other potential wind farm locations further from existing transmission lines. While it is recognized that development of a wind energy facility on the proposed Project site would affect the rural character of the study area, comments from some landowners (summarized in table 1.10-1) indicated that the proposed Project was preferable to additional subdivision of land for housing in the study area. Other landowners viewed the loss of rural character as being most important. These concerns are more closely associated with visual impacts than land use, and are addressed in section 4.7, Visual Resources. The wind energy facility is a compatible use under Albany County Zoning Resolution Chapter V, Section 8. Establishment of a wind energy facility on the proposed Project site is, therefore, a permitted use on lands of willing lessees, and would not be expected to generate adverse land use impacts. Impacts to land use from the proposed Project would be less than significant.

4.2.4 Impact Assessment of SWE's No Project Option

Under the no Project option, it is assumed the proposed Project would not be built and environmental impacts associated with construction and operation of it would not occur. Land use could remain the same; however, other similar parcels in the area are being subdivided for large lot rural residential development. Lessees would not receive financial compensation for the use of their lands for the purposes of the proposed Project under the no action alternative. Lessees could decide to continue to use their lands for grazing purposes, or in the absence of SWE lease payments, could elect to pursue other development opportunities on their properties.

4.2.5 Mitigation Measures

SWE considered potential land use impacts when developing and designing their proposed Project. No significant impacts to land use would result from the construction and operation of the Project as proposed; therefore, no additional mitigation measures are required.

4.3 Biological Resources

4.3.1 Water, Wetlands, and Floodplains

This section describes the water, wetlands, and floodplains present in and near the approximately 11,125-acre proposed Project site. The proposed Project site consists of the wind farm site and the Western interconnection facilities (proposed Federal action). For the purposes of this EIS the study area for water resources extends beyond the proposed Project site boundary to include three primary aquifers, portions of which underlie the proposed Project site.

The CWA established objectives for the restoration and maintenance of chemical, physical, and biological integrity of the Nation's waters and goals for achievement of those objectives.

The provision of EO 11990, Protection of Wetlands, May 24, 1977, directs that actions should be taken to minimize the destruction, loss, and degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetland ecosystems.

The provisions of EO 11988, Floodplain Management, May 24, 1977, direct that actions should be taken to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values provided by floodplains.

4.3.1.1 Significance Criteria

Significant effects 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 indirect effect to groundwater would occur if the following were experienced from construction or operation of the proposed Project:

- Degradation of groundwater quality downgradient of the Project that would cause exceedances of State standards
- Groundwater depletion or interference with groundwater recharge that would adversely affect existing or proposed uses of a downgradient or deep aquifer

Significant effects 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 or stormwater runoff that would result in a violation of Federal and/or State water quality standards
- Surface water quality degradation that causes a long-term loss of human use or use by aquatic wildlife and plants

- Alteration of the existing drainage pattern of the site or area that would result in offsite erosion or siltation resulting in adverse effects to adjacent properties and downstream ecosystems
- Surface water impacts that would violate Section 404 of the CWA or other applicable surface water regulations, including State-established standards for designated uses

Significant effects 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 CWA or other applicable regulations
- 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

Significant effects on floodplains would result if any of the following were to occur from construction or operation of the proposed Project:

- Modification of a floodplain that would impede or redirect flood flows that would result in property damage onsite or offsite
- Construction within floodplains, wetlands, or rivers that would adversely affect the flood-carrying capacity of the floodplain, the pattern, or magnitude of the flood flow
- Increased scouring during a flood event that would result in structural or property damage

Public scoping for this proposed Project raised several issues related to water resources. These issues included the questions and comments listed below, which were considered in this analysis.

- Will the proposed Project affect mapped floodplains?
- Erosion and slope failure may be significant and could result in water quality degradation. How will the proposed Project guard against these effects?
- Are there fen wetlands in the Project area? If so, they should be avoided.
- Provide information on CWA Section 303(d) impaired waters in the Project area and describe how the proposed Project will avoid further degradation of these waters.
- Construction and adverse effects to wetlands should be avoided as per EO 11990. Where avoidance is not possible, then minimization and mitigation measures should be carefully planned and executed.

Through implementation of mitigation measures, construction and operation of SWE's proposed Project would not significantly impact groundwater, surface water, wetlands and riparian areas, or floodplains.

4.3.1.2 Impact Assessment of the Proposed Project

4.3.1.2.1 Methods

Proposed Project site water resources were mapped and are described in section 3.3. Geographic Information System (GIS) tools were used to quantify the potential acreage of effects by overlaying proposed Project features on each mapped water feature type (e.g., streams and wetlands). Desktop results were then field verified. Effects were classified based on projected type (direct, indirect and cumulative), and duration (short- and long-term) of each effect. Cumulative effects are discussed in section 5.2.

4.3.1.2.2 Groundwater

The estimated volume of water needed during construction of the proposed Project is 54,000 gallons per day or 43 acre-feet/year. The exact geological source for this water has not yet been determined, and there are several possible sources. The water used during construction would be drawn from a permitted source not to exceed the amount of the permit. The water used would not be hydrologically connected to the Platte River system. Therefore, there will not be depletion to the Platte River. USFWS established in 2007 that the depletive effects of projects whose water supply is solely derived from sources that are considered “not hydrologically connected” to the Platte River system do not need to be addressed in consultation with the USFWS.

4.3.1.2.2.1 Direct Effects

During facility construction, work crews would rely on drinking water and portable toilets trucked onto the Project site. Portable toilets would be serviced by the contractor providing the facilities. Also during Project construction, the contractors providing concrete batch plant and dust suppression services would supply water for those operations from existing offsite facilities. Similarly, the contractors providing blade washing services during Project operation would supply water for that operation from offsite. Water for emergency services such as firefighting, would be supplied by a local fire department. A permanent groundwater well would be installed near the operations and maintenance building to supply the Project staff with potable water and restrooms during facility operation. The estimated annual water use from this well is approximately 1-acre foot per year. The groundwater well also would provide water for incidental uses, such as vehicle washing. Groundwater in Wyoming is considered to be property of the State. Installation of the groundwater well would be coordinated with the SEO, and SWE would submit an application and secure an approved permit application prior to well drilling.

4.3.1.2.2.2 Indirect Effects

The proposed Project is not anticipated to generate biological, chemical, or physical contaminants that would migrate into downgradient or deeper aquifers. Project construction or operations would not adversely affect the recharge or discharge of groundwater in a downgradient or deep aquifer. SWE would employ BMPs throughout the construction process. Trained spill response crews would respond to accidental releases in accordance with the HSSE plans.

4.3.1.2.3 Surface Water

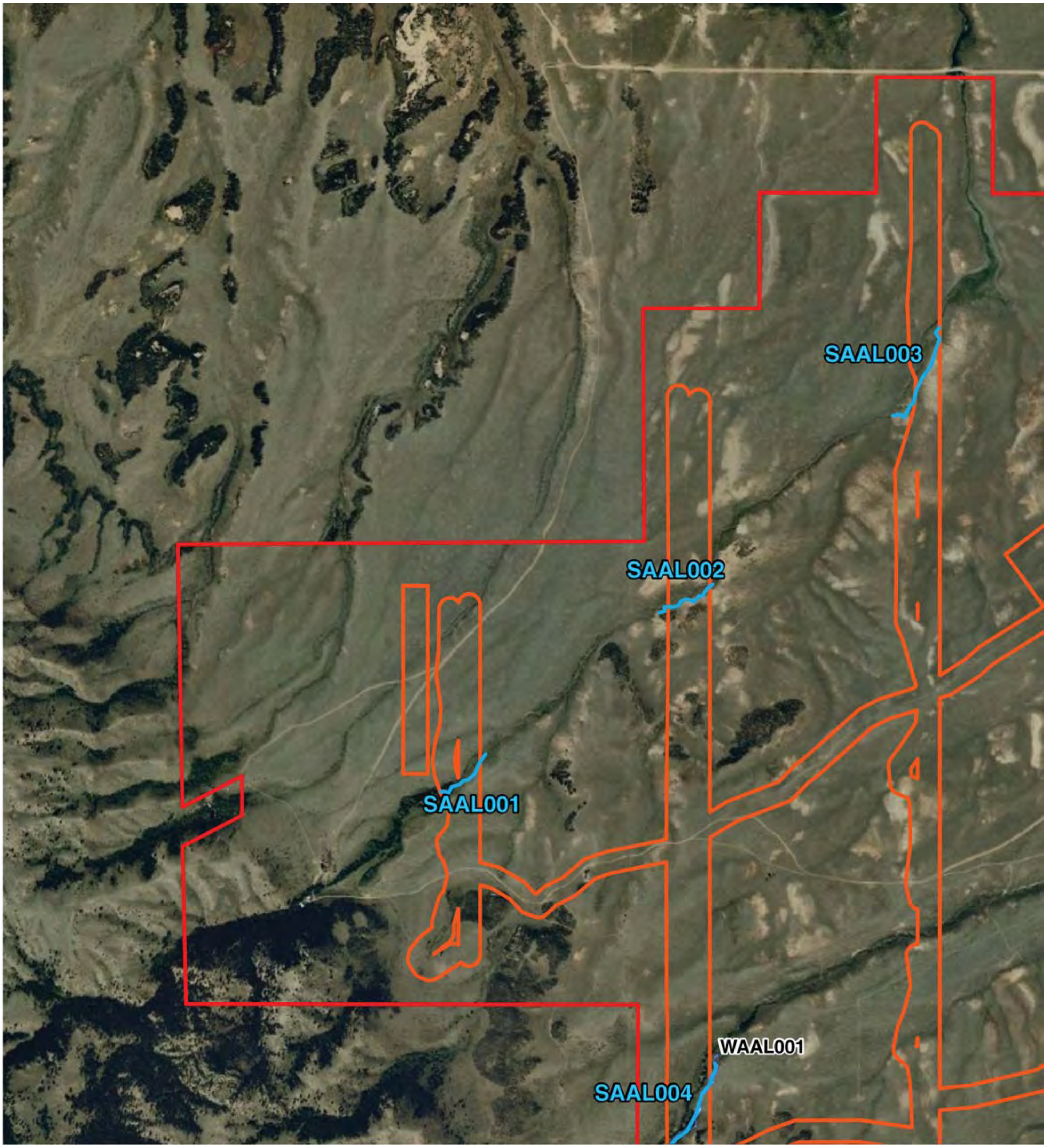
In November 2009, the proposed Project was redesigned to avoid 15 of 45 originally identified waterbodies and to use existing crossings to minimize further adverse effects to wetlands (see section 4.3.1.2.5). The current Project design has a total of 30 waterbody crossings for access roads and electrical connection lines (ERM 2010i) (figures 4.3-1a through 4.3-1h). Of these, 12 are perennial streams, 8 are intermittent streams, and 10 are ephemeral streams (table 4.3-1). A description of each of these stream crossings is presented in table 4.3-2 and includes information on stream flow, stream width, water quality, substrate, and known disturbances. The 30 waterbody crossings are a conservative estimate based on the current design; however, SWE will continue to work on reducing the number of waterbody crossings as the project design continues to develop.

4.3.1.2.3.1 Direct Effects

Waterbody crossings are necessary to construct the access roads and install underground electrical connection lines. Thirteen of the 30 stream crossings are located along existing roads throughout the proposed Project site and may or may not require modifications. Installation of all crossings would be implemented using appropriate BMPs. Permanent Project facilities would be sited outside the ordinary high water mark of waterbodies and outside riparian habitat.

The total linear measurement of all stream crossings is estimated to be 354 feet. Road widths are estimated to average 16 feet, affecting an estimated 5,664 square feet, or 0.13 acres of road over streams. Section 4.3.1.2.5 provides the delineated estimate of permanent effects to the combined resources of jurisdictional wetlands and other waters of the U.S. equal to 0.07 acre (ERM 2010i).

SWE has not completed detailed design of the stream crossings, but SWE has committed to using open bottom culverts as appropriate to reduce the habitat impacts of stream crossings. SWE will also continue to coordinate with USFWS to reduce the number of stream crossings and the impact to stream habitats. The construction equipment used to build the stream crossings could include a bulldozer, hoe and ram hoe, grader, compactor, and/or haul truck (as indicated in table 2.3-1 under “Road Construction”). The type of access road crossings have not yet been designed, but will include a variety of construction methods including round and box culverts, bottomless culverts and low-water crossings. These crossings will be designed in conjunction with wildlife officials to ensure minimal impact on the stream habitat.



Waterbody Crossings

- Culverts/Drains
- Waterbodies
- Stream Start/End Point
- Wetlands
- Hermosa West Wind Energy Project Area
- Survey Area

0 1,400 2,800 Feet

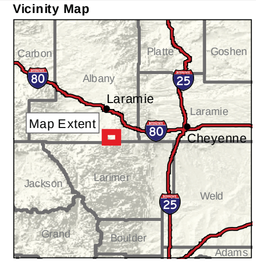


FIGURE 4.3-1A: WATERBODY CROSSINGS

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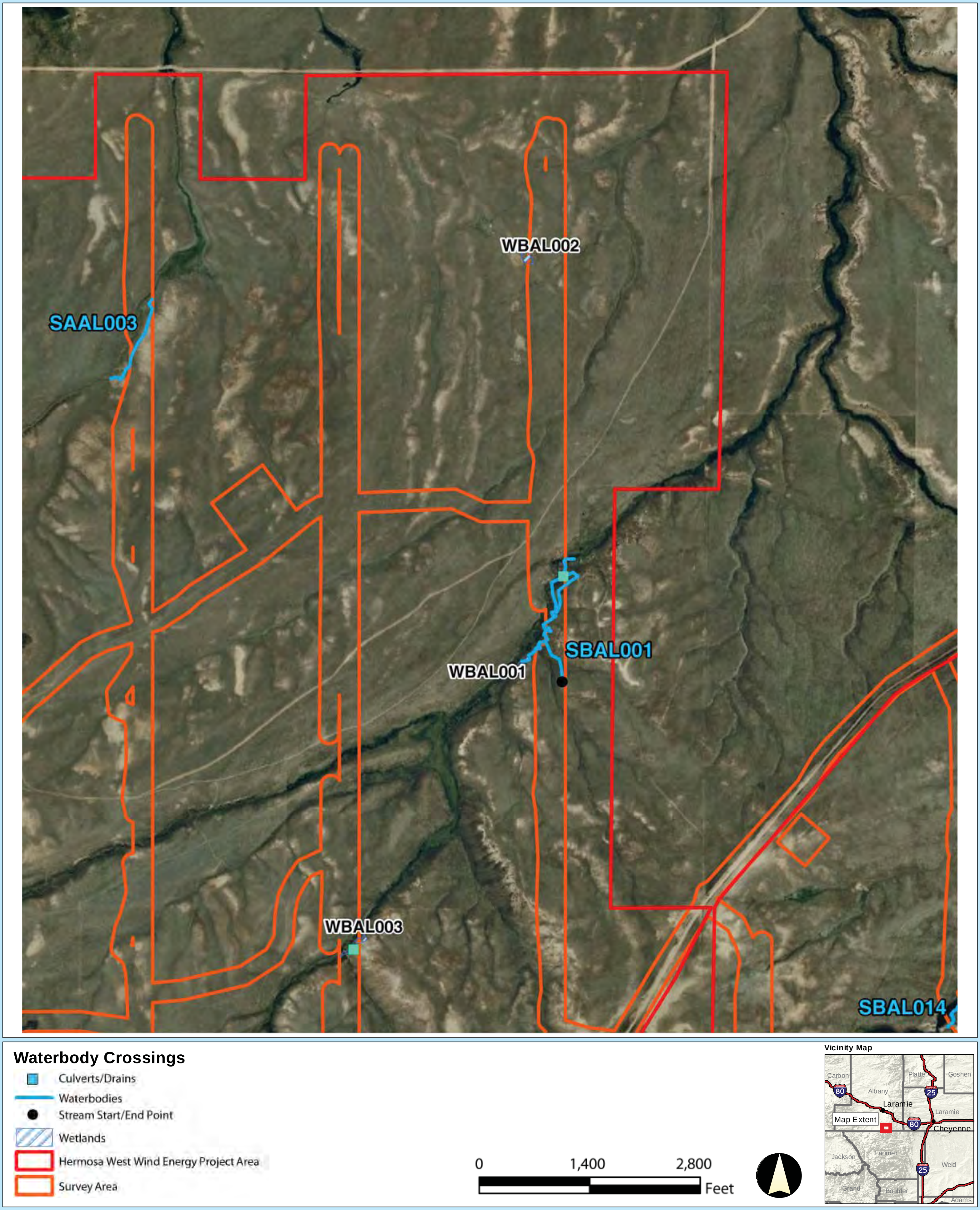

HERMOSA WEST WIND ENERGY PROJECT

FIGURE 4.3-1B: WATERBODY CROSSINGS

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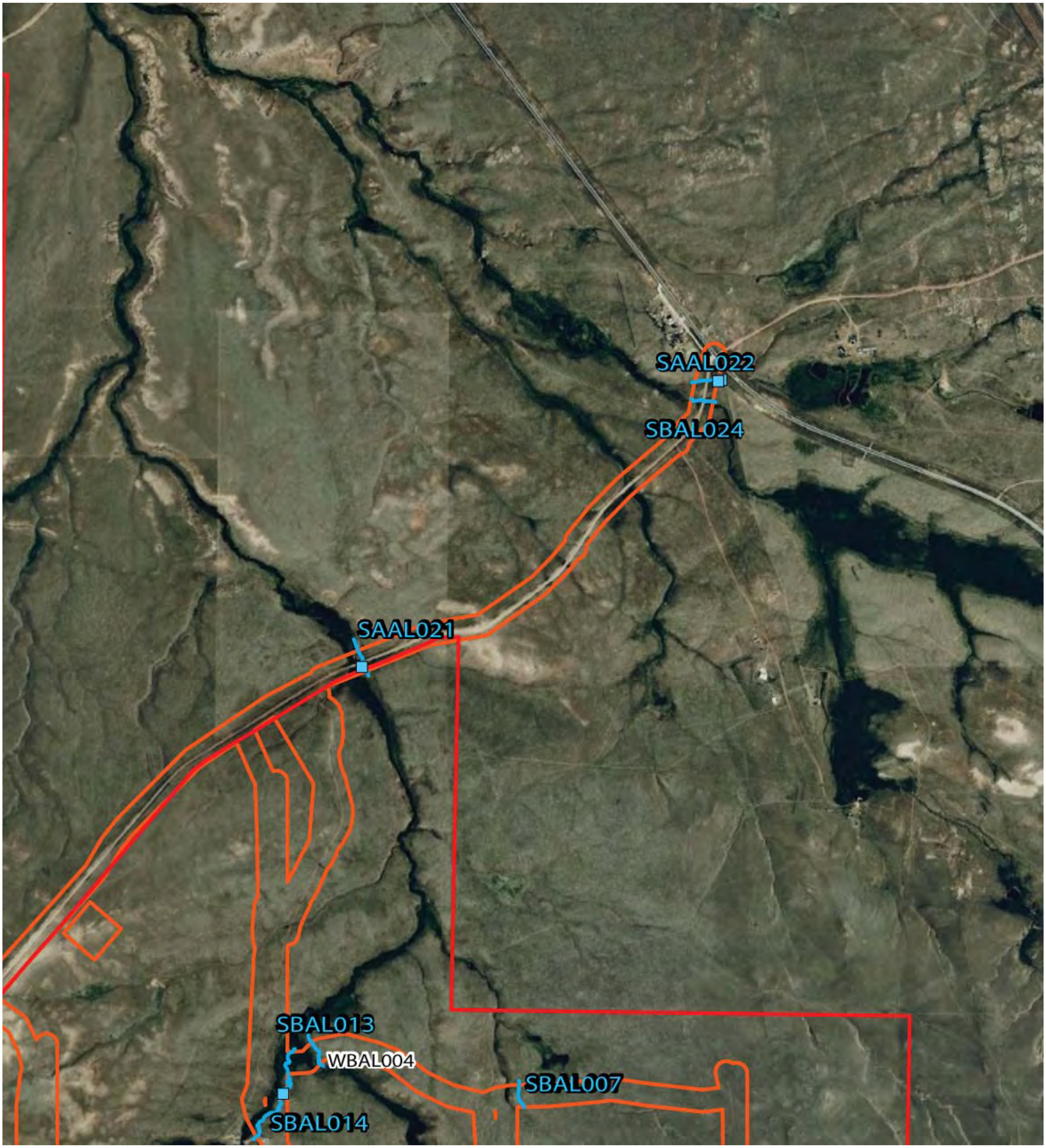
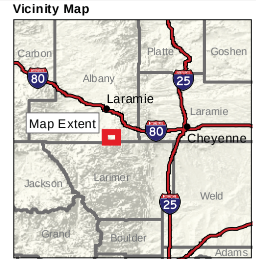


Waterbody Crossings

- Culverts/Drains
- Waterbodies
- Stream Start/End Point
- Wetlands
- Hermosa West Wind Energy Project Area
- Survey Area

0 1,400 2,800
Feet

Vicinity Map



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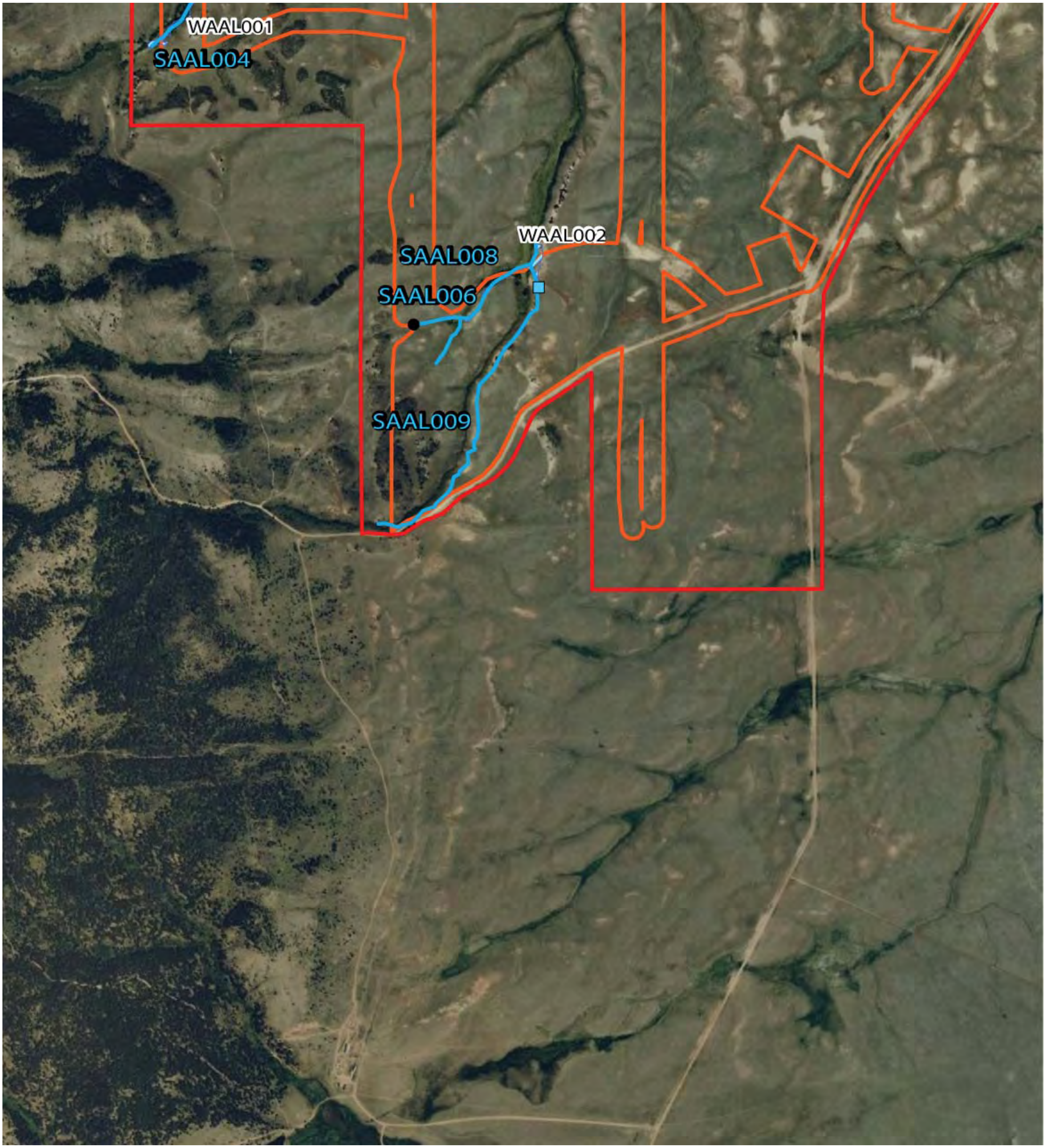
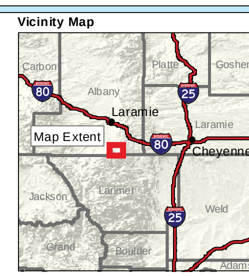


Waterbody Crossings

- Culverts/Drains
- Waterbodies
- Stream Start/End Point
- Wetlands
- Hermosa West Wind Energy Project Area
- Survey Area



HERMOSA WEST WIND ENERGY PROJECT

FIGURE 4.3-1D: WATERBODY CROSSINGS

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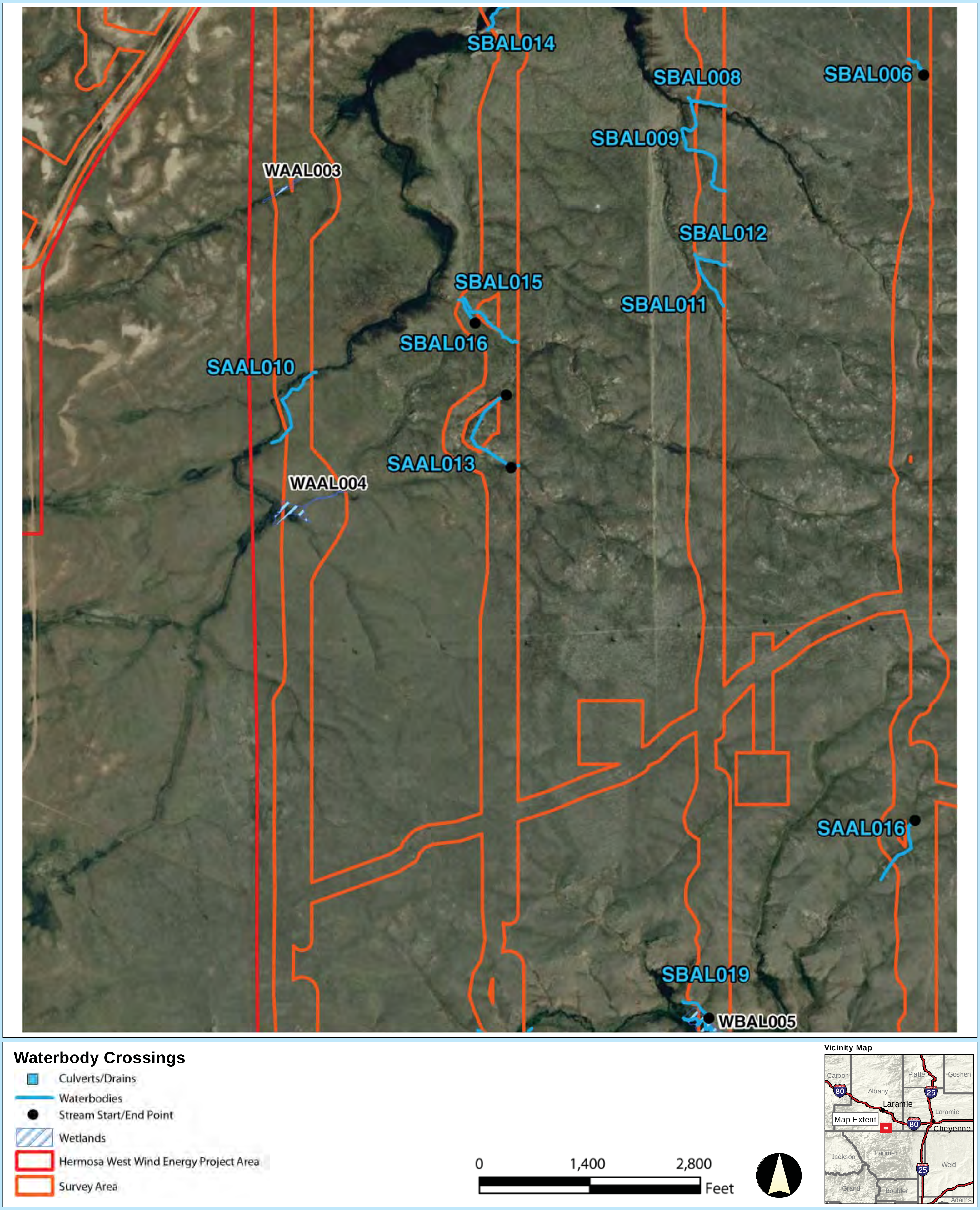

HERMOSA WEST WIND ENERGY PROJECT

FIGURE 4.3-1E: WATERBODY CROSSINGS

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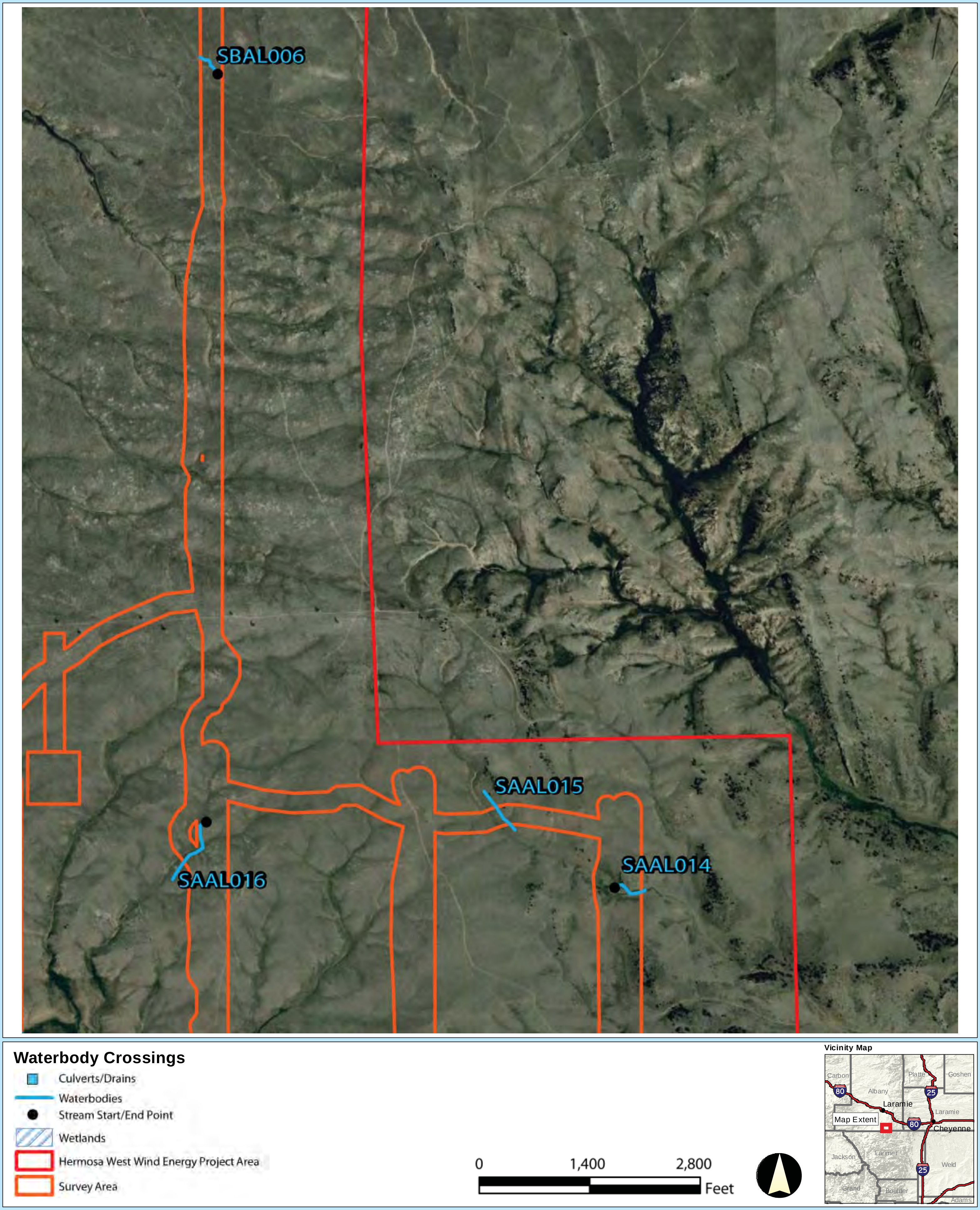

HERMOSA WEST WIND ENERGY PROJECT

FIGURE 4.3-1F: WATERBODY CROSSINGS

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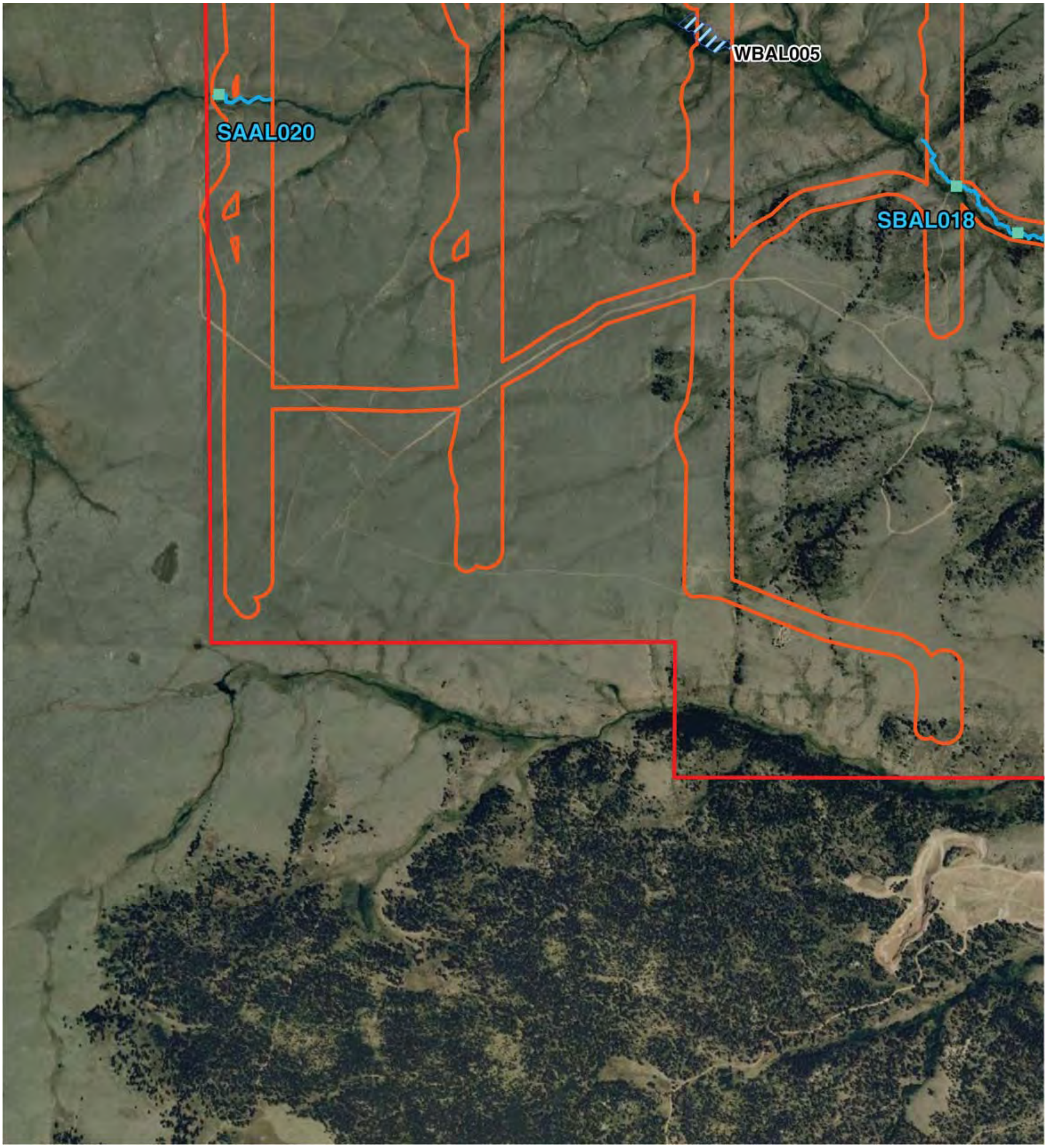
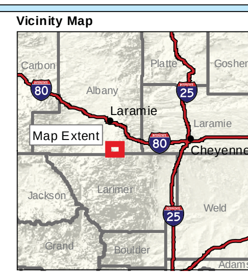


Waterbody Crossings

- Culverts/Drains
- Waterbodies
- Stream Start/End Point
- Wetlands
- Hermosa West Wind Energy Project Area
- Survey Area

0 1,400 2,800 Feet



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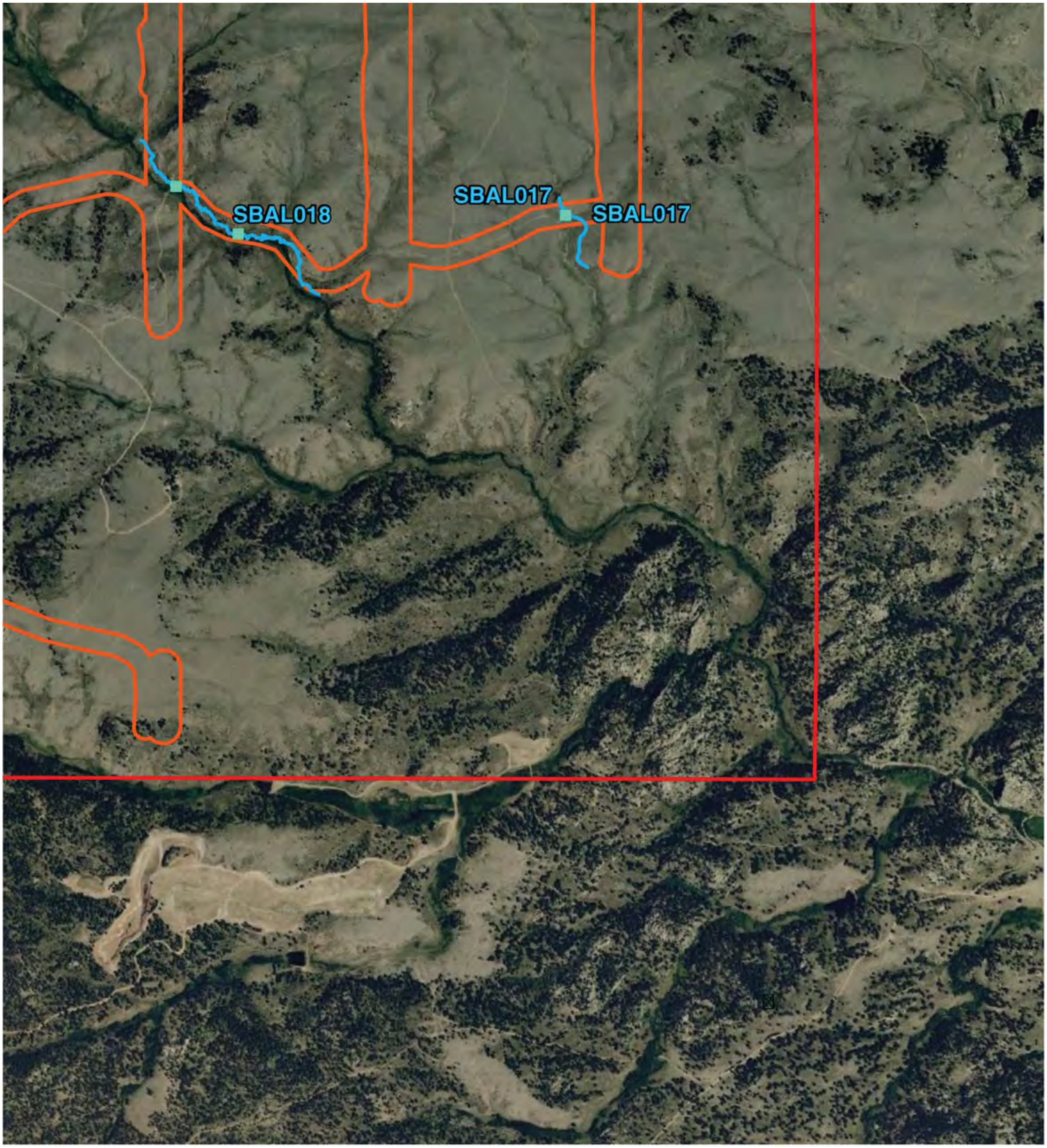
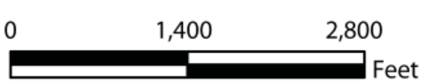
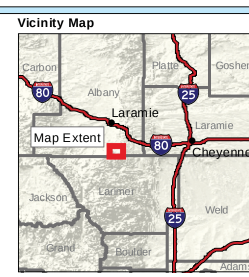


Waterbody Crossings

- Culverts/Drains
- Waterbodies
- Stream Start/End Point
- Wetlands
- Hermosa West Wind Energy Project Area
- Survey Area





HERMOSA WEST WIND ENERGY PROJECT

FIGURE 4.3-1H: WATERBODY CROSSINGS

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Table 4.3-1:
Waterbodies Crossed by the Proposed Project

Feature ID	Latitude	Longitude	Name	Type	Project Feature Crossing Waterbody	Crossing Length (feet)	Area of Crossing (square feet)	Connection to TNW	Figure
SAAL001	41.066863	-105.582609	Government Creek	Perennial	Road/ Collection line	15	240	Direct connection to a TNW	3-1a
SAAL002	41.072383	-105.573911	Government Creek	Perennial	Road/ Collection line	15	240	Direct connection to a TNW	3-1a
SAAL003	41.079602	-105.563864	Government Creek	Ephemeral	Road/ Collection line	30	480	Direct connection to a TNW	3-1a/b
SAAL004	41.056285	-105.573305	Forest Creek	Perennial	Road/ Collection line	40	640	Direct connection to a TNW	3-1a/d
SAAL006	41.046449	-105.562884	Tributary of Boulder Creek	Ephemeral	Road	10	160	Direct connection to a TNW	3-1d
SAAL007	41.045361	-105.562785	Tributary of Boulder Creek	Ephemeral	Road	15	240	Direct connection to a TNW	3-1d
SAAL008	41.047795	-105.560299	Boulder Creek	Ephemeral	Road/ Collection line	2	32	Direct connection to a TNW	3-1d
SAAL009	41.043325	-105.561854	Tributary of Boulder Creek	Ephemeral	Road/ Collection line	2	32	Indirect connection to a TNW	3-1d
SAAL010	41.042975	-105.535672	Willow Creek	Perennial	Road/ Collection line	2	32	Direct connection to a TNW	3-1e
SAAL013	41.041863	-105.526986	Tributary of Willow Creek	Ephemeral	Road/ Collection line	12	192	Indirect connection to a TNW	3-1e
SAAL014	41.025831	-105.487344	Unnamed Tributary	Perennial	Collection line	10	160	Direct connection to a TNW	3-1f
SAAL015	41.028552	-105.493262	Unnamed Tributary	Ephemeral	Road	10	160	Indirect connection to a TNW	3-1f
SAAL016	41.027122	-105.507064	Unnamed Tributary	Ephemeral	Road/ Collection line	20	320	Indirect connection to a TNW	3-1e/f
SAAL020	41.018891	-105.535615	Fish Creek	Perennial	Road/ Collection line	10	160	Direct connection to a TNW	3-1g
SAAL021	41.070793	-105.522148	Willow Creek	Perennial	Road	15	240	Direct connection to a TNW	3-1c
SAAL022	41.079493	-105.508033	Tributary to Grant Creek	Intermittent	Road	5	80	Indirect connection to a TNW	3-1c
SBAL001	41.068364	-105.544509	Tributary to Forest Creek	Ephemeral	Collection line	8	128	Indirect connection to a TNW	3-1b
SBAL006	41.054440	-105.506621	Tributary to Willow Creek	Intermittent	Road/ Collection line	10	160	Indirect connection to a TNW	3-1f
SBAL007	41.057142	-105.515617	Tributary to Willow Creek	Intermittent	Road	30	480	Indirect connection to a TNW	3-1c
SBAL008	41.053209	-105.516595	Tributary to Willow Creek	Perennial	Road/ Collection line	10	160	Indirect connection to a TNW	3-1e
SBAL009	41.051501	-105.516645	Tributary to Willow Creek	Intermittent	Road/ Collection line	20	320	Indirect connection to a TNW	3-1e
SBAL011	41.046786	-105.516241	Tributary to Willow Creek	Ephemeral	Road/ Collection line	10	160	Indirect connection to a TNW	3-1e
SBAL012	41.047692	-105.516305	Tributary to Willow Creek	Intermittent	Road/ Collection line	15	240	Indirect connection to a TNW	3-1e
SBAL013	41.058449	-105.523856	Tributary to Willow Creek	Perennial	Road	2	32	Indirect connection to a TNW	3-1c
SBAL014	41.057108	-105.525356	Willow Creek	Perennial	Road/ Collection line	9	144	Indirect connection to a TNW	3-1b/c/e
SBAL015	41.045800	-105.527373	Tributary to Willow Creek	Intermittent	Road/ Collection line	10	160	Indirect connection to a TNW	3-1e
SBAL016	41.045472	-105.526402	Tributary to Willow Creek	Intermittent	Road/ Collection line	2	32	Indirect connection to a TNW	3-1e

Table 4.3-1:
Waterbodies Crossed by the Proposed Project

Feature ID	Latitude	Longitude	Name	Type	Project Feature Crossing Waterbody	Crossing Length (feet)	Area of Crossing (square feet)	Connection to TNW	Figure
SBAL017	41.014666	-105.489100	Unnamed Tributary	Intermittent	Road	10	160	Indirect connection to a TNW	3-1h
SBAL018	41.015307	-105.504368	Fish Creek	Perennial	Road	3	48	Direct connection to a TNW	3-1g/h
SBAL024	41.078858	-105.508036	Grant Creek	Perennial	Road	2	32	Direct connection to a TNW	3-1c
					Total	354	5,664		

Table 4.3-2:
Description of Waterbody Conditions at Each Stream Crossing

Waterbody ID	Waterbody Type	Flow Type	Water Width (ft)	Water Appearance	Substrate	Stream Quality (1)	Habitat Type (2)	Known Disturbances
SAAL001	Stream	Perennial	3	Clear	Silt/Clay, Gravel, Sand	Moderate	Riparian Zone present	Livestock access to riparian zone
SAAL002	Stream	Perennial	4	Clear	Silt/Clay	Low	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks
SAAL003	Stream	Ephemeral	0	N/A	Silt/Clay	Moderate	No Riparian Zone	Livestock access to riparian zone; Manure in stream or on banks
SAAL004	Stream	Perennial	12	Clear	Silt/Clay	Moderate	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks
SAAL006	Stream	Ephemeral	5	N/A	Silt/Clay	Moderate	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks
SAAL007	Stream	Ephemeral	2	N/A	Sand, Silt/Clay	Moderate	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks
SAAL008	Stream	Ephemeral	2	N/A	Silt/Clay	Moderate	No Riparian Zone	Livestock access to riparian zone; Manure in stream or on banks
SAAL009	Stream	Ephemeral	2	N/A	Sand, Silt/Clay, Gravel	Moderate	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks
SAAL010	Stream	Perennial	2	Clear	Silt/Clay, Sand	Moderate	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks
SAAL013	Stream	Ephemeral	0	N/A	Gravel, Sand	Moderate	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks
SAAL014	Stream	Perennial	0	Clear	Silt/Clay, Gravel, Sand	Moderate	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks
SAAL015	Stream	Ephemeral	2	N/A	Gravel, Sand, Silt/Clay	Moderate	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks
SAAL016	Stream	Ephemeral	7	N/A	Gravel, Sand, Silt/Clay	Moderate	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks
SAAL020	Stream	Perennial	5	Clear	Silt/Clay, Gravel, Sand	Low	No Riparian Zone	Livestock access to riparian zone; Manure in stream or on banks
SAAL021	Stream	Perennial	8	Clear	Silt/Clay, Gravel, Sand	Moderate	Riparian Zone present	Data not Available
SAAL022	Stream	Intermittent	2	Clear	Silt/Clay, Gravel, Sand	Moderate	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks
SBAL001	Stream	Ephemeral	0	N/A	Silt/Clay	High	Riparian Zone present	Manure in stream or on banks
SBAL006	Stream	Intermittent	0	N/A	Silt/Clay, Gravel	Moderate	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks

Table 4.3-2:
Description of Waterbody Conditions at Each Stream Crossing

Waterbody ID	Waterbody Type	Flow Type	Water Width (ft)	Water Appearance	Substrate	Stream Quality (1)	Habitat Type (2)	Known Disturbances
SBAL007	Stream	Intermittent	15	Clear	Silt/Clay	Moderate	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks
SBAL008	Stream	Perennial	6	Turbid	Silt/Clay	Moderate	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks
SBAL009	Stream	Intermittent	0	N/A	Silt/Clay, Organic	High	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks
SBAL011	Stream	Ephemeral	0	N/A	Silt/Clay, Gravel	High	Riparian Zone present	Livestock access to riparian zone
SBAL012	Stream	Intermittent	0	N/A	Gravel, Silt/Clay	Moderate	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks
SBAL013	Stream	Perennial	2	Clear, floating algal mats	Silt/Clay	High	Riparian Zone present	Data not Available
SBAL014	Stream	Perennial	3	Clear	Silt/Clay, Gravel	High	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks
SBAL015	Stream	Intermittent	0	N/A	Silt/Clay, Gravel	High	Riparian Zone present	Data not Available
SBAL016	Stream	Intermittent	0	N/A	Gravel	High	Riparian Zone present	Data not Available
SBAL017	Stream	Intermittent	0	N/A	Silt/Clay, Gravel	High	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks
SBAL018	Stream	Perennial	3	Clear	Silt/Clay, Gravel	High	Riparian Zone present	Livestock access to riparian zone; Manure in stream or on banks
SBAL024	Stream	Perennial	1	Clear	Silt/Clay	High	Riparian Zone present	Livestock access to riparian zone

(1) High Quality: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant macroinvertebrates present.

Medium Quality: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative macroinvertebrates present.

Low Quality: Channel is actively downcutting or widening; rip rap and channelization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; lack of regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no macroinvertebrates present.

(2) Riparian zone consists of vegetative layers consisting of trees, shrubs, and/or herbs.

4.3.1.2.3.2 Indirect Effects

Construction and operations and maintenance of this Project are not anticipated to generate sediment or biological or chemical contaminants that would flow offsite and into downstream surface water locations. BMPs and mitigation measures would be implemented in the construction process, including the development and adherence to a stormwater management plan and applicable water quality standards as required by the WYDEQ Wyoming Pollutant Discharge Elimination System that would effectively prevent migration of sediments into surface water bodies. Any leaks of oil or fuel from construction vehicles would be immediately contained and cleaned up onsite. Storage and handling of chemicals and fuels would be in accordance with procedures outlined in section 4.15.

4.3.1.2.4 Springs and Seeps

Three springs have been identified in the proposed Project site and more are potentially present and one has been identified adjacent to the border of the proposed Project site. Project construction and operations would avoid these mapped springs and any others later identified in the field. No direct or indirect effects are anticipated for these sensitive water resources.

4.3.1.2.5 Wetlands

4.3.1.2.5.1 Direct Effects

In November 2009, the proposed Project was redesigned to avoid or minimize wetlands effects from an originally estimated 6.18 acres of permanent effects, to an estimated 0.12 acre of impacts, including approximately 0.07 acre of permanent impact and 0.05 acre of temporary impact (ERM 2010i). Where possible the redesign included avoiding water bodies and using existing crossings. The permanent effects are estimated based upon construction of access roads and installation of underground electrical connection lines in locations where crossing streams could not be avoided. Turbines, laydown areas, operations and maintenance areas, and the permanent met tower will be sited outside of areas likely to be considered jurisdictional wetlands. Table 4.3-3 describes the estimated Project impacts by wetland and totaling approximately 0.12 acre.

No fen wetlands have been identified in wetland delineations studies (ERM 2010i) and there would be no effects to fens.

The construction equipment used to build the crossings in wetlands will be the same as described above for the stream crossings, and could include a bulldozer, hoe and ram hoe, grader, compactor, and/or haul truck (as indicated in table 2.3-1 under “Road Construction”). The wetland crossings will be designed to provide minimal impact to wetlands, and construction equipment access will be restricted within the delineated wetland area. The type of access road crossings have not yet been designed, but will include a variety of construction methods including, round and box culverts, bottomless culverts and low-water crossings. These crossings will be designed in conjunction with wildlife officials to ensure minimal impact on wetland habitat.

Table 4.3-3:
Estimated Project Impacts by Wetland

Feature ID	Latitude	Longitude	Type[1]	Estimate Affect Acreage[2, 3]	Connection to Significant Nexus	*Project Feature Impacting Wetland*	*Figure*
WAAL001	41.056410	-105.573166	PEM	0.0388	Associated with Forest Creek	Road/Collection line	3-1a/d
WAAL002	41.047740	-105.560374	PEM	0.0361	Associated with Boulder Creek	Road/Collection line	3-1d
WAAL004	41.038912	-105.535552	PEM	0.0101	Associated with Willow Creek	Road/Collection line	3-1e
WBAL004	41.058491	-105.523914	PEM	0.0307	Associated with Willow Creek	Road/Collection line	3-1c
			Total	0.12			
WBAL005	41.020996	-105.516327	PEM	0.0034	Associated with Fish Creek	Collection line	3-1 d/e/g
			Total (acres)	0.1191			
			Total Potentially Jurisdictional Wetlands (acres)	0.12			

Source: ERM (2010i)

1 Wetland types: PEM = palustrine emergent.

2 Wetland acreages are based on Global Positioning System boundaries surveyed.

3 Acreage calculations are based on the assumption that the access roads and underground electrical collections lines will have a 50-foot-wide corridor. Impacts include approximately 0.07 acre of permanent impact and 0.05 acre of temporary impact.

If required, SWE would acquire an appropriate USACE permit prior to construction. At a total of 0.07 acre of permanent effects, the proposed Project may not require a CWA Section 404, NWP #51 for land-based renewable energy generation facilities. If required by USACE, development of a preconstruction notification as part of the permit process would be completed to address the minimization of effects, restoration of temporarily disturbed wetlands and waterbodies, and mitigation for permanent impacts.

4.3.1.2.5.2 Indirect Effects

Indirect effects to wetland resources may include sedimentation resulting from runoff of cleared construction areas. Additional indirect effects could include settling of windborne dust over wetland vegetation from construction activities and from the addition of many acres of new soil- or gravel-surfaced access roads. There is a potential for stormwater runoff containing hazardous materials such as oil or fuel from construction vehicles to enter wetlands during construction; implementation of stormwater BMPs and mitigation measures would reduce the potential for this to occur.

4.3.1.2.6 Water Supply

During facility construction, construction crews would rely on drinking water and portable toilets trucked onto the proposed Project site. Portable toilets would be serviced by the contractor providing the facilities. Also during construction, the contractors providing concrete batch plant and dust suppression services would supply water for those operations from existing offsite facilities. Similarly, the contractors providing blade washing services during Project operation would supply offsite water for that operation. Water for emergency services such as firefighting, would be anticipated to come from an onsite water storage tank.

SWE would install a permanent groundwater well in the vicinity of the operations and maintenance building to supply the staff with potable water and restrooms during facility operation. The groundwater well also would provide water for incidental uses, such as vehicle washing. Groundwater in Wyoming is considered to be property of the State. SWE would coordinate the installation of the groundwater well with the SEO, which requires an approved permit application prior to well drilling.

Working with the SEO, SWE has estimated volume of water consumption needed for the proposed Project at 54,000 gallons per day (approximately 43 acre-feet/year). As indicated in section 4.3.1.2.2, the water used during construction would be drawn from a permitted source not to exceed the amount of the permit. The water used would not be from a source hydrologically connected to the Platte River system. Therefore, there will not be a depletion to the Platte River. USFWS established in 2007 that the depletive effects of projects whose water supply is solely derived from sources that are considered “not hydrologically connected” to the Platte River system do not need to be addressed in consultation with the USFWS.

4.3.1.2.7 Floodplains

There are no Federal Emergency Management Agency-mapped floodplains within the borders of the proposed Project site. As described in section 3.3, discussion with the Albany County Planning Director has confirmed the lack of mapped floodplains. The proposed Project, therefore, would have no impact on any designated floodplain.

4.3.1.3 Impact Assessment of the No Action Alternative

Under the no action alternative, the proposed Project would not be constructed. No direct or indirect effects from construction or operations and maintenance would occur to groundwater, surface water, springs and seeps, wetlands, or floodplains. The prevailing baseline conditions in each of these categories of water resources would be expected to continue unless residential development was to occur in the future.

4.3.1.4 BMPs and Mitigation Measures

The following BMPs and mitigation measures have been identified and committed to by SWE to avoid resource impacts or reduce potential impact levels. They are considered an integral part of the proposed Project and would be implemented by SWE as requirements in SWE's contract with their construction contractor. Mitigation measures applicable to operation and maintenance activities would be incorporated in SWE's Operation and Maintenance Plan for the Hermosa facility, and those related to decommissioning would be incorporated in SWE's Decommissioning Plan. Many of the mitigation measures would also be required by law, regulation, or permit conditions, and compliance would be overseen by the responsible regulatory authorities. While Western has no authority or jurisdiction over SWE's proposed Project, Western's decision to execute an interconnection agreement would consider SWE's commitments to implement these mitigation measures, and the reduction in environmental impacts that would result.

4.3.1.4.1 General BMPs

SWE sited Project facilities outside of wetlands and riparian habitat where feasible. In November 2009, the proposed Project was redesigned to reduce wetlands effects from 6.18 acres to approximately 0.12 acre. This redesign also reduced surface water crossings from 45 crossings to 30 crossings.

To the extent practicable, SWE has collocated 13 waterbody crossings along existing roads throughout the proposed Project site. Design of waterbody crossings will be in accordance with the *Best Management Practices (BMPs) Manual for Access Road Crossings of Wetlands and Waterbodies* (EPRI 2002).

- WAT-1: During the initial clearing phase of the construction process, woody vegetation in potentially disturbed wetlands will be cut at ground level to leave the root systems intact and encourage sprouting of the existing species following construction.
- WAT-2: Small stumps of shrubs and trees may be cut at or just below ground level.
- WAT-3: Larger trees and shrubs will be removed to ensure a safe, level work surface for equipment working on temporary mats.
- WAT-4: Equipment operation in wetlands will be kept to the minimum necessary to safely perform the work, and will operate on prefabricated equipment matting or acceptable substitute.
- WAT-5: Wetland boundaries will be clearly identified in the field during construction. SWE has committed to mark the wetland boundaries and to avoid the marked boundaries during construction.
- WAT-6. No parking or servicing of construction-related vehicles should occur within the wetland boundary.
- WAT-7: Temporary impacts to wetlands by construction will be returned to grade and revegetated with native seed mix or as recommended by the local NRCS.
- WAT-8: SWE will implement sediment and erosion control measures, such as silt fencing and/or hay bales near waterbodies and wetlands, the installation of construction barriers.
- WAT-9: Traffic speeds within the Project site will be 15 mph to minimize dust generation

4.3.1.4.2 Mitigation Measures for Potential Impacts to Water Resources

- WAT-10: To protect water and wetland resources, a SWPPP that includes erosion control measures will be prepared and its requirements will be implemented onsite for the proposed Project. The SWPPP will be based on USEPA requirements.
- WAT-11: The SWPPP will require the use of water or other dust control measures on or near heavily used public roads and roads internal to the Project. Dust control measures will be included to protect water quality, minimize affects to local residents, and minimize affects to vehicles traveling along local roads.
- WAT-12: The proposed Project will obtain a General Stormwater Construction Permit from the WYDEQ.

4.3.1.4.3 Restoration

- WAT-13: SWE will develop a restoration plan to minimize permanent effects to associated wetlands. Upon the completion of the proposed Project, disturbed portions of the Project site will be restored to pre-construction contours to the extent practicable, with exception of permanent facilities including the turbine foundations, access roads, and permanent Project facilities (i.e., operations and maintenance area and substation). Restoration will be done in accordance with the requirements of the permit.

4.3.1.4.4 Mitigation of Permanent Impacts

While many steps have been taken to minimize affects to waters and wetlands within the proposed Project site, a permanent loss of 0.07 acre of wetlands will be unavoidable given the nature of the proposed Project (ERM 2010i). It is anticipated that a purchase of credits from the nearest wetland mitigation bank will mitigate the permanent loss of 0.07 acre of jurisdictional wetland. Construction will maintain natural drainage patterns in Project area waterways. For crossings at perennial streams, bottomless culverts or bridges will be used to make crossings in order to minimize potential impacts. Increased regular monitoring of stream banks and channel stability will be undertaken. The permit has not been applied for at this time. However, mitigation and monitoring will be completed in accordance with the requirements of the permit.

Through implementation of mitigation measures, construction and operation of SWE's proposed Project would not significantly impact groundwater, surface water, or floodplains. There would be some temporary and permanent impacts to wetlands and riparian areas. These would be avoided and minimized to the extent possible through project design. In addition, mitigation measures and BMPs would be used during construction to further avoid and minimize impacts to these areas. Temporary impacts would be addressed through a project restoration plan. Permanent impacts to jurisdictional wetlands would be low (0.07 acre) and would be mitigated through purchase of credits from the nearest wetland mitigation bank.

4.3.2 Vegetation

This section describes potential impacts to vegetation resulting from implementation of SWE's proposed Project, and the facilities associated with Western's proposed Federal action, the Federal no action alternative, and proposed mitigation measures. For the purposes of this impact analysis, the proposed Project site and the study area are the same.

Potential effects to vegetation can be classified as short-term, long-term, and permanent. Short-term effects last less than 5 years and include impacts to vegetation from Project activities where the restoration plan is implemented (e.g., grading and other ground disturbance for temporary facilities needed during construction, operation, and decommissioning). Permanent impacts consist of changes to vegetation lasting 5 years or longer (e.g., construction of permanent Project facilities such as of turbine foundations, access roads, operations and maintenance building, substation, and generation tie line.

4.3.2.1 Significance Criteria

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

- Impact to a rare plant population, or loss of native plant communities, forested wetlands or other sensitive features identified by a Federal or State resource agency
- Loss to any population of plants that would result in a species being listed or proposed for listing as threatened or endangered
- Establishment or increase of a noxious weed population
- Noxious weed infestations that replace native plant communities and impact sensitive plants and/or plants protected under State law
- In considering potential environmental consequences to vegetation, this EIS addresses several related issues that were raised during the public scoping meetings and public comment period for the Project from January 14, 2010 to March 1, 2010, as listed in table 1.10-1. These issues were considered along with the significance criteria during the impacts analysis presented below. Western received the following comments expressing concern about vegetation/habitat:
  - The proposed Project site landscape is a fragile ecosystem that takes a long time to recover from disturbance. This fragile ecosystem could be adversely affected given the number of access roads and turbine footprints associated with the proposed Project.
  - The proposed Project needs a noxious weed management plan to reduce the risk of the dispersion of invasive species.

4.3.2.2 Methods

Vegetation cover on the proposed Project site was analyzed and mapped using aerial photo imagery (WEST 2010b). The cover types were then field verified (Tetra Tech 2010). Acreages for each cover type were summarized in section 3.3.2. GIS tools were used to quantify the potential acreage of effects in each vegetation cover type by overlaying the proposed Project features onto the vegetation cover type mapping. Effects were classified based on projected type (direct, indirect and cumulative), and duration (short- and long-term) of each effect. Cumulative effects are discussed in section 5.2.

4.3.2.3 Impact Assessment of the Proposed Project

4.3.2.3.1 Direct Effects

Direct effects to vegetation from implementation of the proposed Project would be those that would result in the removal of native vegetation and associated topsoil. These effects would result from the construction of access roads, turbine pads, trenching for collector lines, the operations and maintenance building, permanent meteorological towers, and transmission structures. Each of these construction activities would require the removal of vegetation and replacement of that vegetation by permanent man-made facilities. These facilities would include compacted soils, blacktop, concrete or aggregate for road surfaces, concrete foundations and pads, metal towers, metal or wood-frame buildings, and fencing to protect the facilities.

The data in tables 4.3-3 and 4.3-4 document that most temporary and permanent effects would occur in the mixed-grass prairie vegetation cover type. Temporary effects in the mixed-grass prairie vegetation cover type would be approximately 96 percent of the total temporary impacts to vegetation. Permanent effects in mixed-grass prairie would be approximately 98 percent of the total permanent impact to vegetation. Approximately 56 acres of vegetation would be permanently affected by the proposed Project. Approximately 245 acres of vegetation would be temporarily affected. Table 4.3-4 describes the acreage of temporary effects on vegetation cover types within the Project site.

Table 4.3-4:
Temporary Effects by Vegetation Cover Type

Vegetation Cover Type	Acreage[1]	% of Total Disturbed Area[1]
Mixed Conifer Forest	0.82	0.33%
Mixed-grass Prairie	234.67	95.62%
Shrub Lands (Combines Mountain Mahogany and Shrub Steppe cover types)	3.95	1.61%
Riparian	4.72	1.92%
Riparian Willow	1.27	0.52%
Total	245.43	100

1 Features not included in the above acreage and percentage calculations include access roads to the meteorological tower and laydown areas and temporary turn-out areas.

Permanent direct effects to vegetation would be anticipated from the construction of access roads, all of the turbine crane pads, the operations and maintenance building, the meteorological towers, the substation and switchyard, and the gen-tie line towers. Table 4.3-5 describes the acreage of permanent effects to vegetation cover types. Direct effects to vegetation would be anticipated to be short term for the construction of temporary access roads.

Table 4.3-5:
Permanent Effects by Vegetation Cover Type

Vegetation Cover Type	Acreage	% of Total Disturbed Area
Mixed Conifer Forest	0.08	0.14%
Mixed-grass Prairie	55.07	97.57%
Shrub Lands (Combines Mountain Mahogany and Shrub Steppe cover types)	0.34	0.60%
Riparian	0.87	1.54%
Riparian Willow	0.08	0.14%
Total	56.44	100

4.3.2.3.2 Indirect Effects

Indirect effects to vegetation may result from construction and operation of the proposed Project. These effects may include establishment of noxious weeds in disturbance areas, fragmentation of plant populations, compaction of disturbed soils, loss of topsoil due to wind and water erosion, and potential for changes in grazing patterns or amounts of grazing on post-construction Project site vegetation.

4.3.2.3.2.1 Noxious Weeds

As soils are cleared for roads and construction staging areas, the physical and ecological character of this cleared land changes, and these changes provide an opportunity for potential colonization of the site by State listed noxious weeds. Wyoming lists 25 plant species as noxious weeds. The preliminary baseline surveys have documented the present existence of seven of these State-listed noxious weeds within the confines of the proposed Project site. To prevent the expansion of these seven weeds, and potentially other listed noxious weeds across the site, an integrated weed management plan would be prepared and implemented for this proposed Project. Introduction or expansion of noxious weeds would not be expected as a result of the proposed Project, and the weed management plan could even result in control of current noxious weed infestations depending on their proximity to proposed Project facilities. The weed management plan will include monitoring and treatment of areas to be reclaimed, areas undergoing reclamation, and reclaimed areas. Prior to disturbance activities, weed surveys will be conducted to identify existing noxious weeds and other invasive species and their extent. The Hermosa Wind Energy Project Weed Management Plan will include:

- Pre-construction weed inventory and mapping (by a designated weed management contractor who has knowledge in weed identification) will take place on all pre-determined areas of disturbance on project lands and on potentially undisturbed areas potentially impacted by project use.
- Weed population locations will be identified and carried forward in the inventory.
- The location and extent of each weed population will be recorded via Global Positioning System and plotted on project maps.
- Inventories will be conducted in accordance with protocols detailed in the North American Invasive Plant Mapping Standards. The weed mapping will be used to develop a base line for invasive weed management throughout the life of the project.

4.3.2.3.2.2 Population Fragmentation

Fragmentation of plant populations can occur during construction of roads and other permanent structures that physically separate individuals within a given plant population. This physical separation can limit reproductive effectiveness and diminish gene flow within and between populations. These effects vary by species, with some species affected more significantly than others. The majority of fragmentation features involved with this proposed Project would be the creation of road surfaces through mixed grass prairie plant communities. There would be an estimated 57.49 acres of new internal road surface through the mixed grass prairie onsite, assuming an average permanent width of 16 feet for these new roads. The impact to plant populations is expected to be low because the roads would not be a significant barrier to seed dispersal between populations.

4.3.2.3.2.3 Soil Compaction

Compaction of soils can have both beneficial and adverse effects for plant growth and vigor. The University of Minnesota Agricultural Extension Service (UME 2001) states that slightly compacted soils may increase the rate of seed germination because of an increase in contact between seeds and soil surfaces. Moderate levels of compaction may result in a reduction in water loss in soils because of evaporation, thus preventing soils from drying out during the growing season. Excessive soil compaction typically impedes root growth and can limit root extension and travel through the soil, and will result in a decrease in the plant's ability to uptake vital nutrients and water. Soil compaction in wet years has been documented to result in a decrease in soil aeration, resulting in increased denitrification (loss of nitrate-nitrogen to the atmosphere). There can also be a nitrogen and potassium deficiency that is induced by soil compaction. Plants need to expend energy to uptake potassium. Reduced soil aeration affects root metabolism. All of these factors result in added stress to vegetation (UME 2001).

The weight of vehicles and loads anticipated for this proposed Project would be in the range of 2 tons for pickup trucks up to 600 tons for cranes that will install the turbines. In between these weights, a small telehandler could range from 5 to 10 tons. A bulldozer could range from 8 to 49 tons, depending on size. Tractor trailers would be carrying tower sections (38 to 88 tons), and nacelles (75 to 113 tons). By far, the most prevalent vehicles used onsite would be pickup trucks. Compaction of soil will most likely occur on the new roads and crane pads from repeated driving of some of the higher-end weight vehicles, such as the crane and the tractor trailers with turbine parts loaded. Permanent impacts are less than significant.

4.3.2.3.2.4 Erosion of Topsoil

The removal of native vegetation would expose topsoils in the proposed Project site to the potential for wind and water-caused erosion. BMPs (section 4.3.2.5) would be used during construction to reduce and control erosion, so impacts would be expected to be low and limited to the construction period. By the completion of the construction period the exposed soils would be covered by the access roads, turbine pads, and other permanent facilities.

4.3.2.3.3 Special Status Plant Species

No special status plant species are present on the Project site; therefore, special status plant species would not be impacted by the Project.

4.3.2.3.3.1 Indirect Effects

The proposed Project is not anticipated to have any downstream effects on the North Platte River and its associated vegetation. Maps illustrating these hydrologic zones in the proposed Project site are depicted in figure 4.3-2 (SEO 2006). Hydraulic connectivity is shown in figure 4.3-3.

4.3.2.4 Impact Assessment of the No Project Option

Under the no action alternative, the proposed Project would not be constructed. No direct or indirect effects on vegetation or special status plant species from construction or operations and maintenance would be expected to occur. The current vegetation baseline conditions would be expected to remain, so long as alternate development plans for the properties are not developed and implemented.

4.3.2.5 BMPs and Mitigation Measures

The following BMPs and mitigation measures have been identified and committed to by SWE to avoid resource impacts or reduce potential impact levels. They are considered an integral part of the proposed Project and would be implemented by SWE as requirements in SWE's contract with their construction contractor. Mitigation measures applicable to operation and maintenance activities would be incorporated in SWE's Operation and Maintenance Plan for the Hermosa facility, and those related to decommissioning would be incorporated in SWE's Decommissioning Plan. Many of the mitigation measures would also be required by law, regulation, or permit conditions, and compliance would be overseen by the responsible regulatory authorities. While Western has no authority or jurisdiction over SWE's proposed Project, Western's decision to execute an interconnection agreement would consider SWE's commitments to implement these mitigation measures, and the reduction in environmental impacts that would result.

4.3.2.5.1 BMPs

- VEG-1: The permanent disturbance of Project site vegetation will be minimized to the greatest extent practicable. Work zones will be carefully delineated and marked in order to prevent unnecessary access through Project area vegetation.
- VEG-2: A reclamation plan will be prepared prior to the onset of construction that will guide the revegetation of disturbed areas during and following the construction process. The plan is not a requirement of the State siting permit.
- VEG-3: Water quality BMPs would be implemented to minimize any unforeseen impacts to the Platte River System’s watershed and associated vegetation communities, including the use of appropriate sediment and erosion control measures, such as silt fencing and/or hay bales near waterbodies and wetlands and the installation of construction barriers and notices to identify sensitive receptors.
- VEG-4: Temporarily disturbed areas will be revegetated as soon as practicable and active control of noxious weeds will be conducted through the implementation of a site weed management plan, the provisions of which are to be developed. Reseeding will be done with locally approved seed mixtures, as per county requirements.
- VEG-5: During the construction of the proposed project, SWE will utilize BMPs to control the introduction of invasive weeds and manage existing weed populations. These methods will include graveled entrances to all project roads from public roadways to prevent tracking in or out of weed seed bank, and various other weed management methods as described in the weed management plan.
- VEG-6: Weed management methods including prevention; personnel; equipment; integrated pest management using mechanical treatment, herbicide treatment, and/or biological control would be used during pre-construction, construction, post-construction and operations time periods.

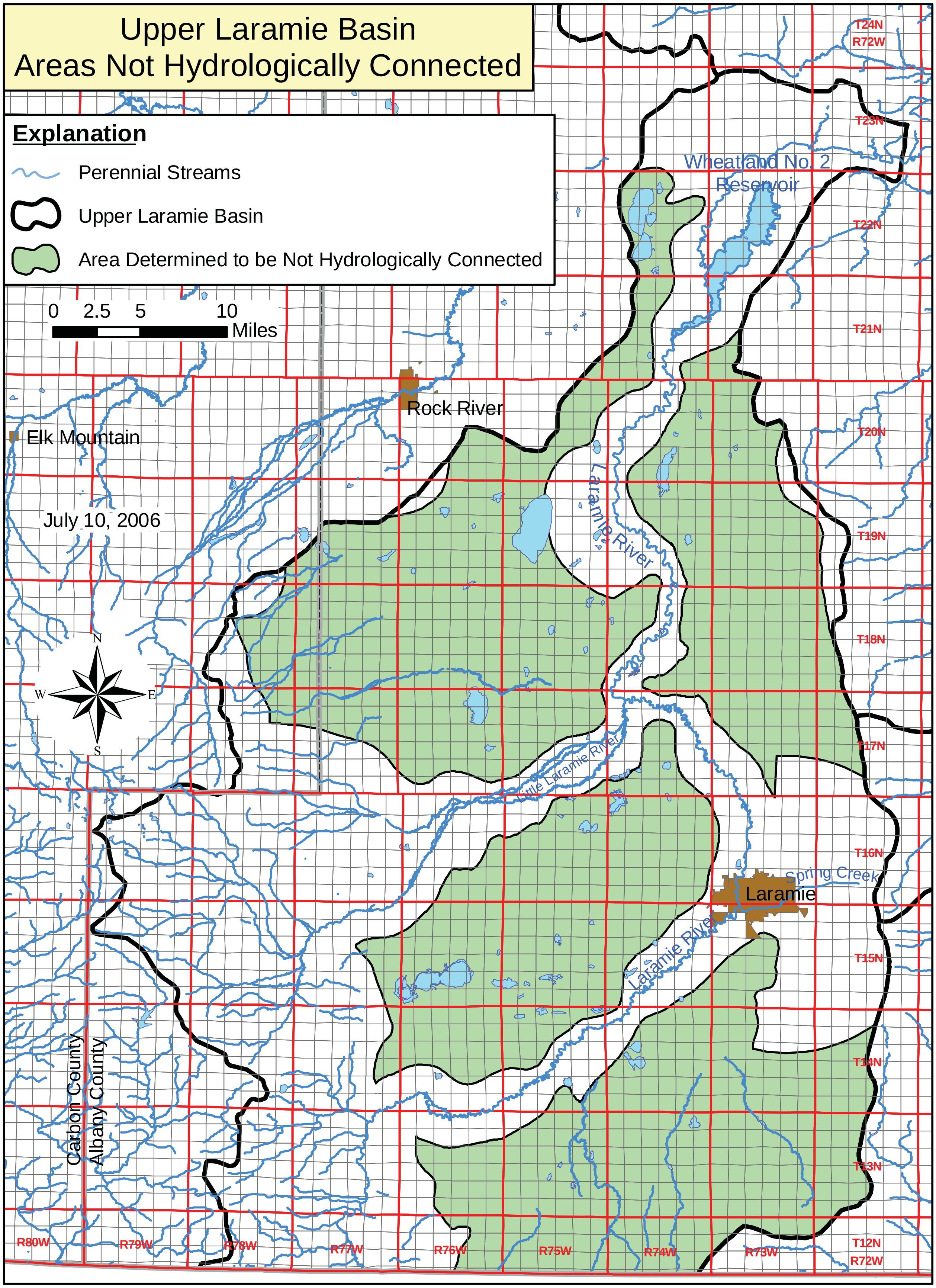

FIGURE 4.3-2: UPPER LARAMIE BASIN AREAS NOT HYDROLOGICALLY CONNECTED

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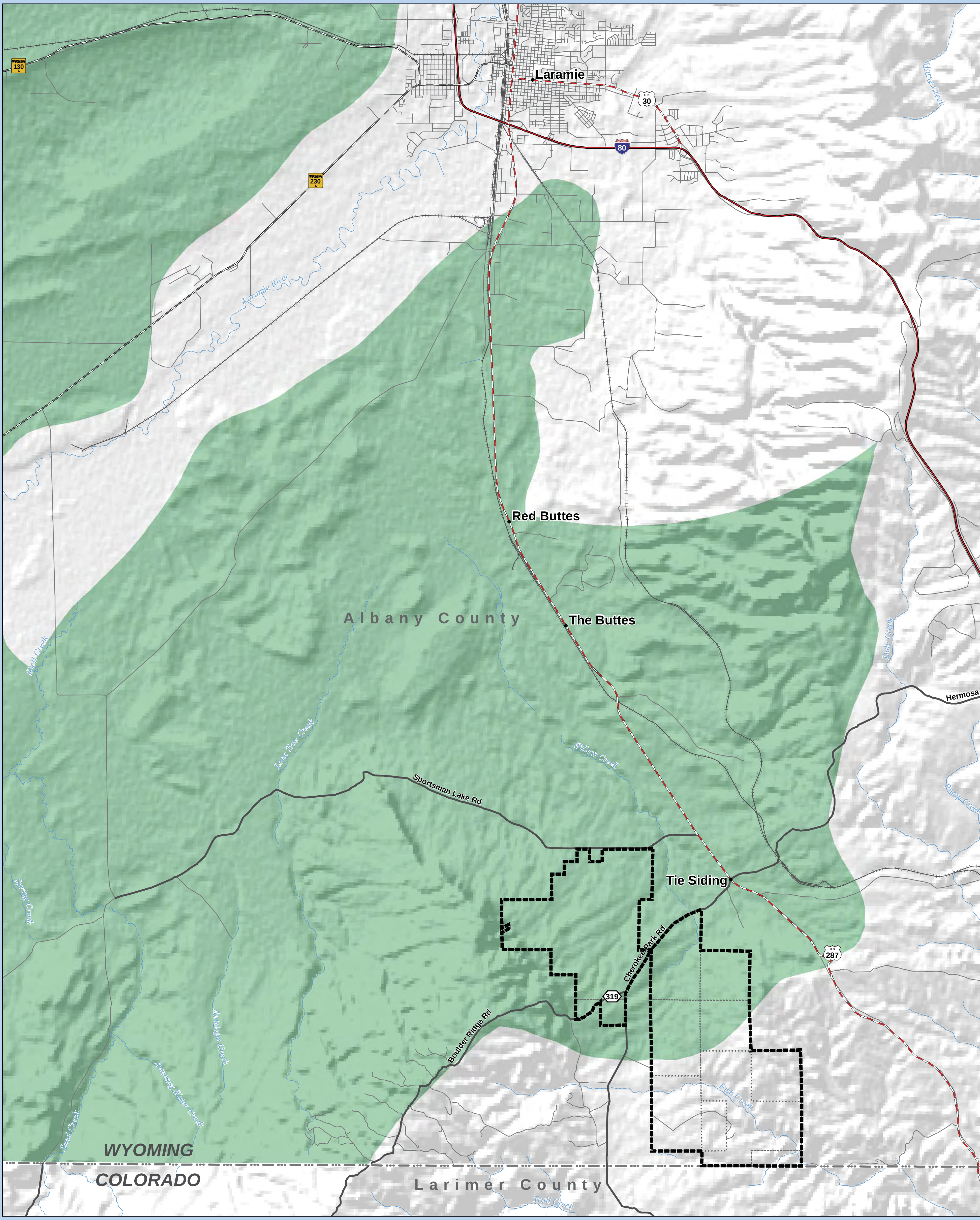


Hydrologic Connectivity

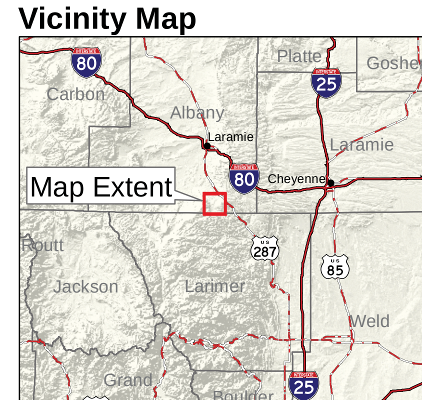
Project Features

- Hermosa West Wind Energy Project
- Area Not Hydrologically Connected to the North Platte River
- Parcel Boundary

0 1 2 4 Miles

Scale 1:20,500 when printed at 22"X34".

Vicinity Map



Source: ESRI, Western, BTS, WyGISC, USGS
Revised: 10-19-2010
MXD: P:\4004_Shell_Hermosa_West\GIS\Layouts\Hydrologic_Connectivity.mxd

HERMOSA WEST WIND ENERGY PROJECT

FIGURE 4.3-3: HYDROLOGIC CONNECTIVITY

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- VEG-7: Construction work areas, turbines, access roads, and facilities have been sited outside wetlands and waterbodies to the greatest extent practicable and as required under Federal, State, and local regulations, to minimize indirect impacts to the Platte River System watershed and its associated vegetation communities.

4.3.2.5.2 Mitigation Measures

- VEG-8: Upon completion of construction of the proposed project, SWE will conduct a Post-construction weed inventory survey to validate the effectiveness of the weed management program and insure that invasive weed level have not exceeded base levels.
- VEG-9: SWE will coordinate with the weed management contractor and project landowners regarding specific treatment methods for approval on their respective properties.
- VEG-10: Records, which track weed inventories, treatments, monitoring, and re-infestation trends will be kept.
- VEG-11: SWE will maintain appropriate weed management documentation, including the pre-disturbance weed inventory, management goals for invasive and noxious weeds, the annual weed inventory and weed management report, pesticide application records and pesticide use reports.

4.3.3 Wildlife and Habitat Resources

This section describes potential impacts to wildlife resulting from implementation of SWE's proposed Project and the facilities associated with Western's proposed Federal action, the Federal no action alternative, and proposed BMPs and mitigation measures. For the purposes of this impact analysis, the proposed Project site is fully contained within the study area, which extends beyond the site boundary and varies depending on the species being discussed.

Potential effects to wildlife species can be classified as short-term, long-term, and permanent. Short-term effects last less than 5 years and include impacts to suitable habitat, disturbance to wildlife from Project activities (e.g., noise disturbance or increases in human presence during construction, operation, and decommissioning), and displacement of individuals. Long-term impacts consist of changes to wildlife and habitats lasting 5 years or longer. The severity of both short- and long-term impacts depends on factors such as the sensitivity of the species impacted, seasonal use patterns, type and timing of construction activities, and physical parameters (e.g., topography, cover, forage, and climate). Permanent impacts include habitat loss resulting from aboveground activities (ERM 2010f).

Potential effects to wildlife species can also be classified as direct or indirect. A direct effect may include individual injury or mortality. Indirect effects may alter the survivorship or reproductive capacity of a species changing the quantity and/or continuity of available suitable habitat, altering the quality and availability of resources used by the species, or altering intraspecific or interspecific competition dynamics (ERM 2010f).

The analysis of potential effects to wildlife and their habitats was based on published literature, USFWS and WGFD agency correspondence, desktop mapping studies for general wildlife including large mammals and habitat mapping, and field surveys of suitable or occupied wildlife habitats and known species occurrences. Sources of information on wildlife and habitat resources found within the proposed Project include data from Project-specific field surveys as follows:

- Threatened and Endangered Species Report (ERM 2010f)
- Bat Acoustical Studies for the Hermosa West Wind Resource Area Albany County, Wyoming Final Report July 2009—November 2009 (WEST 2010a)
- Wildlife Baseline Studies for the Hermosa West Wind Resource Area Albany County, Wyoming Final Report April 2009—April 2010 (WEST 2010b)

In addition, a general wildlife and habitat desktop study was prepared to provide a baseline of existing biological resources across the site in order to assess potential impacts associated with the proposed Project (Tetra Tech 2010).

4.3.3.1 Significance Criteria

Effects to wildlife would occur when habitats or individuals are disturbed or lost during the proposed Project's construction or operation. The significance of the effects depends in part on the sensitivity of the population. A significant effect on wildlife would result if any of the following were to occur from construction or operation of the proposed Project:

- Loss of individuals of a population of wildlife that would result in the species being listed or proposed for listing as threatened or endangered.
- Violation of any statutes and regulations pertaining to wildlife.
- Introduction of constituents in any water body in concentrations that cause adverse effects on wildlife.
- Interfere substantially with the movement of any native, resident, or migratory wildlife species for more than two reproductive seasons.
- Substantial local loss of wildlife habitat (as compared to total available resources within the area) or habitat productivity.
- Interfere with nesting or breeding periods of migratory birds, wildlife species or any special status or protected species to the extent there is a noticeable decline in species numbers.

Effects to fisheries would occur when habitats or individuals are disturbed or lost during the Project's construction or operation. The significance of the effect depends in part on the sensitivity of the population. A significant effect on fisheries would result if any of the following were to occur from construction or operation of the proposed Project:

- Loss of individuals of a population of aquatic species that would result in the species being listed or proposed for listing as threatened or endangered.
- Violation of any statues and regulations pertaining to fisheries.
- Water withdrawal in excess of State-permitted levels.
- Substantially interfere with the movement of any native fish species for more than two reproductive seasons.

In considering potential environmental consequences to wildlife, this EIS addresses several related issues that were raised during the public scoping comment period as listed in table 1.10-1. During the public scoping meetings and public comment period for the Project from January 14, 2010, to March 1, 2010, Western received several comments expressing concern about the following issues:

- Concern about effects to area wildlife populations, and to the vegetation and habitat supporting wildlife populations
- Request that the Draft EIS describe the current use, quality, and capacity of wildlife habitat in the proposed Project area
- Request that the Draft EIS describe critical wildlife habitat and identify effects the proposed Project would have on the habitat and species, including habitat fragmentation effects to individual species
- Request that the Draft EIS provide a mitigation plan containing detailed mitigation measures to minimize or eliminate adverse effects to wildlife
- Request that the Draft EIS provide a monitoring plan, preconstruction, for terrestrial and aquatic habitats to establish a valid baseline database from which to measure and detect future effects
- Request that the Draft EIS analyze potential effects to the specific species in the proposed Project site and that effects to the species be avoided or mitigated
- Concern about the safety of large elk herds in the proposed Project site
- Request for the mitigation measures listed below to minimize effects to elk and pronghorn:
    - Limit the construction season
    - Minimize fencing—Use wildlife-friendly fences as prescribed by the Wyoming Game and Fish Department
    - Minimize winter plowing of access roads
    - Use only motion-activated and downcast lights on buildings to prevent disturbing or attracting wildlife
    - Avoid crucial big game winter ranges and migration corridors
- Concern about the potential mortality of avian species and bats from wind turbines and meteorological tower guy wires
- Request that the Draft EIS include maps identifying migration corridors for birds in the proposed Project site and the potential avian collision hazard areas
- Request for the mitigation measures listed below to minimize effects to avian species:
    - Include bird diverters on wind turbines, meteorological towers, and guy wires
    - Use un-guyed tubular meteorological towers
    - Conduct preconstruction surveys and use careful planning and siting methods to identify and avoid areas that avian species use the most, such as concentration areas and flight pathways
    - Complete preconstruction surveys to find and avoid nests
- Avoid siting Project components in prairie dog colonies because they are habitat for burrowing owl and mountain plover, and Project components would attract birds of prey

- Avoid siting Project components in areas that would attract raptors, such as ridges and bluffs
- Conduct weekly fixed-radius (100-meter radius) passerine/small bird and raptor/large bird point counts
- Conduct post-construction carcass surveys, scavenger removal trials, and searcher efficiency trials to determine which wind turbines are the most detrimental to avian species
- Shut off certain wind turbines that cause many kills during migration season
- Comply with the MBTA and the BGEPA
- Before construction use field analysis of bat use patterns and flight pathways to avoid high use and bat concentration areas
- Raise the cut-in speeds of wind turbines because bats are active at lower wind speeds
- Concern about the potential effects of Project lighting on wildlife
- Statement that FAA-required lights are confusing for nighttime migratory species with suggestion that the problem be mitigated by reducing the number, color, and strobe effect of required lights
- Statement that certain lights would be more detrimental than others with solid red lights and sodium vapor lights, for example, having been shown to attract active or migrating birds
- Request to exclusively use flashing red or white lights on wind turbines, meteorological towers, and communication towers and to avoid using sodium vapor lights

These issues were considered along with significance criteria during the impacts analysis presented below.

4.3.3.2 Impact Assessment of the Proposed Project

Potential direct and indirect effects to wildlife from construction, operation, and maintenance of the proposed Project include loss or alteration of breeding, foraging, wintering, or cover habitat; habitat fragmentation; injury or mortality of individuals; displacement of individuals or populations; and increased predation. BMPs W-2 through W-5 listed in table 2.6-1 would be implemented during construction, operation, and maintenance of the proposed Project to avoid or reduce temporary and permanent impacts to wildlife. Direct, long-term habitat loss would be expected in the Project site where turbines, roads, met towers, operations and maintenance buildings, substations and other Project features would be built. Existing roads and trails on the site will be used to the extent possible in order to reduce impacts, which will include upgrading approximately 10 miles of existing 2-track roads and using approximately 4.0 miles of county access road. Approximately 31 miles of new roads will be constructed.

4.3.3.2.1 Habitat Loss

A total of approximately 56 acres of permanent effects and approximately 245 acres of temporary effects to vegetation are predicted within the Project site. These acreages correspond to the permanent and temporary removal of habitat for wildlife within the Project site. Approximately 86.3 acres of new, 16-foot wide, permanent access roads would be created. Critical wildlife habitats, such as surface water, wetlands, and riparian areas would be avoided to the greatest extent practicable to minimize habitat loss. Direct, short-term habitat loss would be expected within the proposed Project site where areas are temporarily disturbed during construction, such as the concrete batch plant, construction parking, construction office area, and laydown or storage areas.

4.3.3.2.2 Habitat Fragmentation

Fragmentation of wildlife populations can occur during construction that would have the potential to physically separate individuals within a given population. This physical separation can limit reproductive effectiveness and diminish gene flow within and between populations. This indirect effect varies by species, with some species affected more than others. The primary fragmentation feature involved with the proposed Project would be road surfaces through mixed-grass prairie plant communities; however, wildlife would be able to cross the roads since they will be infrequently travelled, and will also be relatively narrow (16 feet) and widely spaced on the Project site. Habitat fragmentation from construction of access roads is not expected to be a significant impact.

Some bird and bat species while in flight may avoid turbines to some as yet unknown degree.

4.3.3.2.3 Direct Injury/Mortality

Direct injury or mortality to individuals of a species may occur. Fossorial mammal species (living part of the time underground), such as prairie dogs, ground squirrels, and voles, may be crushed by moving machinery onsite during construction, operation, or maintenance. Additionally, ground-nesting birds, reptiles, and amphibians may be susceptible to injury or mortality from the activity of construction, and operation and maintenance. Larger mammals, with adequate vision and an ability to detect activity and move, will be less likely to suffer injury or mortality. Birds and bats may suffer direct injury or mortality as a result of collision with operational wind turbines, meteorological towers and guy wires, and transmission lines.

4.3.3.2.4 Displacement

Unavoidable indirect effects to wildlife would include displacement of individuals or populations in the proposed Project site, either temporarily during construction, or permanently during operation. Construction, operation, and maintenance activities would elevate noise levels and increase human presence. Wildlife species respond to noise and human presence differently. Wildlife that exhibit an avoidance response would be physically displaced from areas they previously used within the proposed Project site and have their natural behaviors modified. Wildlife that exhibit an accommodation response may be initially displaced beyond the actual disturbance area, but return to the site despite continued disturbance activities. Small and medium-sized mammals such as fox, coyote, and cottontail may be initially displaced from the disturbance area during construction activities but likely would accommodate human activities and return to the proposed Project site. Large mammals, such as deer, elk, and pronghorn, which graze over large areas, would likely avoid disturbed areas during construction, but would return to utilizing these areas after construction activities are completed. Studies for displacement of raptors and non-raptor bird species have been conducted for wind farm sites in the U.S. For example, a reduced usage of habitat by seven of 22 grassland-breeding birds was observed following construction of the Buffalo Ridge wind-energy facility (WEST 2010b). Although studies have been done suggesting avoidance by some species, the degree of avoidance and long-term response is not yet known.

4.3.3.2.5 Predation

Increased predation is a possible direct effect that may result from two scenarios: 1) species that are displaced from their normal habitat may encounter predators that might otherwise be avoided, and 2) ground dwelling species may be susceptible to predation from raptors or corvids that that can utilize meteorological towers or new transmission lines as hunting perches (e.g., American kestrels, red-tail hawks, and American crows or ravens). Research supporting the effect of increased predation at wind farms is not well documented.

4.3.3.2.6 Mammals

4.3.3.2.6.1 Large Mammals

Potential direct effects to large mammals include direct mortality as a result of collisions with construction or maintenance vehicles. The potential for direct mortality is low given the number of animals observed during surveys (Tetra Tech 2010), the unobstructed rangeland throughout most of the proposed Project site, and the posted 15-mph speed limit on site.

Potential temporary indirect effects include displacement of individuals and populations in areas beyond the ground disturbance footprint, as a result of increased human disturbance as well as habitat loss and fragmentation. Species such as a pronghorn, mule deer, and mountain lion would likely avoid an area temporarily during construction, but would likely return upon completion. Elk would likely avoid the proposed Project site temporarily during construction, but may use the site upon completion depending on the level of ongoing human activity and their sensitivity to the increased habitat fragmentation. Walter et al. (2006) report no effect to an elk population in Oklahoma as a result of construction of a wind energy facility; however both the vegetation and acreage of the proposed Project site are significantly different than that described in the Oklahoma study so comparisons cannot be drawn. Elk are generally known to avoid roads open to vehicles (Lyon 1983; Witmer and DeCalesta 1985; Grover and Thompson 1986; Rowland et al. 2000), and they prefer areas characterized by edge habitat (Thomas et al. 1979, 1988; Irwin and Peek 1983; Grover and Thompson 1986), where quality forage and forest cover habitats are in proximity. In the absence of forest cover, restrictions on vehicular access or limiting road densities may be necessary to maintain an area as effective elk habitat (Lyon 1983; Cole et al. 1997).The effects from disturbance can extend up to 0.625 miles from the developed area for pronghorn (Easterly et al. 1991) and from 0.6 to 1.2 miles for elk depending on the season (Powell 2003). Sawyer et al. (2007) found that road density and amount of vehicle use significantly influenced habitat use by elk, where areas with higher road densities had less elk use, particularly when vehicle use was higher.

Permanent displacement of large mammals from the proposed Project site would result in a reduction of local populations if adjacent habitats are at carrying capacity. These populations would experience lower survival rates as a result of increased competition for resources, lower reproductive success, and lower fitness of individual animals. Moderate levels of human disturbance during the calving season have been shown to reduce population recruitment of elk in other populations in the Rocky Mountains (Phillips and Alldredge 2000; Shively et al. 2005), however, the Project site is not identified as a calving area and thus impacts to elk populations are not expected.

While the potential impacts to big-game due to wind energy development are currently not well understood due to a lack of rigorous scientific studies, pronghorn were observed year-round at the Foote Creek Rim wind energy facility in Carbon County, Wyoming. The mean number of pronghorn observed before construction was 1.07 animals per survey and in the two years following construction the mean number of animals observed per survey were 1.59 and 1.14 (Johnson et al. 2000b in ERM 2010f). This study indicates there was no reduction in use of the site after construction.

A study being conducted at the Dunlap Wind Project in Carbon County, Wyoming may provide additional insight into potential impacts to pronghorn. Results of this study are anticipated in the Spring of 2013, and should help to better understand potential impacts to pronghorn at the proposed Project. Although limited studies are available in the literature, based on available information the impacts of the Project to pronghorn populations is not expected to be significant.

Although limited studies are available in the literature, based on available information the impacts of the Project to big game populations is not expected to be significant.

4.3.3.2.6.2 Medium Sized Mammals

Potential direct effects to medium sized mammals include direct mortality as a result of collisions with construction or maintenance vehicles, but vehicle speeds would be low, as the posted speed limit is 15-mph, and the potential for direct mortality is low.

Potential indirect effects include both permanent and temporary displacement due to loss of habitat and prey species from activities such as trenching of underground collector lines.

The effects on populations of medium-sized mammals are expected to be minor and temporary provided small mammals and prey species populations are not permanently and significantly reduced from existing conditions. The medium-sized mammals have a faster reproduction rate than large animals, and would be expected to replace losses and reoccupy habitat more quickly than large animals, but not as rapidly as small mammals. In addition, the area that would be impacted is only a small percentage of the total area of the Project site, and thus impacts to available habitat would be low.

4.3.3.2.6.3 Small Mammals

Potential direct effects to populations of small mammals include direct mortality as a result of collisions with vehicles and construction equipment, and an increase in predation. Small mammals have a higher potential for direct mortality resulting from collisions with vehicles as compared to large and medium sized mammals because of their size, mobility, and fossorial habits. These effects are anticipated to be temporary, as most small mammal species reproduce at rates sufficient enough to allow them to repopulate the area following construction. Small mammals may also suffer direct effects from an increase in new hunting perches for raptors. Additionally, fragmentation and an increase in edge habitat due to access road construction would provide predatory mammals greater opportunities to prey upon small mammals.

Potential indirect effects to small mammals include both permanent and temporary displacement of animals as a result of habitat loss due to construction of Project facilities, such as roads and turbines. These impacts are anticipated to be minor given small mammal species' tendency to accommodate disturbance, the relatively small area of disturbance compared with the large area of habitat available, and their high reproductive rates.

4.3.3.2.6.4 Bats

Assessing the potential effects to bats in the proposed Project site is complicated because the proximate and ultimate causes of bat fatalities at turbines are poorly understood (Kunz et al. 2007; Baerwald et al. 2008; Cryan and Barclay 2009), and because monitoring elusive, night-flying animals is inherently difficult (O'Shea et al. 2003). In addition, because installed capacity for wind-energy has increased rapidly in recent years, the availability of well-designed studies from existing projects lags development of proposed projects (Kunz et al. 2007). To date, monitoring studies of wind-energy facilities suggest that:

- Bat mortality shows a potential relationship with bat use;
- The majority of fatalities occur during the post-breeding or fall migration season (roughly August and September); and
- Migratory tree-roosting species (eastern red, hoary, and silver-haired bats) comprise almost 75 percent of reported bat fatalities.

The highest reported fatalities occur at wind-energy facilities located along forested ridge tops in the eastern and northeastern United States. However, recent studies in agricultural regions of Iowa and Alberta, Canada, report relatively high fatalities as well. Based on these patterns, current guidance to estimate potential mortality levels at a proposed wind project involves evaluation of the onsite bat acoustic data in terms of activity levels, seasonal variation, and species composition (Kunz et al. 2007), as well as comparison to regional patterns. Seasonal activity levels provide information on the extent to which migratory bats are using the area during migration. The objective of the bat acoustic surveys was to estimate the seasonal and spatial patterns of activity of the Project site. Bats were surveyed using Anabat™ SD1/SD2 bat detectors. Bat detectors are a recommended method to index and compare habitat use by bats. The use of bat detectors for calculating an index to bat impacts is a primary bat risk assessment tool for baseline wind development surveys. Bat activity was surveyed using three detectors from April 26 to October 31, 2010. Two detectors were placed near a met tower sampled in 2009. At this station, a ground detector was paired with a detector raised on the met tower to compare bat activity at different heights (ground versus raised), and to monitor bat activity in the rotor-swept zone. The additional detector was rotated through five ground stations in areas proposed for turbine placement. The five ground stations were placed systematically with a random starting location. One additional location (a historic mine shaft) was sampled in late July/early August and again in late October 2010 (West 2010a).

The proposed wind-energy facility is not located near any large, known bat colonies likely to attract large numbers of bats. The one historic mine location within the Hermosa West Wind Resource Area was sampled in 2010 and the bat activity rate in the vicinity of the mine was within the range of activity rates at other sampling stations. In addition, both hoary bats and eastern red bats were recorded in the vicinity of the mine. Hoary bats and eastern red bats suggest that the historic mine shaft at Hermosa West Wind Resource Area does not appear to be an important bat roosting area. Seasonal activity data indicate that there are both resident and migratory hoary bats utilizing the Project site, and eastern red bats are utilizing the Project site during migration. There is some increase in overall bat activity at the Project site during the migration season, but the activity level during migration is probably not significantly higher than other wind resource areas in Wyoming since overall bat activity levels are comparable, as discussed in the following paragraph (WEST 2010a). Bat activity levels at the ground-based detector at the Project site was 2.22 bat passes per detector-night which is very similar to the mean activity level of 2.2 bat passes per detector-night that was measured at the Foote Creek Rim facility in 2000 (Gruver 2002 in WEST 2010a) and it is within the range of bat activity levels recorded at six other wind resource areas in Wyoming, which ranged from 0.29 to 3.76 bat passes per detector-night (WEST 2010a). Based on similar activity levels, the proximity of the Project site to the Foote Creek Rim facility, and the presence of similar habitats among the two areas, similar rates of bat mortality could be expected at the Project site. Bat mortality at Foote Creek Rim was estimated at 1.05 bat fatalities/MW/year, which is low when compared with data for 15 wind energy facilities in the Rocky Mountains and western North America where bat mortality ranged from 0.07 to 14.62 fatalities/MW/year, and the mean was 3.30 fatalities/MW/year (WEST 2010a). To date, the only bat mortality data for Wyoming are from the Foote Creek Rim wind-energy facility. As more research is conducted at facilities in Wyoming, more information regarding the potential direct impacts of Wyoming wind-energy facilities to bats will be obtained. Based on available information, WEST (2010a) anticipates low levels of permanent effects to bat populations due to bat mortality. These effects would be similar to those known at other wind energy facilities in Wyoming, and lower than wind energy facilities in the eastern United States.

4.3.3.2.6.5 Birds

The MBTA of 1918 (16 USC 703-712) makes it unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product (USFWS 2010a). “Take” is defined as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb”. “Disturb” means to agitate or bother to a degree that causes, or is likely to cause, 1) injury, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. The USFWS is responsible for implementing the MBTA. USFWS issues permits for a variety of intentional activities, such as hunting, falconry, certain import and export activities, depredation control, taxidermy, and scientific research; however there is no permitting framework (i.e., incidental take permits) for the incidental take of protected birds during otherwise lawful activities. The regulations governing migratory bird permits can be found in 50 CFR Part 13, General Permit Procedures and 50 CFR Part 21, Migratory Bird Permits.

Bald (*Haligeetus leucocephalus*) and golden (*Aquila chrysaetos*) eagles are protected under the BGEPA (16 USC 668-668d). BGEPA prohibits the take of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless permitted. Two new permit rules were created for eagles under the 2009 Eagle Permit Rule (50 CFR 22.26). Under this rule, USFWS can issue permits that "authorize limited take of bald and golden eagles when the take is associated with, but not the purpose of an otherwise lawful activity, and cannot practicably be avoided", and also authorizes "ongoing or programmatic take, but requires that any authorized programmatic take is unavoidable after implementing advanced conservation practices." The Draft Eagle Conservation Plan Guidance was issued by USFWS to explain their "approach to issuing programmatic eagle take permits under this authority and provide guidance to permit applicants (project proponents), Service biologists, and biologists with other jurisdictional agencies on the development of draft Eagle Conservation Plans (ECPs) to support permit issuance" (USFWS 2011). The ECP assesses the risk to eagles of a prospective or operating wind facility project, and how siting, design, and operational modifications can mitigate that risk. The final ECP must reduce predicted eagle take, and the population level effect of that take, to a degree compatible with regulatory standards to justify issuance of a programmatic take permit by USFWS (USFWS 2011).

To avoid and minimize impacts to MBTA-protected species that are not listed as threatened or endangered, SWE has, to the extent consistent with the proposed Project's purpose and need, incorporated into the Project certain design features contained in the Wind Turbine Guidelines Advisory Committee Land-Based Wind Energy Guidelines (USFWS 2012). These guidelines contain materials to assist in evaluating possible wind power sites and to assess potential impacts to wildlife, including MBTA-listed species. Although any impact to an MBTA-protected species is considered technically a violation of the MBTA, there are currently no "incidental take" permits for MBTA-species available, and, therefore the USFWS exercises discretionary prosecutorial authority in this respect where a wind farm demonstrates a good faith effort to avoid and minimize take of MBTA species. Through coordination with USFWS the relevant and appropriate aspects of the guidelines would be implemented by SWE to avoid or minimize impacts to MBTA-protected species. Based on observations within 100 meters, no small bird species were observed flying within the RSH; therefore, all small bird species had an exposure index of zero; therefore, impacts would be low.

4.3.3.2.6.6 2010 Study Results

Raptor Use

The objective of the fixed-point bird use surveys conducted on the Project site is to estimate the seasonal, spatial, and temporal use of the study area by birds, particularly diurnal raptors. The study is being carried out over 2 years, with years 1 and 2 complete (WEST 2010b, 2011).

The 2010 study evaluated raptor use in the proposed Project site. The annual mean raptor use estimate (number of raptors divided by the number of plots and the total number of surveys) in the proposed Project site was compared to mean raptor use estimates from studies at 39 other wind energy facilities in the mid-west and western U.S. These studies used similar protocols to the present study and had data for three or four different seasons. Mean annual raptor use was 0.75 raptors/20-minute survey, based on fixed-point bird use data collected for the proposed Project site, and mean annual raptor use at the proposed Project site ranked eleventh relative to raptor use at the other wind-energy facilities (WEST 2010b).

A regression analysis of raptor use and mortality for 13 new generation wind energy facilities (located primarily in the mid-west and western U.S.), where similar methods were used to estimate raptor use and mortality, found a significant correlation between use and mortality (R^2 = 69.9 percent) (WEST 2010b). Based on a mean raptor use estimate of 0.75 raptors/20-minute survey, the regression equation predicts that raptor fatalities for the proposed Project site would be 0.13 fatalities/MW/yr which is somewhat higher than the median number of fatalities (0.09 fatalities/MW/yr) observed at the 13 wind energy facilities that were evaluated. This regression includes two California facilities which had substantially higher use and fatality estimates than the other 11 facilities. As more data on raptor use and fatalities at wind energy facilities in the western U.S. and Rocky Mountain Region becomes publicly available, the predictive ability of this tool will be better understood. Raptor use at the Project site has been studied over a period of three years and data will be used in micrositing the turbines.

Bird Flight Height and Behavior

A rotor sweep height (RSH) for potential collision with a turbine blade of 115 to 427 feet (35 to 130 meters) above ground level was used for the purposes of the analysis.

During the 2010 study, 194 groups of large birds totaling 276 individuals were observed flying during fixed-point bird use surveys. For all large bird species combined, 61.6 percent of birds were observed flying below the likely RSH, 37.7 percent were within the RSH, and 0.7 percent were observed flying above the RSH for typical turbines that could be used in the study area. Raptors were typically observed below the RSH (62.6 percent). However, the remaining 37.4 percent of flying raptors were observed within the rotor-swept heights. Bird types most often observed flying within the turbine RSH were waterfowl (100 percent), waterbirds (66.7 percent), and vultures (47.8 percent). A total of 1,546 passerines or other small bird species within 588 separate groups were observed flying in the 100-meter plot. All flying passerines and other small birds were observed below the estimated rotor-swept heights.

Five large bird species had at least 20 separate groups (defined as one or more individual) of flying birds (golden eagle, red-tailed hawk, turkey vulture, ferruginous hawk, and Swainson's hawk), and only golden eagle was observed within the rotor-swept heights during at least half of initial observations (59.3 percent).

Bird Exposure Index

A relative exposure index (R) was calculated for each bird species based on initial flight height observations and relative abundance (defined as the use estimate). It is calculated using the following equation:

$$R = A * P_f * P_t$$

Where:

> A = mean relative site use of species i (mean number of individuals of species i observed per survey plot per survey period),
>
> P_f = proportion of species i observations that were recorded as "flying", and
>
> P_t = proportion of species i flight height observations that were within the expected RSH.

The exposure index does not account for other possible collision risk factors (e.g., foraging or courtship behavior), nor does it account for a species' tendency to avoid collisions. Sandhill crane had a higher exposure index than other large bird species (0.13) (this is probably a conservative estimate since it does not account for this species' tendency to avoid turbines). The exposure index of 0.13 is based on a total of 36 sandhill cranes all of which were observed flying at the RSH. All other large bird species had an exposure index of 0.08 or less. Raptor species had exposure indices ranging from 0.08 (golden eagle) to 0.01 (rough-legged hawk and bald eagle). Red-tailed hawk had an exposure index of 0.07, whereas, ferruginous hawk and Swainson's hawk had intermediate exposure indices of 0.04. Prairie falcon, northern harrier, American kestrel, and sharp-shinned hawk had no exposure to the RSH based on initial flight height observations, and therefore had exposure indices of zero. Based on observations within 100 meters, no small bird species were observed flying within the RSH; therefore, all small bird species had an exposure index of zero.

Spatial Use

Spatial use is shown on Figures 6a through 6d in the Wildlife Baseline Studies (WEST 2010b). For all large bird species combined, use was slightly higher at point 16 (2.66 birds/20-minute survey) than at other points, which ranged from 0.82 to 1.68 birds/20-minute survey. The higher mean use estimate for point 16 was largely due to waterbird use at this point (1.16 birds/20-minute survey). Waterbird use was also observed at point 13 (0.55 birds/20-minute survey). Waterfowl were only observed at point 14 (0.06 birds/20-minute survey). Raptor use was highest at point 16 (1.19 birds/20-minute survey) and was lowest at point 12 (0.36); use by raptors ranged from 0.65 to 0.91 birds/20-minute survey at other points. Accipiter use was only observed at point 11 (0.06 birds/20-minute survey); while hawk use was observed at all points, with the lowest use at point 12 (0.24 birds/20-minute survey) and the highest use at points 15 and 16 (0.72 and 0.75, respectively). Northern harrier were observed at points 14 and 16 (0.06 and 0.03 birds/20-minute survey, respectively). Eagle use was highest at points 13 and 16 (0.35 and 0.31 birds/20-minute survey, respectively), and ranged from 0.03 to 0.12 at other points. Use by falcons was highest at point 11 (0.25 birds/20-minute survey) and ranged from zero to 0.09 at other points. Vulture use was higher at points 12 and 16 (0.33 and 0.22 birds/20-minute survey, respectively), and ranged from zero to 0.09 at the remaining points. Large corvid use was highest at point 14 (0.74 birds/20-minute survey), and ranged from zero to 0.41 birds/20-minute survey at other points. Passerine use (within 100 meters) was highest at point 12 (13.2 birds/20-minute survey), and ranged from 5.97 to 8.59 birds/20-minute survey at other points.

Flight paths for raptors and vultures were digitized and mapped. Mapped flight paths suggest that the northern portion of the study area had increased ferruginous hawk flights. Prairie falcon flight paths were more numerous in the vicinity of point 11 than at other points in the study area. Points 13 and 16 had a higher number of mapped golden eagle flight paths compared to other points. Turkey vulture flight paths were more numerous in the vicinity of point 12.

4.3.3.2.6.7 2011 Study Results

During the 2011 surveys, a total of 194 20-minute fixed-point bird use surveys were conducted during 33 visits to the Project site. Two different viewsheds were utilized when calculating the different statistics (species richness, use, percent composition, percent frequency, and exposure index): 800 meters (2,625 feet) for large bird observations and 100 meters (328 feet) for small bird observations. For the purposes of this report, small birds were determined to be passerines (excluding large corvids), hummingbirds, and woodpeckers.

Raptor Use

The second year of fixed-point surveys was conducted from April 20, 2010, through April 11, 2011, at six points established throughout the Project site. A total of 194 20-minute fixed-point surveys were completed and 42 bird species were identified. Diurnal raptor use was highest during the summer (1.38 birds/plot/20-minute survey) and lowest during the winter (0.69). The most common raptors observed in the study area were red tailed hawks, ferruginous hawks, and golden eagles. The raptor species with the highest exposure indices were red tailed hawk and golden eagle (0.09 and 0.08, respectively) (WEST 2011).

The annual mean diurnal raptor use (number of raptors divided by the number of 800-meter plots and the total number of surveys) at the Project site was compared with 39 other wind energy facilities that implemented similar protocols and had data for three or four seasons. The annual mean raptor use at these wind energy facilities ranged from 0.10 to 3.18 raptors/plot/20-minute survey. Mean diurnal raptor use at the Project site during the second year of surveys (1.02 raptors/plot/20-minute survey) ranked sixth compared to the 39 other wind energy facilities. Mean diurnal raptor use at the Hermosa West Wind Resource Area during the first year of surveys (0.75 raptors/plot/20-minute survey) ranked 11th compared to the 39 other facilities, and the combined results for the 2 years of baseline studies (0.88 raptors/plot/20-minute survey) ranked eighth out of the 39 other comparable studies at modern wind energy facilities (WEST 2011). Thus raptor use at the Project site is in the top quartile compared to the other 39 sites, and this may be due to the relatively open grasslands at the Project site, although habitat information about each site is not readily available to make detailed comparisons.

In addition to the fixed-point bird use surveys, two-hour raptor observations were conducted from a vantage point allowing maximum visibility between a golden eagle nest identified in 2009 and proposed turbine corridors. The objective of the raptor observations was to better understand the spatial extent and use of a portion of the Hermosa West Wind Resource Area by raptors (especially golden eagles and ferruginous hawks) and to assist in micrositing turbines outside of high-use corridors. Observations were initiated on May 25, 2010, and occurred following the same schedule proposed for avian use surveys in the remainder of the spring/summer 2010. A total of 28 two-hour observation periods were conducted from May 25, 2010, to April 11, 2011. Golden eagles were observed during 12 of the 28 observation periods and 21 golden eagle flight paths were mapped during surveys. Ferruginous hawks were observed during 10 of the 28 observation periods and 14 ferruginous hawk flight paths were mapped during surveys.

Golden eagles are protected by the MBTA and the BGEPA. Mean golden eagle use at the Hermosa West Wind Resource Area ranks 7th out of ten other publicly available golden eagle use estimates reported at other Wind Resource Areas in Wyoming. SWE commissioned additional raptor observations during year three 2011 through 2012 surveys to help better understand use of the Project site by raptors (particularly golden eagles) and to collect information on golden eagle use that can be incorporated into planning/facility siting with the intent of reducing potential risk to golden eagles. The results of the raptor observations can be used to inform project siting and may help to minimize potential impacts to golden eagles.

Bird Flight Height and Behavior

Flight height characteristics were estimated for both bird types and species (See tables 5 and 6, and Appendix D in WEST 2011). During the 194 20-minute fixed-point bird use surveys conducted during 33 visits, 235 groups (defined as one or more individual), totaling 339 individuals, of large birds were observed flying within the 800-meter plot. Overall, 37.8 percent of flying large birds were initially recorded within the RSH, 60.8 percent were below the RSH, and 1.5 percent were flying above the RSH for collision with turbine blades of 35 to 130 meter (115–427 feet) above ground level. More than half (54.0 percent) of flying raptors were initially observed below the RSH, 43.4 percent were within the RSH, and only 2.6 percent were above the RSH. Of flying raptors recorded, 62.5 percent of northern harriers, 56.2 percent of eagles, 46.9 percent of buteo observations, 9.1 percent of falcons, and zero accipiters were recorded flying within the RSH during initial observations. Waterbirds, waterfowl, and gulls/terns had the highest percentage of flying birds within the RSH (100.0 percent) although these observations are based on single groups and few individuals. Approximately forty seven percent of vultures were initially recorded within the RSH. The majority of flying large corvids (99.0 percent) were initially observed below the RSH. All passerines and woodpeckers initially observed flying within the 100-meter plot were observed below the RSH (table 5 in WEST 2011). Passerine use was highest in the spring (8.13 birds/plot/20-minute survey), compared to the summer (5.10), fall (4.38), and winter (3.64; table 4 in WEST 2011). Horned lark had the highest use by any one passerine species across all seasons (fall 3.96, winter 2.74, spring 2.32, and summer 1.93 birds/plot/20-minute survey; Appendix C in WEST 2011). Passerines were observed 85.0 percent or more of surveys in the spring, summer, and fall compared to 52.4 percent of surveys in the winter.

Of all large bird species, five species (red-tailed hawk, golden eagle, ferruginous hawk, prairie falcon and Swainson's hawk) had at least 20 groups observed flying (table 6 in WEST 2011). All observed flying raptor species, except for ferruginous hawk (18.8 percent within RSH) and prairie falcon (13 percent within RSH), were observed flying within the RSH during at least 50 percent of initial observations (table 6 in WEST 2011). American white pelican, Canada goose, and unidentified gull were always seen flying within the RSH during initial observations; however, these were only based on one observation. No passerines or small bird species were observed flying within the RSH.

Bird Exposure Index

A relative exposure index was calculated for each bird species based on initial flight height observations and relative abundance (defined as the use estimate). Those species that had exposure to the turbine RSH are listed in table 6 in WEST 2011, and a complete list of all species is presented in Appendix D in WEST 2011. The exposure index does not account for other possible collision risk factors such as foraging or courtship behavior. Unidentified terns had a higher exposure index than other large bird species (0.11) however this is based on one group of 30 terns. Red-tailed hawk had the second highest exposure index (0.09), followed by golden eagle (0.08) Swainson's hawk (0.06), northern harrier (0.05), rough-legged hawk (0.04), turkey vulture (0.04), ferruginous hawk (0.03), and American white pelican (0.02). All other species had an exposure index of 0.01 or less. Based on observations within 100 meter (328 feet), no small bird species were observed flying within the RSH; therefore, all small bird species had an exposure index of zero.

Spatial Use

Spatial use is shown on Figure 8 in the Wildlife Baseline Studies (WEST 2011). For all large bird species combined, use was highest at point 14 (4.09 birds/20-minute survey); compared to all other points, which ranged from 1.00 to 1.75 birds/20-minute survey. The higher mean use estimate for point 14 was due in part to use by large corvids (1.62 birds/20-minute survey), gulls and terns (0.94 birds/20-minute survey), and buteo use (0.91 birds/20-minute survey). Waterbird were only observed at point 12 (0.16 birds/20-minute survey). Waterfowl were only observed at point 11 (0.06 birds/20-minute survey). Raptor use was highest at point 14 (1.34 birds/20-minute survey) and was lowest at point 12 (0.50). Accipiter use was only observed at point 11 (0.09 birds/20-minute survey); while hawk use was observed at all points, with the lowest use at point 12 (0.19 birds/20-minute survey) and the highest use at point 14 (0.91 birds/20-minute survey). Northern harriers were observed at all points with the highest use at point 11 (0.5 birds/20-minute survey). Eagle use was highest at points 15 and 16 (0.21 and 0.33 birds/20-minute survey, respectively), and ranged from 0.06 to 0.19 at other points. Use by falcons was highest at points 13 and 14 (0.25 and 0.28 birds/20-minute survey, respectively) and ranged from 0.06 to 0.16 at other points. Vulture use was highest at point 14 (0.19 birds/20-minute survey), and ranged from 0.03 to 0.09 at the remaining points. Large corvid use was highest at point 14 (1.62 birds/20-minute survey), and ranged from 0.18 to 0.38 birds/20-minute survey at other points. Passerine use (within 100 meters) was highest at point 12 (10.47 birds/20-minute survey), and ranged from 3.56 to 5.91 birds/20-minute survey at other points. Woodpeckers were only observed at point 13 (0.03 birds/20-minute survey).

Flight paths for raptors and vultures were digitized and mapped (WEST 2011). Mapped flight paths suggest that the northern portion of the study area had increased ferruginous hawk and Swainson's hawk flights. Prairie falcon flight paths were more numerous in the vicinity of point 11 than at other points in the study area. Points 13 and 16 had a higher number of mapped golden eagle flight paths compared to other points. Turkey vulture flight paths were more numerous in the vicinity of point 12.

4.3.3.2.7 Direct and Indirect Effects

4.3.3.2.7.1 Avian Species

Direct and indirect effects to avian species are discussed in detail in the July 16, 2010, and August 18, 2011, *Wildlife Baseline Studies for the Hermosa West Wind Resource Area, Albany County, Wyoming* report (WEST 2010b, 2011); appendix E. It is anticipated that there would be direct and indirect effects of both permanent and temporary nature to avian species in the Project area.

Direct permanent effects include mortality or injury due to collisions with turbines, guy wires, or transmission lines and mortality of ground and shrub nesting birds and possibly nests by construction vehicles and ground clearing activities.

Mean diurnal raptor use at the Project site during the first year of the survey (2009-2010) was 0.75 raptors/plot/survey which ranked 11th compared to 39 other wind energy facilities that had similar protocols (WEST 2011). During the second year of the survey (2010-2011), mean diurnal raptor use at the Project site was 1.02 raptors/plot/survey which ranked 6th compared to the 39 other facilities. The combined results for both years of surveys had a mean use of 0.88 raptors/plot/survey which ranked 8th compared to the 39 other facilities. Foote Creek Rim is the only wind energy facility in the Rocky Mountain Region that has publically available data for both raptor use and raptor mortality. The mean annual raptor use for Foote Creek Rim is 0.55 raptors/plot/survey, and the raptor fatality rate is 0.04 fatalities/MW/year. Both mortality and use data are available for 11 modern wind energy facilities in the Pacific Northwest. For these facilities raptor use ranged from 0.21 to 0.75 raptors/plot/survey and fatality rates ranged from 0 to 0.21 fatalities/MW/year and averaged 0.08 fatalities/MW/year (WEST 2011). The mean raptor use at the Project site (0.88 raptors/plot/survey) is higher than at Foote Creek Rim and the Pacific Northwest facilities. If it were assumed that raptor mortality is correlated to raptor use, then fatality rates at the Project site would be expected to be at upper end of the range of the fatalities rates reported for Foote Creek Rim and the Pacific Northwest facilities. A regression analysis of 16 new generation wind energy facilities showed a significant correlation between raptor use and raptor-collision mortality (WEST 2011). A fatality rate of 0.21 raptor fatalities/MW/year was predicted for the Project site using the regression equation and the 2010-2011 mean use value of 1.02 raptors/pot/survey (WEST 2011). A third year of raptor observations is being conducted at the Project site, and the results will be used to further refine the project layout with the intent of minimizing potential impacts to raptors (WEST 2011). In both years of surveys, no small birds were observed flying at the RSH, and thus direct impacts to these species are expected to be low.

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

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

Birds displaced from wind-energy facilities might move to areas of lower habitat quality with fewer disturbances, with an overall effect of reducing breeding success. Most studies on raptor displacement at wind-energy facilities, however, indicate effects to be negligible (Howell and Noone 1992; Johnson et al. 2000, 2003; Madders and Whitfield 2006 as cited in ERM 2010f).

No indirect temporary effects to birds are anticipated as a result of construction, operations and maintenance of the Project.

4.3.3.2.7.2 Fish

No permanent or temporary direct effects to fish are anticipated as a result of construction, operation, and maintenance of the Project.

Temporary indirect effects to fish may include surface disturbance, changes in flow rates, and changes in water quality such as sedimentation and siltation of waters in the Project area. Soil disturbance, culvert installation for access roads, and the use of water from a temporary water well would be the most likely causes of temporary indirect impacts to downstream fish species. BMPs listed in table 2.6-1, the SWPPP, and SPCCP such as silt fencing and placement of excavated material away from streams, would be implemented to avoid or minimize potential impacts to fish species. Open-bottom culverts would be used where practicable during road construction to avoid changing stream morphology or removing suitable fish habitat.

No permanent indirect effects to fish are anticipated as a result of construction, operation, and maintenance of the Project. The Project would have *de minimis* long-term effects (less than 0.1 acre feet/year) as a result of a permanent water well for the operations and maintenance building. The Project would not withdraw any surface water from within the Platte River Basin.

4.3.3.2.7.3 Amphibians and Reptiles

Permanent direct effects to amphibians and reptiles (herpetiles) in the Project site include mortality due to increased vehicle traffic and loss of suitable habitat as a result of construction of Project features such as access roads and turbine pads. Species known to occur on the Project site utilize both mixed-grass prairie (e.g., lizards, snakes, and turtles) and wetlands (e.g., frogs, toads, salamanders, and turtles). Estimated losses of 55.07 acres of mixed-grass prairie, 0.07 acre of jurisdictional wetlands, and an estimated 0.95 acres of riparian and willow dominated habitats may result in direct permanent effects on herpetiles in the form of habitat loss.

Temporary direct effects to herpetiles include displacement as a result of localized construction disturbance. These effects could result from construction noise and temporary vegetation removal. Estimated disturbance of 234.67 acres of mixed-grass prairie and 5.99 acres of riparian and willow-dominated habitats may result in temporary effects on herpetiles. Temporary indirect effects to herpetiles might include decreased breeding success during construction and until impacted vegetation is restored.

Permanent indirect impacts to herpetiles using riparian and wetland habitats (e.g., frogs, toads, salamanders, and turtles) will not be significant since only a small area will be permanently impacted (0.07 acres of wetlands and 0.95 acres of riparian and willow habitat). As indicated above, there would be some permanent loss of grassland habitat (55.07 acres), however this would not significantly affect populations of herpetiles that use this habitat (e.g., lizards, snakes, and turtles) because the amount lost would be a small fraction (about 0.6 percent) of the total grassland habitat (9,735 acres) on the Project site.

4.3.3.2.7.4 Special Status Species

Effects to wildlife species listed by WGFD as SSC and their habitat are not prohibited under Wyoming law; therefore, no site-specific analysis was done to assess the effects of the Proposed Action and the total Project (ERM 2010f).

Based on surveys and consultation with USFWS, seven federally listed wildlife species could be present in the Project site.

A species summary and evaluation of the effects of the Proposed Action and the total Project was conducted upon threatened and endangered species if they have a potential to occur in the survey area (see section 3.3.3) (ERM 2010f). Project effects determinations are defined as follows:

- No effect—Project activities will have no adverse or beneficial effect on the listed species;
- Not likely to adversely affect—Project activities may directly or indirectly affect the listed species or its habitat; however, the effects are likely to be discountable, insignificant, or beneficial; and
- Likely to adversely affect—Project activities are anticipated to have significant adverse effects (direct or indirect) on the listed species or its habitat.

Wildlife species listed by WGFD as SSC potentially occur within the study area based on suitable habitat (see table 3.3-11). While these species are listed by WGFD, effects to these species and their habitat are not prohibited under Wyoming law; therefore, no site-specific analysis was done to assess the effects of the Proposed Action and the total Project (ERM 2010f).

Table 4.3-6 contains the evaluation of the effects of the Proposed Action and total Project upon Federally threatened and endangered species potentially occurring in the Project area (ERM 2010f).

Table 4.3-6:
Evaluation of the Effects of the Proposed Action and Total Project Upon Federal Threatened and Endangered Species Potentially Occurring in the Survey Area

Common Name	Scientific Name	Federal Status	Potential Occurrence in Survey Area	Proposed Action Potential Impact	Total Project Potential Impact
Mammals					
Canada Lynx	*Lynx Canadensis*	FT	Low	Not likely to adversely effect	Not likely to adversely effect
Black-footed Ferret	*Mustela nigripes*	FE, FX	No	No effect	No effect
Bats					
There are no Federally threatened, endangered, or candidate bat species with potential to occur in the survey area.					
Birds					
Greater Sage Grouse	Centrocercus urophasianus	Candidate	Low	No effect	No effect
Interior Least Tern	Sterna antillarum	Endangered	No	No effect	No effect

Table 4.3-6:
Evaluation of the Effects of the Proposed Action and Total Project Upon Federal Threatened and Endangered Species Potentially Occurring in the Survey Area

Common Name	Scientific Name	Federal Status	Potential Occurrence in Survey Area	Proposed Action Potential Impact	Total Project Potential Impact
Piping Plover	Charadrius melodus	Threatened	No	No effect	No effect
Whooping Crane	Grus Americana	Endangered	No	No effect	No effect
Fish					
Pallid Sturgeon	*Scaphirhynchus albus*	FE	No	No effect	No effect
Amphibians					
Wyoming Toad	*Bufo baxteri*	FE	Low	No effect	Not likely to adversely effect
Reptiles					
There are no Federally threatened, endangered, or candidate reptile species with potential to occur in the survey area.					

Source: adapted from ERM (2010f), Kingery (1998)
FT = Federally Threatened under the ESA
FE = Federally Endangered under the ESA
FX = Federal Nonessential/Experimental Population (no added protection)
FC = Federal Candidate Species

4.3.3.2.7.5 Mammals

The Canada lynx is found in mesic coniferous forests that have cold, snowy winters and which provide a prey base of snowshoe hare (Quinn and Parker 1987; Koehler and Brittell 1990; Koehler 1990; Koehler and Aubry 1994; Mowatt et al., 2000; McKelvey et al. 2000; Ruggiero et al. 2000b). The potential occurrence for Canada lynx is low in the Project site, with approximately 88 percent of the land cover being mixed grass prairie. However, it is possible that the forested mountainous margins of the study area could contain suitable habitat, and individuals could travel through the Project site between habitat patches. Suitable habitat does lie to the south in Colorado, and possibly to the west of the study area.

No permanent or temporary, direct or indirect effects to Canada lynx are anticipated as result of the construction, operation, and maintenance of the Project. The Proposed Action may affect, but is not likely to adversely affect the Canada lynx because the Project site is primarily mixed grass prairie habitat unsuitable for the species. While it is possible for individuals to pass through the area, effects would be limited to times of dispersal or long range movements of individuals.

The black-footed ferret was historically found in grasslands and sagebrush habitats typically associated with prairie dog towns. This species is not expected to occur in the survey area. The nearest known population is approximately 100 miles north of the Project site. Furthermore, there are only three small colonies of white-tailed prairie dogs on site, which are likely too small to provide adequate habitat, and there no evidence for the occurrence of black-footed ferret was identified within the Project site area (ERM 2010f).

No permanent or temporary, direct or indirect effects to black-footed ferret are anticipated as a result of the construction, operation, and maintenance of the Project. The Project would have no effect on the black-footed ferret as there is no suitable habitat present within the survey area.

4.3.3.2.7.6 Birds

The Project site is not located within any mapped greater sage grouse core area. No greater sage grouse individuals or leks were observed in the survey area (ERM 2010f). Very little sagebrush cover suitable for the grouse was observed on the Project site (Tetra Tech 2010). Greater sage grouse are not likely to be adversely affected by the proposed Project.

Both bald eagles and golden eagles have been documented to be present in the proposed Project site during surveys (WEST 2010b). That survey work documented that eagles' flight paths, at initial observation, were within the RSH for this Project 58 percent of the time. Field work also documented an active golden eagle nest site within the proposed Project boundary in the southeastern corner, as well as three small white-tailed prairie dog towns (prairie dogs are potential prey for both bald and golden eagles in the western US) within the proposed Project site (ERM 2010f). Golden eagles were observed in the Project vicinity (near Tie Siding) white-tailed prairie dogs verified in the previously mapped locations (Tetra Tech 2010). Overall raptor mortality for the Project was estimated at 0.13 fatalities per megawatt per year (WEST 2010b). Based on the anomalous California facility data in the model, SWE believes this to be a very conservative estimate. Eagle mortality would be a subset of the overall raptor mortality (i.e., <0.13 fatalities/MW/year). Based upon the estimated mortality rate (WEST 2010b), take of eagles is possible, and SWE would be required to secure an incidental take permit under the BGEPA from the USFWS.

No effect to interior population of least tern is anticipated as result of the proposed Project. This determination is based upon the expectation that no permanent or temporary, direct or indirect effects would occur as a result of the construction, operation, and maintenance of the Project. Based on the least tern's range and preferred habitat, this species is not expected to occur on the Project site. The project will not result in depletions to the Platte River and therefore there will be no indirect effects to the least tern.

No effect to the piping plover is anticipated as a result of the proposed Project. This determination is based upon the expectation of no permanent or temporary direct or indirect effects to piping plover as result of the construction, operation, and maintenance of the Project. Based on the piping plover's range and preferred habitat, this species is not expected to occur on the Project site. The project will not result in depletions to the Platte River and therefore there will be no indirect effects to the piping plover.

The whooping crane is not expected to occur within Project site and thus the Project will have no direct effect on this species. The project will not result in depletions to the Platte River and therefore there will be no indirect effects to the whooping crane.

4.3.3.2.7.7 Fish

There is no potential for the pallid sturgeon to occur within the Project site. The proposed Project would have no effect on the pallid sturgeon, due to the lack of suitable habitat. The project would not result in depletions to the Platte River and therefore there would be no indirect effects to the pallid sturgeon.

4.3.3.2.7.8 Amphibians

The Wyoming toad is found in the Laramie Basin in Albany County inhabiting ponds, small seepage lakes, and floodplains. The potential occurrence in the survey area is low. No individual Wyoming toads were observed in the survey area. Suitable habitat is present for this species in several small riparian wetland environments in the Project site (Tetra Tech 2010). Suitable habitat for the Wyoming toad was also documented in the form of small wetlands and streams, identified within the proposed Project site (ERM 2010f). The Project is estimated to permanently affect 0.07 acre of jurisdictional wetlands. The GIS land cover evaluation estimated 2.86 acres of wetland cover type may be lost. At this estimated impact acreage to wetlands, the proposed Project may adversely affect Wyoming toad individuals, but is not likely to result in a downward trend at the population level.

4.3.3.3 Impact Assessment of the No Project Option

Under the no Project option, Western would not execute an interconnection agreement and the Project would not be built. The environmental effects associated with construction, operation, and maintenance of the Project would not occur. There would be no effects to wildlife associated with the no action alternative. As long as current land use is maintained, there should be no change to wildlife, but development opportunities could be pursued in the absence of the proposed Project that could have impacts.

4.3.3.4 Mitigation Measures

The following BMPs and mitigation measures have been identified and committed to by SWE to avoid resource impacts or reduce potential impact levels. They are considered an integral part of the proposed Project and would be implemented by SWE as requirements in SWE's contract with their construction contractor. Mitigation measures applicable to operation and maintenance activities would be incorporated in SWE's Operation and Maintenance Plan for the Hermosa facility, and those related to decommissioning would be incorporated in SWE's Decommissioning Plan. The mitigation measures are required by law, regulation, or permit conditions, and compliance would be overseen by the responsible regulatory authorities. While Western has no authority or jurisdiction over SWE's proposed Project, Western's decision to execute an interconnection agreement would consider SWE's commitments to implement these BMPs and mitigation measures, and the reduction in environmental impacts that would result.

In addition to the BMPs listed in section 2.6, including the Fire Management Plan and invasive species management and WAT-8, SWE has identified measures that will be implemented under the proposed Project to avoid and minimize impacts to wildlife, which include timing considerations, required pre-construction surveys, selection of Project components, and facility siting considerations. These BMPs are built into the proposed Project description.

4.3.3.4.1 General BMPs

- WL-1. The Project will avoid to the greatest extent practicable, siting Project facilities in sensitive areas used by large numbers of wildlife species.
- WL-2. All ground clearing activities will be preceded by surveys for ground nesting birds to prevent take of protected species.
- WL-3. An Avian Monitoring and Protection Plan will be implemented post construction to collect data (for approximately 1 to 3 years) and understand effects to avian species.
- WL-4. Areas temporarily disturbed during construction, such as lay down areas and temporary access roads to the concrete batch plant, construction parking, and construction office area, will be reclaimed by recontouring the area to original conditions if necessary and reseeding with a certified native seed mix.
- WL-5. A qualified site monitor will be responsible for clearing areas ahead of construction equipment to reduce the potential for wildlife conflict including nesting birds to the extent practicable during construction.
- WL-6. Waste containment facilities will be designed to avoid attracting scavengers.

4.3.3.4.2 Mitigation for Potential Impacts to Fish

- WL-7. BMPs listed in table 2.6-1, the SWPPP, and SPCCP such as silt fencing and placement of excavated material away from streams, will be implemented to avoid or minimize potential impacts to fish species. Open-bottom culverts will be used where practicable during road construction to avoid changing stream morphology or removing suitable fish habitat.
- WL-8. Water quality BMPs will be implemented to minimize any unforeseen impacts to the Platte River System’s watershed including the use of appropriate sediment and erosion control measures, such as silt fencing and/or hay bales near water bodies and wetlands and the installation of construction barriers and notices to identify sensitive receptors. Furthermore, construction work areas, turbines, access roads, and facilities will be sited outside of wetlands and water bodies, to all extents practicable, to further minimize impacts to the Platte River System watershed (ERM 2010f).

4.3.3.4.3 Mitigation for Potential Impacts to Mammals

- WL-9. Individuals of threatened and endangered wildlife species passing through the Project site will be allowed to pass unharmed and unharassed, as required under the ESA. This will be accomplished by the implementation of a no approach, no kill policy for all threatened and endangered species by all onsite personnel during construction and operation activities.

4.3.3.4.4 Mitigation for Potential Impacts to Birds

- WL-10. Avian collisions with guy wires will be avoided by using self-supporting meteorological towers which do not use guy wires.
- WL-11. Wind turbines will be lighted using FAA requirements.

- WL-12. The USFWS will be notified within 24 hours of federally listed species mortality on the Project site.
- WL-13. As cited in WEST (2010b), impacts to raptor species can be minimized by not placing wind turbines inside spatial buffers (following the recommendations provided by the WGFD in a letter dated June 22, 2009) around the following:
    - Known raptor nest sites during siting of the wind-energy facility as well as avoiding the two small white-tailed prairie dog colonies identified.
    - The three small white-tailed prairie dog colonies, to help to minimize impacts to foraging raptors.

4.3.3.4.5 Mitigation for Potential Impacts to Amphibians

4.3.3.4.5.1 Wyoming Toad

- WL-7 and WL-8 will be implemented to minimize any unforeseen impact to the Wyoming toad.

4.4 Cultural Resources and Native American Concerns

This section discusses the potential impacts to cultural resources and Native American concerns associated with the implementation of SWE's proposed Project. The proposed Project elements analyzed include SWE's construction and operation of the wind farm.

The proposed Project must comply with Federal laws relating to identification, management, and protection of cultural resources. Western and SWE assessed the existing previously recorded cultural resource data for the proposed Project under the requirements, including those in Section 106 of the NHPA and its implementing regulations (36 CFR Part 800). This EIS is not intended to address all of the requirements of Section 106. Western is conducting Section 106 compliance in accordance with the implementing regulations for this statute, 36 CFR 800.4 (b)2, which state:

> *(2) Phased identification and evaluation. Where alternatives under consideration consist of corridors or large land areas, or where access to properties is restricted, the agency official may use a phased process to conduct identification and evaluation efforts. The agency official may also defer final identification and evaluation of historic properties if it is specifically provided for in a memorandum of agreement executed pursuant to §800.6, a programmatic agreement executed pursuant to § 800.14 (b), or the documents used by an agency official to comply with the National Environmental Policy Act pursuant to § 800.8. The process should establish the likely presence of historic properties within the area of potential effects for each alternative or inaccessible area through background research, consultation and an appropriate level of field investigation, taking into account the number of alternatives under consideration, the magnitude of the undertaking and its likely effects, and the views of the SHPO/THPO and any other consulting parties. As specific aspects or locations of an alternative are refined or access is gained, the agency official shall proceed with the identification and evaluation of historic properties in accordance with paragraphs (b)(1) and (c) of this section.*

Resources listed or eligible for listing in the NRHP are defined by the regulations as “historic properties,” and impacts to these resources must be considered. In addition, there may be areas of interest to Native Americans, such as traditional use areas or TCPs. These could be areas inside the Project site, or areas that extend outside the geographic boundaries of the proposed Project site. These concerns must be considered through consultation with interested tribes.

4.4.1 Methods

A Class III cultural resources inventory was completed. The inventory included background research and a three-week comprehensive surface field survey for archeological resources. The inventory included:

- A Class I survey/records review of materials accessible through the SHPO WYCRO database
- Review of General Land Office maps and other historic cartographic sources
- Research on local history, including western-migration trails and overland transportation corridors
- Field survey of all proposed Project elements (including turbine strings, collector lines, access roads, substation, switchyard, gen-tie line corridor, temporary disturbance areas, and other supporting infrastructure)

Consultation with Native American tribes who may have an interest in cultural resources in the area has been initiated and is ongoing.

Assessment of potential impacts involved consideration of the proposed Project layout in relationship to the locations of inventoried cultural resources. Resources located within the footprints of proposed Project elements such as turbine pads, access roads, collector lines, substation, and other infrastructure, or in adjoining work zones or buffers, were identified. Once the cultural resources were identified, SWE used the location information to proactively modify the project layout to avoid them. The potential for visual impacts was assessed through a generalized consideration of the BLM's visual contrast rating protocol, which is recognized by the Wyoming SHPO as an acceptable procedure for evaluating and mitigating potential visual impacts (BLM 1986a, SHPO 2006). Aspects of cultural resources considered in relation to the proposed Project included:

- Character-defining elements of the resource as expressed by the criteria applied to identify the resource as significant
- Size, massing, and other visual elements of the Project
- Distance between the resource and the Project
- Nature of intervening topography and vegetation

In particular, the assessment of potential visual impacts employed two general guidelines: first, visual impacts would not occur if a cultural resource is significant primarily because of the data it contains (NRHP Criterion D—see below); and second, there will be no substantive visual impacts if the resource is separated from the Project by distances of more than approximately 2 to 5 miles (BLM 1986a, SHPO 2006).

4.4.2 Significance Criteria

The threshold of significance for cultural resources is based on whether the resource is listed in, or considered eligible for listing in, the NRHP. Under NEPA, NHPA, and related laws and regulations, cultural resources have standing for assessment of project effects if they are listed on or are determined to be eligible for listing on the NRHP. Criteria for NRHP eligibility are defined at 36 CFR 60.4:

> *National Register criteria for evaluation. The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts,*

sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and

(a) that are associated with events that have made a significant contribution to the broad patterns of our history; or

(b) that are associated with the lives of persons significant in our past; or

(c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(d) that have yielded, or may be likely to yield, information important in prehistory or history.

Resources meeting these criteria are variously referred to as "significant," NRHP-listed, or NRHP-eligible. The process of formally listing a property on the NRHP is defined at 36 CFR 60, and is discussed in detail in various *Bulletins* issued by the National Park Service's NRHP program. Determining NRHP eligibility is a process involving a formal statement of opinion by the SHPO and/or other designated authority and is defined at 36 CFR 65.

In the context of NHPA, project effects on historic properties are classified as "no adverse effect" or "adverse effect." Under NEPA, significant impacts to cultural resources may occur if a site of archaeological, tribal, or historical value that is listed or eligible for listing in the NRHP cannot be avoided and is not appropriately mitigated during construction or operation of a proposed project. In addition, NEPA regulations consider impacts to cultural resources as "direct" or "indirect." Under the regulations implementing Section 106 of the NHPA, the definition of direct or indirect refers to the area of potential effect within which the Federal undertaking may directly or indirectly cause alterations in historic properties (36 CFR 800.16[d]). Therefore, avoidance or mitigation of historic properties can ensure that sites are not adversely impacted (NHPA) and that there are no significant impacts (NEPA).

Adverse effects or significant impacts to cultural resources could occur if construction or operation of the Project resulted in:

- Damage to or loss of a historic property listed on or eligible for listing on the NRHP
- Loss or degradation of a TCP, including creation of conditions that render the locality inaccessible for future use

During public scoping, several potential issues related to cultural resources were raised and are summarized as follows:

- Potential damage to significant archeological traces historic trails and roads due to Project construction activities
- Potential damage to significant Native American archeological sites due to Project construction activities
- Potential impacts to Native American TCPs

- A recommendation that an unanticipated discoveries plan be created to address the unexpected recognition or exposure of an archeological resource during Project construction

These comments were taken into consideration during this impacts analysis.

4.4.3 Impact Assessment of the Proposed Project

Of the 10 inventoried cultural resources in the Project vicinity that have been listed on the NRHP, evaluated as eligible for the NRHP, or recommended for NRHP evaluation study, two archeological sites could potentially be adversely affected by construction of the proposed Project (table 4.4-1). These are sites 48AB1932, a historic farmstead or ranch, and 48AB1933, a prehistoric Native American lithic scatter. SWE plans to avoid these sites. The remaining properties are outside the construction zone of the proposed Project. They will not be subject to visual or other indirect impacts either because they are substantially distant from the Project site or because they are significant/potentially significant only because of the data they contain (NRHP Criterion D).

Table 4.4-1:
Known Cultural Resources

Resource Identifier	Resource Type and Period	NRHP Status	Potential Impacts/Effects
48AB130 (Willow Springs Bison Pound Site)	Multicomponent prehistoric Native American bison kill site (Archaic to Late Prehistoric periods)	Consultant recommended as NRHP eligible under Criterion D. No SHPO comment to date.	No impact/adverse effects. Outside Project area and because significant for data only (Criterion D), not subject to visual impacts.
48AB145 (Dale Creek Crossing)	Railroad bridge ruins (1868/1885–1901)	NRHP listed. Criteria not specified, but statement of significance implies Criterion A.	No impact/adverse effects. Distant from Project and screened by intervening terrain.
48AB157 Segment 14	Overland Trail ruts segment (ca. 1849–1880)	Consultant recommended as NRHP eligible; criteria not specified. Has SHPO concurrence.	No impacts/effects. Moderately distant from Project and surrounding environment already contains some visual intrusions.
48AB157 Segment 16	Overland Trail ruts segment (ca. 1849–1880)	Consultant recommended as NRHP eligible; criteria not specified. Has SHPO concurrence.	No impacts/effects. Moderately distant from Project and surrounding environment already contains some visual intrusions.
48AB359 (Tie Siding Stage Station Site)	Overland Trail stagecoach stop (ca. 1860–1900)	Consultant recommended as NRHP eligible; criteria not specified, but recommendation comments imply Criterion D. No SHPO comment to date.	No impact/adverse effects. Outside Project area and because implied significance is for data only (Criterion D), not subject to visual impacts.
48AB1932	Farmstead/Ranch (late 1800s through mid-1900s)	NRHP eligibility undetermined; consultant recommended further study. Possible eligibility under Criteria D and B. No SHPO comment to date.	Adjacent to proposed access road. If site determined to be NRHP eligible, potential for impacts due to road construction.
48AB1933	Lithic Scatter—Prehistoric Native American (Late Prehistoric and possibly additional periods)	NRHP eligibility undetermined; consultant recommended further study. Possible eligibility under Criteria D. No SHPO comment to date.	Adjacent to proposed access road. If site determined to be NRHP eligible, potential for impacts due to road construction.
Ames Monument	Monument/Railroad	NRHP listed. Criteria not specified, but statement of significance implies Criteria B and C.	No impact/adverse effects. Distant from Project and largely screened by intervening terrain.

Table 4.4-1:
Known Cultural Resources

Resource Identifier	Resource Type and Period	NRHP Status	Potential Impacts/Effects
Barn at Oxford Horse Ranch	Barn (1887)	NRHP listed. Criteria not specified, but statement of significance implies Criteria C and B.	No impact/adverse effects. Distant from Project and screened by intervening terrain.
Virginia Dale Stage Station	Overland Trail stagecoach stop (1862)	NRHP listed. Registration form not readily available, but summary of significance implies Criteria A and C.	No impact/adverse effects. Distant from Project and screened by intervening terrain.

Although no NRHP evaluation of the two archeological sites, 48AB1932 and 48AB1933, has been completed, if eligible they could be adversely affected by earthmoving and other ground disturbances produced by construction of Project access roads. Construction-related ground disturbances have the potential to severely compromise or destroy the integrity of archeological sites by displacing artifacts, destroying spatial associations, and damaging or destroying features and other site elements. SWE has modified the proposed Project layout to avoid these sites.

Evaluation of Project impacts on the remaining eight cultural resources indicates that no direct impacts will occur under the proposed Project because all resources are substantially outside the planned construction zone. Visual impacts/adverse effects are not anticipated because the inventoried resources are relatively distant from the proposed Project's most visually intrusive elements, the wind turbines. In some instances, intervening terrain also effectively screens the resource from the proposed Project, while in others visually intrusive elements are already present in the vicinity of the resource and the proposed Project will not substantively increase these intrusions. Finally, in at least one instance, the Willow Springs Bison Pound, the significance of the property lies in the data it contains (Criterion D), so visual effects, if any, do not have a substantive impact on the property.

No information is currently available about the potential impacts, if any, on TCPs associated with Native American groups. Since the proposed Project area is open grassland in a relatively low topological position compared to the surrounding area, few or no TCPs would be expected. Consultation with interested tribal groups is ongoing.

4.4.4 Impact Assessment of the No Project Option

Under the no Project option, it is assumed the proposed Project would not be built and potential environmental impacts associated with construction and operation of it would not occur. Therefore, under the no Project option there would be no impacts to cultural resources.

4.4.5 Mitigation Measures

The following BMPs and mitigation measures have been identified and committed to by SWE to avoid resource impacts or reduce potential impact levels. They are considered an integral part of the proposed Project and would be implemented by SWE as requirements in SWE's contract with their construction contractor. BMPs and mitigation measures applicable to operation and maintenance activities would be incorporated in SWE's Operation and Maintenance Plan for the Hermosa facility, and those related to decommissioning would be incorporated in SWE's Decommissioning Plan. The mitigation measures are things that would also be required by law, regulation, or permit conditions, and compliance would be overseen by the responsible regulatory authorities. While Western has no authority or jurisdiction over SWE's proposed Project, Western's decision to execute an interconnection agreement would consider SWE's commitments to implement these mitigation measures, and the reduction in environmental impacts that would result.

BMPs

- CUL-1: Modify alignments of proposed access roads to avoid impacts to sites 48AB1932 and 48AB1933.
- CUL-2: Supervise construction contractors diligently to ensure that construction activities, including vehicle movements, laydowns, and borrow pitting, take place only in designated, previously-surveyed areas.
- CUL-3: Conduct appropriate worker education concerning the recognition and protection of cultural resources.

Mitigation Measures

- CUL-4: If the Project design cannot be modified to avoid impacts to sites 48AB1932 and 48AB1933, conduct additional studies to assess NRHP eligibility and, if necessary, conduct data recovery excavations to mitigate impacts.
- CUL-5: Develop an Unanticipated Discoveries Plan that describes procedures for responding to the discovery of archeological or other cultural resources, including unmarked graves, during construction.
- CUL-6: Develop plans for ongoing protection and monitoring, as appropriate, of identified cultural resources during the operational life of the Project.

4.5 Paleontology

This section discusses the potential impacts to paleontological resources associated with the proposed Project. The proposed Project components discussed include SWE's construction and operation of the proposed Project.

4.5.1 Methods

As a result of the record search, described in section 3.5.3, a spot inspection for fossils was conducted by a qualified professional on geological outcrops mapped as the Pennsylvanian/Permian Fountain and Casper Formation within the proposed Project site.

4.5.2 Significance Criteria

An impact has the potential to be significant if a project would directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. Identification of potential impacts is based upon the "paleontological sensitivity" of the geologic formations that would be encountered during construction and operation of the proposed Project.

Paleontological sensitivity is an estimate of the likelihood that fossils would be discovered during excavations in a given area. This estimate, however, does not measure the significance of individual fossils that may be present or discovered in an area. Specifically, fossil remains encountered at the proposed Project site have the potential to provide important data that would add to the understanding of the geologic history or evolution of climate in the region in the Pleistocene/early Holocene interval. Individual fossils that may be discovered must be examined to determine the nature, age, and value of the fossil to the paleontological record (e.g., understanding of regional paleo-environments).

Based on the significance criteria listed below, a significant effect to paleontological resources would occur if the following were experienced from construction or operations of the proposed Project:

- Damage to or loss of a site of paleontological value
- Loss or degradation of a paleontological resource
- Loss in future use of or accessibility to the property or site

No scoping comments were specific to paleontological resources.

4.5.3 Impact Assessment of the Proposed Project

This section presents the potential impacts of construction and operation of the proposed Project on paleontological resources.

4.5.3.1 Construction

No fossils of any kind were discovered during the field inspection. Although inspection was hindered by extensive snow cover, it was determined that deep regolithic soil and thin loess deposits cover most of the exposures of the Casper Formation within the proposed Project site.

(EVG 2010). As a result, the Casper Formation (gray, tan and red thick-bedded sandstone underlain by interbedded sandstone and pink and gray limestone) is very poorly exposed onsite. It also appears that none of the outcrops present within the proposed Project site contains limestone beds from which Casper Formation fossils have been previously recovered. The southern portion of the Hermosa West Lease is underlain predominantly by Sherman Granite (Daub and Associates 2010); The Sherman Granite and metasedimentary and metavolcanic rocks forming the Laramie Range and exposed in the Project site have no paleontological potential (EVG 2010). This review, as well as the nature of wind farm construction, indicates that it is very unlikely that any significant fossil resources would be encountered during development of the wind turbines, meteorological towers, substation, buildings, electrical connections, or access roads.

Construction projects are often the cause of important fossil discoveries that otherwise would not be discovered and made available for scientific study. Minor damage to paleontological resources due to discovery during construction often results in an overall benefit.

4.5.3.2 Operation

No impacts to paleontological resources would be expected during operation of the proposed Project.

4.5.4 Impact Assessment of SWE's No Project Option

Under the no Project option, it is assumed the proposed Project would not be built and environmental impacts associated with construction and operation of it would not occur. No impacts on paleontological resources, therefore, would occur.

4.5.5 Mitigation Measures

The following BMPs have been identified and committed to by SWE to avoid resource impacts or reduce potential impact levels. They are considered an integral part of the proposed Project and would be implemented by SWE as requirements in SWE's contract with their construction contractor. BMPs applicable to operation and maintenance activities would be incorporated in SWE's Operation and Maintenance Plan for the Hermosa facility, and those related to decommissioning would be incorporated in SWE's Decommissioning Plan. While Western has no authority or jurisdiction over SWE's proposed Project, Western's decision to execute an interconnection agreement would consider SWE's commitments to implement these BMPs and the reduction in environmental impacts that would result.

BMPs

- PALEO-1: Paleontological Mitigation Plan—The Project will require the preparation of a mitigation plan for use during construction that includes emergency discovery procedures; sampling and data recovery, if needed; museum storage coordination for any specimen and data recovered; preconstruction coordination; and reporting.
- PALEO-2: Construction Personnel Education—Prior to the start of construction, construction personnel involved with earth-moving activities will be informed of the possibility of

encountering fossils, how to recognize fossils, and proper notification procedures. This worker training will be prepared and presented by a qualified paleontologist and be part of the Worker Environmental Awareness Program for the proposed Project. If fossils are discovered in an active construction area, work would be stopped at that location and the construction project manager would be notified within 24 hours.

Implementation of these mitigation measures during Project earth-moving activities will reduce the potential for impact on undiscovered paleontological resources to an insignificant level.

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4.6 Noise

This section analyzes the potential noise effects of the proposed Project. The proposed Project components discussed include SWE's construction and operation of the proposed Project and Western's associated interconnection facilities (proposed Federal action). In considering potential environmental consequences to the acoustic environment, this EIS addresses several related issues that surfaced during public scoping, including potential adverse noise impacts on noise sensitive receivers located closest to the Project and at select locations along the Project boundary as discussed below.

4.6.1 Methods

A screening-level noise assessment was completed for the Project (ERM 2012c; appendix I). The updated noise assessment (ERM 2012) provides the basis for the analysis presented below. Sound propagation calculations were performed using the methodology set out in ISO 9613 (Acoustics—Attenuation of Sound during Propagation Outdoors—Part 2: General Method of Calculation). This methodology incorporates frequency spectral data for the candidate turbines and the recommended levels at various wind speeds, as provided by manufacturer specifications (see tables 4.6-1 and 4.6-2). When evaluating received sound levels resulting from wind farm operation, the following factors are typically considered:

- Decrease in noise with distance
- Absorption of noise in air
- Attenuation of noise over site specific ground and terrain conditions
- Screening of the turbines by topography and other obstacles
- Meteorological conditions

Table 4.6-1:
Broadband Sound Power Levels (L_w) (dB) Correlated with Wind Speed

10-meter Above Ground Level Wind Speed	Wind Turbine Generator L_{max} Sound Power Level (L_W) at Reference Wind Speed									
	7 mph (3 m/s)	9 mph (4 m/s)	11 mph (5 m/s)	13 mph (6 m/s)	16 mph (7 m/s)	18 mph (8 m/s)	20 mph (9 m/s)	22 mph (10 m/s)	25 mph (11 m/s)	27 mph (12 m/s)
Siemens SWT	—	—	—	105.0	107.0	107.0	107.0	107.0	—	—
GE 1.5 xle	98.0	98.0	101.1	105.0	106.0	106.0	106.0	—	—	—
Vestas V90	—	97.0	105.0	105.8	108.2	109.3	109.4	106.7	105.9	105.7

m/s Meters per second
L_{max} Maximum sound level
L_w Sound power level; the total amount of noise inherent in a particular noise source independent of the acoustic environment that it is in

Table 4.6-2:
Sound Power Level by Octave Band Center Frequency

Wind Turbine	Frequency (Hz)								Broadband (dBA)
	63	125	250	500	1,000	2,000	4,000	8,000	
	Octave Band Sound Power Level (dBA)								
Siemens SWT	86.3	95.3	102.0	102.6	99.0	95.0	90.2	85.4	107.0
GE 1.5 xle	85.1	94.0	97.2	98.6	97.9	94.5	87.3	78.1	104.0
Vestas V90	93.5	96.9	102.0	104.0	104.0	99.7	93.7	80.7	109.3

Meteorological factors can affect the propagation of sound from wind turbines. For example, warm air at ground level during summer seasonal periods may cause noise from the turbine to curve upwards, which would reduce noise levels; conversely, temperature inversions may cause noise from the turbine to curve downwards over increasing large separation distances, resulting in increased noise levels. Wind direction can also affect the level of turbine noise at a property (e.g., blowing toward or away from the property).

Wind shear is a measure of how much wind speed increases with height. Under certain circumstances, such as very stable atmospheric conditions that more commonly occur at night, wind speed at the turbine hub height may be substantially higher than wind speed at ground level. For example, the wind at turbine height may be sufficient to power the turbine and generate noise, yet the wind speed at a property may be negligible, so little to no masking of wind turbine noise may take place.

In predicting operational noise from the proposed Project site, air absorption and distance attenuation were accounted for using the method described in ISO 9613 assuming 10 degrees Celsius (˚C) and 70 percent relative humidity. No acoustic screening of the wind turbines was expected; therefore, no corrections were applied for intervening barriers such as topography. Additionally, to be conservative, attenuation due to ground absorption was ignored.

The acoustic model assumes that all wind turbines are operating continuously and concurrently at the maximum manufacturer-rated sound level. Received sound levels were evaluated at the noise sensitive receivers located closest to the Project and at select locations along the Project boundary for the three proposed scheme layout and wind turbine options. The noise emissions of each turbine have been reported in independent tests undertaken in accordance with International Electrotechnical Commission (IEC) 61400-1 and used as the basis of the operational noise assessments. Results have been reported as A-weighted octave band sound power levels for a wind speed of 10 meters per second (m/s) (22 mph), corrected to a height of 10 meters (33 feet) and as the A-weighted sound power level at wind speeds of 3 to 12 m/s. The Project would not exceed 300 MW and the scenarios listed below are considered conservative estimates based on the number of potential pad sites. These values are presented in tables 4.6-1 and 4.6-2 and are based on the following operating modes:

- 147 Siemens SWT 2.3-MW wind turbines, hub height 262 feet (80 meters),total capacity of 338 MW, and operating at normal operation as opposed to noise restricted;
- 224 GE 1.5-MW wind turbines, hub height 262 feet (80 meters),total capacity of 336 MW, and operating at normal operation as opposed to noise restricted;
- 113 Vestas V90 3-MW wind turbines, hub height 262 feet (80 meters),total capacity of 339 MW, and operating in mode 0 with the highest noise emission levels.

4.6.2 Significance Criteria

Review of State and Federal regulations showed that there are no noise regulations that would be directly applicable to the Project. The Albany County Zoning Resolution, which stipulates a do-not-exceed limit of 55 dBA as measured at any point along the common property lines between a non-participating property and a participating property, is the criterion used to assess proposed Project conformance (Albany County 2011). Any portion of a common property line where the participating property abuts State or Federal property is exempted from this standard. The do-not-exceed limit of 55 dBA may be temporarily exceeded during short-term events such as utility outages, severe weather events, or construction or operations and maintenance activities. In addition, noise levels may exceed the 55-dBA limit along non-exempted common property lines if written permission or waivers, as recorded with the Albany County Clerk, are granted by the affected adjacent non-participating property owners. The noise impact analysis, therefore, is a based on the Albany County noise standard. A significant impact on noise may result if an exceedance occurs of the Albany County Zoning Resolution Chapter V, Section 8.G.3, which states that noise associated with Project operation shall not exceed 55 dBA as measured at any point along the common property lines between a non-participating property and a participating property.

During the public scoping meetings and public comment period for the Project from January 14, 2010, to March 1, 2010, Western received four comments expressing concern:

1. Request that information be provided about the noise created by one turbine versus the total number of turbines that would be constructed for the Project
2. Request that the incremental noise effect of each additional turbine be explained, how far audible noise would travel, and whether the noise could be characterized
3. Question about whether the wind turbine noise could be heard inside a car traveling near the wind farm and at what level it would occur; what effects the noise would have on humans, wildlife, and livestock; and whether noise effects could be mitigated with a dampening system
4. Request that wind turbine syndrome and the echo effect be analyzed in the EIS and that noise effects to the Mill Creek subdivision in Colorado and subdivisions surrounding the Project be discussed

These comments were taken into consideration during the analysis of noise impacts as presented below.

4.6.3 Impact Assessment of the Proposed Project

This section describes the potential noise impacts of construction and operation of the proposed Project.

4.6.3.1 Construction

Construction of the proposed Project may cause temporary increases in ambient noise levels in the immediate vicinity of the construction site. The sound levels resulting from construction activities would vary significantly depending on several factors such as the type and age of equipment, the specific equipment manufacturer and model, the operations being performed, and the overall condition of the equipment and exhaust system mufflers.

Examples of construction related noise-emitting sources include heavy equipment (e.g., trucks, backhoe, excavators, loaders, and cranes) used in earthmoving, foundation preparation structure assembly and other activities. Construction equipment associated with projects such as this one typically generate noise levels ranging from approximately 76 to 90 dBA at 50 feet, depending on the equipment being used (see table 4.6-3). Construction equipment would generally not all operate at the same time and would be distributed throughout the proposed Project site depending on the activity. Construction would most likely occur intermittently at each of the wind turbine locations, typically during normal daytime working hours. Construction noise may temporarily affect wildlife and livestock in the area, but no permanent impacts to wildlife or livestock would be anticipated. Construction noise impacts would be temporary, intermittent, and localized; adverse noise impacts during construction are therefore expected to be low. There are very few existing receptors within and in proximity to the Project boundary. The nearest potential turbine site to the Project boundary is 660 feet. Distances from all noise sensitive receivers turbine are listed in table 5-1 through table 5-3 of appendix I. Given the relatively rural nature of the Project area, and given the distance between the Project and existing residences, impacts resulting from Project construction would be expected to be low and short term. Individuals driving through the area may be subject to noise during construction activity, but exposures would be below generally accepted health and safety limits.

Table 4.6-3:
Construction Equipment Noise Levels

Equipment	Typical Noise Levels 45 feet from Source (dBA)
Heavy truck or motorcycle	*90*
Pneumatic tool	85
Grader	83
Dozer	82
Mobile crane	81
Excavator	81
Generator	81
Garbage disposal	*80*
Concrete mixer truck	79
Front-end loader	79
Backhoe	78
Dump truck	76

Source: DOT (2003), USEPA (1971), and Beranek (1988)

1 **Bolded and italicized text** indicates reference noise levels for non-construction equipment.

4.6.3.2 Operation

An acoustic modeling analysis for wind farm operation was conducted for the proposed Project inclusive of the wind turbines, electrical substation and switchyard, and gen-tie line (appendix I). An acoustic screening analysis was completed to determine received sound levels expected from wind turbine operation. Electrical substation and gen-tie line noise and low frequency sound, infrasound, and amplitude modulation are also discussed.

4.6.3.2.1 Wind Turbine Acoustical Analysis

Sound can be distinguished by its content, and Hz is the unit used to describe the tonality or frequency content of sound. As described in the noise assessment (ERM 2012), wind turbine noise is a combination of mechanical sound from the gearbox and control mechanisms and aerodynamic sound produced by the rotation of the turbine blade through the air. Aerodynamic noise is the dominant source and would be present over all frequencies, including the infrasound range (i.e., below 20 Hz), but it is generally within the mid-frequency range (approximately 500 Hz to 1 kHz).

Noise emissions associated with each turbine considered for the proposed Project were reported in independent tests undertaken in accordance with internationally accepted standard IEC 61400-11 (Wind Turbine Generator Systems—Part 11: Acoustic Noise Measurement Techniques) and used as the basis of the sound propagation calculations. A summary of sound power levels (dBA) for the selected wind turbines correlated by wind speed at the rotor hub height at the turbine are presented in table 4.6-1. A summary of sound power data by octave band center frequency is presented in table 4.6-2.

Received sound levels resulting from Project wind turbine operation were calculated at discrete locations representative of nearby noise-sensitive receivers and also at select locations along the Project boundary as defined by the Albany County noise standard and shown in figure 4.6-1. The predicted sound levels, over a range of wind speeds, are given in tables 4.6-4 through 4.6-7 based on wind turbine model and corresponding Project layout.

Table 4.6-4:
Acoustic Analysis Summary from the Siemens SWT-2.3-101 Wind Turbine

Receiver Location	Distance to Closest Turbine (feet)	Closest Turbine	Received Sound Level (dBA) by Wind Speed (m/s)				
			6	7	8	9	10
Location 1	1,460	T123	46	48	48	48	48
Location 2	3,045	T30	42	44	44	44	44
Location 6	2,011	T1	46	48	48	48	48
Location 7	10,000	T8	33	35	35	35	35
Location 8	5,515	T16	38	40	40	40	40
Location 9	7,235	T49	37	39	39	39	39
Location 10	6,998	T76	36	38	38	38	38
Location 15	1,493	T136	45	47	47	47	47

m/s Meters per second

Table 4.6-5:
Acoustic Analysis Summary from the GE xle 1.5 MW Wind Turbine

Receiver Location	Distance to Closest Turbine (feet)	Closest Turbine	Received Sound (dBA) Level by Wind Speed (m/s)						
			3	4	5	6	7	8	9
Location 1	1,155	T187	42	42	45	49	50	50	50
Location 2	3,009	T44	37	37	40	44	45	45	45
Location 6	1,998	T8	40	40	43	47	48	48	48

Receiver Location	Distance to Closest Turbine (feet)	Closest Turbine	Received Sound (dBA) Level by Wind Speed (m/s)						
			3	4	5	6	7	8	9
Location 7	10,023	T11	27	27	30	34	35	35	35
Location 8	5,469	T24	33	33	36	40	41	41	41
Location 9	663	T73	31	31	34	38	39	39	39
Location 10	6,532	T117	30	30	33	37	38	38	38
Location 15	2,818	T89	37	37	40	44	45	45	45

m/s Meters per second

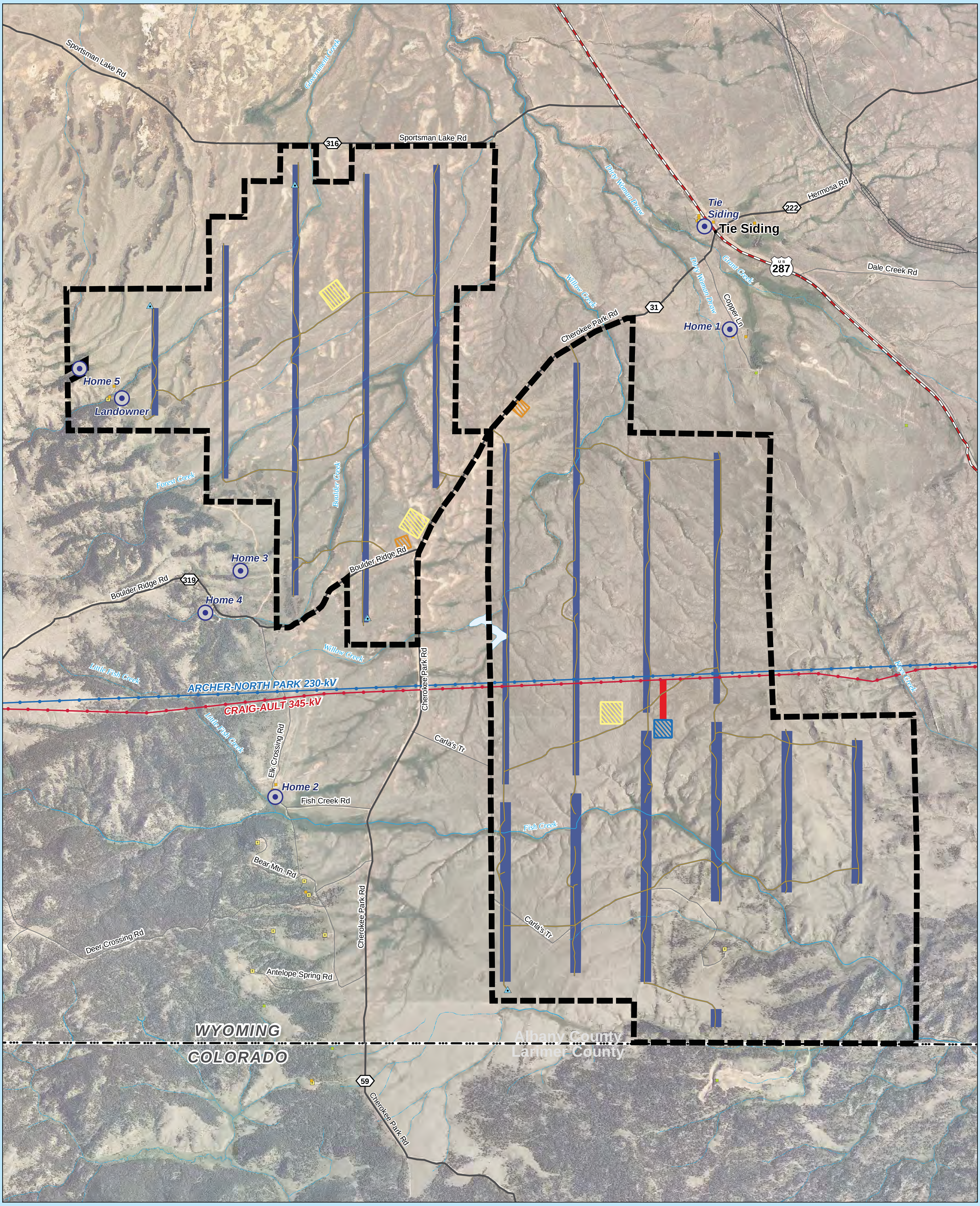
Table 4.6-6:
Acoustic Analysis Summary from the Vestas V90 3.0 MW Wind Turbine

			Received Sound Level (dBA) by Wind Speed (m/s)								
Receiver Location	Distance to Closest Turbine (feet)	Closest Turbine	4	5	6	7	8	9	10	11	12
Location 1	1,913	T36	36	41	45	47	48	48	45	45	44
Location 2	3,225	T78	32	37	41	43	44	44	41	41	40
Location 6	1,978	T60	37	42	46	48	49	49	47	46	46
Location 7	10,000	T61	23	28	32	34	35	35	33	32	32
Location 8	5,469	T69	28	33	37	40	41	41	38	37	37
Location 9	7,359	T91	27	32	35	38	39	39	36	35	35
Location 10	7,241	T113	26	31	34	37	38	38	35	35	34
Location 15	912	T44	39	44	48	50	51	51	49	48	48

m/s Meters per second

Table 4.6-7:
Acoustic Analysis Summary at Boundary Locations as Identified on Figure 4 (ERM 2012, appendix I)

				Received Sound Level (dBA) by Wind Speed (m/s)		
Boundary Location	Easting (m)	Northing (m)	Elevation (m)	GE 1.5MW LA90	Siemens 2.3MW LA90	Vestas 3MW LA90
A	454819	4539096	2445	48	47	47
B	456433	4539076	2429	48	52	54
C	456452	4538626	2441	44	46	47
D	458387	4538618	2384	40	42	43
E	459610	4542331	2385	43	44	45
F	458513	4542313	2449	48	48	50
G	458017	4542304	2460	50	50	52
H	457955	4544019	2458	47	48	49
I	457985	4545496	2427	44	46	45
J	456924	4545512	2387	47	49	50
K	454805	4541037	2420	52	54	54
L	453169	4543165	2432	48	47	47
M	454779	4543514	2400	52	53	54
N	452367	4543320	2447	46	47	47
O	452365	4544094	2437	51	53	53



Noise Sensitive Receptors

Project Features

- Hermosa West Wind Energy Project
- New Access Road
- Proposed Transmission Interconnect
- Proposed Turbine Corridor
- Proposed SWE Substation
- Operation And Maintenance Area
- Construction Laydown Area
- Alternate Met Tower Location

Digitized Structures

- Residence
- Farm or Outbuilding
- Other Building

Transmission

- 230-kV Transmission Line
- 345-kV Transmission Line

Noise Sensitive Receptors

- Sensitive Receptors

0 0.25 0.5 1 Miles

Scale 1:20,500 when printed at 22"X34".

Source: ESRI, BTS, WyGISC, WYFG, and USGS
Revised: March 23, 2011
MXD: P:\4004_Shell_Hermosa_West\GIS\Layouts\Chapter_4\Noise.mxd

Vicinity Map

HERMOSA WEST WIND ENERGY PROJECT

FIGURE 4.6-1: NOISE SENSITIVE RECEPTORS

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				Received Sound Level (dBA) by Wind Speed (m/s)		
Boundary Location	Easting (m)	Northing (m)	Elevation (m)	GE 1.5MW LA90	Siemens 2.3MW LA90	Vestas 3MW LA90
P	451567	4544739	2443	48	48	48
Q	449996	4545667	2474	42	44	45
R	449974	4547144	2392	41	45	50
S	451595	4547962	2349	47	49	51
T	452581	4548763	2321	49	49	49
U	454854	4548769	2313	43	44	45
W	461284	4543708	2255	35	36	36

Wind farms, in comparison to conventional energy projects, are somewhat unique in that the sound generated by each individual wind turbine will increase as the wind speed across the site increases. Wind turbine sound is negligible when the rotor is at rest, increases as the rotor tip speed increases, and is generally constant once rated power output and maximum rotational speed is achieved. Under maximum rotational wind speed the assumed maximum sound power level will be reached, generally occurring at approximately 7 to 9 meters per second depending on wind turbine type and according to manufacturer specifications. As an offset, as wind speeds increase, the background ambient sound level will likely continue to increase, resulting in acoustic masking effects. Conversely, there may be anomalous meteorological conditions from time to time that will aid in the long range propagation of sound, potentially causing Project sound levels to increase, specifically at points of reception located further away. These anomalous meteorological conditions may include stable air masses resulting in pronounced temperature inversions, and wind gradients that can bend sound waves downwards.

Nevertheless, based on the assessment performed, all Project configurations have demonstrated compliance with the Albany County Noise Standard at each of the discrete locations representative of noise sensitive receivers and locations selected at the Project boundary, which were included in the acoustic modeling analysis.

4.6.3.2.2 Electrical Substation and Gen-tie Line Analysis

As a part of the acoustic assessment completed for the proposed Project, sound generated from the proposed onsite electrical substation, switchyard, and gen-tie line was considered. Operation of the gen-tie line may generate corona noise (see section 4.16 for a description of corona) during high humidity and rain events, but would generally be indistinguishable from background sound levels at locations beyond the edge of the gen-tie line ROW during fair weather conditions. Two high-voltage transmission lines currently exist within the Project area and the Project action is limited to the addition of the 0.3-mile gen-tie line.

Substations have switching, protection and control equipment and one or more transformers, which generate the sound generally described as a low humming. There are three main sound sources associated with a transformer: core noise, load noise, and noise generated by the operation of the cooling equipment. The proposed substation has been carefully sited for a location more than 3,000 feet from the nearest residence property line (figure 2.2-3), so adverse noise impacts related to the substation are not expected. Western's proposed switchyard, having no transformer, would be quieter in operation than SWE's substation.

4.6.3.2.3 Low Frequency Sound, Infrasound, and Amplitude Modulation

The lowest frequency that can be identified as sound by a person with good hearing is 20 Hz. Frequencies below this (infrasound) can be detected, but are perceived as a feeling in the body as opposed to an actual sound. At the other end of the scale, the highest frequency that can he heard may be up to 20,000 Hz, but this depends on factors such as age, health and previous exposure to noise and an upper range between 16,000 and 18,000 Hz might be more representative. Sound below 20 Hz is referred to as infrasound, and sound between 10 Hz and 200 Hz is often described as low frequency noise, although there is not a commonly held definition for these terms.

Sound from wind turbines would rise and fall as the turbine blade rotates and this change or "modulation" is described as "amplitude modulation" that can be perceived by a listener as a fluctuation in sound occurring approximately every second. The phenomenon of amplitude modulation occurs has often been improperly identified as low frequency noise or infrasound, although amplitude modulation typically occurs within the range of 500 Hz to 1 kHz. It has been suggested that under certain conditions, such as wind shear, this fluctuation can be heard some distance away.

The noise assessment (ERM 2012, page 17) cites several reports that assess noise and noise-related health effects related to wind turbines. The noted papers and scientific studies available on this topic have conflicting viewpoints. The wind turbine syndrome (*Wind Turbine Syndrome: A Report on a Natural Experiment* study was thought to have limited scientific credibility: the syndrome is based on a single-case series from a group of self-nominated individuals and from a single investigator (ERM 2012, page 18). The Australian Government National Health and Medical Research Council completed a study (*Wind Turbines and Health. A Rapid Review of the Evidence.* July 2010), which concluded:

> "This review of the available evidence, including journal articles, surveys, literature reviews and government reports, supports the statement that: *There are no direct pathological effects from wind farms and that any potential impact on humans can be minimized by following existing planning guidelines.*"

The conclusions of the noise assessment in terms of noise and noise-related health effects indicated that further medical study is needed. In addition, the noted research was insufficient to resolve the controversy over the potential health effects from wind turbines both in terms of methodological shortcomings and the lack of an epidemiologist.

4.6.4 Impact Assessment of the No Project Option

Under the no Project option, it is assumed the proposed Project would not be built and environmental impacts associated with construction and operation of it would not occur. The effect of the no action alternative would, therefore, include noise levels representing baseline conditions without the Project.

4.6.5 Mitigation Measures

The proposed Project has been purposely designed to minimize environmental noise during Project operations by siting wind turbines as far away from existing residential receptor locations as practicable, while keeping the Project an economically viable source of clean renewable energy. As discussed above, construction noise would cause temporary unavoidable noise impacts. The following BMP has been identified and committed to by SWE to avoid resource impacts or reduce potential impact levels. BMPs are considered an integral part of the proposed Project and would be implemented by SWE as requirements in SWE's contract with their construction contractor. While Western has no authority or jurisdiction over SWE's proposed Project, Western's decision to execute an interconnection agreement would consider SWE's commitments to implement this BMP, and the reduction in environmental impacts that would result. No mitigation measures are required.

BMPs

- NOISE-1: construction vehicles and equipment will be maintained in proper operating condition and would be equipped with manufacturers' standard noise control devices or better (e.g., mufflers, engine enclosures).

It is not expected that mitigation measures would be required during Project operations. Any noise concerns will be investigated on a case by case basis.

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4.7 Visual Resources

Impacts to the visual character of a landscape are obviously some of the most important impacts associated with large utility-scale wind developments, and they are often the greatest source of public comments concerning the development. Objectively measuring the level of impact to visual resources is difficult because the impacts vary with viewing location and viewer perception of the impacts is inherently subjective (Bisbee 2003). As discussed in section 3.7.1, the BLM has, since the mid-1970s, developed a system that attempts to objectively compare the visual characteristics of both existing landscapes and proposed development activities in an effort to classify the visual impacts to a given landscape. Their widely adopted method of comparing and contrasting landscape characteristics to assess impacts is called the contrast rating system and is part of the VRM system summarized in section 3.7. Although the BLM does not manage any lands within the Project site boundary, it manages hundreds of thousands of acres in the western United States and many areas within its jurisdiction have similar landscapes to those in the Project area. In addition, the BLM VRM system provides a detailed and systematic framework for implementing and documenting the various components of a visual impact assessment; those include characterizing the existing visual quality, determining the degree of change in visual quality, and considering the viewer response to that change. The BLM well-developed and time-tested VRM methodology is widely considered an accepted tool for visual resource assessment, and applicable components of the VRM system have been adapted to gauge the potential visual effects of this proposed Project.

4.7.1 Methods

The visual impact analysis for this proposed Project used applicable parts of the BLM VRM process; some parts of VRM are only applicable to specific BLM land management objectives, but not for an EIS analyzing effects of a project on private lands. This analysis followed VRM guidance in evaluating existing scenic quality, visual contrast and viewer response. The visual impact analysis for this proposed Project incorporated the following approach:

- Conduct a viewshed analysis to determine areas where turbines would be visible and the number of turbines visible in those locations.
- Utilize public scoping comments and information gathered at Project stakeholder meetings to identify sensitive viewing areas and viewer groups.
- Identify key observation points (KOPs) utilizing the viewshed analysis and public scoping comments. Include both typical views of representative landscapes and views from sensitive viewing areas.
- Characterize the existing landscape in and around the Project area, and the existing visual quality of the landscape as seen from the KOPs.
- Analyze potential change in visual quality from the respective KOPs by creating visual simulations that show the expected appearance of the Project facilities on the landscape and applying the BLM contrast rating process to assess the conditions depicted in the simulations.
- Assess the expected viewer response to the change in visual quality, based on consideration of viewer sensitivity, viewer numbers, and related factors.

- Identify the level of visual impact expected at each KOP, based on the degree of visual resource change and the expected viewer response.
- Evaluate the significance of the identified visual impacts at the representative KOPs, based on applicable significance criteria and the context of the impacts.

As outlined above, the evaluation of impacts to visual resources is subject to individual viewer attitudes, preferences, outlook, and bias, which are factors that influence the public's perception of visual impacts associated with any type of project or action. For example, two people viewing the same wind energy project may have polar opposite reactions in that turbines may be perceived as appealing by one viewer and as objectionable by the other viewer. Opinions or bias unrelated to actual visual impact may be the underlying factors that contribute to these reactions. Some viewers may have a particularly intense reaction to a given visual change, based on their specific biases, beliefs or values. Positive opinions or bias may be based on the following, among many possible reasons:

- General support for renewable energy
- Support for development of domestic energy sources.
- Provides interesting visual features on the landscape

Negative opinions or bias may stem from the following:

- Perceived devaluation of land values
- Potential impacts of wind turbine development on wildlife or avian species
- A general dislike of change or development in an otherwise little-developed area

The key steps in the visual resources impact analysis are summarized below.

4.7.1.1 Viewshed Analysis

In October 2009, SWE engaged a contractor to conduct a preliminary viewshed analysis of the Project using GIS software (AWS Truewind 2009; appendix Q). The analysis was based on a build-out scenario of up to 224 turbines distributed among 11 turbine corridors, using a total turbine height of 428 feet (corresponding to the 2.3-MW turbine model under consideration) and a digital elevation model with 10-meter (approximately 33 feet) accuracy. The 2.3-MW turbine was selected for visual analysis because it is the most likely turbine size that would be installed and because Western believes it would represent the 'worst case' in terms of visual impact. The higher-capacity 3-MW turbine under consideration would be slightly shorter, at 410 feet in total height and there would be fewer of them, resulting in somewhat less overall visual impact. Conversely, selection of the 1.5-MW turbine model would result in a Project with physically smaller (379 feet), but more numerous turbines.

Once computed, the results showed how many turbines would be visible from every point on the landscape within 10 miles of the Project site boundary. Western prepared an updated viewshed analysis based on a representative layout with 131 2.3-MW turbines, corresponding to the proposed Project capacity of up to 300 MW. The results of the updated viewshed analysis can be seen in figure 4.7-1. The analysis has some limits to its accuracy, such as not taking into account vegetative screening or using higher resolution elevation data, but it does give a reasonable overall impression of how many turbines would be visible from a given location in the study area. The analysis demonstrates that the steeper more rugged hills to the south of the Project would limit the visibility of the majority of turbines in views toward the Project from the southwest, south and southeast. In comparison, the flatter, open landscapes to the north of the Project provide less screening and, as a result, a greater number of turbines that could be observed from those areas. Viewers on the western slopes of Boulder Ridge (specifically three Fish Creek Ranch residences) would have limited visibility of the Project, while nine residences on the east side of the ridge in Fish Creek Ranch would have varying views of the proposed Project. The closest residence is 0.5 miles away from the nearest turbine. Motorists travelling south from Laramie along U.S. Highway 287 would have an almost uninterrupted view of the majority of turbines.

4.7.1.2 Viewing Areas and Viewer Groups

As discussed above, the viewshed analysis results indicate the areas from which the Project could be viewed. Section 3.7 documents the viewer groups to be considered in the impact assessment for the Project, based on review of the distribution of travel routes, developed areas, and recreation and historic sites within the study area. Sensitivity levels and other aspects of the expected response of the viewer groups are discussed in sections 4.7.1.6 and 4.7.4.

4.7.1.3 Key Observation Points

Consistent with VRM guidance (BLM 1986a), KOPs (representative viewpoints) were selected for use in applying the contrast rating part of the analysis process. Primarily using comments gathered during the public scoping period and data from the viewshed analysis, five KOPs were chosen for detailed visual analysis. These points provide a range of representative locations for assessing the visual impacts of the Project. The KOPs include views both from typical Project area landscapes and from sensitive viewing locations outside the Project area. The visual impacts to the visual resources in the Project area landscapes were analyzed from these viewpoints. Figure 4.7-2 shows the location of the five KOPs chosen for the Project.

4.7.1.4 Existing Landscape Character and Scenic Quality

The visual impact of an action is determined in part by the change in visual quality created by the action. Therefore, characterizing the existing landscape and the visual quality of that landscape is a fundamental part of the impact assessment process. Section 3.7.3 describes the landscape within the Project area and in the surrounding areas. Section 4.7.4 provides information on the scenic quality of the existing views from the KOPs.

Scenic quality is a measure of the visual appeal of a tract of land (BLM 1986b). Within the inventory portion of the VRM system, landscapes are rated as A, B or C (or high, medium and low) based on their apparent scenic quality. Seven key characteristics of the landscape are specifically considered when measuring the scenic quality of the landscape, as follows:

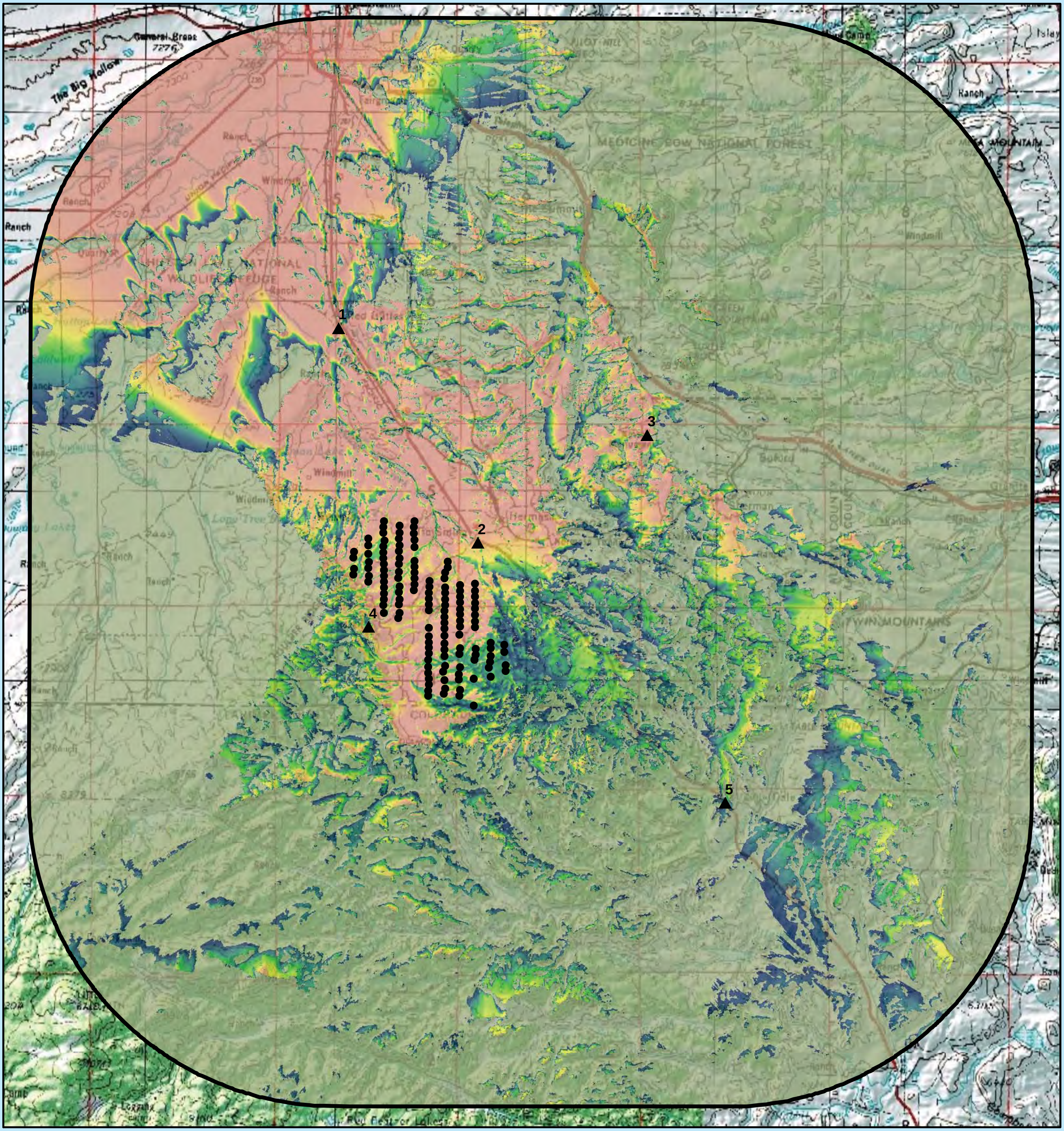
- Landforms—Landscapes with larger, steeper, or highly eroded landforms are more scenic than flat landscapes.
- Vegetation—The greater the diversity of plant species and forms, the more scenic the landscape becomes.
- Water—Landscapes with dominant water features that add movement or serenity are generally more scenic.
- Color—Landscapes with pleasing color combinations, vivid colors, or many different colors are more scenic than areas with subtle color variations and muted tones.
- Adjacent scenery—Areas with foreground and middleground views towards unique and scenic landscapes are generally more scenic.
- Scarcity—One-of-a-kind landscapes are more scenic than those that are common within the physiographic region.
- Cultural modifications—These may either detract from or improve the scenic quality of a landscape.

For a given landscape, a rating or score is assigned for each factor based on comparison with other landscapes in the same physiographic province or ecoregion (BLM 1986b). Scores of 1, 3 or 5 points are assigned for each of the first six characteristics, while scores of 2, 0 or -4 are assigned for cultural modifications. The ratings for the individual factors are summed to derive an overall scenic quality rating. In the VRM system, landscapes with total scores of 19 or more are rated as scenic quality class A (high), scores of 12 to 18 represent class B (medium), and scores of 11 or less are in class C (low). In general, landscapes with the most visual variety and most harmonious composition have the greatest scenic value (BLM 1986b). Figure 4.7-3 shows examples of landscapes with high and low scenic quality.

4.7.1.5 Contrast and Change in Visual Quality

The contrast rating process from the BLM VRM system was used to measure the degree of visual change the proposed Project components would have on the existing landscapes in the Project area. The main philosophy behind the contrast rating process is this: the degree to which proposed Project features affect the visual quality of a landscape depends on the visual contrast created between those features and the existing landscape (BLM 1986a). To assess the contrasts between the proposed Project features and the existing landscape properly, it is necessary to break down both the Project features and the existing landscape into their basic features and character elements so that the specific features and elements that cause contrast can be accurately identified (BLM 1986a).

Visual simulations are a prescribed step in the VRM contrast rating process. Photo simulations of the Project as it would appear from each of the five KOPs were prepared as the key tool for identifying the visual contrast introduced by the Project. Based on the simulations, the degree of contrast with the proposed Project was assessed with respect to the form, line, color and texture aspects of landforms and/or water, vegetation, and structures. The resulting level of contrast for each landscape characteristic from each KOP is characterized as one of four possible values: none, weak, moderate, and strong (BLM 1986a). The component land/water, vegetation and



Viewshed Analysis of Turbine Visibility

Viewshed

Turbines Visible

High : 131

Low : 1

No Turbines Visible

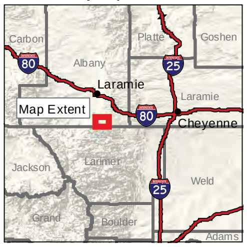
Viewshed Boundary (10 Mile Buffer)

● Proposed Turbine

▲ Representative Viewpoint

1 - 20-Acre Ranchettes
2 - Priority Residential Growth Area
3 - Ames Monument
4 - Fish Creek Ranch
5 - Virginia Dale

0 1.25 2.5 5 Miles



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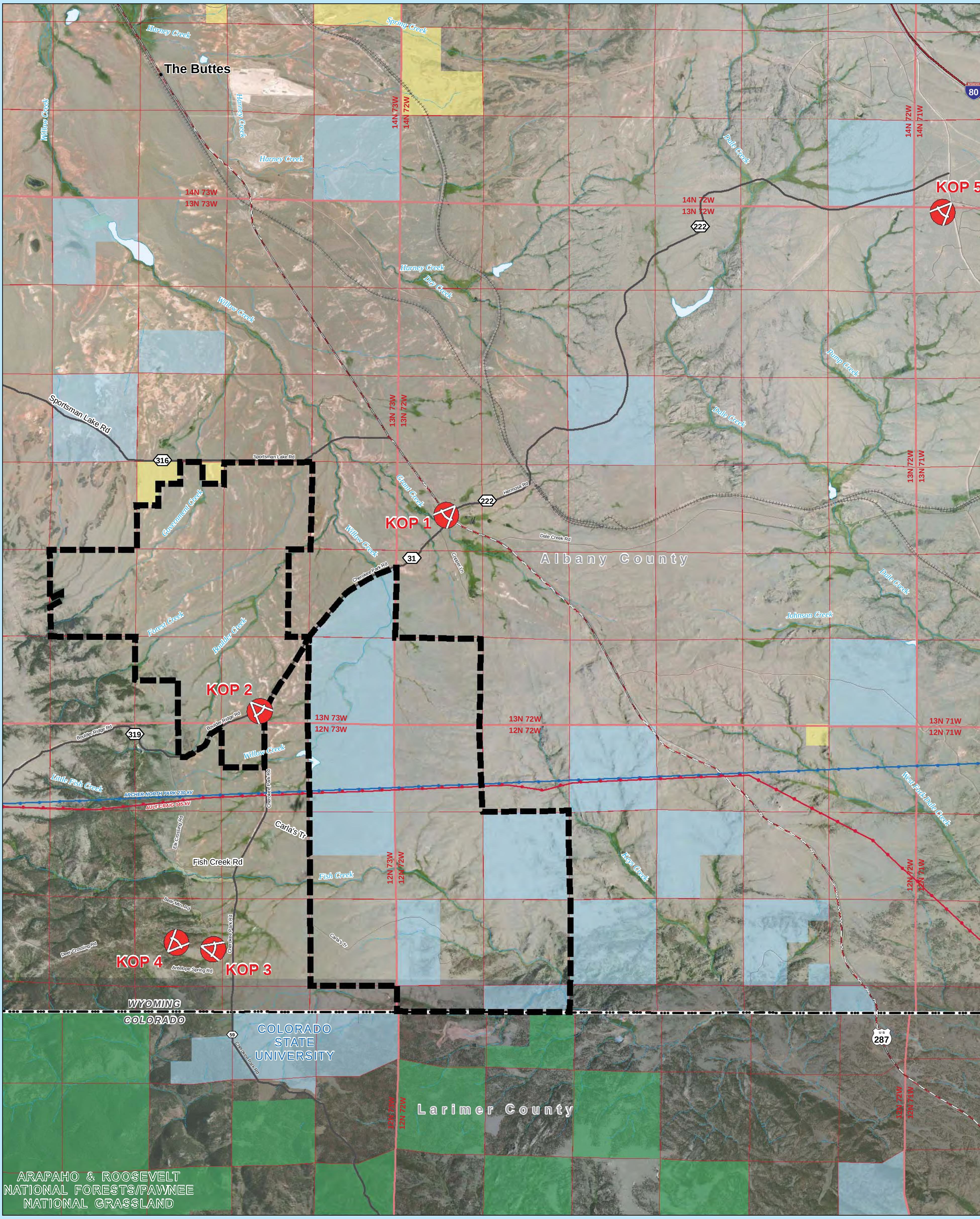


Key Observation Points

Project Features

Hermosa West Wind Energy Project

Key Observation Point (KOP) Location and View Orientation

Transmission

230-kV Transmission Line

345-kV Transmission Line

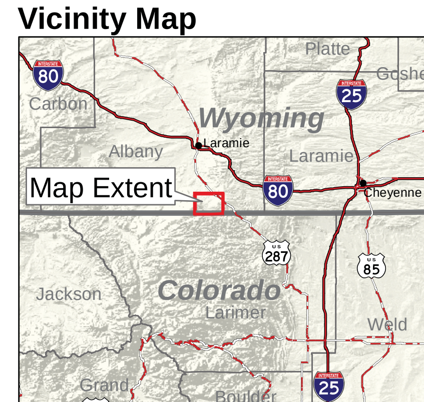
Jurisdiction

Bureau of Land Management

U.S. Forest Service

State Land

Vicinity Map



0 0.5 1 2 Miles

Scale 1:20,500 when printed at 22"X34".

Revised: August 3, 2011
File Name: KOP_Map_Ch4_110803
MXD: P:\4004_Shell_Hermosa_West\GIS\Layouts\Visual
PDF: P:\4004_Shell_Hermosa_West\GIS\Maps\Visual
Sources: ESRI, Western, BTS, WyGISC, USGS

HERMOSA WEST WIND ENERGY PROJECT

FIGURE 4.7-2: KEY OBSERVATION POINT MAP

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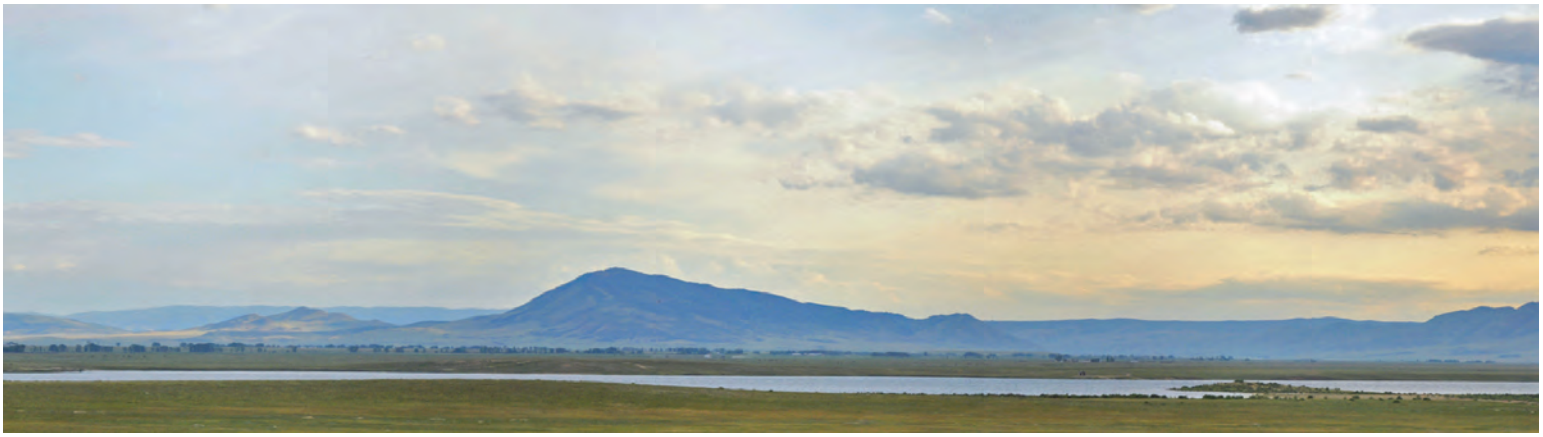
Landscapes with high scenic quality



Landscapes with low scenic quality

HERMOSA WEST WIND ENERGY PROJECT

FIGURE 4.7-3: EXAMPLES OF SCENIC QUALITY OF LANDSCAPES

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structure ratings were applied to derive an overall contrast rating for the KOP. Descriptions of each contrast value are listed below (BLM 1986a):

- None—The contrast is not visible or perceived.
- Weak—The contrast can be seen but does not attract attention.
- Moderate—The contrast begins to attract attention and begins to dominate the characteristic of the landscape.
- Strong—The contrast demands attention and is dominant in the landscape.

Various factors can influence the degree of contrast that a project can have on the landscape and are accounted for in the rating process, including (BLM 1986a):

- Distance—The further away the facilities are, the less contrast they will have.
- Angle of Observation—Viewing a project from different angles, such as from above or below the project, can greatly affect the apparent size of a project and the resulting level of contrast.
- Length of Time in View—The longer a project is in view, the more contrast it will create.
- Relative Size or Scale—The contrast created by a project is directly related to its size and scale compared to the surrounding landscape.
- Lighting Conditions—The direction and angle of the sun affects the color, intensity, shadow, reflection, form, and texture of visual aspects of a landscape.
- Motion—Movement such as spinning wind turbine blades draws attention to a project and increases the amount of contrast.

4.7.1.6 Viewer Response

In addition to the change in visual quality created by a project, the visual impact of that change depends on the response of viewers to the change. Viewer sensitivity is a measure of the level of public concern for scenic quality (BLM 1986b). Those areas with greater public concern for the quality of visual resources are more sensitive to changes to visual resources. The sensitivity level for a given KOP can be classified as high, moderate, or low. A variety of factors can influence the level of viewer sensitivity and include the following (BLM 1986b):

- Type of Users—Visual sensitivity will vary with the type of users. Recreational sightseers may be highly sensitive to any changes in visual quality, whereas workers who pass through the area on a regular basis may not be as sensitive to change.
- Amount of Use—Areas seen and used by large numbers of people are potentially more sensitive. Protection of visual values usually becomes more important as the number of viewers increase.
- Public Interest—The visual quality of an area may be of concern to local, State, or National groups. Indicators of this concern are usually expressed in public meetings, letters, newspaper or magazine articles, newsletters, land-use plans, etc. Public controversy created in response to proposed activities that would change the landscape character should also be considered.

- Adjacent Land Uses—The interrelationship with land uses in adjacent lands can affect the visual sensitivity of an area. For example, an area within the viewshed of a residential area may be very sensitive, whereas an area surrounded by commercially developed lands may not be visually sensitive.
- Special Areas—Management objectives for special areas such as Natural Areas, Wilderness Areas or Wilderness Study Areas, Wild and Scenic Rivers, Scenic Areas, Scenic Roads or Trails, and Areas of Environmental Concern, frequently require special consideration for the protection of the visual values. This does not necessarily mean that these areas are scenic, but rather that one of the management objectives may be to preserve the natural landscape setting. The management objectives for these areas may be used as a basis for assigning sensitivity levels.
- Other Factors—Consider any other information such as research or studies that includes indicators of visual sensitivity.

For clarity, assessment of viewer response to the change in visual quality attributed to the proposed Project incorporates separate and specific consideration of viewer sensitivity and viewer numbers. In this context, viewer sensitivity reflects the types of users, identifiable level of public interest, adjacent land uses and special areas as described in the list above. Consideration of viewer numbers corresponds to the amount of use associated with a KOP, and is an important factor in evaluating the intensity of an impact.

4.7.1.7 Visual Impact Levels

The overall impact of an action on visual quality is the product of the change in the visual resource and the viewer response to that change. Consequently, the visual impact analysis for the Project involved a three-step process for each KOP. The first step was to define the degree of contrast and change in visual quality, as discussed in section 4.7.1.5. The second step was to characterize the expected viewer response to that change, based on the combination of viewer sensitivity and viewer numbers as described in section 4.7.1.6. The overall visual impact level for a KOP is determined by combining the visual quality change with the expected viewer response.

Contrast levels for the KOPs were assigned ratings of none, weak, moderate and strong. Existing visual quality and the change in visual quality are identified on a high/moderate/low scale, as is the expected viewer response. The visual impact level for each KOP was also defined as low, moderate or high based on combining the respective inputs for visual quality change and viewer response. For the final step of defining the impact level, a high rating for both visual quality change and viewer response would clearly result in a rating of high visual impact. Similarly, a low rating for both visual quality change and viewer response would clearly result in a rating of low visual impact. A low rating for one component and a high rating for the other would result in a moderate impact level.

4.7.1.8 Significance Criteria and Thresholds

NEPA implementation guidance addresses evaluating the significance of impacts based on their context and intensity. Following scoping and prior to conducting the impact assessments for the respective resources, the EIS team defined criteria that would be used to assess the significance of the resource impacts identified. The prescription for visual resources was that an impact on visual resources would be considered significant if any of the following were to occur as a result of the construction or operation of the Project:

- Strong visual contrasts in landscapes that are seen from highly sensitive viewer locations or locations with special scenic, historic, recreational, cultural, archaeological significance, and/or natural qualities that have been recognized through legislation or some other official declaration
- Substantial degradation of the foreground character or scenic quality of a visually important landscape
- Predicted air pollutant emissions causing a change in visibility that would exceed Class I standards
- Unresolved conflict with visual standards identified by a Federal land management agency (e.g., BLM, USFS, NPS)

4.7.1.9 Public Scoping Input

During the public scoping meetings and public comment period for the Project from January 14, 2010, to March 1, 2010, Western received several comments specifically expressing concern:

- Comment that visual effects would be unavoidable because of the sheer height of the turbines and the associated components of the Project
- Request that Project planning consider the visual effects to adjacent properties, properties on Boulder Ridge, and the rural character of the area
- Concern about how lights required by the FAA might be placed, flash, and affect views
- Question about whether turbulence from the turbines could cause visual haze in the valley
- Concern that shadow flicker from turbines could create hazardous driving conditions along Cherokee Park Road and Boulder Ridge Road with a request that the EIS discuss the flicker effect of up to 200 wind turbines
- Request for new photo simulations of the Project to represent new KOPs and times of day. Photo simulations were requested from the vantage points listed below:
    - All directions
    - Ground level
    - Adjacent properties
    - Summit of Interstate 80
    - Medicine Bow National Forest
    - Laramie River valley
    - Dale Creek area
    - Roosevelt National Forest in Colorado
    - Boulder Ridge area

- o Cherokee Park Road
- o U.S. Highway 287

The proposed Project would not be visible from several of these locations and therefore photo simulations were not conducted for the following locations: Summit of I-80, Medicine Bow National Forest, Laramie River valley, and Roosevelt National Forest in Colorado.

- Request for the following mitigation measures: design wind turbines to have a uniform appearance; locate transmission lines and wind turbines in low-lying areas; paint the wind turbines light brown or dark grey to blend with the landscape; and convert surrounding land into conservation easements so that more wind turbines cannot be added in the future
- Request for a specific mitigation measure for Cherokee Park Road to locate the wind turbines on one side of the road (north or south), instead of on both sides to reduce the visual degradation of the area
- Request that SWE follow mitigation measures prescribed in the Albany County Wind Energy Siting Regulations (Albany County 2011).

These comments were taken into consideration during the analysis of impacts to visual resources, as presented below.

4.7.2 Visual Characteristics of Individual Project Components

4.7.2.1 Wind Turbines

The proposed Project would have a total generating capacity of up to 300 MW, and would consist of up to 200 wind turbines arranged in 11 linear corridors running north-south on the Project site. The number of wind turbines installed would depend on the size of the turbine model selected. The viewshed analysis and the visual simulations prepared to support the impact analysis are based on the use of the turbine model with the maximum height; therefore, a reference 2.3-MW turbine model is discussed.

The 2.3-MW turbine has a total height of 428 feet. The turbine includes a cylindrical tower that rises 262 feet above the ground, on top of which sits the large rectangular block of the nacelle. The rotor assembly, with three thin, tapering blades each 165 feet long (as measured from the rotor hub, resulting in a 331-foot rotor diameter), is connected to the nacelle block. During operation, the rotor assembly would spin at a rate between 10 and 20 revolutions per minute, and the individual blades would be visible. The 1.5-MW and 3.0-MW turbine models considered for the Project would be somewhat shorter (379 feet and 410 feet, respectively), as described in table 2.3-3. This analysis assumes that a Project with larger 428-foot turbines would have somewhat greater visual effects than either a larger number of shorter, 1.5-MW turbines or a somewhat smaller number of 3-MW turbines.

In accordance with the Albany County Wind Energy Siting Regulations (Albany County 2011), towers and blades would be painted white or gray or another non-reflective, unobtrusive color. The surfaces of the turbine components would appear to be perfectly smooth and would be painted a uniform, neutral color. A non-reflective finish would be added to the paint to minimize reflection and glare.

4.7.2.2 Lighting

The FAA requires that any structure that exceeds an overall height of 200 feet above ground level, or exceeds an obstruction standard contained in 14 CFR part 77, must be marked and/or lit. In addition, FAA Advisory Circular AC 70/7460-1K (FAA 2007) documents FAA standards for marking and lighting structures to promote aviation safety, and indicates that any structures more than 200 feet above the ground should normally be marked and/or lighted. Daytime obstruction lighting on the wind turbines would not be required as long as the turbines are painted a bright white or light off-white color, while nighttime obstruction lighting would be required. Either flashing red or white lights mounted on top of the nacelle may be used to light wind turbines, but studies have shown that red lights are most effective and should be the first consideration for lighting wind turbines (FAA 2007). All turbine lights are required to be synchronized to flash at the recommended rate of 20 to 40 flashes per minute.

In addition to the FAA requirement for lighting, Current FAA guidance for wind farms recommends a lighting configuration sufficient to define the perimeter of the facility, with a gap of no more than 0.5 mile between lighted wind turbines. Assuming all turbines in the installation are the same height, the remaining turbines in the interior of the installation would be required to be no more than 0.5 mile from the nearest lit turbine. With these requirements, the lighting solution for the representative 200-turbine scenario (using 1.5-MW turbines) would be accomplished with obstruction lights on 40 to 50 turbines, with the remaining turbines unlit. However, the exact number of obstruction lights required cannot be determined until final decisions on the turbine model and turbine locations have been made. Both the FAA and USFWS would review the proposed Project’s lighting plan to ensure its consistency with FAA guidance and USFWS recommendations for protection of avian species.

During construction of each wind turbine, an area approximately 100 feet in radius around each turbine would be cleared of vegetation, graded, and finished with layer of aggregate to allow for various construction activities to take place. These activities would include pouring of the wind turbine foundation, delivery of the turbine components, crane operation, and wind turbine installation. During construction, these disturbance areas would appear as repeating patches of light buff-colored rock and soil.

In addition to the wind turbines, the Project would include other permanent facilities, including:

- Access and turbine string roads
- 34.5-kV underground collection lines
- Meteorological towers
- Ten-acre Project substation and switchyard
- One-mile-long low-voltage distribution line
- A 5,000- to 8,000-square-foot operations and maintenance facility

- Approximate 0.3-mile-long 345-kV overhead gen-tie line connecting the Project substation and Western switchyard to the existing 345-kV transmission line

4.7.2.3 Roads

Depending on the turbine model selected for the Project, up to approximately 12 miles of roads would be improved through widening, re-grading, or refinishing the surface; and more than 31 miles of new roads would be constructed. The maximum widths for the access roads and turbine string roads during construction would be 25 feet and 50 feet, respectively. The access roads would utilize existing roads within in the Project boundary and the turbine string roads would be located within the turbine siting corridors wherever possible. After construction is completed, the widths of the roads would be scaled back to 16 feet by removing aggregate and revegetating the shoulders. These roads would appear as narrow curvilinear light tan and gray bands of medium to fine coarseness that conform to the topography of the landscape. Irregular patches of coarse disturbed soil associated with road cut-and-fill would be possible in areas with steeper terrain. The roads would not be fenced, and the Project would not construct any new fences except those around the substation, switchyard, and operations and maintenance building.

4.7.2.4 Collection System

The 34.5-kV underground collector lines designed to bring power from the turbines to the substation and switchyard would be buried in the soil in narrow trenches along the new access and turbine roads wherever possible, minimizing the potential visual impacts from trenching activities. In areas where new trenches need to be dug, a thin narrow band of disturbed light-colored soil and the light green, yellow, and brown colors associated with revegetation activities would be seen temporarily, until the vegetation blended with surrounding grassland.

4.7.2.5 Meteorological Towers

Up to four permanent 262-foot self-supporting meteorological towers would be constructed on the Project site to measure wind speed, wind direction, barometric pressure, humidity, and temperature. The data collected from these measurements would be used to ensure optimal management and operation of the turbines on the Project site. The lattice towers would be constructed with galvanized steel and would taper from the base to the top. The remaining length of the towers would be unpainted galvanized steel, grayish blue in color. Temporary towers would be painted to conform to FAA specifications and Albany County requirements of either white or gray. A flashing red obstruction light would also be required on top of the tower, and would flash simultaneously with the other turbines on the Project site.

4.7.2.6 Substation and Switchyard

The Project substation and switchyard would be co-located on a 10-acre site near the center of the southern portion of the Project boundary. The site would be characterized by many long thin cylinders of white or gray steel, arranged in a geometric pattern of vertical and horizontal lines. Some structures on the site would be up to 60 to 70 feet above the ground. Multiple large geometric blocks housing various electrical monitoring components would be present on the site as well. A 1-mile-long low-voltage electrical distribution line would be constructed to supply local power to the Project site, and would be characterized by a regular repeating pattern of single thin vertical wooden posts that would be approximately 30 feet above the ground. Several thin wire conductors would be strung between the posts. Some pieces of equipment on the substation and switchyard site would be constructed with a smooth stainless-steel finish that could be highly reflective under certain light conditions. The 10-acre site would be finished with a light tan to buff covering of aggregate of medium coarseness. Metallic chain-link security fencing around the perimeter and limited nighttime facility lighting would also be required.

4.7.2.7 Gen-tie Line

To connect the substation and switchyard with the existing transmission lines in the Project boundary, a 0.3-mile-long 345-kV overhead gen-tie line would be required. The structures associated with this gen-tie line would be steel single pole or wooden H-frame configuration. The three new structures would be 65 to 125 feet above the ground.

4.7.2.8 Operations and Maintenance Building

The Project operations and maintenance building would be approximately 5,000 to 8,000 square feet and would be located on a 0.25-acre site near the intersection of Boulder Ridge Road and Cherokee Park Road in the center of the Project boundary. The building would be a large rectangular block with a smooth earth-toned metal finish with a similarly colored metal roof. Large flat parking lots would be located around the building and would either be finished with a covering of light colored crushed gravel or dark smooth asphalt. A metal chain link security fence and limited nighttime facility lighting would also be required.

4.7.3 Universal Visual Impacts of Project Components

This section describes the individual visual impacts common to all landscapes in the Project vicinity from Project construction, including the gen-tie line, operations and maintenance building, substation and switchyard, meteorological towers, access roads, and wind turbines. The overall visibility and visual contrast associated with each Project component is also discussed.

4.7.3.1 Construction

Construction of wind turbines and associated transmission and road infrastructure would have a direct impact on the visual resources in the Project area by introducing a large-scale construction operation to a predominantly rural area. Viewers of the Project area would see heavy construction equipment clearing vegetation and grading access roads, construction staging areas, and turbine foundations. These activities would move from place to place over the Project site, and in some cases would be hidden from view, depending on the viewing location. Concrete trucks travelling to and from turbine locations and oversized load trucks hauling the large turbine components would be common along U.S. Highway 287 and Cherokee Park Road during certain periods of construction. There would also be a noticeable increase in small vehicle traffic along those roads from workers travelling to and from the site. One or more tall cranes would be required to assemble the components for each turbine. These cranes would need to be taller than the height of the nacelle and would likely be more than 300 feet tall. Exhaust plumes from the heavy equipment may be seen. There would be increased fugitive dust from vehicle travel and grading activities, although BMPs that require construction crews to water unpaved roads and exposed soil to suppress dust would be implemented and would limit this effect. Similarly, the requirements to keep equipment engines in good running order should limit exhaust plumes.

All of these construction activities could create a weak to moderate amount of contrast, depending on the pace and schedule of Project construction and the viewing location. With respect to the level of visual impact, the key characteristic of the construction impacts is that they would be temporary in duration. As a result, they are not considered significant, this moderate impact would be reduced to less than significant under NEPA.

4.7.3.2 Transmission Lines

The electric lines proposed for the Project include a 0.3-mile-345-kV gen-tie line and an approximate 1-mile-long distribution line. The proposed 345-kV gen-tie structures would be constructed with similar materials and in a similar method as the existing parallel 230-kV and 345-kV transmission structures that bisect the Project boundary. The gen-tie line would be located within the middle of the southeastern portion of the Project area, and would be 2 miles or more from the nearest travel routes or stationary viewing locations within the study area. The proposed distribution line would also be similar to the existing distribution lines that deliver electricity to the rural residences in the area. Given these characteristics and their relatively short length in comparison to the existing transmission lines in the Project vicinity, the two proposed electric lines would introduce at most a weak visual contrast to the existing landscape. Therefore, the impact of these Project components on the visual resources of the Project vicinity landscapes would be low, and is considered insignificant.

4.7.3.3 Operations and Maintenance Building

The operations and maintenance building would be located at the intersection of Boulder Ridge Road and Cherokee Park Road, two of the more travelled improved roads in the Project vicinity that provide access to the communities of Fish Creek Ranch Preserve and Boulder Ridge Estates. The large rectangular metal-sided building, parking lot, and chain-link fenced storage area would introduce structures typically associated with industrial land uses into a predominantly rural landscape. While these structures would not fit the character of existing modifications to the local landscape and would be clearly seen from a variety of vantage points, they would not be visually dominant elements in the vast and open landscape of the study area and would therefore create a weak contrast with the surrounding landscape. Viewers traveling past the site on Boulder Ridge Road or Cherokee Park Road would have foreground views of the facility; the contrast level would be moderate (the facility would attract attention) on an instantaneous basis, but the contrast would diminish because that view would be transitory. Other views within the study area would be from middleground distances, at which the contrast level would be weak. Given weak visual contrast and relatively few viewers, the overall visual impact of the operations and maintenance building would be low, and insignificant.

4.7.3.4 Substation and Switchyard

The Project substation and switchyard would be located 0.3 mile south of the existing 345-kV transmission line and approximately 1.75 miles east of Cherokee Park Road. The numerous vertical and horizontal metallic structures of the substation and switchyard would be similar in finish and color to the existing transmission structures to the north and would therefore create a weak amount of contrast on the landscape with respect to structures. The primary source of visual contrast from the substation and switchyard would be from the 10-acre disturbance area planned for the site. For comparison, 1 acre of land is approximately 90 yards long and 53 yards wide, or 75 percent of the area of one American football field, including the end zones. Therefore, 10 acres of land is between seven and eight football fields in size. This rectangular patch of disturbed ground would need to be cleared of vegetation, graded, and finished with a covering of light-colored crushed rock, or aggregate. This would create a moderate amount of contrast with the relatively unbroken coverage of light green and brown grasses that dominate the landscape in the Project area. This contrast would be most noticeable if seen in the foreground or at a near middleground distance from an elevated viewpoint. The substation and switchyard site is relatively distant from potential viewers along Cherokee Park Road (approximately 1.3 mile) and at approximately the same elevation, and therefore would create a weak degree of contrast as seen from the road. As seen from elevated potential viewing locations on Boulder Ridge that are more than 2.5 miles distant, the visual contrast of these Project components would also be weak because of the relatively small size of the disturbance area within the surrounding landscape. Based on the weak visual contrast and relatively few viewers, the overall visual impact of the substation and switchyard would be low.

4.7.3.5 Meteorological Towers

Up to 4 permanent meteorological towers would be located strategically within the proposed Project area approximately 3.5 miles southwest of U.S. Highway 287 at its closest point, and 2.4 miles northwest of the intersection of Cherokee Park Road and Boulder Ridge Road. The towers' tall lattice-type metal construction would be similar in form and line to existing communication towers in the vicinity, and the required FAA obstruction lighting would be synchronized to flash with the turbines in the Project area. The meteorological towers would generally create a weak amount of contrast with the existing landscape.

The towers would be visible in many middleground views from well-travelled roads in the vicinity of the Project area. These include Sportsman Lake Road, slightly more than 1 mile north of the met tower corridor, and Boulder Ridge Road, approximately 1.5 mile to the south. The met towers would also be visible from two residences located within 0.5 mile of the met tower corridor. The distance of the met towers from potential viewing locations and their similarities to other communication towers in the area would decrease the amount of visual contrast they create. Based on the weak visual contrast and relatively few viewers, the overall visual impact of the met towers would be low.

4.7.3.6 Access Roads and Turbine Roads

Up to approximately 31 miles of new roads would be created, and 12 miles of existing roads upgraded to provide access to Project components; this would represent a substantial increase in both the length and number of roads in the Project site. These new roads would need to be graded and cleared of vegetation, which would create contrasting light, earth-tone, curvilinear bands on the landscape. In areas with steeper topography, clearing and grading would result in exposed slope faces. All of these impacts would break the uniform coverage of short, light green and brown prairie vegetation into discontinuous, irregular patches.

From viewing locations within foreground viewing distance (essentially, public roads within the Project site boundary), these impacts would create a strong contrast with the existing landscape, which currently has only two main roads, Cherokee Park Road and Boulder Ridge Road. The contrast would be moderate, or possibly strong, if seen at a near middleground distance from an elevated viewpoint. Based on the distribution of travel routes and residences in the vicinity, there appear to be relatively few locations with these conditions. The visual contrasts from the new access roads would decrease to weak in viewing locations further from the Project, such as along U.S. Highway 287, because the terrain in these locations does not provide an elevated vantage point. The rolling terrain would hide parts of roads from view; that would reduce the exposure of new lines and color variation created by the roads, thereby decreasing the overall degree of contrast. Based on contrast levels and viewer characteristics, the overall visual impact of the access roads and turbine roads would likely be considered low in some locations and moderate in others. The independent visual effect of the roads is difficult to characterize because they would be seen in the same view with turbines, rather than in isolation.

4.7.3.7 Wind Turbines

The wind turbines proposed for the Project would be the single largest contributor of visual impacts to the existing landscape. The representative 2.3-MW, 428-foot tall turbines used in the visual analysis would be highly visible from all locations within the Project site boundary. The majority of the turbines proposed would also be visible from the open landscapes north of the Project area and from areas with higher elevations, such as Boulder Ridge to the west and the Laramie Mountains to the northeast. The visibility of large utility-scale wind turbines similar to those proposed for the Project cannot be completely avoided or concealed because of the size of the turbines, the motion of the turbine blades, and the required installation of nighttime perimeter obstruction lighting (BLM 2005).

4.7.3.7.1 Wind Turbine Structures

The proposed wind turbines would introduce contrasting elements of form, line, color, and texture to the existing landscape. The tall cylinders of the turbine towers would create a cluster of strong vertical lines that are unlike any other elements in the landscape. While other structures such as communication towers or transmission line structures exhibit similar characteristics, they do not occur at the size and scale or in as dense concentrations as would the proposed turbines. The dull white color of the turbines would contrast with the predominantly light green and brown colors of the landscape, although this contrast would be lower in the winter months when the vegetation turns a light gray and yellow color and is sometimes covered in snow. The smooth finish of the turbine components would introduce elements typically associated with industrial operations into a predominantly natural environment with few man-made alterations. During low sun-angle conditions, such as sunrise, sunset, and the winter months, the light is more directional and often emphasizes an object's texture or shape. The low-angle light is also filtered by more of the atmosphere, producing colors that are warmer in hue and are more saturated. These light conditions would tend to make the turbines more visible and prominent than during different seasons or times of the day (BLM 2005).

The movement of the turbine blades would be another source of visual contrast with the existing landscape. The movement of the turbine blades would be plainly visible from locations within the middleground viewing zone of approximately 0.5 to 5 miles and would attract attention to the Project. The rotating blades also may produce two strobe-like effects, shadow flicker and blade flicker, which are discussed below. The overall visual impact of the wind turbines, based on consideration of the respective sources of contrast associated with the turbines and the applicable receptor characteristics, would vary by viewing location and is discussed for the respective KOPs in section 4.7.4.

4.7.3.7.2 Shadow Flicker

Shadow flicker would occur when the rotating blades of a wind turbine cast moving shadows on the ground or on stationary objects. This strobe-like flicker of alternating light and shadow would be most often observed from locations within 0.62 mile of a turbine during daylight hours with low sun-angle conditions like those mentioned above. Figure 4.7-4 depicts the shadow flicker effect. From distances of 0.62 mile or more, the shadows from the turbine blades would be sufficiently blurred and scattered by the atmosphere that the visual impacts from shadow flicker would be negligible (Danish Wind Industry Association 2010). During conditions of low light intensity, such as overcast skies, fog, or haze, the visual impacts from shadow flicker would be less or not evident. When the blades of the turbine are not rotating, there would be no impacts from shadow flicker.

Concerns have been raised regarding a potential correlation between the visual effects of shadow flicker and seizures in people with photosensitive epilepsy. According to the Epilepsy Foundation, seizures are most likely to occur in people with photosensitive epilepsy when exposed to flashing lights at a frequency of 5 to 30 flashes per second (Hertz), although the likelihood of a seizure occurring during those conditions are small (Epilepsy Foundation of America 2010). The rotating blades of the proposed 1.5-MW turbine would typically create shadow frequencies of less than 1 Hz and would be unlikely to trigger a seizure in people with photosensitive epilepsy.

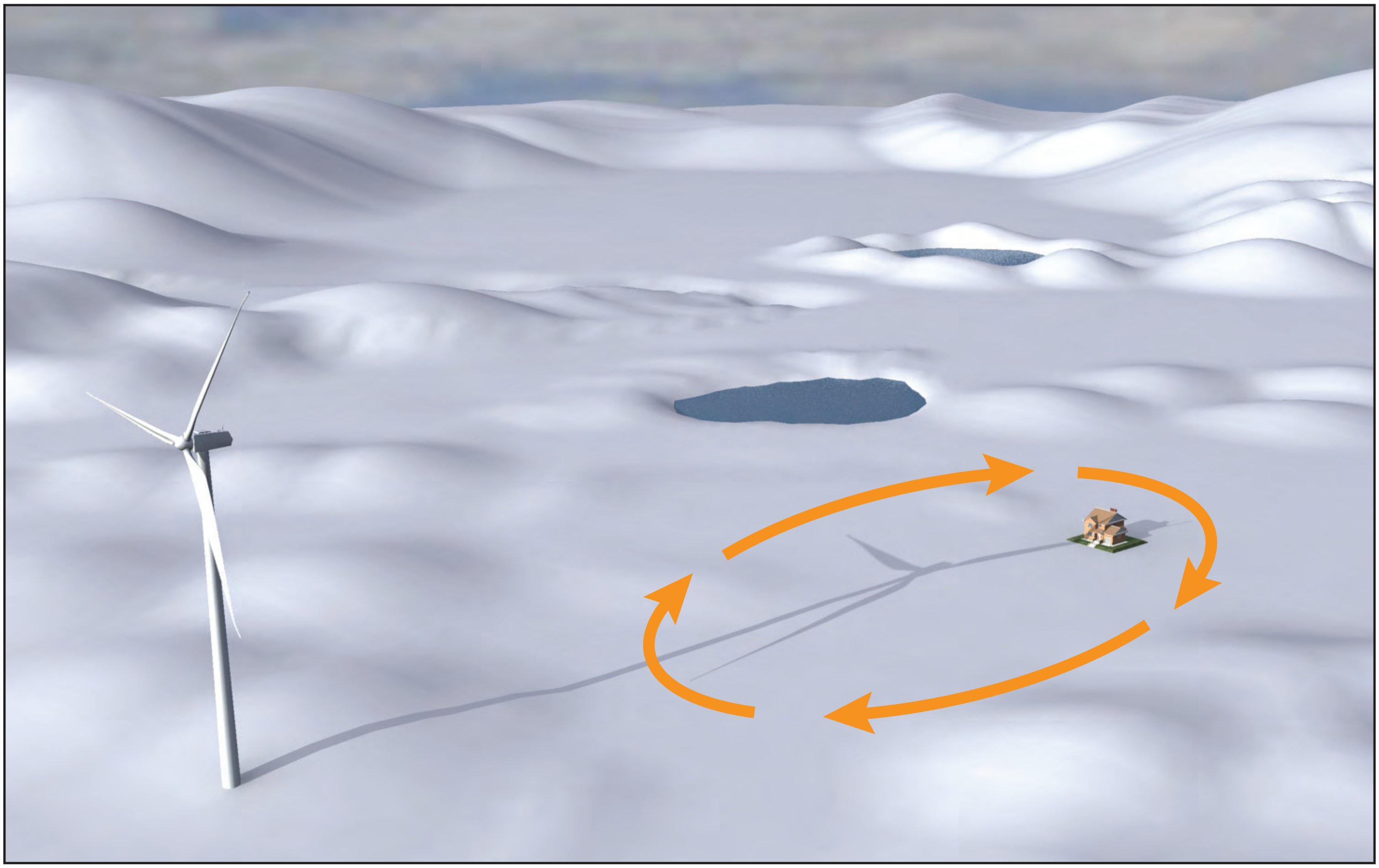
There is one residence within the Project area that may be impacted by shadow flicker. This residence is located near the western edge of the Project area and 0.5 mile from the nearest turbine location. At a distance of 0.62 mile, shadows become blurred and scattered by the atmosphere and would be negligible at this distance. As a result, the residence located at a distance of 0.5 mile from the nearest turbine could experience shadow flicker from multiple turbines in the westernmost turbine string. Shadow flicker occurrences at this location have not been modeled. Given the location of this residence to the west of the nearest turbines, shadow flicker effects would be possible only during the early-morning hours, and only on sunny days with sufficient wind to operate the turbines. In addition, the residence is situated on the slopes of Boulder Ridge and at a higher elevation than the nearest turbines; the elevation difference and the timing during the day, may influence whether shadow flicker occurs at this location and with what frequency or duration.

Other locations where shadow flicker might be experienced would be limited to one or two relatively short segments of Boulder Ridge Road and two segments of Cherokee Park Road that are within 0.62 mile of one or more turbines. In most of these locations shadow flicker effects would be possible during morning or evening hours of the day, but not both. If and when shadow flicker occurred in these locations, travelers on these roads would experience shadows cast by at most a few turbines. Because the individual occurrences would be transitory and the time range for possible occurrences would be limited, the impact of potential shadow flicker occurrences is considered to be low.

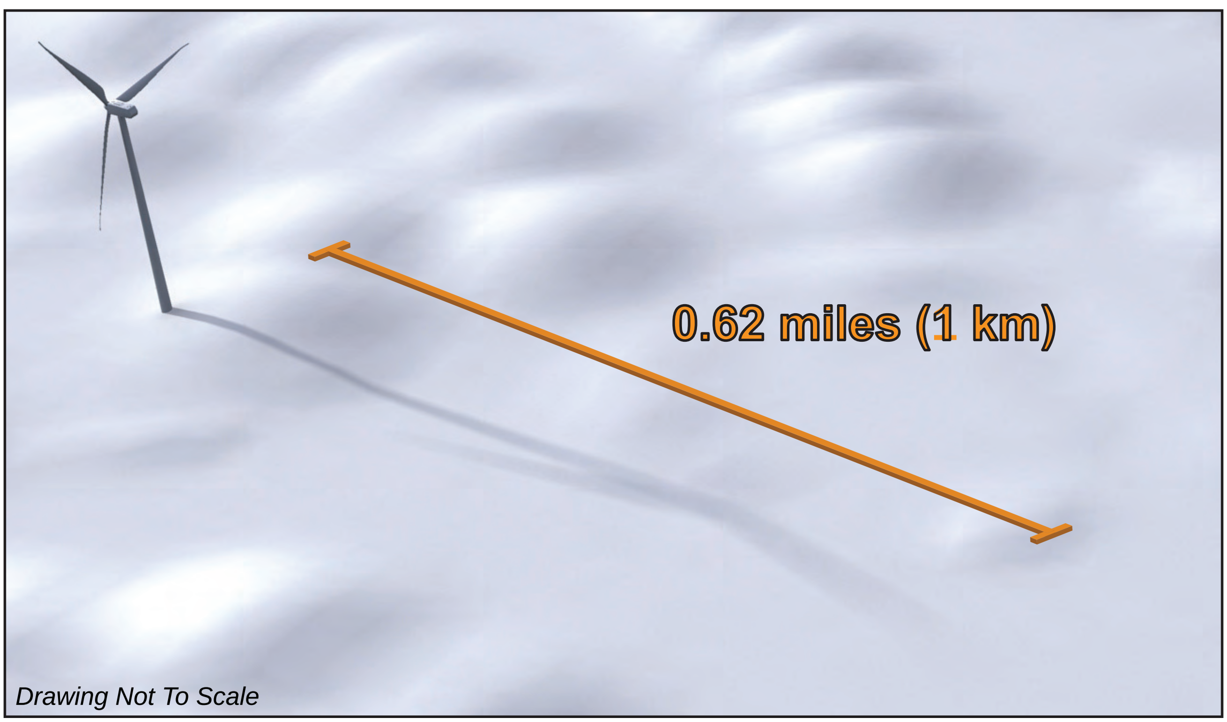
4.7.3.7.3 Blade Flicker

Blade flicker is similar to shadow flicker in that alternating periods of lightness and darkness are created when rotating wind turbine blades are positioned between an observer and the sun. Blade flicker differs in that instead of the alternating light and dark periods created by the moving shadows of the blades, they are created by observing the sun's rays through the moving blades themselves. Figure 4.7-5 depicts the blade flicker effect. Blade flicker can only occur during daylight hours with low sun-angle conditions, and is most commonly experienced from locations in close proximity to the turbine blades. Like the shadows experienced with shadow flicker, blade flicker would only be perceivable under certain temporary conditions from distances within 0.62 mile of a turbine location, as the atmosphere would scatter the perceived change in light intensity to a negligible level from distances of 0.62 mile or more.

The geographic and timing aspects of blade flicker occurrences would be essentially the same as those described previously for shadow flicker. They could occur at two residences within 0.62 mile of the Project (one within the Project site and one adjacent to the western boundary of the Project site) Blade flicker occurrences at these locations have not been modeled, but would have the same limitations as discussed for shadow flicker. Blade flicker could also occur along one or two relatively short segments of Boulder Ridge Road and two segments of Cherokee Park Road that are within 0.62 mile of one or more turbines. Given its temporary nature, both in duration of the effect as the sun moves, and duration of exposure of a moving motorist, the small number of viewers, and the precise conditions under which blade flicker occurs, the visual contrast would be weak and is not anticipated to interfere with driving conditions in the Project area.



Shadow flicker would occur when the rotating blades of a wind turbine cast moving shadows on the ground or on stationary objects, such as a window in a residence.



From distances over 1km, the shadows from the turbine blades would be sufficiently blurred and scattered by the atmosphere that the visual impacts from shadow flicker would be negligible.

Source: Danish Wind Industry Association

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Blade flicker would occur when the rotating blades of a wind turbine are observed passing in front of the sun from a viewer's perspective.

From distances over 0.62 miles (1km), blade flicker would be sufficiently blurred and scattered by the atmosphere, and the resulting visual impacts would be negligible.

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4.7.3.7.4 FAA-Required Aviation Safety Lighting

Nighttime aviation safety lighting for the wind turbines installed to comply with FAA requirements would also introduce visual contrasts to the landscape. Currently, the only nighttime lights in operation in the immediate vicinity of the Project area include some small-scale exterior lighting around residences, outbuildings, and commercial buildings near Tie Siding, Boulder Ridge, and along U.S. Highway 287. These lights are generally white or yellow, and are positioned relatively low to the ground. There are also red flashing lights on the uppermost portion of the 5 communication towers within 5 miles of the Project site boundary. On certain towers, these lights can be more than 200 feet above the ground. Once the turbines for the Project would be constructed, there would potentially be 40 to 50 flashing red lights around the perimeter of the Project, approximately 262 feet above the ground, and these lights would simultaneously flash 20 to 40 times per minute. The red beacons would increase the visibility of the turbines at night by introducing a dense horizontal cluster of flashing lights into a rural landscape that is almost completely dark at night (BLM 2005). The height of the beacons would allow them to be seen from locations more than 15 miles away. These characteristics would create a strong contrast with the existing visual characteristics of the Project nighttime landscape.

A viewshed analysis based on nighttime conditions with the Project has not been prepared; it is possible, however, that visibility of the obstruction lights would be equivalent to daytime visibility of the turbines (i.e., if all turbines would be visible from a given location during the day, it is possible that all obstruction lights would be visible from that location). Therefore, it is assumed that all or most of the obstruction lights would be visible from travel routes and residences in and near the Project area that have clear views toward the Project. The visual impact of the contrast associated with the obstruction lights would vary with the applicable receptor characteristics, as is discussed for the respective KOPs in section 4.7.4.

4.7.4 Assessment of Proposed Project Impacts by KOP

While there would be strong visual contrasts from Project components in the landscapes immediately surrounding the Project site, the visual contrasts experienced from each KOP would be unique to that particular location. Environmental factors discussed in section 4.7.6, such as distance from the Project and angle of observation, can greatly affect the perceived visual contrast of the Project components.

The five KOPs discussed below were identified after several Project stakeholder meetings and after a review of comments received during the public scoping process. Several KOPs suggested by the public were not analyzed because they would not be visible from the proposed Project site as described in section 4.7.1.9. A summary description of the existing visual environment surrounding each KOP is included below; additional information about the study area landscape and existing scenes from identified viewing areas can be reviewed in sections 3.7.2 and 3.7.3.

Individual KOP photos were obtained during site visits on June 24, 2010, and July 20, 2010. The weather conditions for each visit were typical for the area during the summer, with bright, sunny skies in the morning and clouds developing in the afternoon. A digital camera equipped with a 52mm-equivalent lens was used to take the photos. This lens most closely approximates the human field of vision and does not distort the apparent size or scale of objects in the scene.

Photo simulations were created to help visualize the impacts to the existing landscape from each KOP. These simulations were created using a combination of GIS and the most current 3D software to ensure the accuracy in both the locations of the Project components and the eventual design and finish of the components. Figures 4.7-6 through 4.7-10 show the existing conditions photos and photo simulations from each of the five KOPs.

4.7.4.1 KOP 1—Tie Siding

KOP 1 is located in the unincorporated area of Tie Siding at the intersection of Cherokee Park Road and U.S. Highway 287, approximately 0.8 mile northeast of the Project site. There are multiple residences located within 1 mile of the KOP, although motorists along the highway represent the majority of the viewers of the Project from this location. Viewer sensitivity in this area would be classified as high for the residents, who are small in absolute number and account for a small proportion of the potential viewers in this location. A large majority of the viewers represented by this KOP are motorists traveling on U.S. 287 between Laramie and Fort Collins. Highway travelers are typically not considered to be highly sensitive to changes to the visual character of the landscape because they are traveling at a relatively high rate of speed and will have brief exposure to site-specific landscape modifications. In addition, many highway viewers are engaged in travel for other than recreational or tourist purposes, and are not highly focused on the visual setting of the travel corridor. Based on the combined attributes and numbers of the viewer groups, the overall response to visual change for KOP 1 is considered moderate.

The scenic quality of the landscapes seen from Tie Siding is also considered moderate, according to the factors defined for this component of the VRM system (see section 4.7.1.4). The steeper topography of Boulder Ridge to the west enhances the scenic quality of the landscape near the horizon. Most of the open landscape as seen from Tie Siding has average diversity for the basic visual elements of form, line, color and texture, however. The color and texture contrast created by Cherokee Park Road provides a focal point in this view. Overall, the visual character is typical of the landscapes of the Laramie Basin ecoregion and is considered common, as opposed to distinctive.

The Project components, primarily the turbines (and the obstruction lights, as seen at night) would introduce strong visual contrasts to the existing landscape from KOP 1, primarily by creating contrasts in form, line, and color (figure 4.7-6). The majority of turbines and some access roads would be visible in middleground views (1.24 miles [2 kilometers] and beyond) to the west and south, but topography and the turbines themselves would likely obscure most of the access road network. The numerous near-white vertical lines of the turbine towers and the rotating turbine blades would draw the viewer’s attention and would make the turbines the dominant features on the landscape. The large number of turbines visible from this KOP would create the perceptual effect of a forest of structures on the existing open plain. While the fence

KOP 1 - Looking Southwest - Current View

KOP 1 - Looking Southwest - Proposed Turbine Layout - Simulated View

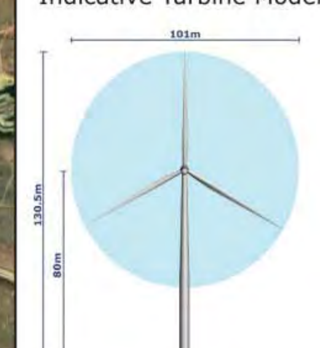
Key Observation Point 1 Looking Southwest

GPS Coordinates

Easting (Latitude WGS 84)	**41.08014**
Northing (Longitude WGS 84):	**-105.50781**
Date & Time of photography:	**24 June 2010 at 9.56 am**
Distance to the nearest visible turbine (m):	**2.0 km**

KOP Location

Indicative Turbine Model



Notes:

Photo point locations have been captured using hand held GPS. These simulations are an indicative view of the proposed project and are subject to final engineering, survey fixing and design.

Date Created 22-June-2011

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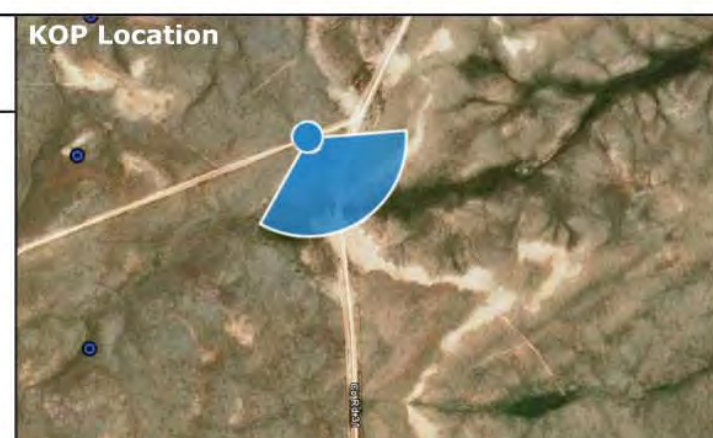
KOP 2 - Looking South - Current View

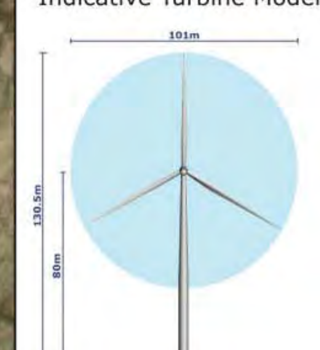
KOP 2 - Looking South - Proposed Turbine Layout - Simulated View

Key Observation Point 2 Looking South

GPS Coordinates	
Easting (Latitude WGS 84)	**41.04745**
Northing (Longitude WGS 84):	**-105.54871**
Date & Time of photography:	**24 June 2010 at 11.22 am**
Distance to the nearest visible turbine (m):	**0.9 km**



Indicative Turbine Model



Notes:

Photo point locations have been captured using hand held GPS. These simulations are an indicative view of the proposed project and are subject to final engineering, survey fixing and design.

Date Created 22-June-2011

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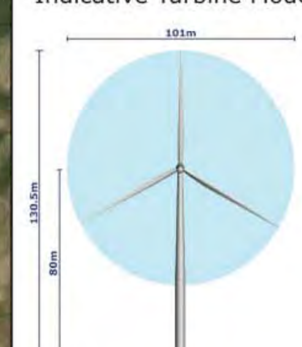
KOP 3 - Looking Southeast - Current View

KOP 3 - Looking Southeast - Proposed Turbine Layout - Simulated View

Key Observation Point 3 - Looking Southeast

GPS Coordinates	
Easting (Latitude WGS 84)	**41.00776**
Northing (Longitude WGS 84):	**-105.55863**
Date & Time of photography:	**24 June 2010 at 2.32 pm**
Distance to the nearest visible turbine (m):	**1.9 km**

Indicative Turbine Model



Notes:

Photo point locations have been captured using hand held GPS. These simulations are an indicative view of the proposed project and are subject to final engineering, survey fixing and design.

Date Created 22-June-2011

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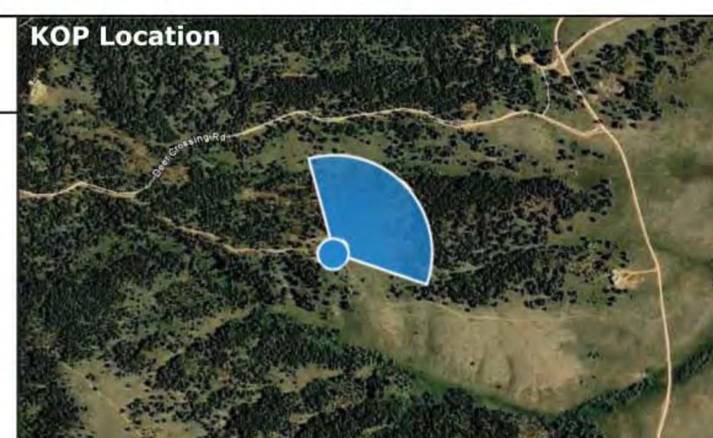
KOP 4 - Looking Northeast - Current View

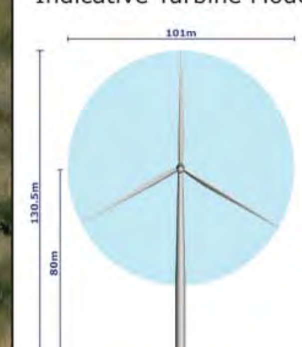
KOP 4 - Looking Northeast - Proposed Turbine Layout - Simulated View

Key Observation Point 4 - Looking Northeast

GPS Coordinates	
Easting (Latitude WGS 84)	**41.00884**
Northing (Longitude WGS 84):	**-105.56680**
Date & Time of photography:	**24 June 2010 at 2.39 pm**
Distance to the nearest visible turbine (m):	**2.6 km**



Indicative Turbine Model



Notes:

Photo point locations have been captured using hand held GPS. These simulations are an indicative view of the proposed project and are subject to final engineering, survey fixing and design.

Date Created 22-June-2011

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KOP 5 - Looking Southwest - Current View

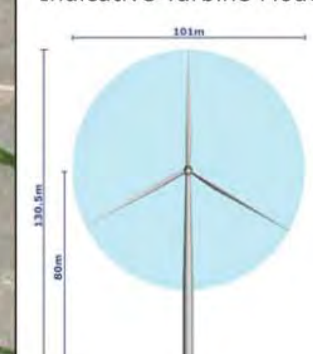
KOP 5 - Looking Southwest - Proposed Turbine Layout - Simulated View

Key Observation Point 5 Looking Southwest

GPS Coordinates

Easting (Latitude WGS 84)	**41.13106**
Northing (Longitude WGS 84):	**-105.39835**
Date & Time of photography:	**24 June 2010 at 10.22 am**
Distance to the nearest visible turbine (m):	**12.2 km**

Indicative Turbine Model



Notes:
Photo point locations have been captured using hand held GPS. These simulations are an indicative view of the proposed project and are subject to final engineering, survey fixing and design.

Date Created 24-August-2012

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posts and the poles of an electric distribution line in the foreground create vertical line elements in the existing scene, the number and size of the turbine towers would result in a pronounced change to the vertical dimension. For most viewers (highway travelers), however, the degree of contrast would be tempered by the brief duration of the view of the Project facilities.

The potential nighttime facility lighting of the operations and maintenance building (even though they are local and downcast), and the red, flashing obstruction lights of the turbines would be visible from KOP 1. Visual contrasts from shadow or blade flicker would be classified as none, because the distance from the KOP to the nearest potential turbine location would be more than 1 mile.

With a strong visual contrast and moderate existing visual quality, the change in visual quality as seen from KOP 1 would be moderately high. Based on the viewer characteristics, as discussed above, the overall viewer response to this change is expected to be moderate. A key factor in the evaluation for this location is that nearly all of the potential viewers would have a brief visual exposure to the Project and a relatively low sensitivity to visual change. Combining the change in scenic quality with the expected viewer response, the overall visual impact is considered moderate.

Despite the outputs from the VRM-based analysis process, from public scoping input and comments received Western believes that most residents of the Tie Siding area would consider the visual impact from developing SWE’s proposed Project to be significant to them. Therefore, the NEPA determination of visual impacts from KOP 1 is a moderate level of visual impacts to travelers on U.S. Highway 287, but potentially significant visual impacts to residents in the vicinity.

4.7.4.2 KOP 2—Boulder Ridge Road

KOP 2 is located on the shoulder of Boulder Ridge Road at a point just west of the intersection with Cherokee Park Road, and inside the Project site boundary. The landscape adjacent to the road is similar in character to the scene from KOP 1, with a predominantly flat open plain and little vegetative diversity. As a result, there is little variety in form, line, color or texture. Views to the south include forested ridges beyond the Project site, but at that distance vegetation patterns are not distinct. Cultural modifications of the landscape are evident, but not dominant. They include a fence in the foreground, a straight stretch of Cherokee Park Road extending beyond the fence, and two transmission lines on lattice-steel structures approximately 1 mile in the distance. Overall, the landscape observed from this KOP is typical when compared with other landscapes in the area. The existing scenic quality of this landscape is considered moderate.

Viewers represented by KOP 2 are travelers on Boulder Ridge Road, as there are no residences within 0.5 mile of the KOP. These travelers include primarily residents of the Fish Creek Ranch and Boulder Ridge Estates. The road may be used by small numbers of people traveling to recreate in areas to the southwest of the Project site, such as Arapaho-Roosevelt National Forest lands in Colorado; because there are no notable recreation attractions in the latter area, such use of the Boulder Ridge Road would be expected to be limited. Viewers at this KOP are assumed to have high sensitivity to visual change. Viewer numbers at this location are low, as the road receives relatively little traffic. Based on high viewer sensitivity and low viewer numbers, the overall viewer response for KOP 2 is considered moderate.

The majority of turbines and some access roads and other Project components would be visible in views to the south and east from Boulder Ridge Road (figure 4.7-7). (The adjacent operations and maintenance building and turbines located to the north of KOP 2 would also be visible, but they are beyond the field of view shown in this image.) The primary sources of contrast from these components would be from the landscape character elements of form, line, and color. The numerous strong vertical white lines of the turbine towers would dominate middleground views to the south and east. The turbine shown at the near right is at a distance of 0.56 mile, while the remaining turbines are generally beyond 1 mile. The turbines would be seen against the skyline at this location, making them more prominent. The movement of the rotating turbine blades would further attract attention to the Project. Some man-made alterations to the landscape, such as fence lines and roads, are currently visible. However, these features exist at a much smaller scale and in smaller numbers when compared with the potential Project facilities, particularly the wind turbines. There would be a small potential to experience visual impacts from shadow or blade flicker from this viewing position while travelling east on Boulder Ridge Road (as discussed previously), but this would only be experienced during the early morning hours of the day and would only occur for a short period of time over the course of the year.

Currently, motorists travelling east on Boulder Ridge Road at night see diffuse red obstruction beacons on communications towers flashing in the landscape. The estimated 40 to 50 red flashing obstruction lights required for the Project would be highly visible from this KOP. They would represent a large increase in the number of visible light sources and would dominate the landscape at night. The visual contrast at night would be strong, and in relative terms would likely be more pronounced that the daytime contrast.

With a strong visual contrast (both day and night) and moderate existing visual quality, the change in visual quality as seen from KOP 2 would be moderately high. Based on the viewer characteristics, as discussed above, the overall viewer response to this change as defined by the VRM-based analysis process is characterized as moderate. A key factor in the evaluation for this location is that the number of viewers would be relatively low, although they would have a high sensitivity to visual change. Combining the moderately high change in scenic quality with the expected moderate viewer response, the overall visual impact is rated as moderate.

Despite the outputs from the VRM-based analysis process, Western believes that the known high viewer sensitivity of Boulder Ridge residents and assumed high sensitivity of recreational users of Boulder Ridge Road would result in potentially significant visual impacts to that relatively small number of people from developing SWE's proposed Project. Therefore, the NEPA determination of visual impacts from KOP 2 is a moderate level of visual impacts to casual users of Boulder Ridge Road, but significant visual impacts to the residents of Boulder Ridge.

4.7.4.3 KOP 3—Elk Crossing Road

KOP 3 is located along Elk Crossing Road in the Fish Creek Ranch Preserve, a private ranch consisting of approximately 4,200 acres on the slopes of Boulder Ridge. The KOP is approximately 0.25 mile west of Cherokee Park Road and 1.15 miles west of the Project site. Currently, 12 homes in the ranch have been constructed, and 9 are on the eastern slopes of Boulder Ridge and have views of the Project site. The ranch provides its homeowners access to more than 3,700 acres of wildlife habitat that can be used for hiking, biking, fishing, horseback riding, or wildlife viewing. The ranch also borders the Arapaho-Roosevelt National Forest, which provides access to the same types of recreation opportunities mentioned above.

The total number of viewers associated with KOP 3 is low. Homeowners in the ranch have expressed a high sensitivity to changes to the visual character of the existing landscape. They have also noted appreciation for the landscape qualities, and orientation of their homes to take advantage of the views. Based on low viewer numbers and high viewer sensitivity, the overall viewer response for KOP 3 is classified as moderate.

The Fish Creek Ranch Preserve lies on the border of two distinct ecoregions, the Laramie Basin and the Mid-Elevation Forests of the Southern Rocky Mountains. These two contrasting landscapes, one with open panoramic valleys covered in prairie grass, the other with steeper terrain and dense forests, create interesting patterns in landforms, vegetation, and color. These contrasting landscapes are fairly typical in the Mid-Elevation Forest ecoregion, and can be seen along the edges of Boulder Ridge and the Medicine Bow Mountains further to the west. The view toward the Project site from KOP 3 includes only the basin landscape, which exhibits little visual variety (figure 4.7-8). Compared to the view from KOPs 1 and 2, this scene has less landform variation, but somewhat more vegetative diversity and color variation. Landscape modifications evident in this view include the gravel-surfaced Elk Crossing Road and adjacent electric distribution line, and a short segment of Cherokee Park Road. The pair of existing transmission lines on the northern border of the ranch, approximately 2 miles from the KOP (and not included in the field of view for this photo), slightly decreases the scenic quality of the local landscape. Overall, the existing scenic quality of this landscape is considered moderate.

As seen from KOP 3, the Project components would introduce a moderate degree of visual contrast to the existing landscape (figure 4.7-8). All four landscape character elements would exhibit strong contrasts. The vast majority of the tall cylindrical forms of the turbine towers in the southern part of the Project area would be visible from much of the ranch, at distances of 1.2 miles (1.9 kilometers) and beyond. These structures would be unlike any other feature currently existing in the landscape, and would attract attention from any location with views of the Project site. The motion of the turbine blades would increase the level of visual contrast created by the Project. Most of the turbines would be seen against the skyline, although the lighting conditions in this instance result in less color contrast than in the simulation for KOP 2. The network of turbine roads and access roads would introduce a large number of light tan and buff colored bands to a landscape that currently has few developed roads. At KOP 3, however, the viewing distance and the intervening terrain would minimize the visibility of the access road network.

Cherokee Park Road is located approximately 0.3 mile to the east of the KOP, for example, but only a short segment of the road is visible from the KOP. In any case, turbines would overshadow the visual effects of the access roads. Because the distance between a proposed turbine and the KOP would be approximately 1.25 miles, the atmosphere would blur any shadows created by the rotating blades and there would be no contrast from shadow or blade flicker.

The bright red flashing obstruction lights would introduce many sources of artificial light to the current night sky conditions, which are presently nearly free from any source of man-made light. They would dominate the scene at night and produce strong contrast.

With a moderate visual contrast (both day and night) and moderate existing visual quality, the change in visual quality as seen from KOP 3 would be moderately high. Based on the viewer characteristics, as discussed above, the overall viewer response to this change is expected to be moderate. A key factor in the evaluation for this location is that the number of viewers would be low, although they would have a high sensitivity to visual change. Combining the change in scenic quality (moderately high) with the expected overall viewer response (moderate), the analysis process results in an overall visual impact rated as moderate.

Since KOP 3 is on the Fish Creek Ranch, there would be no general public viewing from this location. Affected viewers would be limited to the small number of Fish Creek Ranch residents and their invited visitors. While the Fish Creek Ranch residents are known to have high viewer sensitivity, the VRM-based visual analysis process impact rating reported above specifically takes into account the small number of viewers. Nevertheless, based on public input Western believes that the proposed Project would result in significant visual impacts to the Fish Creek Ranch residents. Therefore, the NEPA determination of visual impacts from KOP 3 is a significant visual impact to the residents of Fish Creek Ranch, particularly those with primary views oriented to the east.

4.7.4.4 KOP 4—Fish Creek Ranch Preserve

KOP 4 is also located in the Fish Creek Ranch Preserve. KOP 4 is approximately 0.5 mile to the northwest of KOP 3, at a higher elevation and more within the interior of the ranch. As noted previously, Fish Creek Ranch Preserve lies in the transition between the open Laramie Basin and the varied terrain of the Mid-Elevation Forests of the Southern Rocky Mountains. The more interesting patterns in landforms, vegetation, and color that result from this mix are evident in the existing scene from KOP 4 (figure 4.7-9). While the landform and vegetative variety is noticeably greater than for the other KOPs, much of the scene again includes a large plain with little variety. The existing view for KOP 4 also includes a number of dead and dying trees as a result of a mountain pine beetle infestation; this could result in further change to future baseline conditions in the forested landscapes near the Project. As with KOP 3, the two existing transmission lines approximately 1.5 miles to the north are evident in the view, as are several local roads. These cultural modifications slightly decrease the scenic quality of the landscape. As a result of the conditions for the respective landscape factors, the visual variety is not enough to be considered distinctive and the existing scenic quality in this location is still rated as moderate overall.

Viewer characteristics for KOP 4 are essentially the same as for KOP 3, with low viewer numbers and high sensitivity. Viewers are primarily residents of Fish Creek Ranch Preserve, particularly those with homes in elevated positions on the slopes of Boulder Ridge. The view from KOP 4 is representative of the residents who have oriented their homes to take advantage of the distant views.

From KOP 4 the Project components would introduce varying degrees of visual contrast to the existing landscape (figure 4.7-9). The vast majority of the cylindrical forms of the turbine towers would be visible from this location, at distances of 1.6 miles (2.6 kilometers) and beyond. These structures would be different from other features currently present in the landscape, including the lattice transmission towers, and would attract attention from any location with views of the Project site. Viewers on the slopes of the ridge would have a wide expansive view of the entire Project site, and the Project turbines would be present within nearly the full sweep of the view from KOP 4. On the other hand, because of the elevated angle of observation at KOP 4, the turbines would all be below the horizon and not skylined as at other KOPs. For this reason, and because of the somewhat greater viewing distance, the degree of dominance at KOP 4 would not be as strong as at the other KOPs. Considering all sources of visual contrast in this scene, and the descriptive guidance from the BLM contrast rating system, the overall level of contrast created by the Project in daytime views would be considered moderate. The proposed Project would certainly begin to dominate the characteristics of the landscape in this scene, but would not quite rise to the level of demanding attention and being dominant in the landscape.

Similar to the other KOPs, at KOP 4 the bright red flashing obstruction lights would introduce many sources of artificial light to a night sky that presently has limited sources of man-made light. In this case, existing light sources are on or near U.S. 287 and the communication towers. Because of their number and configuration, the Project obstruction lights would dominate the scene at night and produce strong contrast.

With a moderate daytime visual contrast and moderate existing visual quality, the change in daytime visual quality as seen from KOP 4 would be moderate. Because the contrast level at night would be strong, the change in nighttime visual quality would be moderately high. Based on the viewer characteristics, as discussed above, the overall viewer response to change is expected to be moderate. A key factor in the evaluation for this location is that the number of viewers would be low, although they would have a high sensitivity to visual change. Combining the change in scenic quality (moderate or moderately high) with the expected viewer response (moderate) results in an overall visual impact rating of moderate for both day and night conditions.

Since KOP 4 is on the Fish Creek Ranch, there would be no general public viewing from this location. Affected viewers would be limited to the small number of Fish Creek Ranch residents and their invited visitors. While the Fish Creek Ranch residents are known to have high viewer sensitivity, the VRM-based visual analysis process impact rating reported above specifically takes into account the small number of viewers. Nevertheless, Western believes that the proposed Project would result in significant visual impacts to the Fish Creek Ranch residents. Therefore, the NEPA determination of visual impacts from KOP 4 is a significant visual impact to the residents of Boulder Ridge, particularly those with primary views oriented to the east, out over the Project site.

4.7.4.5 KOP 5 – Ames Monument

KOP 5 is located at the Ames Monument, near the intersection of Hermosa Road and Monument Road and approximately 1.5 mile south of I-80 at Exit 329. The monument is located approximately 7.5 miles northeast of the Project site. As discussed in section 3.7.3.2.3, Ames Monument commemorates the highest elevation along the route of the first U.S. transcontinental railroad, and was listed in the NRHP in 1972. It is also a state historic site. It is important to note that the railroad was relocated several miles to the south of the monument in 1901 and visual evidence of the railroad no longer exists near the site. The site is on private land and there are no visitor facilities.

Visitors interested in the history associated with the monument are the primary viewers of the Project at this KOP; most are assumed to travelers on I-80 who access the monument as a side trip. Viewer sensitivity at this location is therefore classified as moderate (see the previous discussion for KOP 1), although it is likely to be somewhat higher than for highway travelers in general. The number of visitors to Ames Monument is not known, but is assumed to be low or moderate. Because there no visitor facilities at the monument and on-site activities are limited, the duration of a typical visit is assumed to be brief (on the order of a few minutes). Based on the combined view and viewer attributes, the overall response to visual change for KOP 5 is considered moderate.

The scenic quality of the landscape seen from Ames Monument (figure 4.7-10) is similar to the existing view from Tie Siding, and is also considered moderate. The steeper topography of Boulder Ridge and mountains farther to the west enhances the scenic quality of the landscape near the horizon. Most of the open landscape in the foreground and middleground has little diversity for the basic visual elements of form, line, color and texture, however. The broad, open expanse of light-green grassland is the dominant element in this view. Scattered, small clumps of shrub vegetation and occasional rock outcrops provide some degree of color and texture variety. Modifications of the natural landscape include fencing, some utility poles, a two-track road and several residences, one of which has a prominent, copper-colored metal roof that attracts the viewer’s attention. Overall, the visual character is typical of the landscapes of the Laramie Basin ecoregion and is considered common, as opposed to distinctive.

As indicated by the simulated view in figure 4.7-10, the Project would introduce weak or minimal visual contrasts to the existing landscape from KOP 5. Because the Project turbines would be seen at a background viewing distance (7.5 miles), contrasts in form, line, color and texture are softened and indistinct. The viewshed analysis indicates that essentially all of the Project turbines would be potentially visible from Ames Monument, based on the existence of a direct line of sight to the turbine locations. Viewed with the unaided eye, however, the Project turbines spanning the middle of the simulated image are not distinguishable. It is possible that the turbines would be more noticeable under different lighting conditions, and/or that the rotating turbine blades would draw the viewer's attention. If so, the turbines would be a subordinate (not dominant) feature on the landscape and would at most meet the definition of weak contrast (can be seen but does not attract attention).

The red, flashing obstruction lights of the turbines would be visible from KOP 5. It is unlikely that visitors would be present at the monument during non-daylight hours, however, indicating that the lights would not be an impact issue. Visual contrasts from shadow or blade flicker would likewise not occur at this distant location.

With a weak or minimal visual contrast and moderate existing visual quality, the change in visual quality as seen from KOP 5 would be low. Based on the viewer characteristics, as discussed above, the overall viewer response to this change is expected to be moderate. Combining the change in scenic quality with the expected viewer response, the overall visual impact is considered low to moderate, and not significant. However, the Wyoming SHPO believes that visibility of the proposed Project, in conjunction with other existing visible cultural modifications, would have the potential to jeopardize designation of the monument as a National Historic Landmark. SHPO has not submitted a nomination to the National Park Service to have the monument designated as a National Historic Landmark at this time.

4.7.5 Summary of Results

As discussed in section 4.7.1, assessment of the visual impacts of the Project involves consideration of the visual contrast that would be created by the Project facilities within the context of the existing scenic quality and the sensitivity and number of the viewers who would experience the contrast. Table 4.7-1 summarizes the viewer sensitivity, viewer number, scenic quality, and contrast characteristics identified for the five KOPs used for the impact assessment.

Table 4.7-1:
KOP Summary Table

KOP	Viewer Sensitivity	Viewer Number	Scenic Quality	Contrast Rating
1—Tie Siding	Low (Predominantly)	High	Moderate	Strong
2—Boulder Ridge Road	High	Low	Moderate	Strong
3—Elk Crossing Road	High	Low	Moderate	Moderate
4—Fish Creek Ranch	High	Low	Moderate	Moderate
5—Ames Monument	Moderate	Low or Moderate	Moderate	Weak (or minimal)

The viewer characteristics and scenery conditions are considered in combination to derive impact ratings for each KOP. The viewer sensitivity levels and viewer numbers are combined to derive a high/moderate/low rating for overall viewer response. For example, high sensitivity and low viewer numbers will result in a moderate overall viewer response rating. Similarly, the existing scenic quality and contrast ratings are combined to derive a high/moderate/low rating for visual quality change. Finally, an impact rating of high, moderate or low was assigned for each KOP based on the respective overall viewer response and visual quality change ratings. Table 4.7-2 is a matrix of possible outcomes used to derive the impact ratings for the KOPs.

Table 4.7-2:
KOP Impact Rating Matrix

Viewer Response	Visual Quality Change		
	Low	Moderate	High
Low	L	M	M
Moderate	M	M	MH
High	M	MH	H

The KOPs selected as representative viewpoints for assessment of the potential visual impacts of the Project include one location (KOP 1) along the major highway serving the study area, three locations (KOPs 2 through 4) on low-volume secondary roads in and near the Project site, and one distant location (KOP 5) that has historical significance. KOP 1 accounts for a large majority of the potential viewers of the Project, including both highway travelers and a small rural community approximately 1 mile from the Project. KOPs 2 through 4 represent other residents living near the Project and, in the case of KOP 2, some people traveling on the Boulder Ridge Road to locations southwest of the proposed Project area.

Viewer response for KOP 1 is considered to be moderate overall; although the number of viewers is relatively large, most viewers are highway travelers with low individual sensitivity to visual change along the route. By contrast, viewers at KOP 2 (primarily Boulder Ridge Estates residents) are low in number but are assumed to have a high sensitivity to visual change. Similarly, viewers at KOP 3 and KOP 4 (primarily Fish Creek Ranch Preserve residents) are quite low in number but have a high sensitivity. Considering the balance of both attributes, overall viewer response for KOPs 2 through 4 is also rated as moderate. Viewer response for KOP 5 is considered to be moderate overall; the number of viewers is assumed to be low or moderate, most viewers are likely to be highway travelers with less individual sensitivity to visual change, and the view duration is relatively brief.

Based on the existing landscape characteristics evident at the respective locations, the existing scenic quality is rated moderate at all five KOPs. While there are evident differences in visual variety among the locations, the existing landscape is not considered either distinctive (high scenic quality) or indistinctive (low scenic quality) at any of the locations. In general, the scenes from these viewpoints show relatively little cultural modification of the landscape, but also relatively little visual variety.

As discussed in section 4.7.3, the primary sources of visual contrast introduced by the Project would be the access and turbine roads (depending on viewing distance and position) and the wind turbines, including obstruction lighting installed to comply with FAA guidance. The size and scale of these Project elements, particularly the turbines, are so large that the natural landscapes in the Project area cannot fully absorb the visual contrast that would be created.

The Project features would not mimic or reflect elements in the natural landscape and would generally dominate the natural landscape.

Based on the simulations, the contrast created by Project components in views from these locations was rated as strong for KOPs 1 through 3, moderate for KOP 4, and weak at most (likely minimal) at KOP 5. The Project facilities would be seen at middleground viewing distances in the first four cases, and would not have the looming-scale dominance that often occurs with foreground views of wind farms. Regardless, the contrast at three locations was rated as strong because the number, large size, light color, and motion of the turbines evident in the scene would dominate the landscape. At KOP 4, a slightly greater viewing distance and elevated viewing position would create a somewhat different perspective and result in a level of contrast considered to be moderate. The Project would be at a background viewing distance from KOP 5, and the simulation for that viewpoint indicates the turbines would not be distinct in an unaided view.

At night, however, the flashing red obstruction lights of the wind turbines would be highly visible from all five locations. While the nighttime condition has not been simulated, it is apparent that the obstruction lights would introduce a strong contrast to an existing night sky that is largely free of man-made sources of light at locations where viewers are present. The latter condition does not apply to KOP 5.

Following the guidance for the applicable components of the VRM system, the assessment for the Project characterized the levels of change in visual quality and viewer response for each KOP. Combining those components resulted in identification of visual impact levels that were rated as moderate for four KOPs and low for one KOP. In general terms, those impact levels were influenced by (1) the baseline condition of moderate existing visual quality at all locations and (2) a moderate viewer response at all locations, based typically on either low viewer sensitivity (e.g., KOP 1) or low viewer numbers (KOPs 2-4). Consistent with the VRM guidance, evaluation of existing scenic quality for the KOPs was based on comparison of landscape conditions within the respective ecoregion. While that process resulted in ratings of moderate scenic quality for all KOPs, Western recognizes that views over the Project site are highly valued at the local level.

The methods discussion in section 4.7.1 identified four possible conditions under which visual impacts from the Project would be considered significant. Two of those conditions are clearly not applicable, as air emissions from the Project would be limited and would not occur within areas subject to Class I standards, and the Project is not subject to the visual management standards of a Federal land management agency. The remaining conditions that are potentially applicable are:

- Strong visual contrasts in landscapes that are seen from highly sensitive viewer locations or locations with special scenic, historic, recreational, cultural, archaeological significance, and/or natural qualities that have been recognized through legislation or some other official declaration

- Substantial degradation of the foreground character or scenic quality of a visually important landscape

The Project would not result in the degradation of the foreground character of a visually important landscape; public views of the Project would be from middleground or background distances. Therefore, the second significance criterion listed above clearly does not apply.

Similarly, none of the potential viewing locations around the Project site has special scenic, historic, recreational, cultural, archaeological significance, and/or natural qualities that have been recognized through legislation or some other official declaration. While the assessment indicated that the Project would create strong daytime visual contrast from three of the KOPs and strong nighttime visual contrast from all of the KOPs, none of those has been identified as a highly sensitive viewing location. In applying the previously specified significance criteria as stated, the VRM-based visual impact attributed to the Project is not considered a significant impact.

Notwithstanding the discussion above, NEPA guidance (40 CFR 1508.27) requires consideration of context and intensity in evaluating the significance of impacts. Ten specific considerations are identified for intensity, which refers to the severity of an impact. They include factors such as the degree to which the proposed action affects public health or safety; unique characteristics of an area, such as proximity to historic or cultural resources, park lands, or wild and scenic rivers; the degree to which the effects of the action are highly uncertain or involve unique or unknown risks; and whether the action threatens a violation of Federal, State or local law or requirements imposed for the protection of the environment. Review of these intensity considerations relative to the identified visual impacts for the Project does not provide a basis for determining that those visual impacts would be significant.

The context guidance directs lead agencies to consider the significance of the effects of an action in several contexts or levels, including society as a whole, the affected region, the affected interests, and the locality. The guidance indicates that significance in the case of a site-specific action would usually depend on the effects in the locale rather than the world as a whole; “locale” is not defined, and is therefore subject to interpretation.

The visual impact analysis for the Project considered impacts that would occur within the Project area and in the vicinity. Four of the KOPs used as the framework for the analysis are within 2 miles of the Project and therefore indicate expected conditions for the local area. Based on the methods employed for the analysis and the standard procedures used to develop specific measures in the VRM system, the assessment resulted in identification of visual impacts that were characterized as moderate. The numbers of highly sensitive viewers affected at each location are few, which lessens the overall impact levels determined through the analysis process used for this EIS. Western understands that identifiable affected interests, specifically certain residents near the Project area, will consider the visual impacts experienced from their viewpoints to be significant. This point is noted in the discussions above, in which Western has acknowledged significant visual impacts for residents represented by the KOPs that are near the Project site.

4.7.6 Impact Assessment of the Federal No Project Alternative and SWE's No Project Option

Under the SWE no Project Option, the proposed Project would not be constructed and visual resources would not be affected. There is potential for future commercial-scale wind development in the region, however, and visual impacts could occur from these developments, as well as the potential development of the Project site for wind power generation without an interconnection to Western's 345-kV transmission line. It is not possible to compare and contrast these speculative visual impacts with those of the proposed Project.

4.7.7 Mitigation Measures

The following project design features and mitigation measures have been identified and committed to by SWE to avoid resource impacts or reduce potential impact levels. They are considered an integral part of the proposed Project and would be implemented by SWE as requirements in SWE's contract with their construction contractor. Design features applicable to operation and maintenance activities would be incorporated in SWE's Operation and Maintenance Plan for the Hermosa facility, and those related to decommissioning would be incorporated in SWE's Decommissioning Plan. The mitigation measures would be required by law, regulation, or permit conditions, and compliance would be overseen by the responsible regulatory authorities. While Western has no authority or jurisdiction over SWE's proposed Project, Western's decision to execute an interconnection agreement would consider SWE's commitments to implement these design features and mitigation measures, and the reduction in environmental impacts that would result.

4.7.7.1 Construction

BMPs

- VIS-1: Existing roads will be utilized to the extent possible for access and turbine roads to minimize visual impacts from clearing and grading new roads.
- VIS-2: Water will be applied as necessary to exposed soil in active construction areas to minimize dust potential.
- VIS-3: Existing trees and shrubs will be preserved to the extent possible to minimize visual contrasts.
- VIS-4: Construction activities in areas of highly erodible soils and steep slopes will be avoided to the extent possible.

4.7.7.2 Transmission Lines

BMPs

- VIS-5: For the gen tie line, single steel pole or wooden H-frame configuration construction similar to the existing transmission lines on Project site will be used.

- VIS-6: Collector lines will be buried and collocated within access or turbine road rights-of-way to minimize new ground disturbance, to the extent possible.

4.7.7.3 Operations and Maintenance Building

BMPs

- VIS-7: The building will be designed with rural and agricultural architectural elements to minimize contrast with existing structures.

Mitigation Measures

- VIS-8: The building will be painted with earth-tone colors from the BLM Standard Environmental Colors palette or as required by Albany County to reduce visual contrasts from color.
- VIS-9: Outdoor facility lighting will be designed with light caps, and where practicable motion sensors, to minimize offsite glare.

4.7.7.4 Substation and Switchyard

BMPs

- VIS-10: Switchyard and substation facilities will be collocated east of Cherokee Park road to utilize the undulating topography to screen visual impacts from viewers on Cherokee Park Road.
- VIS-11: The size of the disturbance area required at each turbine location will be reduced to the smallest feasible size to create less visual impact from vegetation scarring and to reduce the need for soil and vegetation reclamation.
- VIS-12: A dark-colored gravel or stone will be used for the finish material within the fenced area of the substation a switchyard site to reduce visual contrasts from color.

Mitigation Measures

- VIS-8 and VIS-9: As described above

4.7.7.5 Meteorological Towers

Mitigation Measures

- VIS-13: The towers will be composed of materials and colors that minimize reflectivity. The remaining length of the towers will either be unpainted galvanized steel and be grayish blue in color, or painted to conform to FAA specifications and Albany County requirements of either white or gray.
- VIS-14: Required obstruction lights will be synchronized to flash with obstruction lights of wind turbines.

4.7.7.6 Access Roads

BMPs

- VIS-15: Roads will be routed to follow existing contours and to avoid steep slopes that would require cut-and-fill construction.
- VIS-16: The initial disturbance width of the roads will be minimized to the extent possible, and road width will be reduced to 16 feet after construction is completed.
- VIS-17: Vegetation along roadsides will be restored with native vegetation to reduce the color difference associated with reclamation of those areas that require clearing.

4.7.7.7 Wind Turbines

BMPs

- VIS-6: As described above.

Mitigation Measures

- VIS-18: Turbine components will be painted with a light, non-reflective color such as white or gray in accordance with the Albany County Wind Siting Regulations (Albany County 2011).

4.7.8 Consistency with Albany County Wind Energy Siting Regulations

In 2011, Albany County Commissioners amended the Albany County Zoning Resolution to include specific language regarding the development of commercial-scale WECS. Among other things, the Wind Energy Siting Regulations were adopted specifically to acknowledge: that these facilities (WECS) are clearly visible and cannot be hidden from view, however, design consideration should include minimizing the degradation of the visual character of the area (Albany County 2011).

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4.8 Air Quality

This section describes potential air quality effects of the proposed Project and the no Project option. The proposed Project components discussed include SWE's construction and operation of the proposed Project. In considering potential environmental consequences to air quality, this EIS addresses several related issues that surfaced during public scoping, including potential adverse impacts on local climate and weather conditions as discussed below.

4.8.1 Methods

Emissions estimates for both construction and operations of the proposed Project were conducted using the following methods and references:

- USEPA's Compilation of Air Pollution Emissions Factors, AP-42 (USEPA 2009)
- Western Regional Air Partnership, Fugitive Dust Handbook, revised 2006 (WRAP 2006)
- Engineering and/or process specific data supplied by SWE for this EIS
- Construction equipment database of exhaust emissions data supplied by the South Coast Air Quality Management District (SCAQMD 2004)
- Construction and/or operations data supplied by SWE for this EIS (manpower schedules, equipment schedules, operations schedules, etc.)
- Vehicle emission rate factors and other emissions rate factors from the USEPA (USEPA 2009)

4.8.2 Significance Criteria

Based on the significance criteria listed below, a significant effect to air quality would occur if the following were experienced from construction or operations of the proposed Project:

- Predicted concentrations of criteria air pollutants would exceed State and/or Federal ambient air quality standards
- Predicted concentrations would exceed the maximum allowable PSD increments for PM_{10}, NO_2 or SO_2
- 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
- Project emissions would result in a significant increase of any criteria pollutant for which the Project region is in non-attainment under an applicable local, State, or Federal ambient air quality standard
- Predicted air pollutant emissions that would result in a change in visibility that would exceed Class I standards
- Project emissions would exceed Class I or Class II increment values established by the PSD regulations
- Predicted mercury emissions that would result in a violation of emissions guidelines.
- Produce air contaminants above the level of significant cancer risk, if any
- Contribute to a collective or combined air quality effect of the proposed Project and alternatives and foreseeable other projects that lead to violation of air quality standards,

even if the individual effect of the Project/activity is relatively minor compared with other sources

- Predicted ambient air concentrations would create damage to the existing crops or vegetation
- Predicted deposition of sulfates and nitrates would exceed established depositional guidelines in areas deemed sensitive to acidification
- Predicted emissions would cause sensitive receptors to be exposed to pollution concentrations exceeding State and/or Federal standards
- Predicted emissions would conflict with or obstruct implementation of an applicable air quality plan (general conformity)

During the public scoping meetings and public comment period for the Project from January 14, 2010, to March 1, 2010, Western received several comments specifically expressing concern:

- Concern about the effect of wind turbines on local climate and weather conditions
- Concern that wind turbines could cause an increase in local air turbidity and moisture content

4.8.3 Impact Assessment of the Proposed Project

Air quality in Wyoming is regulated at the State level by the WYDEQ-AQD (under authority delegated by the Federal government). The WYDEQ-AQD regulations generally apply to stationary sources as well as fugitive dust from construction activities, although permits for construction-related activities are not required. The Savage Run Wilderness Area, approximately 40 miles to the west of the proposed Project site, is the closest State Class I area, and the Rawah Wilderness Area, approximately 28 miles to the southwest of the proposed Project site (in Colorado), is the closest Federal Class I area, so air dispersion modeling of construction emissions is not required.

4.8.3.1 Construction Impacts

Direct short-term air emissions would be generated from fossil fuel combustion from construction equipment and vehicles such as haul trucks, cranes, drill rigs, and numerous other pieces of earth-moving equipment, flatbeds, water trucks for dust suppression, and pickup trucks. These are collectively referred to as mobile sources. Tailpipe emissions from mobile sources generate particulate matter (predominantly the fine fraction $PM_{2.5}$), CO, NO_x, SO_2, and VOCs from gasoline and diesel fuel combustion. In addition, the use of a portable concrete batch plant capable of producing 50 to 70 cubic yards of concrete per hour may be located on the proposed Project site during construction. The portable batch plant would be properly permitted pursuant to the WYDEQ-AQD regulations as either a portable source or a temporary source and would be subject to emission thresholds regulated by the WYDEQ-AQD.

The CO_2 emitted by mobile sources also contributes to greenhouse gas emissions. The total carbon dioxide-equivalent (CO_{2e}) emissions for all inventoried sources in Wyoming for 2010 are estimated to be approximately 60.3 million metric tons (Center for Climate Strategies 2007). Because constructing the proposed Project would represent only a small fraction of the total

State’s estimated $CO2_e$ emissions, the effects of construction-associated CO_2 emissions would be considered negligible.

Direct short-term air emissions during construction would be generated from grading for wind turbine foundation preparation, vegetation clearing, preparation of the transmission structure sites and the operations and maintenance building, and similar clearing and grading for the substation and road construction. Soil disturbance and construction traffic on unpaved access roads would generate particulate matter (predominantly the coarse fraction PM_{10}) in the form of fugitive dust. The amount of fugitive dust generated would be a product of the silt and moisture content of the soil, frequency of rainfall, wind speed, vegetation removal, traffic volumes and speeds, and BMPs at the proposed Project site. Because it would be coarse-fraction particulates, as opposed to gaseous emissions or aerosols, fugitive dust from construction would be localized, settling in the area surrounding each tower pad, transmission structure or substation construction site, staging area, and roadway. Based on the kinds of soils expected on the Project site and on the levels of activity planned for the time period, fugitive dust would be greatest during drier summer and autumn months.

To minimize levels of fugitive dust, a Fugitive Dust Control Plan would be prepared that incorporates the construction mitigation practices and techniques as delineated in section 4.8.5. Dispersion modeling of construction emissions was not required for this analysis and was not performed. Data from numerous similar projects in California with much larger construction footprints and timeframes indicate that any construction impacts would occur at the site boundary line or well within several hundred meters of the site boundary. Impacts from construction of the proposed Project would not be expected to result in any short- or long-term effects on ambient air quality. The construction phase of the proposed Project would not cause any changes in local or regional climate or meteorology, e.g., changes in temperature, wind directions or wind speed, humidity, precipitation, fogging, misting, icing, visibility impairment, etc. Table 4.8-1 summarizes the potential estimated construction-related emissions.

Table 4.8-1:
Construction Emissions Summary

Tons Per Construction Period[1]							
Category	NO_x	CO	VOCs	SO_x	PM_{10}	$PM_{2.5}$	CO_2
Onsite							
Fugitive Dust	—	—	—	—	2.4	0.5	—
Construction Equipment Exhaust	11.4	5.8	1.8	0.012	0.72	0.71	2855
Portable Concrete Plant[2]	—	—	—	—	14.7	4.3	—
Onsite Totals	11.4	5.8	1.8	0.012	17.8	5.5	2,855
Offsite							
Worker Commute	1.0	8.9	1.0	0.0	0.1	0.1	1179
Materials Deliveries	49.8	18.1	4.2	0.054	2.34	2.32	5586
Paved Roads	—	—	—	—	2.56	0.43	—

Table 4.8-1:
Construction Emissions Summary

Tons Per Construction Period[1]							
Category	NO_x	CO	VOCs	SO_x	PM_{10}	$PM_{2.5}$	CO_2
Site Support Vehicles	0.024	0.218	0.024	0.0003	0.0023	0.0023	28.9
Track-out Dust	—	—	—	—	0.48	0.082	—
Offsite Totals	50.8	27.2	5.2	0.054	5.48	2.93	6,794

1 The construction period is approximately 12 months, so these values can also represent emissions in terms of tons per year.

2 These emissions would only occur if the batch plant is used. Per USEPA, AP-42, Section 11.12, June 2006, a moderate controlled emissions factor for a batch plant is 0.1587 pounds PM_{10}/cubic yard. Assuming 70 cubic yard/hour, 10 hours/day, 264 days = 185,000 cubic yards per construction period.

Construction emissions would not exceed State and/or Federal ambient air quality standards, cause sensitive receptors to be exposed to pollution concentrations exceeding State and/or Federal standards, conflict with any applicable air quality plan (general conformity), or impact any air quality related values associated with any State or Federal Class I areas.

4.8.3.2 Operations Impacts

Emissions during the operational phase of Project would consist primarily of (1) fugitive dust from the use of onsite paved and graveled roads, (2) exhaust emissions from site maintenance vehicles, and (3) emissions from any onsite permitted devices such as emergency generators, degreasers, etc.

Data provided by SWE indicate that the site would employ one, and possibly two, emergency electrical generators (diesel powered). These generator sets would be sized at approximately 1,000 horsepower (800 kilowatts). These systems would be used to provide emergency power for the necessary onsite activities during power outages on the local grid. These systems would be operated for readiness testing and during emergencies only, and would not be operated in a mode to supply power to the grid. In addition, a small degreaser may be used in the maintenance shop area for small parts washing and cleaning. Use of solvents would be in conformance with the CAA and the National Emission Standards for Hazardous Air Pollutants. Solvents would be disposed of in accordance with applicable regulations (see section 3.14.1). Other onsite operations emissions would be derived from the light duty vehicles (exhaust emissions) used by maintenance staff to access the wind turbine field and substations, as well as the infrequent use of large equipment, such as a crane, to perform large turbine repairs, rebuilds, and/or replacements. The movement of this equipment along the onsite graveled roadways would generate fugitive dust. Table 4.8-2 summarizes the potential estimated operations-related emissions.

Table 4.8-2:
Operations Emissions Summary

Tons Per Operation Year							
Category	NO_x	CO	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2
Onsite Emissions							
Emergency Generators (2)	0.54	0.01	0.001	0.001	0.002	0.002	67
Maintenance Shop Degreaser	—	—	0.033	—	—	—	—
Road Fugitive Dust	—	—	—	—	7.1	1.5	—
Mobile Equipment	0.17	0.12	0.023	0.001	0.012	0.012	137
Onsite Totals	0.71	0.13	0.06	0.002	7.1	1.5	204
Offsite Emissions (associated with operations)							
Employee Commute	0.20	1.81	0.20	0.0	0.02	0.02	240
Site Deliveries	0.28	0.09	0.02	0.0	0.01	0.01	30.3
Offsite Totals	0.48	1.9	0.22	0.0	0.03	0.03	270

Operations-related emissions would not exceed State and/or Federal ambient air quality standards, cause sensitive receptors to be exposed to pollution concentrations exceeding State and/or Federal standards, conflict with an applicable air quality plan (general conformity), or impact any air quality related values associated with any State or Federal Class I areas.

In addition, the operations phase of the proposed Project would not cause any changes in local or regional climate or meteorology, e.g., changes in temperature, wind directions or wind speed, humidity, precipitation, fogging, misting, icing, visibility impairment, etc. This conclusion is based in part on a study published in the Proceedings of the National Academy of Sciences of the United States of America (Roy and Traiteur 2010). This study indicated that the Great Plains is optimal for siting of wind farms because the region has high quality wind resources and characteristically turbulent air patterns that serve to mitigate the effects of localized air movement that may result from wind turbines sited in less favorable locales.

4.8.4 Impact Assessment of SWE's No Project Option

Under the no Project option, it is assumed the proposed Project would not be built and environmental impacts associated with construction and operation of it would not occur. The effect of the no Project option would, therefore, be maintenance of the existing baseline air quality conditions on the Project site.

4.8.5 Mitigation Measures

4.8.5.1 Construction

The following BMPs and mitigation measures have been identified and committed to by SWE to avoid resource impacts or reduce potential impact levels during construction. They are considered an integral part of the proposed Project and would be implemented by SWE as requirements in SWE's contract with their construction contractor. BMPs and mitigation measures applicable to operation and maintenance activities would be incorporated in SWE's

Operation and Maintenance Plan for the Hermosa facility, and those related to decommissioning would be incorporated in SWE's Decommissioning Plan. The mitigation measures would also be required by law, regulation, or permit conditions, and compliance would be overseen by the responsible regulatory authorities. While Western has no authority or jurisdiction over SWE's proposed Project, Western's decision to execute an interconnection agreement would consider SWE's commitments to implement these BMPs and mitigation measures, and the reduction in environmental impacts that would result.

Construction BMPs

- AQ-1: All unpaved roads and disturbed areas where construction activities are occurring, including laydown areas within the Project site, will be watered as frequently as necessary to control fugitive dust. Watering may be reduced or eliminated when the ground is moist.
- AQ-2: Onsite vehicle speeds will be limited to 15 mph or less on unpaved areas and unpaved roadways within the Project construction site. Onsite vehicle speeds will be limited to ≤15 mph on graveled and/or paved roadways within the Project construction site.
- AQ-3: The construction site entrance(s) will be posted with highly visible speed limit signs.
- AQ-4: All construction equipment vehicle tires will be cleaned via track pad entrances as necessary to limit tracking of dirt onto public roadways prior to leaving the construction site.
- AQ-5: Gravel ramps will be provided at the tire cleaning area.
- AQ-6: All unpaved exits from the construction site will be graveled track pads or treated to reduce track-out to public roadways.
- AQ-7: All construction vehicles will enter the construction site through the graveled track pad entrance roadways.
- AQ-8: All vehicles that are used to transport solid bulk material on public roadways and have the potential to cause visible emissions either will be covered or the materials sufficiently wetted and loaded onto the trucks in a manner to minimize fugitive dust emissions.
- AQ-9: Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) will be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition will remain in place until the soil is stabilized or permanently covered with vegetation.
- AQ-10: Disturbed areas will be revegetated as soon as practical.

To mitigate exhaust emissions from construction equipment, the following BMPs are proposed:

- AQ-11: SWE will work with construction contractors to use USEPA Tier 2/Tier 3 engine-compliant equipment where applicable, i.e., when equipment rated at more than 100 horsepower is required.
- AQ-12: SWE's construction contractors will perform periodic maintenance and inspections of construction equipment per the manufacturer's specifications.
- AQ-13: SWE's construction contractors will endeavor to reduce idling time through equipment and construction scheduling.

Construction Mitigation Measures

- AQ-14: Preparation of a Fugitive Dust Control Plan will be required for the Project pursuant to Wyoming Air Quality Standards and Regulations Chapter 3, Section 2(f).
- AQ-15: An onsite construction manager will be responsible for the implementation and compliance of the construction mitigation program, including the Fugitive Dust Plan. The documentation of the ongoing implementation and compliance with the proposed construction mitigation activities will be provided to WYDEQ-AQD on a periodic basis as required.

4.8.5.2 Operation

The following BMPs and mitigation measures will be implemented during the operation phase of the proposed Project:

Operation BMPs

- AQ-16: Onsite vehicle speeds will be limited to 15 mph or less on unpaved areas and unpaved roadways within the Project site. Onsite vehicle speeds will be limited to ≤15 mph on graveled and/or paved roadways within the Project site.

Operation Mitigation Measures

- AQ-17: Maintenance vehicles subject to the State's motor vehicle registration and emissions compliance programs will be properly registered and comply with any and all motor vehicle "tailpipe" emissions standards and testing requirements based on model year and vehicle type.
- AQ-18: SWE will work with operations and maintenance contractors to use USEPA Tier 2/Tier 3 engine-compliant equipment where applicable, i.e., when equipment rated at more than 100 horsepower is required, to ensure periodic maintenance and inspections per the manufacturer's specifications, and to reduce idling time through equipment and maintenance scheduling.
- AQ-19: Any small or minor stationary sources of air pollutants that are subject to the WYDEQ-AQD permitting regulations will be properly permitted prior to being brought onsite or utilized onsite. These sources would typically be emissions units including, but not limited to, emergency electrical generators, small maintenance shop degreaser units, etc.

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4.9 Transportation

This section describes potential transportation effects of the proposed Project and the no Project option. The components discussed include SWE's construction and operation of the proposed Project and Western's associated interconnection facilities (proposed Federal action). In considering potential environmental consequences to transportation in the proposed Project area, this EIS addresses several related issues that surfaced during public scoping, including impacts to local roads, increased access and traffic volumes and large trucks and heavy equipment, and potential upgrades on public highways, travel management, and enforcement. These issues provide a framework for the discussion presented below.

The mitigation strategies to address impacts are described in section 4.9.4. The Project layout is shown on figure 2.3-1.

4.9.1 Methods

Construction of the proposed Project is could commence as early as late 2013 with construction lasting approximately 26 months. The Project is expected to have a 20-year operational lifespan. Potential effects related to construction were evaluated based on projected conditions in 2014 (during the height of construction), while impacts from decommissioning are evaluated based on projected conditions in 2037. Impacts from operations are also evaluated based on projected conditions in 2037 (e.g., just before decommissioning starts). This is a conservative estimate for the operations phase of the proposed Project since this scenario captures the highest background traffic volumes.

As described below, several issues relating to transportation were identified during public scoping and were considered in this analysis. Public comments are summarized in table 1.10-1.

4.9.1.1 Significance Criteria

The potential impacts to transportation facilities from the construction, operation, and decommissioning phases of the proposed Project were analyzed through evaluation of the two sets of criteria listed below:

- Wyoming Industrial Siting Division, Section 109 Application Criteria, Rule I Section 7(i)(v) requires:
  - An analysis of transportation facilities containing discussion of roads (surface, type) and railroads (if applicable).
  - An analysis of effects on transportation facilities, including effects on service levels of roads, haul routes for materials and supplies, increased rail traffic at grade crossings, and intersection of new access roads with existing roads
- A significant impact on transportation may result if any of the following were to occur from construction or operation of the proposed Project:
  - Causes long-term major traffic delays for a substantial number of motorists
  - Causes increases in traffic that exceed a level of service established by the local or State transportation management agency

- o Creates road dust and/or unrepaired severe road damage at levels that create hazardous situations for motorists and pedestrians
- o Results in changes in traffic patterns that result in hazardous situations for motorists or pedestrians

The Wyoming Industrial Siting Division regulatory requirements are included because SWE must complete a Section 109 application to construct the Project.

During the public scoping meetings and the public comment period for the Project from January 14, 2010, to March 1, 2010, Western received seven comments expressing concern:

- Concern about effects of the proposed Project to local roads, including U.S. Highway 287, Cherokee Park Road, and Boulder Ridge Road
- Request for information in the EIS regarding effects to roads from new roads and road improvements, Project construction and operation, increased access and traffic volumes, and large trucks and heavy equipment
- Concern about the potential for car and truck collisions and collisions with wildlife
- Question about the requirements of the Albany County Road and Bridge Department, including potential upgrades on public highways, travel management, and enforcement
- Request that SWE mitigate surface disturbances by minimizing the construction of new roads and, if new road construction were necessary, to adequately plan road construction
- Request that a map of proposed access roads be included in the EIS
- Concern that wind farms present aviation hazards and expression of hope that bird diverters may serve a dual purpose by providing visual cues to pilots

These comments were taken into consideration during the analysis of impacts to transportation as presented below.

4.9.2 Impact Assessment of the Proposed Project

The following describes the potential impacts to transportation associated with the implementation of Western's proposed Federal action and SWE's proposed Project. The analysis is focused on impacts to transportation during the construction, operations, and decommissioning phases.

4.9.2.1 Construction

Construction of the proposed Project would take place over approximately a 26-month period, with approximately 6 months of pre-construction coordination (e.g., pre-construction management, coordination with Albany County to achieve any required pre-construction conditions of approval, etc.), and 3 months of onsite post-construction compliance (e.g., cleanup and site restoration). The typical sequence of construction activities is listed below:

- Met tower installation
- Mobilization
- Site preparation

- Access roads and material laydown areas
- Wind turbine foundations
- Substation and switchyard construction
- Electrical collection system installation
- Operation and maintenance building construction
- Overhead gen-tie line construction
- Wind turbine installations
- Acceptance testing
- Site reclamation

When the project is decommissioned, the goal of decommissioning would be to remove the power generation equipment and return the site to a condition as close to its pre-construction state as possible. Per WISC guidelines the underground collector lines would also be removed. Decommissioning would be expected to be of shorter duration than construction.

The substation access roads would require meeting the minimum standards of a Local Rural Road with an average daily traffic less than 50 and a design speed of 30 mph. Other Project access roads would be constructed in accordance with the Wyoming County Road Standards Committee County Road Fund Manual (Wyoming County Road Standards Committee 2008).

Construction would involve frequent trips by large trucks carrying construction equipment, building materials, turbine components, and components of other facilities (such as the operations and maintenance building). Normal heavy truck traffic includes concrete trucks, dump trucks, and water tankers. This peak vehicular activity would include normal heavy duty truck traffic and oversize load vehicle deliveries of turbine components. Table 4.9-1 summarizes the assumed number of daily round trips (to and from the Project Site) by vehicle type during peak construction activity in 2012.

Table 4.9-1:
Estimated Daily Vehicle Traffic—Construction

Vehicle Type	Origin/Destination	Average Daily Trips[1]
Construction Workers (268 workers @ 1.3 persons per vehicle)	Laramie	309
	Fort Collins	103
Turbine and Meterological Tower Components	Laramie (UPRR)	8
	Fort Collins	8
Normal Heavy Trucks (Concrete, Dump Trucks, Water Trucks)	Laramie	240

Source: ERM (2010b)
[1] Includes the average daily trips to and from the Project site (e.g., delivery of a turbine component on a single truck would count as two trips).

Concrete would likely be supplied via an onsite temporary batch plant or would be delivered from the Laramie area, and other trucks would deliver components, equipment, and materials to the site.

The number of truck deliveries per turbine would depend on the turbine technology selected for the proposed Project (maximum of up to 200 wind turbines). It is assumed that eight oversized, heavy truck deliveries would be required for each turbine, with eight return trips by empty turbine delivery vehicles. Furthermore, given the construction schedule, this analysis assumes that an average of one complete turbine “package” would be delivered to the Project site each day during months 4 through 12. Scheduling of Project deliveries is described below.

4.9.2.1.1 Anticipated Haul Routes

Figure 3.9-1 displays affected roads and key intersections for the proposed Project. It is anticipated that most normal heavy truck traffic would originate in Cheyenne, Laramie, or Fort Collins. The exact distribution of this traffic would depend on the preferred turbine technology, the construction schedule if rail transport was used, and for purposes of analysis, this document makes the following assumptions about the distribution of construction traffic:

- Normal heavy trucks could be dispatched from a variety of locations in and around Laramie and Cheyenne. For modeling, half of normal heavy truck traffic was assigned to portions of I-80 east of U.S. Highway 287, while the other half was assigned to I-80 west of U.S. Highway 287. All normal heavy truck traffic would drive directly from Laramie to the site via U.S. Highway 287.The exact origin points of such vehicles are unknown, but could stretch across a substantial portion of Wyoming and Colorado. While these trucks would add incremental traffic to major facilities such as I-80 and I-25, the most concentrated impact would be on portions of I-80 in Laramie. This assumes that aggregate source(s) would come from the Laramie area, not Fort Collins.
- Turbine components could be delivered from I-25, I-80, and U.S. Highway 287 to reach the Project site.
- The remaining half of turbine components could be shipped via rail to UPRR’s Laramie yard, transferred to trucks, and shipped to the site via Snowy Range Road (WY130/230), I-80, and U.S. Highway 287.
- U.S. Highway 287 between Fort Collins and the proposed Project site would only be used for turbine component deliveries if unusual traffic or travel circumstances were to arise on I-25 or I-80.

4.9.2.1.2 Alternative Scenario for Haul Routes

It is possible that rail would not be used at all for deliveries of turbine components. In such an alternative scenario, all deliveries of large turbine components (tower sections, nacelles, hubs and blades) would be via interstate highways from Colorado or other areas outside Wyoming. In such a scenario, the only traffic variable would be eight additional daily trips by oversize trucks carrying turbine components. Delivery of other materials would still be by tractor-trailer from either Fort Collins or Laramie. Other normal heavy truck and construction worker traffic would not change.

4.9.2.1.3 Anticipated Personnel Access Routes

An estimated maximum of 268 workers may access the site per day during peak construction and decommissioning activities (see figure 2.3-2). An average worker vehicle occupancy of 1.3 persons was assumed (ERM 2010g). Based on this assumption, the estimated 268 workers for the Hermosa Project would arrive in approximately 206 vehicles. This analysis assumes that 75 percent of those worker vehicles would be based in Laramie, while the remaining 25 percent would commute from Fort Collins (ERM 2010g).

4.9.2.1.4 Internal Road Network

Project construction activities would include upgrades to existing public unpaved roads (Albany County and non-State roads) and the creation of other new private Project roads to allow construction vehicle access to the turbine pads, laydown yards, operations and maintenance building, and other Project facilities. These roads would be developed to a standard sufficient to safely support the volume and type of construction vehicles anticipated for Project construction activities. Section 4.9.4 describes the road design/development standards and the required mitigation measures that would be used by SWE.

4.9.2.1.5 Future Year Traffic Volumes

Traffic data from WYDOT indicate that, since 1970, AADT along U.S. Highway 287 south of Laramie has grown by approximately 1.5 percent per year. (This is the compounded growth rate between 1970 and 2005. After 2005, there was a noticeable drop-off in traffic along U.S. Highway 287, possibly due to construction of the four-lane segment near Tie Siding [ERM 2010g].) AADT on interstates in the vicinity of the proposed Project, however, grew by approximately 4 percent per year. Overall, traffic has leveled off in recent years, and actually decreased between 2000 and 2008 along U.S. Highway 287. However, to account for factors that might lead to increased future traffic volumes, this analysis assumes AADT growth of 2 percent per year on all affected roads in the study area, except for Snowy Range Road. For Snowy Range Road, traffic growth was tied to population growth as projected by the 2007 Laramie Comprehensive Plan (City of Laramie 2007), or approximately 1 percent annual growth (ERM 2010g).

Table 4.9-2 shows projected future AADT on affected roads in the study area. The future AADT includes “natural” traffic increases based on the growth rates described above, as well as Project-related trips from the construction, operations, and decommissioning phases. Truck volumes were calculated by applying the current percentage of trucks in the current traffic stream to future “base” traffic volumes (projections without added Project-related traffic), and then adding Project-related trucks from table 4.9-1.

Table 4.9-2:
Projected Future Traffic Volumes

Road	Location	2012 AADT		2037 AADT (Operations)		2037 AADT (Decommissioning)	
		Total	Trucks	Total	Trucks	Total	Trucks
I-80 Eastbound	Curtis Street	3,724	2,208	6,109	3,623	6,109	3,623
	Snowy Range Rd	9,549	3,726	15,219	5,665	15,492	5,938
	Third Street/U.S. Highway 287	7,766	3,598	11,845	5,008	12,391	5,554
	Grand Avenue/I-80 Business	7,644	3,434	12,094	5,185	12,367	5,458
	Albany/Laramie County Line	7,081	3,560	11,170	5,185	11,443	5,585
	Cheyenne West Urban Limits	6,768	3,476	10,655	5,043	10,928	5,446
I-80 Westbound	Curtis Street	4,016	3,042	6,588	4,990	6,588	4,990
	Snowy Range Rd	9,506	3,813	15,148	5,807	15,421	6,080
	Third Street/U.S. Highway 287	7,907	3,653	12,076	5,097	12,622	5,643
	Grand Avenue/I-80 Business	7,720	3,477	12,218	5,257	12,491	5,530
	Albany/Laramie County Line	7,103	3,594	11,206	5,239	11,479	5,639
	Cheyenne West Urban Limits	7,006	3,596	11,046	5,239	11,319	5,641
I-25 Northbound	Colorado State Line	9,571	2,267	15,255	3,179	15,528	3,509
	Cheyenne South Urban Limits	10,470	2,474	16,728	3,516	17,001	3,847
I-25 Southbound	Colorado State Line	9,582	2,279	15,272	3,197	15,545	3,527
	Cheyenne South Urban Limits	9,506	2,290	15,148	3,214	15,421	3,545
U.S. Highway 287	I-80	8,881	1,501	13,704	2,047	14,220	2,298
	Blackfoot Street	7,235	1,338	11,005	1,781	11,521	2,032
	Laramie South Urban Limits	4,464	1,035	6,459	1,285	6,986	1,535
	Red Buttes	4,421	1,025	6,388	1,267	6,904	1,517
	UPRR Bridge	4,421	1,025	6,388	1,267	6,904	1,517
	Tie Siding	4,322	1,025	6,068	1,267	6,680	1,517
	6 Miles South of Tie Siding	3,776	769	6,038	1,261	6,134	1,261
Snowy Range Road (SR 130/230)	Junction I-80	17,872	714	22,146	577	22,154	833

Source: ERM (2010g)

4.9.2.1.6 Impacts on Roads

This section discusses the potential impacts that the proposed Project would have on roadway safety and LOS.

4.9.2.1.6.1 Future Roadway Levels of Service

Table 4.9-3 shows the projected future LOS for affected roadways in the Project area. LOS was calculated during Project construction (2012), operations (2037), and decommissioning (2037). The LOS analysis assumes that U.S. Highway 287 would be essentially in its current state in 2012, but would have been upgraded to a four-lane divided highway for its entire length by 2037.

Table 4.9-3:
Projected Future LOS

Road	Location	LOS[1]		
		2012 (Construction)	2037 (Operations)	2037 (Decommissioning)
I-80 Eastbound	Curtis Street	A	A	A
	Snowy Range Rd	A	A	A
	Third Street/U.S. Highway 287	A	A	A
	Grand Avenue/I-80 Business	A	A	A
	Albany/Laramie County Line	A	A	A
	Cheyenne West Urban Limits	A	A	A
I-80 Westbound	Curtis Street	A	A	A
	Snowy Range Rd	A	A	A
	Third Street/U.S. Highway 287	A	A	A
	Grand Avenue/I-80 Business	A	A	A
	Albany/Laramie County Line	A	A	A
	Cheyenne West Urban Limits	A	A	A
I-25 Northbound	Colorado State Line	A	A	A
	Cheyenne South Urban Limits	A	A	A
I-25 Southbound	Colorado State Line	A	A	A
	Cheyenne South Urban Limits	A	A	A
U.S. Highway 287	I-80	A	B	B
	Blackfoot Street	A	A	A
	Laramie South Urban Limits	B	A	A
	Red Buttes	B	A	A
	UPRR Bridge	B	A	A
	Tie Siding	A	A	A
	6 Miles South of Tie Siding	B	A	A
Snowy Range Road (SR 230/130)	Junction I-80	B	C	C

Source: ERM (2010g)

[1] LOS ratings range from LOS-A (ideal conditions, with free-flowing traffic) to LOS-F (complete failure or gridlock).

Background traffic increases and Project-related activity is not anticipated to cause any road segments to exceed the LOS thresholds established by WYDOT as shown in table 3.9-3. Most affected roadways would be expected to operate at LOS-A or LOS-B during all Project phases. Snowy Range Road is projected to operate at LOS-C in 2037, a reduced but acceptable LOS for an urban arterial; this projection is due to population growth and is unrelated to the proposed Project.

Based on these analyses, traffic associated with the proposed Project would not degrade LOS below State thresholds, and would not cause long-term major traffic delays for a substantial number of motorists (ERM 2010g). Therefore, although the proposed Project would result in increased traffic, the impact would not be significant.

4.9.2.1.6.2 Intersections

Level of Service Considerations. The straight-line LOS calculation results shown in section 3.9.4 do not necessarily reflect the LOS of key intersections and interchanges. LOS analyses intersections require site-specific traffic turning-movement data that were not available for this study. Instead, this section presents a qualitative analysis of the potential impacts of the proposed Project on LOS at key intersections in the study area.

Of particular interest are the I-80 interchanges at Snowy Range Road and U.S. Highway 287 and the Tie Siding intersection on U.S. Highway 287. These intersections would host most of the heavy truck traffic and commuter traffic associated with the proposed Project, and would be the location of large numbers of turning movements (including those not related to the Project), which have more of an impact on intersection LOS than straight-line volumes.

Based on the available data, there is no indication that traffic associated with the proposed Project would cause these intersections to operate at LOS-C (U.S. Highway 287) or LOS-D (I-80) or worse. However, it is possible Project-related truck traffic—specifically oversized trucks carrying turbine components—could temporarily degrade LOS below these thresholds during peak hours, such as during the morning and evening commute. The normal heavy and oversize load truck traffic would be limited to the construction and decommissioning phases only, and would not be a factor during the planned 20-year operational phase.

General Considerations. Geometric design of key intersections and interchanges should also be carefully considered. The I-80 interchanges already carry normal large truck traffic, and the newly constructed U.S. Highway 287 intersection at Tie Siding is designed to accommodate “natural traffic levels” as described in table 4.9-3. Potential upgrades are described in section 4.9.4.1.

4.9.2.1.7 Road Safety

WYDOT’s Safety Index lists U.S. Highway 287 and I-80 as being “below average” for safety (WYDOT 2010), indicating the potential for implementation of improvements to reduce crash potential. Planned upgrades to U.S. Highway 287 (to extend the four-lane divided highway section recently implemented near Tie Siding) are WYDOT’s planned response to this safety Index rating.

Until such upgrades are complete, however, the presence of Project-related trucks, especially oversized vehicles, on affected roads could potentially reduce safety for other drivers. This potential impact is highest for the two-lane segments of U.S. Highway 287 and for peak travel hours. No improvements to I-80 are known at this time. By implementing TRANS-15 as described below, impacts would be reduced to the extent practicable.

4.9.2.1.8 Internal Road Network

Project-specific internal roads and newly installed Project access roads, would be constructed to standards necessary to safely and efficiently move construction vehicles to and from turbine pad sites and other areas of the Project. Accordingly, impacts of these roads on the regional transportation system would be minimal. The very small number of private vehicles that use these roads would potentially experience temporary delays during construction. Except for the businesses at the Tie Siding, no significant nearby residential or commercial development (intersection) exists, so these impacts would be minimal. Section 4.9.4 describes the internal Project roads, design criteria, and the anticipated mitigation measures in detail.

4.9.2.1.9 Other Road Impacts

4.9.2.1.9.1 Increased Traffic for At-Grade Rail Crossings

As described in section 3.8.6, haul routes for trucks associated with the proposed Project and commuter routes for employees would not cross railroad tracks at-grade. This finding assumes that rail-transported turbine components would be offloaded in UPRR's Laramie yard.

Such volumes would likely cause temporary delays for the travelers along Hermosa Road, and so would need to be carefully coordinated with the UPRR to avoid delays to or conflicts with freight rail traffic.

4.9.2.1.10 Impacts on Railroads

As described above, the number of turbine components delivered by rail would depend on the specific turbine model selected for the proposed Project. This analysis assumes that half of all turbines would be delivered via UPRR deliveries, equating to one or two full trains per week, or less than 1 percent of existing UPRR rail traffic through Laramie (approximately 60 trains per day). While any rail delivery of Project components would need to be coordinated with the UPRR, Project-related rail deliveries to Laramie would not adversely impact railroad operations.

4.9.2.1.10.1 Road Dust and Road Damage

Since a majority of the affected public roads in the study area are paved, the potential for Project-related impacts from road dust or road damage would be limited. However, along unpaved roads including Cherokee Park Road, Hermosa Road (both roads form the Tie Siding intersection on U.S. Highway 287), and Boulder Ridge Road the potential for road dust or road damage is higher.

Most road maintenance would be performed on an as-needed basis in accordance with Albany County requirements. Regular snow removal is likely during the winter months to maintain access to the turbines and substation when drifting occurs. It is expected that minor amounts of surface dragging, blading, or grading would be required after the spring thaw to remove vehicle ruts. Other similar surface work may be needed after periods of heavy rainfall. Any identified needs for repairs would be promptly addressed in accordance with the road use agreement SWE would make with Albany County. Any culverts, drains, or other water management structures would need to be kept clear to allow effective drainage. To the extent that this happens on public roads, the proposed Project would have a beneficial impact on road maintenance compared with the existing situation.

To manage dust on unpaved roads, SWE would develop a SWPPP, which would include erosion control measures. The SWPPP would be based on USEPA regulations as well as State permit requirements. Examples of BMPs that will be included in the SWPPP are:

- Using water or other dust control agents on unpaved roads or near heavily used public roads
- Reducing traffic speeds to appropriate levels to minimize dust generation
- Using stabilized aggregate to cover disturbed soil and/or roads
- Revegetating or otherwise covering soils as soon as possible following soil disturbance
- Once construction activities have been completed, dust treatment would be implemented in accordance with Albany County requirements.

Given these procedures, SWE's commitment to avoiding damage to public roads to maintain access to the turbines in accordance with Albany County requirements and the road maintenance agreement with Albany County, and the low volume of existing background traffic on County roads in and around the Project site, the proposed Project would not create hazardous situations related to dust or road damage.

Trucks carrying construction materials offloaded at the UPRR Laramie Yard would follow designated haul routes to reach I-80, avoiding damage to roads not intended for heavy cargo. This use would fall under State and Federal DOT regulations and requirements.

4.9.2.2 Alternative Scenario for Haul Routes

Under the alternative delivery scenario presented above (rail would not be used for deliveries of turbine components) (section 4.9.2.1.2), the added traffic volume on U.S. Highway 287 would be minimal. I-25 and I-80, however, would host a total of 32 oversized vehicle trips per day rather than the 16 trips assumed in the LOS modeling as described in sections 3.9.4. This change in volume would not, in and of itself, affect the LOS on road segments, and would not likely affect peak-hour LOS at key intersections. Safety considerations and procedures (see section 4.9.4) would not change.

4.9.2.3 Operations

Once all construction activities have been completed, the Project would begin the operational phase and is expected to have a lifespan of approximately 20 years. During this period, employee trips to the site would consist of commuting by a limited number of permanent employees and occasional visits by inspection or maintenance personnel. It is estimated that during the operations period, approximately 20 to 40 employees would work on the site during an average day, generating approximately 60 vehicle trips per day.

Public access to the land within the proposed Project site would not be altered with the exception of extremely infrequent major maintenance activities such as the replacement of an entire nacelle and blades. In these rare cases, internal road closures would be partial and of short duration. It is estimated that if partial internal road closures are required, these closures would last from one-half day to 2 to 3 days.

4.9.2.3.1 Impacts on Air Traffic Patterns

The FAA has reviewed the Project description as it relates to air travel, and has found no objection to the Project (ERM 2010g).

As part of the FAA review, the U.S. Department of Commerce, National Telecommunications and Information Administration (NTIA), also reviewed the Project description for impacts related to weather radar signals, which is an important tool for maintaining safe air travel. NTIA has expressed concern over the potential for the proposed Project to interfere with weather radar (ERM 2010g).

In follow-up to the NTIA concerns, representatives from the National Weather Service (NWS) Radar Operations Center in Cheyenne held a conference call with representatives from SWE and its contractors on June 25, 2009. The purpose of the conference call was to discuss the contents of the January 12, 2009, NTIA letter regarding potential radar interference from the proposed Project. During the conference call, representatives from NWS indicated that Albany County averages 3 hours per year of severe weather events (e.g., tornado warnings) with a maximum of approximately 9 hours per year of severe weather events. During severe weather events, NWS could experience radar interference from the proposed Project, which would be located approximately 30 nautical miles away from the Cheyenne NWS radar (ERM 2010g).

Following the 2009 consultation with NTIA, SWE consulted with representatives from National Oceanic and Atmospheric Administration (NOAA)/NWS and in May 2012 regarding potential impacts to weather tracking radar (NEXRAD). NOAA/NWS indicated in May 2012 that they would not object to the construction and operation of the proposed Project and although the proposed Project would be visible in the lowest scan angle of the Cheyenne radar, the impacts would be low and not significant enough to require mitigation.

4.9.2.4 Decommissioning

This analysis assumes that the peak amount of traffic generated by decommissioning activities, including the dismantling of the turbines and other Project facilities and the restoration of the natural landscape, would require fewer truck trips over a shorter period of time than construction. These activities could occur as early as 2037. The impacts of decommissioning would be similar to construction, and would not be significant.

4.9.3 Impact Assessment of the No Project Option

Under the no Project option, it is assumed the proposed Project would not be built and the environmental impacts associated with construction and operation of it would not occur. The effect of the no Project option would, therefore, include levels of service representing baseline conditions, but steadily increasing over time in pace with anticipated population growth. Possible development of the Project site as residential properties in the absence of the proposed Project would result in additional increased traffic in the area.

4.9.4 Mitigation Measures

The following BMPs and mitigation measures have been identified and committed to by SWE to avoid resource impacts or reduce potential impact levels. These strategies fall into two general categories: physical improvements and operational procedures. They are considered an integral part of the proposed Project and would be implemented by SWE as requirements in SWE's contract with their construction contractor. BMPs and mitigation measures applicable to operation and maintenance activities would be incorporated in SWE's Operation and Maintenance Plan for the Hermosa facility, and those related to decommissioning would be incorporated in SWE's Decommissioning Plan. The mitigation measures would also be required by law, regulation, or permit conditions, and compliance would be overseen by the responsible regulatory authorities. If required by Albany County, SWE would enter into a long-term road maintenance agreement with Albany County for the proposed Project. While Western has no authority or jurisdiction over SWE's proposed Project, Western's decision to execute an interconnection agreement would consider SWE's commitments to implement these BMPs and mitigation measures, and the reduction in environmental impacts that would result.

4.9.4.1 Physical Improvements

SWE may need to improve certain public and private roads to accommodate oversized truck deliveries. This includes, but is not limited to, U.S. Highway 287 (specifically at the Tie Siding intersection), Cherokee Park Road/CR 31 (expected at four intersections), Boulder Ridge Road/CR 319 (expected at two intersections), and roadway improvements to several two-track (or unimproved) roads within the proposed Project site.

As previously discussed throughout this section, potential upgrades to existing County and other local roads and intersections may be required for oversized truck deliveries of turbine components and construction materials. It is expected that a majority of these upgrades/improvements would be required on U.S. Highway 287 (specifically at the Tie Siding intersection), Cherokee Park Road/CR 31 (expected at four intersections), Boulder Ridge Road/CR 319 (expected at two intersections), and roadway improvements to two-track (or dirt) roads within the Project area. The construction of new access roads within the proposed Project site would not have an impact on the existing road service until such roads intersect with the existing Albany County roads as described below.

Typically, the required improvements (e.g., addition of gravel layer, widening of road, grading of roads to required slopes, increasing turning radius of intersections, potential extension of culverts and cattle guards, etc.) can be performed with no complete shutdowns (or clearances) of the roads and usually only require shutdown of one-lane sections of roads for significant re-grading and resurfacing of roads. As previously discussed, the current traffic loads on these county and other local roads, which provide access to privately owned rangeland, a limited number of homes, and some State-owned land within the proposed Project, site are minor. These roads are unpaved and carry extremely low traffic volumes. It is expected that the impacts from these road improvements would be minimal. However, the land access and safety of the local landowners and travelers in the proposed Project site and vicinity is critical to the success of the Project, and SWE would implement all necessary safety precautions, mitigation measures, and professional standards of practice for roadway construction to minimize the impacts to the area.

Depending on the type of road improvements being performed, the road improvements would be conducted in either the shoulder(s) and/or adjacent drainage channels of the existing roads (e.g., for widening of shoulders, intersections, drainage culverts, etc.) or within one lane (one-way) sections of the road (e.g., for re-grading of road slopes, adding gravel surface, etc.). This partial shutdown of lanes would allow local traffic to safely pass by the construction. Once the road construction has been completed in the one lane, then the contractor would open the completed side to road traffic and shut down the other side (or lane) for completion of the road improvements. The Project would improve the public roads in the Project area, and the local residents would benefit from improved roads, improved maintenance, and improved road clearing (snow plowing).

SWE would post signage, delineate construction areas with cones, and staff the areas with traffic-control flaggers as appropriate to provide the required safety measures. All road improvement work and potential road clearances/shutdowns would be coordinated with the proper Albany County departments and local law enforcement (if required) as stated in section 4.9.4.4. It is estimated that if partial road closures are required, these closures would not last no longer than 2 to 3 days.

The procedure for maintenance and repair of road damage will be agreed to between SWE and Albany County as part of the road maintenance agreement that will be established prior to construction.

To maintain safety during construction and maintenance activities, the following design criteria and methodologies would be utilized for the upgrades to the existing roads and construction of the new internal roads for the proposed Project.

BMPs

- TRANS-1: Maximum access road slope of 5 to 10 percent; depending on turbine requirements. To achieve this grade, potential upgrades to the slopes of existing Albany County roads may be required.
- TRANS-2: Maximum road slope between turbines (turbine string road) between 5 and 10 percent.
- TRANS-3: Maximum road width of 25 feet for access roads and 50 feet for turbine string roads (required for movement of the assembled crane from turbine to turbine onsite). Road width reduction to 16 feet after construction, with reclamation of shoulders with native vegetation.
- TRANS-4: Minimum turn radius (inside radius of roadway) of 135 feet (based on transporting three turbine blades at a time) wherever possible (varies by turbine type). To achieve this

minimum turning radius, potential upgrades to the existing Albany County roads may be required per SWE's road maintenance agreement with Albany County.

- TRANS-5: SWE-developed specific design criteria related to maximum crest vertical curves (or humps), maximum sag vertical curves (or dips), road crown or cross-sloping of the road section (maximum of 2 percent), and cut-and-fill side slopes (dependent on existing soil types). These criteria would be established for the proposed Project site roads during the detailed design stage. The majority of these criteria are dependent on the turbine type selected and manufacturer requirements.
- TRANS-6: All-weather gravel road surface for internal Project roads and upgraded existing Albany County and local roads. The thickness of the required gravel layer would be dependent on subgrade soil characteristics to be determined during the detailed design phase of the Project.
- TRANS-7: Design speed limit of 15 mph maximum in the Project construction site for all construction and operations equipment and personnel.
- TRANS-8: Road dust and maintenance procedures and BMPs as described in chapter 2 and section 4.9 will be implemented.
- TRANS-9: Any existing culvert extensions or improvements would be constructed in a manner that prevents sediment erosion and deposition of sediment and minimizes impacts to any wetlands, waterbodies, and other environmentally sensitive areas.
- TRANS-10: Existing utilities would be avoided whenever possible; however, any required modifications to existing utilities and structures (either temporary or permanent) would be evaluated during the design phase of the Project. Section 4.9.4.6 details the required utility modifications.
- TRANS-11: Onsite Project traffic would use laydown yards as turnarounds where possible. SWE would construct additional turnouts and other turn-around areas as necessary.

Mitigation Measures

- TRANS-12: No improvements are expected to be required for either the Federal highways (I-80, U.S. Highway 287) or State highways (WY 130/230) since the expected future traffic volumes and LOS during construction and decommissioning phases of the Project are acceptable. In addition, since these roads met WYDOT and Federal standards for highway design, the existing slopes, load capacities, vertical curves, and turning radii for these roads are assumed to be within the safety criteria for transport of the Project turbine components. Nonetheless, the I-80/WY 130/230 interchange and U.S. Highway 287/CR 31 intersection would be evaluated in greater detail during the detailed design phase of the Project. If deemed necessary, upgrades to these intersections would be addressed at that time.
- TRANS-13: Culvert and waterbody crossings would be designed in consultation with the WGFD and applicable professional engineering standards. In addition, such waterbody crossings and culverts would be constructed in a manner that prevents sediment erosion, deposition of sediment, and minimizes impacts to any wetlands, waterbodies, and other environmentally sensitive areas.

4.9.4.2 Operational Procedures for Construction and Decommissioning Phases

Safe operation of Project-related traffic depends not only on the condition and characteristics of affected roads, but also on procedures governing the time and frequency of deliveries of Project components and materials and the scheduling/phasing of required road improvements to minimize impacts to local residents. To maximize safety and compatibility with background traffic flows, the following BMPs are recommended for the construction and decommissioning phases of the proposed Project.

4.9.4.3 Scheduling of Truck Movements

BMPs

- TRANS-14: To minimize conflicts between Project traffic and background traffic, SWE will consider and attempt to work around the local traffic volume peaks when scheduling deliveries to the extent feasible.
- TRANS-15: Movements of oversized trucks (deliveries of turbine components) would be minimized during the afternoon peak and minimized in the morning peak, to the extent practicable. If possible and considering worker safety, such oversized deliveries would occur during other times of the day, when background traffic volume tends to be lower, such as early morning and late afternoon. If necessary, road clearances may also be implemented during component deliveries if they are to occur during peak traffic hours.
- TRANS-16: Road clearances may include blocking road intersections via construction cones and manning blocked intersections with a traffic-control flagger to allow haul trucks sole access to the road while delivering Project components. Once a haul truck has reached its destination, the cones would be removed and public vehicles would be permitted to use the roads. It is estimated that the roads would typically be closed for no longer than 15 minutes during each/any road clearance.
- TRANS-17: To the degree practicable, Project-related activities would be coordinated to avoid major traffic-generating events on the University of Wyoming campus. SWE could contract with local law enforcement, to manage traffic flows and monitor traffic speed to assist with safety during deliveries.
- TRANS-18: Whenever possible, Project turbine components and materials would be delivered directly to the construction/erection pad area for each turbine or other facility, and assembly of the turbine would commence shortly after delivery. If components arrive before the site is prepared for wind turbine erection, they will be stored in the construction laydown areas (figure 2.2-2).
- TRANS-19: All staging activities and parking of equipment and vehicles would occur onsite and on private rights-of-way, and would not occur on maintained Albany County roads.

4.9.4.4 Other Safety

BMPs

- TRANS-20: Construction-related vehicles would only utilize roads identified in this section (to be approved by Albany County) and travel at a maximum of 15 mph within the Project construction site for safety purposes and to reduce dust generation.

Mitigation Measures

- TRANS-21: Transport of Project equipment and materials to the site would be performed by professional transportation companies familiar with the type of equipment, loads involved, and DOT, WYDOT, and Albany County regulations.
- TRANS-22: Road signs would be erected to notify travelers and local residents that construction is occurring in the area and provide information regarding the timing and route for oversized vehicle movements and deliveries. The erection/placement of road signs and the Project construction activities would be performed in accordance with the Albany County Zoning Resolution (Albany County 2011) and coordinated with the Albany County Road and Bridge Department.
- TRANS-23: The Project construction activities would not begin until SWE has received authorization and approval by the County Planning and Zoning Commission and County Board of Commissioners.
- TRANS-24: As required by applicable permits, SWE's transportation contractor(s) would utilize escort vehicles (or police vehicles if required by WYDOT) to escort large oversized loads and convoys of large vehicles and to give drivers additional warning.
- TRANS-25: The transportation contractor for the Project would obtain oversized vehicle permits in conjunction with the use of escort vehicles as required by Federal, State, and Albany County regulations.
- TRANS-26: On turbine access roads where cranes may be traveling fully rigged, overhead obstructions must be temporarily removed for the full width of the road to secure free passage of the cranes and possibly other transportation vehicles. The Project would invoke OSHA minimal interference from overhead power lines rules and necessary safety precautions would be applied in situations, if any, requiring temporary removal of overhead power lines.

4.10 Recreational Resources

This section describes potential impacts to recreational resources that could result from implementation of the proposed Project and the no Project option. The components discussed include SWE's construction and operation of the proposed Project. In considering potential environmental consequences to recreation in the proposed study area, this EIS addresses several related issues that surfaced during public scoping, including a concern that hunting in the area would be negatively affected by the proposed Project.

For the purposes of this analysis, the study area used to describe recreational resources surrounding the Project site includes an area extending 50 miles from the Project site in Albany County, Wyoming, and Larimer County, Colorado, and recreational resources in Carbon County and Laramie County, Wyoming. The study area encompasses recreational resources that have the potential to be used by construction workers and permanent employees of the proposed Project who would be expected to live in Albany County near Laramie, and in northeastern Larimer County near Fort Collins. The discussion below is focused on recreational resources available in the Project site first, and then on those within the larger study area.

4.10.1 Methods

The evaluation of potential impacts to recreational resources considered potential changes to Federal and State recreational areas, such as national forests, NWRs, and PAAs, and recreational activities such as hunting, fishing, and camping. Analyses completed for this section evaluated environmental impacts from the proposed Project, including the proposed Federal action and SWE's no Project option. In considering potential environmental consequences to these resources, this analysis considered issues raised about recreation during public scoping, which are summarized in table 1.10-1 of this EIS.

Information sources included the recreation and land use assessment prepared for the proposed Project by ERM (2010d), recreational atlases, local tourism websites, land management agency websites, and Project participants. County, forest, and municipal planning documents were also reviewed to identify any planned recreational facilities that could be impacted by the proposed Project.

4.10.2 Significance Criteria

A significant impact to recreational resources would result if any of the following were to occur from construction or operations and maintenance of the proposed Project:

- Long-term substantial conflicts with established recreational areas
- Long-term substantial increased demand for recreational activities related to the influx of people during construction and operation and maintenance of the proposed Project that would exceed capacity for that activity in a given area
- Long-term denial of hunting access on the proposed Project area on both State lands and private lands where hunting is currently allowed

During the public scoping meetings and public comment period for the Project from January 14, 2010, to March 1, 2010, Western received several comments specifically expressing concerns about the following:

- Statement that hunting in the area would be negatively affected by the Project given the direct loss of state property to the development
- Statement that state land in the Project area is intended for recreation for the public, specifically hunting

4.10.3 Impact Assessment of the Proposed Project

The following describes the potential impacts to recreational resources associated with the implementation of the proposed Project. The analysis is focused on impacts to recreational resources available within the Project site first, and then on those in the larger study area.

During the public scoping meetings and public comment period for the proposed Project from January 14, 2010, to March 1, 2010, Western received two comments expressing concern that hunting in the area would be negatively affected by the proposed Project given the direct loss of State property to the development, and that State land in the proposed Project site is intended for recreation for the public, specifically for hunting. These comments were taken into consideration during the analysis of impacts to recreational resources as presented below.

4.10.3.1 Proposed Project Site

The following describes potential impacts to recreational resources located within the Project site. Recreational uses of the Project site are described in section 3.10.

4.10.3.1.1 Hunting

The proposed Project would not preclude hunting within the Project site. Public access for hunting would continue on the 3,070 acres of State land located along Cherokee Park Road once the proposed Project has been constructed. Similarly, proposed Project activities would not prohibit hunting on private lands within the Project site; each landowner would determine access to their property for hunting just as they currently do. It is possible that temporary closure of some hunting areas on the State land parcel along Cherokee Park Road or on private lands in the Project site would be required during the construction phase and for brief periods during the operations and maintenance phase to protect public safety.

Temporary disturbances during construction would impact approximately 367 acres of land, or 3 percent of the total acreage. Permanent facilities supporting the proposed Project would impact approximately 128 acres of land, or 1 percent of the total 11,125 acres. Together, the permanent and temporary disturbances would total approximately 4.5 percent of the total site acreage. The proposed Project would not impede the use of the land for hunting because only a few Project components on less than 20 acres of private land, as described in chapter 2, would be fenced.

The quality of hunting opportunities currently on the Project site is low because sparse vegetation (ERM 2010d) has reduced the quality of big game habitat. It is also likely that both big game and small game would avoid some areas within the site during construction, but game populations would be expected to return during the operations and maintenance period.

Because closures on State land during construction would be temporary and would not create long-term conflicts with existing recreational uses within the Project site, impacts to the quantity of hunting acreage available in the Project site are less than significant.

Impacts to the quality of hunting in the Project site are also expected to be less than significant given the short-term and temporary nature of the impacts during construction. No long-term adverse impacts on game populations within the proposed Project site are expected. Elk usage of the valley for winter range is addressed in section 4.3.3.

4.10.3.1.2 Fishing

Fishing within the Project site is limited to Willow Creek or Fish Creek, the only streams within the site that support game fisheries. The fishing quality of these streams is low; see section 3.3.3.2 for additional information regarding WGFD pounds of sport fish per mile stream classifications. The installation of culverts or crossings on these two creeks could result in short-term temporary impacts because specific crossings would be closed during construction. The installation of these Project elements will conform to stormwater BMPs to protect water quality and aquatic life. Additionally, these facilities will be designed so that they do not impede the passage of fish along the affected reaches. Design and construction of these crossings would also conform to 404 permit conditions, and would be coordinated with the USFWS and/or WDFG. Therefore, no long-term significant impacts to fisheries resources within the Project site are expected.

4.10.3.1.3 Use by Residents with Adjacent Property

Public access to the State land within the proposed Project site would not be altered with the exception of extremely infrequent major maintenance activities such as the replacement of an entire nacelle and blades. In these rare cases, temporary road closures would be partial and of short duration. It is estimated that if partial road closures are required, these closures would last from one-half day to 2 to 3 days. The Project components that would be fenced would not be located on the State land parcel. Recreational use of the entire proposed Project site could continue as it did prior to Project implementation, with the exception of the less than 20 acres of private land that would be fenced. Long-term substantial conflicts with established recreational areas would not occur and impacts to recreational resources use by nearby residents would be negligible.

4.10.3.2 Study Area

4.10.3.2.1 Albany and Larimer Counties

The potential effects on recreational resources located in Albany and Larimer Counties outside the Project site are described below. Recreation areas and resources located in Albany and Larimer Counties are described in section 3.10.

4.10.3.2.2 Federal, State, and Local Recreation Areas

Substantial long-term conflicts would occur if the quality or quantity of recreational areas were reduced, or if increased demand for recreational activities resulting from the influx of people during construction and operation of the proposed Project exceeded capacity for an activity in a given area. During the peak construction period, it is estimated that 212 construction workers from outside the local area would seek temporary housing in either Laramie or Fort Collins. It is generally assumed that these construction workers would not relocate their families. The wind farm would be permanently staffed during normal business hours with a combination of approximately 20 to 40 workers from SWE and contractors from the wind turbine manufacturer. Not all temporary or permanent workers would choose to participate in recreational activities in Albany County.

There are many different types of recreation areas and activities available in Albany County, including the Medicine Bow National Forest, Hutton Lake NWR, WHMAs, PAAs, Wyoming State Trust Land, Wyoming State Parks, and private hunting and fishing grounds. In Larimer County, recreation areas include Roosevelt National Forest, Rocky Mountain National Park, SWAs, Colorado State Parks, and Larimer County Parks. These areas afford opportunities for activities such as hiking, biking, birding, rock climbing, fishing, and hunting to name a few.

Given the diversity of recreation opportunities currently available in both counties, substantial long-term impacts to them related to increased attendance and crowding during the peak construction period would be less than significant. Furthermore, the low number of permanent workers at the wind farm would have no significant long-term impact on recreation resources.

Short-term temporary impacts would be more likely to occur at smaller recreational areas near the Project site or along driving routes between the site and Laramie or Fort Collins, where construction workers might be likely to stay. Because there are so very few such facilities between Laramie and Fort Collins, no permanent impacts are expected to aforementioned resources. No impacts to Laramie municipal facilities would occur because of the small size of the permanent workforce.

Although some construction workers are expected to stay in RVs, it is assumed they would want amenities such as full electric and water hookups where a long-term stay is allowed. Because the campgrounds that offer full hook-up sites on the Medicine Bow and Roosevelt National Forests and Horsetooth Reservoir impose a 14-day stay restriction, no measurable effects on campsite availability in the National Forest campsites would be anticipated.

4.10.3.2.3 Camping Facilities—Private

BSR (2010) estimated that during the peak construction period, 7 percent of non-local workers would choose to camp in an RV. Construction workers who choose to camp in an RV for the duration of their work assignments would likely choose to stay in private campgrounds with full amenities. It is assumed that the majority would camp closer to the Project site in Albany County, with a minority camping in Larimer County. It is assumed that workers would prefer to camp near a population center—Laramie in Albany County or Fort Collins in Larimer County. There is also the possibility that some workers could make arrangements with private landowners to stay near or on the Project site.

The Laramie KOA, the only private RV campground in Laramie, has 115 RV campsites, and the assumed peak season availability rate is 5 percent (BSR 2010), leaving an estimated six campsites during peak season that would be available for construction workers. In this case, the demand would exceed supply. Therefore, the proposed Project may have a short-term temporary negative impact to the supply of RV campsites with electric and water hookups in Laramie, particularly if peak construction coincides with peak recreation season (assumed to be summer). The reduced availability of private campground RV sites to the public would be a temporary negative impact, and the public would have to seek campsites that may not offer full amenities or are not as convenient to Laramie. This impact would not be significant because the impact would occur only during peak workforce conditions and would not constitute a long-term substantial conflict. No effects are anticipated on the supply of RV campsites with electric and water hookups at private campgrounds in the Fort Collins area, because only few workers would be expected to stay in Fort Collins. The potential beneficial economic impacts are described in section 4.11.

4.10.4 Impact Assessment of the No Project Option

Under SWE’s no Project option, it is assumed the proposed Project would not be built and environmental impacts associated with construction and operation of the Project would not occur. Under the no Project option, no direct or indirect impacts to recreational areas or activities would occur.

4.10.5 Mitigation Measures

The following BMPs have been identified and committed to by SWE to avoid resource impacts or reduce potential impact levels. They are considered an integral part of the proposed Project and would be implemented by SWE as requirements in SWE's contract with their construction contractor. BMPs applicable to operation and maintenance activities would be incorporated in SWE's Operation and Maintenance Plan for the Hermosa facility, and those related to decommissioning would be incorporated in SWE's Decommissioning Plan. Many of the mitigation measures would also be required by law, regulation, or permit conditions, and compliance would be overseen by the responsible regulatory authorities. While Western has no authority or jurisdiction over SWE's proposed Project, Western's decision to execute an interconnection agreement would consider SWE's commitments to implement these BMPs, and the reduction in environmental impacts that would result.

BMPs

- REC-1: Work with City officials in Laramie and Fort Collins and private campgrounds or mobile home park owners to identify facilities available to construction workers bringing RVs to the area to avoid displacement of public recreational use at private campgrounds.

4.11 Socioeconomics

This section describes potential impacts to social and economic values that could result from implementation of the proposed Project, and the facilities associated with Western's proposed Federal action as well as SWE's no Project option. For the purposes of this analysis, the study area for socioeconomics is defined as all of Albany County, including the 11,125-acre proposed Project site, and all of Larimer County. Larimer County is included in the analysis because it is assumed that a portion of the construction workforce would originate in the area of Fort Collins, Colorado in Larimer County. Socioeconomic information from Larimer County, therefore, is included in this analysis where it is relevant to analyzing potential effects that would result from the proposed Project.

4.11.1 Methods

The evaluation of potential effects on social and economic values considered census data, workforce and engineering estimates, and proposed Project cost estimates. The study used available information to compare workforce and capital cost projections for the proposed Project with information on existing conditions in the study area to make estimates of significance (BSR 2010).

As described below, several issues relating to socioeconomics surfaced during public scoping regarding property values and tax revenues and were considered in this analysis. Public comments are summarized in table 1.10-1.

4.11.1.1 Significance Criteria

A significant impact to social or economic values would occur if the following were experienced from construction or operations of the proposed Project:

- An increase in population that would create shortages of housing and place an excessive burden on local government and community facilities and services
- Permanent displacement of existing residences or businesses
- Permanent and irreversible loss of work for a major sector of a community
- Change resulting from the proposed Project would exceed historical or estimated fluctuations in the regional economy
- Result in a need for new infrastructure systems, including power or gas utilities, communications systems, water and sewer services, or solid waste disposal systems
- Substantial economic benefit (a positive impact that could be considered significant)
- A substantial decrease in property values
- Long-term loss of economic viability of farms or other businesses

During the public scoping meetings and public comment period for the Project from January 14, 2010, to March 1, 2010, Western received several comments specifically expressing concern:

- Statement that Laramie, Albany County, and the Sate of Wyoming would enjoy job creation, tax revenue, and a general boost to the economy from the purchase of goods and services associated with the Project
- Statement that wind development would allow some families to generate extra income and would help ranchers remain economically viable
- Request that the EIS quantify the effect on the local economy, businesses, and employment from revenue related to taxes, goods, services, and post-construction jobs
- Request for an explanation of how and in what timeframe tax incentives would be applied to the Project
- Statement that economic benefits from the Project would be temporary and would occur during the construction phase but, in the long-term, the Project would negatively affect local economies by requiring the State to pay for road maintenance, snow removal, snow fences, law enforcement, and administrative staffing associated with the Project
- Statement that local tax revenues would actually decline because the Project would reduce property values in the area
- Concern about a potential decrease in property values from the Project
- Statement that properties within 1 mile of a wind farm would lose 25 percent of their value
- Statement that properties in the vicinity would lose value in the following locations because visual quality would be degraded: Tie Siding, the Buttes Subdivision, the Fish Creek Ranch Preserve, other adjacent properties and subdivisions, and the entire southeastern portion of the State
- Statement that property values would decline because of the adjacency of an industrial site (the Project)
- Request that the EIS include (1) a discussion on home value effects, including homes valued at more than $1 million and (2) case studies comparing historical property values of homes adjacent to wind development pre- and post-construction
- Statement that the cost of the Project would outweigh the financial benefits
- Comment that wind turbines do not conflict with the visual setting of the natural environment and would not deter that stakeholder from purchasing property in the area

4.11.2 Impact Assessment of the Proposed Project

Since 1980 the population has increased by 3,471 in Albany County (see table 3.11-1), and since 1990, total employment has increased in Albany County by 3,771 (see table 3.11-3). Individual social and economic values are described below. They include the proposed Project's potential effects associated with the construction workforce, housing availability, emergency services, property values, the local and State economy, and government revenue. The total construction workforce is estimated to be 268 workers. During operations, the proposed Project is expected to employ at least 20 to 40 full-time workers.

4.11.2.1 Population and Employment

One of the most important effects that the proposed Project would have on the social and economic conditions in local communities and Albany County is the creation of jobs. By using local workers and construction-related services and bringing in non-local workers (defined as those who do not live in the study area), the proposed Project would have an impact on the local economy and on the provision of public services.

Table 4.11-1 provides estimates of the number and types of workers that the proposed Project would likely require over the course of its construction.

Table 4.11-1:
Construction Workforce Type Estimates: Hermosa West

Type of Worker	Number of Crews	Size of Crew
Miscellaneous	1	10
Roads	2	12
Foundation Excavation	5	3
Rebar	2	8
Concrete Placement	1	12
WTG Grounding	1	2
Foundation Backfill	5	3
WTG—Offloading	1	10
WTG—Tower, base, and midsections	1	10
WTG—Grouting & Tensioning	1	8
WTG—Spike and Nacelle	1	8
WTG—Rotor	1	8
WTG—Mechanical Completion	4	2
WTG—Internal Wiring	2	4
Collection System	2	24
Substation	1	40
Turbine—Original Equipment Manufacturer	1	18
Clean Up and Restoration	1	10
Total		268

Each labor category would be engaged at different times on the proposed Project based on the construction schedule. For example, access road construction would occur during the first stage of the proposed Project, and electrical construction and tower erection would take place in the latter stages. Assuming a 26-month construction timeframe, the first six months would see a gradual increase in the number of workers onsite, followed by a period of approximately 17 months when the workforce would peak which would be followed by a decrease in the workforce during the three-month long post-construction phase. The peak workforce is estimated to be 268 workers per day. Figure 2.3-2, Manpower Loading Curve, shows the distribution of the workforce over the duration of the construction schedule.

Based on previous wind farm construction experience, it is expected that a proportionately smaller percentage of the construction workforce would come from the local area. There are a number of potential reasons for this, including a shortage of local specialized skilled labor and the use of non-local contractors who bring a substantial number of workers with them. Three types of jobs account for 40 percent of a wind farm local labor force: surveying, construction of the operation and maintenance building, and security (BSR 2010). Where wind farms are built, the associated construction jobs also account for 18 to 24 percent of the total of all local jobs available according to one estimate (BSR 2010). These jobs would include the locally sourced materials needed for construction (concrete, water, and aggregate).

For the proposed Project, a value of 85 percent is used for total non-local worker percentage; 15 percent of the workers are anticipated to be local. Using the same percentage, 214 workers of the total 268 peak workforce are expected to be non-local. This non-local construction workforce is not expected to relocate with families because of the temporary and mobile nature of the work. The construction workforce would have no effect on local schools because workers would not be expected to relocate with families. The temporary influx of workers to Albany County would amount to a temporary increase of less than 1 percent in population.

The completed Project would employ 20 to 40 workers during operation. Long-term significant impacts from the addition of this permanent workforce to the local socioeconomic conditions of Albany County are not expected. This workforce would be made up of a management team including at least one experienced SWE employee and two other staff who may or may not be locally hired. For the remaining positions, SWE would hire locally to the extent that local employees with the appropriate skillsets are available.

4.11.2.2 Housing Availability

The estimated 214 non-local construction workers are expected to affect the local housing market over the temporary construction period. Of these 214 non-local workers, 80 percent (172 workers) are predicted to live in Albany County and 20 percent (43 workers) are predicted to live in Larimer County. Since the non-local workers are generally anticipated to be single or not accompanied by their families, they are expected to rent accommodations during construction of the proposed Project. Two assumptions were used to estimate housing demand based on temporary housing information from other wind farm developments (BSR 2010):

a. Twenty-five percent of the non-local workers will share accommodations and the remaining 75 percent will seek out individual living situations
b. Seventy-five percent of workers will live in hotel/motel rooms; 14 percent will live in single-family homes, 7 percent will live in recreational vehicles, and 5 percent will live in apartments or mobile homes

Based on the above assumptions (derived from data available from the construction of similarly-sized wind projects) and the total peak workforce of 268 workers per day, the peak demand for housing from the construction of the proposed Project would be 150 units in Albany County and 38 units in Larimer County. Table 4.11-2 shows how this demand would be distributed across the different types of housing.

Table 4.11-2:
Housing Demand Estimate

Accommodation	Albany County (Wyoming)	Larimer County (Colorado)
Hotel/Motel Rooms	113	28
Single-Family Homes	20	5
Recreational Vehicles	10	3
Apartments/Mobile Homes	7	2
Total Demand	150	38

Table 4.11-3 shows the supply of different types of housing units in Laramie. In all cases other than for recreational vehicles, there is an excess of supply over the potential demand for housing of the projected workforce for the proposed Project. The most significant housing demand would be for hotel/motel accommodations. This demand has the potential to result in a beneficial impact to the hotel/motel market during the peak construction period because it would cut the vacancy rate in half.

Table 4.11-3:
Housing—Peak Construction

Accommodation	Existing Housing Supply—City of Laramie		
	Number	Vacancy Rate	Available Units
Hotel/Motel Rooms	1,545	15.0 percent	231
Single-Family Homes	6,150	9.7 percent	590
Recreational Vehicles	115	5.0 percent	6
Apartments/Mobile Homes	5,325	4.0 percent	213

Source: BSR (2010)

4.11.2.3 Larimer County Housing Impact Assessment

The majority of non-local workers seeking housing in Larimer County are expected to live in hotels/motels. Given the large number of hotels and motels—70—as well as other temporary accommodations available in Larimer County, there are not expected to be any deleterious effects to local housing markets from the proposed Project.

4.11.2.4 Public Safety

Given the small and dispersed workforce, no measurable effects to public services such as utilities, communication systems, water and sewer, or solid waste disposal are anticipated. Potential effects to local public services, including police protection, fire protection, and medical services, as further described in section 4.16, are expected to be minimal because of the short duration the workforce would locate in a particular jurisdiction and because the majority of the workforce hours would be spent at the construction site.

4.11.2.4.1 Municipal Services

The additional 214 residents that would reside in Albany and Larimer Counties for a portion of the temporary construction period would not significantly impact municipal services in either county.

4.11.2.5 Property Values

This section discusses the potential effects to residential property values as a result of visual and noise impacts resulting from the proposed Project. Public comments relative to socioeconomics (table 1.10-1) made during public scoping were related to impacts to neighboring residential property values. It is common knowledge that a home's value is positively affected if a high-quality scenic vista is enjoyed from the property. Noise impacts and impacts to visual resources are discussed separately in sections 4.6 and 4.7 respectively.

Assessing the potential impact of a wind farm on property values in surrounding areas has to be based on the variables and influences uncovered in research on other wind farms. Preference and opinion surveys generally indicate negative attitudes and expectations of adverse impacts to property values prior to construction, while attitudes and survey results and actual property transaction data post-construction do not generally bear out such adverse impacts. In addition, many studies have relied on (1) surveys of homeowners or real estate professionals, rather than trying to quantify real price impacts based on market data, and (2) a very limited number of residential sales transactions that lack a certain degree of statistical validity. A brief review of some of these studies follows.

In the United Kingdom, Sims et al. (2008) found both positive and negative relationships between views of wind turbines and sales prices for 199 residential transactions related to the Bears Down facility in Cornwall. In another study, Sims and Dent (2007) analyzed 919 transactions for homes within 5 miles of two wind facilities and found only limited evidence of a relationship, which local real estate experts attributed to other causes.

Hoen (2006) investigated 280 residential transactions occurring near a wind facility in Madison County, New York, and found no evidence that views of turbines significantly affect prices. Sterzinger et al. (2003) analyzed roughly 24,000 residential transactions and found no apparent difference between transactions for homes within and outside a 5-mile radius from 10 wind facilities in the United States However, McCann (2008) found that the lengthy selling periods of two homes in Lee County, Illinois, might have been affected by the proximity of a wind facility.

Kielisch (2009) compared 12 transactions of undeveloped land near 2 wind facilities in Wisconsin (Blue Sky Green Field and Forward) to transactions of undeveloped land farther away and found that land tracts near the wind facilities sold for dramatically lower prices than the comparable group. However, the statistical significance of the comparison was not reported. Poletti analyzed the prices of 187 homes in Illinois (2005) and 256 homes in Wisconsin (2007) by comparing the mean sales prices of homes near the wind facilities to those farther away. The study found no statistical evidence that homes near the wind facilities sold for different prices than those farther away.

To date, the most comprehensive and statistically valid study across multiple wind farms and geographies is one performed by Hoen et al. (2009). This study focused on the sale prices of 7,500 single-family homes within 10 miles of 24 wind farms in 9 states and 14 counties in the United States. Ten statistical models were used to investigate the effects of wind facilities on residential sales prices. The following categories of potential visual impacts to residential property values were examined:

- Area Stigma—A concern that the general area surrounding a wind energy facility will appear more developed, which may adversely affect home values in the local community regardless of whether any individual home has a view of the wind turbines.
- Scenic Vista Stigma—A concern that a home may be devalued because of the view of a wind energy facility and the potential impact of that view on an otherwise scenic vista.
- Nuisance Stigma—A concern that factors that may occur in close proximity to wind turbines, such as sound and shadow flicker, will have a unique adverse influence on home values.

The results of that study did not find any statistically significant differences in sales prices between the affected residential area and a neutral unaffected residential area stating that "no evidence is found that home prices surrounding wind facilities are consistently, measurably, and significantly affected by either the view of wind facilities or the distance of the home to those facilities" (Hoen et al. 2009).

Similarly, no evidence in the literature suggests that noise significantly affects property values. A review of available studies, including the Hoen et al. study, suggests that the frequently heard argument that wind farms negatively impact property values may not, in fact, be true and, at the very least, is not supported by the available empirical evidence. As in any transaction involving significant assets, however, the factors affecting price are complex and would vary depending on the details of each transaction, and the personalities involved, and it is not possible to forecast the potential impact on property values in proximity to a wind farm facility. While there is no absolute assurance that the property values of homes in proximity to the turbines of the proposed Project would not decline, available credible research studies do not support a conclusion of adverse impacts to residential property values because of proximity to wind farm facilities.

4.11.2.6 Effects on the Local and State Economy

There are several streams of local, State, and Federal government revenue that are generated by wind farms including property taxes; sales, use, and lodging taxes; excise tax on wind production; and State Trust Land fees. The land for the proposed Project is owned privately and by the State of Wyoming through its Office of State Lands and Investments. The capital cost of the proposed Project is conservatively estimated to be $475 million (BSR 2010). Tax revenue estimates are summarized in table 4.11-4, however, it should be noted that the tax regime in Wyoming is always under review and these estimates are subject to change. Additionally, it is not uncommon for negotiations to take place between developers and the taxing authorities which may also affect the tax estimates. The vast majority of this revenue would flow from three sources: (1) the sales tax on purchased components of the wind farm, (2) the royalty fee assessed for turbines placed on land leased from the State, (3) and the newly enacted excise production tax (Original House Bill No. 0101, effective January 1, 2011). The two principal sources of local revenue would be the property tax levied annually on the operating assets of the wind farm and the excise production tax. Assuming the proposed Project operates for 20 years and achieves an average capacity utilization of between 30 and 40 percent, the total tax revenues (property, excise, sales, and royalties) during construction and operations are estimated to be $56.6 million for Albany County and $34.2 million for the State (BSR 2010).

Table 4.11-4:
Hermosa West Estimated Tax Revenues—20 Year Life of Project

Tax	Revenue
Property Tax	Total: $40,600,000 Year 1: $2,900,000 Year 20: $1,300,000
Excise Production Tax	Total: $15,640,000 County: $9,384,000 State: $6,256,000
Excise Sales Tax (Project Components)	Total: $19,900,000 County: $6,600,000 State: $13,300,000
Sales and Optional Taxes (Goods and Services)	$397,000 (during construction)

Source: BSR (2010)

The initial 2 to 3 years of construction and operations would result in excise tax payments exceeding $25 million; thereafter total tax payments would be in the range of $3 million annually (BSR 2010).

During the same timeframe, Albany County would be the beneficiary of approximately $85.8 million in tax revenue as a result of construction and operations of the proposed Project (BSR 2010).

4.11.2.6.1 Property Tax

Based on standard assessment methods applicable to the proposed Project site, it is estimated to have an assessed industrial property valuation of $43.7 million (BSR 2010). Albany County's tax levy is 66.718 mills, and applying this rate to the assessed valuation of the proposed Project yields an annual property tax of between $2.01 and $2.91 million.

4.11.2.6.2 Sales Tax

Workforce expenditures and material procurement would represent direct spending in local economies. That spending would indirectly affect local business revenues and State sales taxes. State and local governments would also benefit from taxes generated by the purchase of goods and services such as food, lodging, and entertainment, by non-local workers.

The State-wide sales tax is 4 percent, and counties are allowed to levy three additional taxes: general purpose optional (1 percent), specific purpose optional (1 percent), and lodging (4 percent). Based on an estimated construction period of 17 months and the previously discussed workforce estimates, tax revenues from the sale of goods and services are estimated to be approximately $400,000 (BSR 2010) based on a total daily taxable expenditure of $132 for lodging, food, and other living expenses.

Assuming that the State sales tax would apply to the proposed Project, there would be a 6 percent levy (4 percent at the State level and an additional 2 percent levied at the local level) on the purchase of various components of the wind farm. Based on the estimate that 70 percent of the proposed Project's cost would be subject to the 6 percent tax, the total sales tax revenue generated for the State and local governments would be $19.9 million (BSR 2010).

4.11.2.6.3 Excise Production Tax

The Wyoming legislature in 2010 passed a new tax on wind energy production equivalent to $1 per megawatt of electricity produced (Original House Bill No. 0101). There is a 3-year grace period that begins at the moment a wind farm starts production. Based on construction of a 300-MW wind farm, the total potential tax revenue is $2,628,000 (BSR 2010). Wind turbines do not operate at full capacity, however, and a 35 percent utilization factor is more reasonable. Using this factor, the excise production tax on the proposed Project would generate approximately $920,000 of revenue each year that would be divided among Albany County ($552,000) and the State ($368,000).

4.11.2.6.4 State Lease Revenue

The proposed Project would mostly be developed on private property, approximately 80 percent of the proposed project area. The remaining property is held by the State of Wyoming. There are a number of different revenue streams associated with leasing State land, including an option payment, a lease conversion, and royalty payments. The revenue generated for the state will be dependent on the number of turbines and wind resource.

4.11.3 Impact Assessment of SWE's No Project Option

Under the no Project option, it is assumed the proposed Project would not be built and environmental impacts associated with construction and operation of it would not occur. Existing economic and demographic trends would, therefore, continue in the study area.

4.11.4 Mitigation Measures

No specific mitigation measures for population or housing are anticipated because the impacts to these resources are expected to be less than significant. Impacts to the local and State economies are expected to be significantly beneficial and mitigation is not necessary.

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4.12 Environmental Justice

This section describes the potential impacts on environmental justice associated with implementation of the proposed Project. The proposed Project components discussed include SWE's construction and operation of the proposed Project and Western's proposed Federal action. This section includes discussions of the methods used for analysis, the significance criteria used to evaluate environmental impacts resulting from the proposed Project, potential impacts of the no Project option, and recommended mitigation measures.

4.12.1 Methods

For the purposes of this analysis, the study area includes all of Albany County, Wyoming, where the proposed Project site is located, and Larimer County, Colorado, as well as two census block groups (one in Wyoming and one in Colorado). The data are derived from the U.S. Census Bureau and are used to identify income and race characteristics for the study area. The block groups provide census data for large geographic areas and are useful in this analysis because the study area is very rural. The block group in Wyoming, for example, covers approximately half of Albany County. U.S. Census Bureau Quick Facts data (U.S. Census Bureau 2010) were used to identify race and income characteristics throughout the study area.

The evaluation of environmental justice considered census data from 2000 and estimates for 2006–2008 for minority and low-income populations that were collected for the two counties and two census block groups potentially affected by the proposed Project. The analysis compared 2000 census block groups and county data and State data to determine whether disproportionately high minority or low-income populations would be affected by the proposed Project.

CEQ guidance directs that a low-income population exists in any geographic unit where the number of low-income individuals exceeds 50 percent of the total population. A low-income population also exists where the percentage of low-income individuals in any geographic unit is more than 20 percent higher than in the reference geographic unit. Specific data for low-income populations are presented in tables 3.12-1 and 3.12-2 in section 3.12.

4.12.2 Significance Criteria

Based on the significance criteria listed below, a significant effect to minority or low-income populations would occur if the following were experienced from construction or operation of the Project:

- A disproportionately negative effect on minority or low-income populations in the area would occur.
- Affected minority or low-income populations were not informed of and offered an opportunity for meaningful involvement to ensure that their interests and concerns about the proposed action would be considered.
- The minority population of the affected area exceeds 50 percent.

- The minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

This EIS applies these criteria in using the Census Bureau data for census block groups, wherein consideration is given to the minority population that is both more than 50 percent and 20 percentage points higher than in the surrounding county. Specific data for minority populations is shown in table 3.12-2 in section 3.12.

During the public scoping meetings and public comment period for the Project from January 14, 2010, to March 1, 2010, Western received one comment specifically expressing concern:

- Request that the requirements of EO 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) be addressed in the EIS

4.12.3 Impact Assessment of the Proposed Action

When broken down by census block groups consistent with the study area, minority populations potentially affected by the Project ranged from 3.4 percent to 4.2 percent (2000 Census) of the total population for an analysis area. These values are well below the 50 percent guideline described above. In addition, compared with both county and State data, the percentages do not show a disproportionate effect on minority populations within and immediately surrounding the study area. The minority population in the study area is lower than county and State minority populations. In no instance does the minority population affected by the Project exceed the 20-percent or higher guideline in comparison to the surrounding area.

For the 2000 census year, the population living below the poverty level in the two block groups in the study area ranged from 5.9 to 6.2 percent, which is lower than in the overall county populations. County-wide poverty levels ranged from 9.2 percent in Larimer County to 21 percent in Albany County. State poverty levels are 9.3 percent for Colorado and 11.4 percent for Wyoming. The data do not show a disproportionate effect on low-income populations in the Project.

4.12.4 Impact Assessment of SWE's No Project Option

Under the no Project option, it is assumed the proposed Project would not be built and environmental impacts associated with construction and operation of it would not occur. No environmental justice impacts are associated with the no Project option.

4.12.5 Mitigation Measures

No potential concerns with regard to low income or minority populations were identified, so no avoidance or mitigation measures are proposed. There are no permits or additional coordination (outside the EIS process) required for environmental justice issues. NEPA requirements for environmental justice include those of EO 12898.

4.13 Agriculture

This section describes potential effects to agriculture from implementation of the proposed Project, the proposed Federal action and SWE's no Project option. In considering potential environmental consequences to agriculture, this EIS addresses several related issues that arose during public scoping. These include possible adverse effects of wind turbines, road construction, and increased traffic on grazing land and livestock; possible damage caused by Project activities to fields, fences, and food for livestock; and concerns that livestock could escape fenced-in areas and be frightened, injured, or killed by construction or operation of the Project. These issues shape the discussion presented below.

4.13.1 Methods

The evaluation of potential effects on agriculture considered potential changes to irrigated and non-irrigated farmland, pasture and ranchland, prime or unique farmland, farmland of statewide importance, and conservation easements. Analyses completed for this resource evaluate environmental impacts from implementation of the proposed Project, the proposed Federal action, and the no Project option. As described in chapter 3, information sources included NRCS databases and personal communications with agencies and organizations that track conservation easements. The Project description provided the Project details to evaluate potential effects from the proposed action.

4.13.2 Significance Criteria

A significant impact on agricultural practices would result if the following were to occur from construction or operation of the Project:

- Substantial loss of prime or unique farmlands in the proposed Project site.

During the public scoping meetings and public comment period for the Project from January 14, 2010, to March 1, 2010, Western received several comments specifically expressing concern:

- Concern about the possible effects of wind turbines on grazing land and livestock
- Concern about potential effects from construction of new roads, increased traffic, and damage to fields, fences, and food for livestock
- Concern that livestock could escape fenced-in areas and be frightened, injured, or even killed directly or indirectly by construction or operation of the Project

4.13.3 Impact Assessment of the Proposed Project

The majority of the proposed Project site is used for cattle grazing. Current livestock ranching and agriculture would continue, even though some land would be converted to industrial use. The Project site is not currently tilled. SWE has coordinated with landowners and has entered into lease agreements for development of the proposed Project, so the affected landowners are aware of and in agreement with the changes that would result from construction and operation of the proposed Project.

The proposed Project would be located on privately owned lands and State of Wyoming lands pursuant to lease agreements negotiated between landowners and SWE. These leases allow for construction and operation of the wind facilities for the useful life of the equipment of approximately 20 years. Proposed turbine corridors and facility locations were designed incorporating landowner requirements and setbacks.

During construction and operation activities, there would be a potential for temporary interruption of ranch operations within portions of the proposed Project site. SWE would coordinate with landowners regarding the timing and location of construction or decommissioning activities so that landowners could manage their operations in concert with the proposed Project. Such coordination could mean, for example, that landowners would move cattle from one area to another to minimize potential impacts to their herds. Project facilities (access roads and collector systems) would not permanently affect grazing patterns or interfere with livestock movement as no new fences would be constructed (excepting the enclosure of the substation and switchyard, and operations and maintenance building). Decommissioning activities would be similar to those during construction but would take less time than construction. Anticipated impacts would be expected to be similar in type and magnitude even though some portions of facilities would be left in place.

The BMPs described in chapter 2 would be enforced during construction and decommissioning. A minimal amount of vegetation would be removed around each wind turbine site. With the wind turbine sites and access roads and collector system trenching, a total of 105 acres of vegetation would be permanently removed from the Project site. Construction vehicle traffic would have the potential to create dust as vehicles move through the proposed Project site, as described in section 4.9. Water tankers would be used to wet down roads to control dust during construction. The majority of heavy equipment and other construction vehicles would be confined within the Project site boundaries during the construction period. By keeping equipment onsite the potential for noxious weed seed to be brought onsite from elsewhere, is minimized. These measures would reduce any effects to forage and livestock. The risk to livestock from collisions with vehicles would be further minimized by implementing design speed limits of 15 mph on Project roads.

In areas with safety risks to livestock, temporary warning fences would be erected. At the end of work shifts, open pits, trenches, and holes would be covered or fenced to prevent livestock from becoming trapped or injured. Areas with open trenches or other excavated areas would be enclosed by temporary chain-link or other livestock fencing. Permanent fencing around the switchyard, substation, and operations and maintenance building would be of a sturdy design. If blasting were required, a blasting plan would be prepared that would include measures to prevent adverse effects to livestock. A SWPPP would be prepared, including BMPs for dust control, traffic speeds, and revegetation that would minimize effects to grazing. During operation, Project staff would perform drive-by inspections, which would include reviewing the condition of fencing and checking for any vandalism to Project facilities.

When construction is completed, revegetation and reclamation would be conducted to return the site to near pre-construction conditions as appropriate. Activities would include re-seeding areas exposed during construction and controlling noxious weeds per BMPs described in section 3.3. These activities would minimize potential long-term negative effects on agriculture. Exposed areas would be revegetated using an approved native seed mixture or landowner-preferred mixture. Noxious weed control would continue onsite from the commencement of construction and continuing throughout the life of the Project. Public access to the State-owned portion of the proposed Project site would be limited during some construction phases. The remainder of the Project site is privately owned and access is by landowner permission only. During the operation and maintenance phase, permanent chain-link fencing would be installed at the substation and switchyard, and at the operations and maintenance building. Access roads would not have fencing installed, and livestock would not be blocked from crossing. New gates or cattle guards would be installed where access roads would cross fence lines. Decommissioning activities would return the site to a condition as close to its pre-construction state as possible.

Development of the 11,125 acres contained within the proposed Project site would result in approximately 367 acres (3 percent of total acres) of disturbance from temporary facilities (e.g., temporary roads, laydown areas, and installation of underground collector cable) and approximately 128 acres (1 percent of total acres) of disturbance from permanent facilities (e.g., turbine pads, permanent roads, operations and maintenance building, switchyard, interconnection line, switchyard, and substation). Based upon the review of the aforementioned sources, none of the disturbed areas within the proposed Project site includes prime or unique farmlands, farmlands of statewide or local importance, or lands within conservation easements. Temporary impacts resulting from construction activities would be mitigated through restoration including revegetation with native grasses and/or crops matching the surrounding agriculture landscape. The permanent impacts would account for approximately 1 percent of the entire proposed Project site. Consequently, while there would be some impacts to cattle grazing, they would be less than significant.

4.13.4 Impact Assessment of SWE's No Project Option

Under the no Project option, it is assumed the proposed Project would not be built and environmental impacts associated with construction and operation of it would not occur. Local landowners would not receive lease payments from SWE. There would be no agricultural impacts associated with the no action alternative. Economic impacts are addressed in section 4.11.

4.13.5 Mitigation Measures

The proposed Project would have less than significant impacts on agriculture and no additional mitigation is required.

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4.14 Geology and Soils

This section discusses the potential impacts resulting from geologic hazards and impacts to mineral and soil resources associated with the proposed Project. The components discussed include SWE's construction and operation of the proposed Project and Western's proposed Federal action. This section includes discussions of the methods used for analysis, the significance criteria for environmental effects, potential effects of SWE's no Projection option, and mitigation measures.

4.14.1 Methods

4.14.1.1 Geologic Hazards

The geologic hazards analysis used publicly available maps, reports, and government agency databases to assess the geology of the proposed Project site and to identify potential geological hazards. Studies specifically performed to assess the proposed Project include geotechnical investigations (Black & Veatch 2009, 2010).

4.14.1.2 Mineral Resources

The mineral resources analysis used publicly available maps, reports, and government agency databases to assess mineral resources in the Project area. Studies specifically performed to assess the proposed Project include an economic analysis of mineral resources (Daub & Associates 2010).

4.14.1.3 Soils

This analysis used information on the physical characteristics of soil types, the extent of the soil types found within the proposed Project site, and the geotechnical characteristics of the soils in relation to construction activities. Studies performed for the proposed Project included geotechnical investigations (Black & Veatch 2009, 2010) and an evaluation of NRCS soil data (NRCS 2010a, 2010b).

4.14.2 Significance Criteria

4.14.2.1 Geology

A significant impact associated with geological hazards would occur if the following were experienced from construction or operation of the proposed Project:

- Areas of geological importance are lost or made inaccessible for future use. (Areas of geological importance are those types defined in the North American Stratigraphic Code or unique geological features as defined by due process [e.g., a cave area that is declared a recreational site under the jurisdiction of a government agency].)
- Increases in the probability or magnitude of mass geological movement (e.g., slope failures, slumps, and rock falls).
- Structure failure or hazards to adjacent properties from slope instability effects of earthquake or adverse soil conditions (such as compressible, expansive, or corrosive soils)

During the public scoping meetings and public comment period for the Project from January 14, 2010, to March 1, 2010, Western received one comment specifically expressing concern:

- Concern about changes to access and surface rights for kimberlite deposits in the Project site

4.14.2.2 Mineral Resources

A significant impact associated with mineral resources would occur if the following were experienced from construction or operation of the proposed Project:

- The loss or inaccessibility of known mineral resources of economic value to the region and the residents of the State

4.14.2.3 Soils

A significant impact to soils would occur if the following were experienced from construction or operation of the proposed Project:

- Soil characteristics are not suitable for construction of the proposed Project
- Severe erosion from disturbance of soils on steep slopes (slopes greater than 20 percent)
- Compaction or mixing of soils that would result in long-term loss of productivity or significantly alters current use or revegetative growth.
- Loss of soils that uniquely support threatened or endangered plant species or contamination of soils that support an existing sensitive ecosystem
- Soil loss or accelerated erosion due to disturbance that results in the formation of rills and/or gullies or that result in sediment deposition in downgradient lands or waterbodies to the extent that existing uses cannot be maintained

4.14.3 Impact Assessment of the Proposed Project

4.14.3.1 Geologic Hazards

Potential impacts to the proposed Project resulting from geological hazards would be associated with unstable slopes and the potential for seismic activity to occur within the proposed Project site. The potential for either condition is very low based on available data. Geotechnical engineering would identify the potential of any localized unstable slopes and the potential for seismic activity during facility design. Preliminary geotechnical investigations concluded that subsurface conditions in the proposed Project site are suitable to support development of the Project (Black & Veatch 2010). Structures would be built to State and Federal required standards and industry BMPs for unstable slopes and seismicity, thereby reducing potential impacts from geologic hazards to less than significant. There are no areas of geological importance on the proposed Project site.

4.14.3.2 Mineral Resources

Potential impacts to mineral resources within the proposed Project site would be associated with potential interference with access to mineral leases. As discussed in section 3.14, neither oil nor gas development nor active mineral extraction activities are occurring within the proposed Project site. An economic analysis of mineral resources (Daub & Associates 2010) concluded that except for a few localities of sand and gravel resources, existing economic conditions do not support mineral resources extraction within the proposed Project site. While the geotechnical study found that near-surface soils could be used for road construction (Black & Veatch 2010), sand and gravel resources required for proposed Project roads and for concrete batch plant materials would be supplied by licensed sand and gravel operations located outside the proposed Project site.

Based on the analysis of economically viable mineral resources (including kimberlite deposits) present within the proposed Project site, there would be no significant impacts resulting from construction and operation of the proposed Project because the resources are not currently economically viable. There are no historical or currently operating kimberlite mines identified within the study area, and kimberlite outcrops are rare and localized. Kimberlitic minerals exist within the project footprint, however studies indicate potential deposits are not within the area of disturbance of the proposed Project and the Project would not interfere with kimberlite locations.

According to Title 30 (Section 30-1-119) of the Wyoming Constitution (Wyoming 2010), property owners are protected in the case where they elect to develop their land because they have the right to demand security from a mineral rights owner. To the extent practicable, all mineral rights owners would be identified and notified prior to the initiation of Project construction. SWE will also place a public notice in the newspaper for those property owners that cannot be identified.

4.14.3.3 Soils

Potential impacts to soil resources within the proposed Project site would be associated with unstable slopes and soils that are unsuitable for placement of turbine foundations or other infrastructure including linear features such as roads and electrical transmission. The potential for increased soil erosion resulting from earth-moving activities during construction was also examined.

Surface soils within the proposed Project site do not exhibit swelling characteristics. Sub-soils in the region often have saline, sodic, or calcareous properties that may affect soil productivity and reclamation potential. The top 12 inches of excavated material, therefore, would remain onsite. Excess soil from 12 inches or more below ground surface, or from deep foundation excavations, may be disposed of with other construction debris and if stockpiled onsite, it will be placed in areas where it will not enter a stream or wetland during a storm or periods of runoff.

The geotechnical investigation concluded that subsurface conditions within the Project site are suitable to support development of the proposed Project (Black & Veatch 2010). Depth to bedrock appears sufficient, based on preliminary geotechnical investigations, to allow relatively easy excavation to the depths necessary for the wind turbine foundations.

All facilities and infrastructure would be built to State and Federal required standards and industry BMPs, thereby reducing potential impacts from unstable slopes to less than significant.

Impacts to soil resources as a result of erosion during construction activities would be less than significant because the proposed Project would be required to adhere to the SWPPP as described in section 4.3.1.

4.14.4 Impact Assessment of SWE's No Project Option

4.14.4.1 Geologic Hazards

Under SWE's no Project option, the proposed Project would not be constructed and the proposed Project would not be potentially affected by geologic hazards.

4.14.4.2 Mineral Resources

Under the no Project option, the proposed Project would not be constructed and mineral resources would not be affected.

4.14.4.3 Soils

Under the no Project option, the proposed Project would not be constructed and soil resources would not be affected. Natural and anthropogenic causes of erosion or loss of soil productivity, however, could still occur in the analysis area from agricultural practices and other activities such as residential development.

4.14.5 Mitigation Measures

The following BMPs and mitigation measures have been identified and committed to by SWE to avoid resource impacts or reduce potential impact levels. They are considered an integral part of the proposed Project and would be implemented by SWE as requirements in SWE's contract with their construction contractor. BMPs and mitigation measures applicable to operation and maintenance activities would be incorporated in SWE's Operation and Maintenance Plan for the Hermosa facility, and those related to decommissioning would be incorporated in SWE's Decommissioning Plan. Many of the mitigation measures would also be required by law, regulation, or permit conditions, and compliance would be overseen by the responsible regulatory authorities. While Western has no authority or jurisdiction over SWE's proposed Project, Western's decision to execute an interconnection agreement would consider SWE's commitments to implement these BMPs and mitigation measures, and the reduction in environmental impacts that would result.

4.14.5.1 Geologic Hazards

BMPs

- GEO-1: SWE will conduct additional geotechnical investigations based on final facility layout to reduce potential for impacts from geologic hazards.

4.14.5.2 Mineral Resources

No mitigation measures for mining resources are required.

4.14.5.3 Soils

BMPs

- GEO-2: Ditches, tile drains, terraces, and other agricultural features or conservation practices damaged during construction will be repaired or replaced.
- GEO-3: Construction crews will revegetate disturbed areas using an approved weed-free, native seed mixture per the Site Restoration Plan.
- GEO-4: Soil will be stockpiled appropriately and returned to an excavated area in the order in which it was removed to ensure that nutrient and biologically rich topsoil stays at the surface and calcareous and saline-sodic sub-soil remains below the rooting zone.

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4.15 Hazardous Materials

This section discusses the potential impacts associated with the use and storage of hazardous materials resulting from the implementation of SWE's proposed Project. The proposed Project components analyzed include SWE's construction, operation and maintenance, and decommissioning of wind turbines as well as Western's proposed Federal action. This section presents the methods used for analysis, the significance criteria used to determine the significance of potential environmental effects, the potential effects of SWE's no Project option, and proposed mitigation measures. For the purposes of this analysis, the study area encompasses the proposed Project site.

Transportation routes are not included in the study area for this analysis, but any spills or accidents that occur during the transport of hazardous materials to and from the proposed Project site would be addressed in the same manner as described in the sections that follow for spills or accidents that occur at the proposed Project site.

4.15.1 Methods

The analysis of impacts from hazardous materials associated with the proposed Project identified and quantified materials likely to be used during construction, operations and maintenance, and decommissioning, including the following:

- Identification of the types of hazardous materials and quantities that will be required for construction, operations and maintenance, and decommissioning
- Determination of how and where hazardous materials will be used during construction, operations and maintenance, and decommissioning
- Identification of safety measures that would be implemented in the event of an accident
- Identification of local, State, and Federal regulations applicable to the proposed Project

4.15.1.1 Significance Criteria

Based on the significance criteria listed below, a significant effect from hazardous materials would occur if the following were experienced from construction, operations and maintenance, or decommissioning of the proposed Project:

- Creation of a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment
- Improper disposal of waste generated by the proposed Project that would pose a threat to public health or the environment
- Violation of Federal, State, or local regulations regarding containment, handling, transport, use, and disposal of hazardous materials
- Creation of a conflict with or impairment of the implementation of an existing local emergency response plan or emergency evacuation plan

During the public scoping meetings and public comment period for the Project from January 14, 2010 to March 1, 2010, Western received one comment specifically expressing concern:

- Concern about hazardous materials associated with the Project, which could include industrial waste, air pollutants, toxic chemicals used for vehicle maintenance and in construction, and smoke from the burning of vegetation

4.15.2 Impact Analysis of the Proposed Project

Hazardous materials that would likely be used during construction, operations and maintenance, and decommissioning of the proposed Project include fuel, lubricants, solvents, oils, chemicals, and paints. Table 4.15-1 identifies the hazardous materials that would be used throughout the lifetime of the proposed Project. Many of them are familiar to and commonly used by homeowners and the general public. There is potential for the public, workers, or the environment to be exposed to hazardous materials if the latter were improperly handled or as a result of a transportation accident.

Table 4.15-1:
Hazardous Materials Associated with Construction, Operations and Maintenance, and Decommissioning of Wind Farm

Material	Use of Material	Typical Quantities Present during Construction[1]	Typical Quantities Present during Operations[1]
Hydraulic fluid	Used in wind turbine components and construction equipment	4940 gallons	210 gallons
Gearbox oil	Used in motor gearboxes	0	60,000 gallons (300 gallons per turbine)[2]
Diesel fuel	Fuels construction and transportation equipment Powers emergency generator	4,000 gallons	20 gallons
Motor oil	Used for maintenance of fluid levels	110 gallons	15 gallons
Transmission fluid	Used for maintenance of construction vehicles	110 gallons	0
Antifreeze	Used in turbine components for cooling Used in cooling system for emergency generator	10 gallons	750 gallons
Plasticizer (for concrete)	Used for construction of foundation	55 gallons for entire construction period	0
Concrete curing compound	Used for construction of foundation	330 gallons for entire construction period	0
Cable cleaning compound	Used for cable preparation/termination	1 gallon	0
Acetylene	Used for welding	1 compressed gas cylinder	0
Grout	Used between turbine and turbine foundation	100 cubic yards	0
Lubricating grease	Maintenance of fluid levels in vehicles Used in motor gears	20 pounds	200 pounds
Never-seize	Used in maintenance of turbine gears	16 pounds	0
Loctite	Thread-locking fluid for bolts	10 ounces	2 ounces
Penetrox	Joint compound used to prevent oxidation of aluminum conductors	2 gallons	1 gallon
WD40 or equivalent	Maintenance of construction equipment Maintenance of mechanical turbine components	3 gallons	60 ounces

Table 4.15-1:
Hazardous Materials Associated with Construction, Operations and Maintenance, and Decommissioning of Wind Farm

Material	Use of Material	Typical Quantities Present during Construction[1]	Typical Quantities Present during Operations[1]
Transformer oil	Used for insulating transformers	0	120,000 gallons[2] (511 gallons per pad mount, approximately 17,600 gallons at the substation)
De-Icer	Used for vehicles and equipment	12 gallons	2 gallons
Simple green or equivalent	Used for cleaning operations building and periodic cleaning	110 gallons	110 gallons
Epoxy resin	Used for turbine blade repair	5 gallons	0
Paint	Used to paint operations building Used for corrosion control on turbines Used for touch-ups during construction	100 gallons	1.5 gallons
Oxygen	Used for welding	1 compressed gas cylinder	0
Propane	Used for heating operations building	30 gallons	1,000 gallons
Form oil	Used on concrete forms	220 gallons	0
ABC Fire Extinguisher	Used for extinguishing onsite fires	50 extinguishers	20 extinguishers
Gasoline	Used for vehicles/equipment	500 gallons	10 gallons

1 Quantities are reported for the amounts of products found onsite during a typical day during the operational phase.
2 Quantities reported are based on the use of 200 GE turbines (for representation purposes only)

4.15.2.1 Construction Activities

The proposed Project would consist of the construction of between 100 and 200 wind turbines, access roads, four permanent meteorological towers, underground 34.5-kV power collection tie lines, a Project substation, Western's switchyard and 345-kV gen-tie line, metering equipment, and an operations and maintenance facility. As described in section 3.15, it is not likely that there are any pre-existing hazardous materials located within the proposed Project site; therefore, it is not expected that existing hazardous materials or waste would be encountered during construction activities.

Table 4.15-1 lists the types of materials that are expected to be used for construction of the proposed Project, including fuel, oil, and hydraulic fluid for maintaining construction vehicles and equipment and solvents for equipment cleaning. It is anticipated that the maximum quantity of any one type of hazardous material used onsite and stored onsite during construction would not exceed 4,000 gallons.

Although many different types of hazardous materials will be used for construction of the proposed Project, only small quantities of hazardous waste would be generated during the construction phase of the Project. Hazardous wastes would not be generated in quantities greater than 220 pounds in a calendar month; it is anticipated that the Project will be under the threshold of small quantity generator status. Any oily waste, rags, or dirty or hazardous solid waste will be collected in sealable drums and removed for recycling or disposal by a licensed contractor, in accordance with standard industry practice and regulations.

A total of 220 pounds of hazardous waste is the threshold for being considered a conditionally exempt small quantity generator. If this threshold were to be exceeded, generator status would be changed from conditionally exempt small quantity generator status to small quantity generator status and SWE would be responsible for adhering to regulations set forth in the Wyoming Hazardous Waste Rules. Wastes would be properly disposed of at a permitted Resource Conservation and Recovery Act Subtitle C Treatment Storage and Disposal facility according to Federal and State requirements.

According to the Phase I ESA conducted in 2009 (Ecology and Environment 2009), there are no underground storage tanks located onsite and none are proposed to be installed during the construction phase of the proposed Project. Effects to humans and the environment could occur if hazardous materials were to leak from containment vessels, storage containers, or from vehicles. All hazardous materials would be properly stored, including within secondary containment vessels such as concrete berms or manufactured containment pallets where applicable to safeguard humans and the environment from an accidental hazardous materials release. Leaks of hazardous materials from equipment being used during construction would be cleaned up immediately and the contaminated soil would be disposed of according to regulatory requirements governing disposal of contaminated soils.

The public or workers could also be exposed to hazardous materials if the latter were improperly handled or as a result of a transportation accident. However, the handling of these materials would follow all applicable local, State, and Federal regulations, which are designed to minimize risk. Should there be an accidental release into the environment, SWE would follow the procedures outlined in the SPCCP, in accordance with 40 CFR 112. The SPCCP would document procedures for spill prevention, response, containment, reporting, and cleanup and would also describe training requirements, inspection protocols, and emergency procedures. Prior to beginning construction, workers will receive spill cleanup training and spill kits for rapid and effective response will be available in the construction office, vehicles, laydown areas, and staging areas.

It is common practice in the ready-mixed concrete industry to thoroughly clean the inside of a concrete trucks drum at the end of each day using approximately 150 to 300 gallons of water. Concrete wash water is alkaline, has high levels of suspended solids, and can contain high levels of metals, which can leach into the ground and contaminate groundwater. Contaminated water can also migrate to a drainage which can increase the pH of area waters and harm aquatic life.

Concrete washout would only be disposed in properly designed concrete washout facilities or possibly re-using the water for concrete mixing. Re-use for concrete mixing would depend on the chemical composition of the water.

With adherence to applicable regulations, standard industry practices and normal BMPs, it is expected that there would be little impact from hazardous materials during construction of the proposed Project.

4.15.2.2 Operations and Maintenance

The types and anticipated quantities of hazardous materials that would be used for operation and maintenance activities are listed in table 4.15-1. Operation and maintenance of the proposed Project would not require the use or disposal of regulated amounts of hazardous materials.

Wind turbines require relatively small amounts of hydraulic fluids, lubricating oils, and coolant to operate properly. These materials would require periodic changing or refilling throughout the lifetime of the proposed Project. Once individual wind turbines have been serviced, waste fluids would be properly stored and disposed of at a facility that is licensed to accept hazardous wastes. Each individual turbine would contain approximately 300 gallons of gear box oil and the transformer oil required for each pad-mounted transformer is approximately 510 gallons. These quantities are representative of utilization of the GE turbine model described in chapter 2 and may change based on final turbine selection. Approximately 17,600 gallons of transformer oil would be required for substation transformers.

The potential for impacts to the public or the environment with regard to hazardous materials and wastes generated during operations and maintenance activities is greater than those associated with construction of the proposed Project. Impacts to the environment, workers, or the public could occur as a result of accidental spills, or from leaks if the materials were improperly handled. The handling of these materials, however, would follow the procedures described in section 4.15.2.1 above. Since the transportation, handling, storage, use, and disposal of hazardous materials are highly regulated and standard industry practices and BMPs are in place, it is expected that the risk of impacts would be low, and any actual impacts minimal during operations and maintenance of the proposed Project.

4.15.2.3 Decommissioning

The expected operational period of the proposed Project is approximately 20 years. Potential effects from decommissioning of the proposed Project are similar to those described in the sections above in that workers and the public could be exposed to hazardous materials if these were improperly handled or if a transportation accident occurred. It is not anticipated that regulated quantities of hazardous materials would be used or generated during this phase of the proposed Project. Project components would be dismantled and properly disposed of in accordance with regulations in place at the time of decommissioning. The materials used would be similar to those used during the construction and operations phases, including fuel, oil, and hydraulic fluid for construction vehicles and equipment and solvents for equipment cleaning. These materials are listed in table 4.15-1.

4.15.3 Impact Assessment of SWE's No Project Option

Under SWE's no Project Option, it is assumed the proposed Project would not be built and environmental impacts associated with construction and operation of it would not occur. No impacts to public and worker health and safety would, therefore, occur.

4.15.4 Mitigation Measures

The following BMPs and mitigation measures have been identified and committed to by SWE to avoid resource impacts or reduce potential impact levels. They are considered an integral part of the proposed Project and would be implemented by SWE as requirements in SWE's contract with their construction contractor. BMPs and mitigation measures applicable to operation and maintenance activities would be incorporated in SWE's Operation and Maintenance Plan for the Hermosa facility, and those related to decommissioning would be incorporated in SWE's Decommissioning Plan. Mitigation measures would also be required by law, regulation, or permit conditions, and compliance would be overseen by the responsible regulatory authorities. While Western has no authority or jurisdiction over SWE's proposed Project, Western's decision to execute an interconnection agreement would consider SWE's commitments to implement these BMPs and mitigation measures, and the reduction in environmental impacts that would result.

BMPs

- HAZ-1: Prior to commencing construction, a Hazard Communication Program will be developed that will document the process of informing Project personnel of the hazardous substances that may be encountered on the proposed Project site. This program will comply with OSHA requirements under the Hazard Communication Standard. Elements of the Hazard Communication Program include a hazard determination process, approval process, materials inventory system, and training for site personnel. At a minimum, hazardous materials will be properly labeled and material safety data sheets will be available at the site.
- HAZ-2: As part of the Hazard Communication program, proper storage of hazardous substances will be identified and implemented. Flammable and combustible materials will be stored in appropriate cabinets or other containers. It is likely that aboveground storage tanks with appropriate containment will be used for fuel storage. Care will be taken when selecting the location of hazardous materials storage areas within the site to avoid potentially sensitive areas. During construction, it is anticipated that most materials will be used as they are delivered to the site.
- HAZ-3: Secondary containment for all hazardous materials that are stored onsite will be provided to minimize potential effects to the surrounding environment. Examples of secondary containment are concrete bermed areas and manufactured containment pallets.
- HAZ-4: Concrete washout would only be disposed in properly designed concrete washout facilities or possibly re-using the water for concrete mixing. Re-use for concrete mixing would depend on the chemical composition of the water.
- HAZ-5: Trained spill containment crews will respond to accidental releases as described in the HSSE plans.

Mitigation Measures

- HAZ-6: If oil products are stored above ground in quantities greater than 1,320 gallons, a SPCCP developed in accordance with 40 CFR 112 will be implemented that will define procedures for storage, clean up, and disposal of materials associated with construction, operations and maintenance and decommissioning of the proposed Project. As defined in the SPCCP and the HSSE Plans, a spill response crew would respond to accidental releases.
- HAZ-7: If an accidental spill of hazardous materials occurs as a result of improper handling or a transportation accident, the materials will be promptly cleaned up by trained spill response crews in accordance with the HSSE plans.
- HAZ-8: A certified waste disposal company will be contracted to properly dispose of wastes according to Federal, State, and local regulations.
- HAZ-9: Prior to construction, SWE will prepare a Decommissioning Plan for the proposed Project in accordance with Albany County Wind Energy Siting Regulations and in accordance with Section 10 of the WYDEQ Rules and Regulations of the Industrial Siting Council. The plan will be updated as necessary throughout the lifetime of the Project to reflect changes in local, State, and Federal regulations. The Plan will document hazardous waste management and disposal procedures.
- HAZ-10: Should previously unknown hazardous materials such as contaminated soils be encountered within the site during construction, operations and maintenance, or decommissioning, the materials will be identified and the appropriate agency will be informed. If this occurs during construction, construction will be halted at the location where the potentially hazardous material is identified.
- HAZ-11: All potentially hazardous materials will be handled, processed, treated, stored, and disposed of in accordance with Federal, State, and county rules and regulations and label instructions.

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4.16 Health and Safety

This section discusses the potential impacts to public health and safety associated the implementation of SWE's proposed Project. The proposed Project components analyzed include SWE's construction, operation and maintenance, and decommissioning of the wind farm as well as Western's proposed Federal action. For the purposes of this discussion, the study area extends beyond the proposed Project site and is defined as the residences and towns or cities that receive public services from Albany County or Laramie.

Comments received from stakeholders during public scoping and identified in table 1.10-1 were considered during this analysis. The comments received expressed concerns with the adequacy of law enforcement on the proposed Project site, fire prevention and response, hazardous road and driving conditions, buffering between residences and the proposed Project, ice throw, industrial waste, and effects to aviation. Stakeholders also expressed concerns with the control of access to the Project site.

4.16.1 Methods

Impacts related to public and worker health and safety as a result of implementing the proposed Project were evaluated based on a review of existing regulations, safety standards, and proposed construction and operations procedures. Industry practices are required to be protective of public and worker health and safety. Impacts associated with the proposed Project that could occur were assessed by comparing projected activities and impacts with existing safety standards and regulations to protect public health.

4.16.2 Significance Criteria

A significant impact to public and worker health and safety would result if any of the following were to occur from constructing and operating the proposed Project:

- Injuries to workers above the normal industry rate, and injuries to visitors to the area, or land users that require medical treatment

During the public scoping meetings and public comment period for the Project from January 14, 2010, to March 1, 2010, Western received several comments expressing concern:

- Concern about the adequacy of law enforcement on the Project site, fire prevention and response, road and driving conditions, buffering between residences and the Project, industrial waste, and effects to aviation
- Concern about the control of access to the Project site because there have been recorded instances of illegal activity in the area and providing additional access roads could facilitate such activities, in particular poaching and drug manufacturing
- Concern that the Project could potentially increase the need for law enforcement in the area
- Request that the design of the maintenance building include a large water tank for the Tie Siding Volunteer Fire Department to use to fight fires on the Project site

- Concern about hazardous winter driving conditions, such as turbulence, ground blizzards, and drifting snow caused by wind turbines and maintenance facilities located near Cherokee Park Road and Boulder Ridge Road
- Concern about potentially hazardous driving conditions on Highway 287 from cars trying to pass construction equipment or trucks with a request for mitigation measures during the construction period
- Request that a buffer zone of 1.5 to 2 miles be created between homes and the wind farm for health and safety for area residents

These comments were taken into consideration during the analysis of impacts to public health and safety as presented below. Comments regarding hazardous road and driving conditions and effects to aviation are addressed in section 4.9.

4.16.3 Impact Assessment of the Proposed Project

This section discusses key public health risks, workplace health and safety, and the availability of emergency services associated with the proposed Project. Risk to public health and safety may occur during the construction, operation, or decommissioning phases throughout the lifetime of the proposed Project.

Public health risks discussed in this section include general construction and operations risks associated with proposed Project components and EMF. Other sections of this draft EIS that describe potential public health issues and address the comments received include the following:

- Air Quality
- Transportation (including impacts to aviation and airports)
- Hazardous Materials
- Noise
- Water Resources
- Visual Resources (including shadow flicker and aviation lighting discussion)

4.16.3.1 Workers

Activities that typically occur during construction, operation, and decommissioning of a wind farm include establishment of site access, tower foundation excavation, tower assembly and erection, installation of nacelles and rotors, construction of an operations and maintenance building, construction of an electrical substation and switching station, meteorological tower installation, construction of the gen-tie line, and periodic maintenance of turbines and associated facilities. Injuries and fatalities from onsite accidents can still occur even when workers are properly trained to follow safety procedures and use appropriate protective equipment. Health impacts to workers resulting from construction, operations and maintenance, and decommissioning of the proposed Project are expected to be minimal and would be reduced by complying with BMPs listed in section 2.6 and by complying with health and safety regulations, standard industry practices, and mitigation measures.

4.16.3.1.1 Construction Workers

Potential health impacts to construction workers may result from fugitive dust, high noise levels associated with construction equipment, and airborne emissions from activities such as soldering, welding, painting, and cleaning. Injury resulting from accidents such as slips, trips, falls, and those associated with the operation of heavy construction equipment also pose a risk to workers. Exposure to health risks would vary depending on the number of construction workers performing any particular construction-related task and the length of time that task takes to complete.

Table 4.16-1 shows average national rates of injury/illness for construction workers. Similar rates of injury/illness may be expected for construction of the proposed Project, as construction activities are always potentially dangerous to workers. Of the 5.7 million construction workers, there were 202,100 recordable injury cases during the reporting year. Of those recordable injuries, 75,000 cases resulted in lost workdays. In the power industry, the injury/illness rates are better than the average rates of all industries (Table 4.16-2).

Table 4.16-1:
Occupational Injury/Illness Rates for Construction Industry (Number of Workers in Thousands)

Industry	2010 Average Annual Employment[1]	Total Recordable Cases	Total Recordable Case Rate	Lost Workday Cases[2]	Lost Workday Case Rate[2]
Construction	5,701.5	202.1	4.0	75.0	1.5
All Industries	124,868.5	3,883.6	3.8	1,191.1	1.2

Source: U.S. Bureau of Labor Statistics (2010)

1 Employment is expressed as an average and is derived primarily from the BLS-Quarterly Census of Employment and Wages program.

2 Days-away-from-work cases include those that result in days away from work with or without job transfer or restriction.

4.16.3.1.2 Operations and Maintenance Workers

The potential for worker-related adverse health and safety-related impacts to occur during operations would be low but would occur over the long term, lasting the lifetime of the proposed Project. Operations and maintenance of turbines and associated facilities may subject workers to physical hazards resulting from onsite accidents such as slips, trips, or falls, electrocution hazards, and exposure to chemicals used during maintenance activities. Table 4.16-2 shows average national rates of injury/illness for electric power generation workers. Similar rates of injury/illness may be expected for operation of the wind farm.

Table 4.16-2:
Occupational Injury/Illness Rates for Utilities (Number of Workers in Thousands)

Industry	2010 Average Annual Employment[1]	Total Recordable Cases	Total Recordable Case Rate	Lost Workday Cases[2]	Lost Workday Case Rate[2]
Electric Power Generation, Transmission and Distribution	557.1	16.9	3.1	5.7	1.0

Source: U.S. Bureau of Labor Statistics (2010)

1 Employment is expressed as an average and is derived primarily from the BLS-Quarterly Census of Employment and Wages program.

2 Days-away-from-work cases include those that result in days away from work with or without job transfer or restriction.

4.16.3.2 Public Health and Safety and Site Security

Potential health risks to the public from implementation of the proposed Project include fugitive dust, increased noise, traffic injuries, accidental fires, blade breakage, shadow flicker, and ice throw, which can occur if ice builds up on the turbine blades. Potential health impacts associated with increased noise, fugitive dust, shadow flicker, and traffic accidents are discussed in detail in sections 3.5, 3.7, 3.6, and 3.8, respectively. It is anticipated that impacts to public health and safety from those potential sources, with proposed mitigation measures employed, would be negligible.

Rotor blade breakage has been reported, but is rare, and manufacturing processes have improved as the wind turbine industry has matured. A broken blade would instantly trigger an automatic shutdown of the turbine, which would take only seconds. Ice buildup on turbine blades can occur under certain atmospheric conditions. During an icing event, turbines are proactively taken out of service and the site is closed to all personnel and the turbines are not returned to service until the ice has been shed from the blades. Appropriate setback distances from residences and public roads also would be factored into Project design and placement of individual turbines. SWE exceeds the Albany County setback requirement of at least 0.25 mile or 5.5 times the tower height, whichever is greater, from residential dwelling or occupied structure (Albany County 2011). Should ice throw occur at the Project site, it highly unlikely that it would be thrown past more than approximately 1.5 times tip height, so any risk to human safety would be very low based on the required setbacks.

Unauthorized access to the proposed Project site during construction, operation and maintenance, and decommissioning would pose a potential health and safety risk to trespassing parties, and could increase risk to workers. In the event a trespass on private land was detected, SWE employees would escort the trespassing individual off of the property.

Wind energy projects and their associated substation and transmission facilities could be the subject of intentional destructive acts. True terrorism or sabotage would be more likely to occur at the regional electric system level, such as a regional electricity grid, to cause widespread disruption. Targeting a single small facility in a sparsely populated area like the proposed Project would be very unlikely, and in any event, would cause little to no impact on the surrounding population. The proposed Project would be more likely to experience vandalism, which SWE would minimize by screening the substation and switchyard using topographic features and securing them with security fencing. Normal maintenance activities would have SWE employees traveling to various locations within the Project site on a seemingly random schedule during the day, which would provide some level of site security for the entire Project, and also help identify and report illegal or suspicious activity on the site.

Small volumes of waste would be generated during the construction and operations and maintenance phases of the proposed Project. The types of waste expected to be generated during construction include shipping and packing materials for turbine parts, concrete waste, wood waste, surplus subsoil and excavated rock, straw bales and silt fencing associated with erosion control, and ground clearing materials. Solid waste generated during operations is not expected to be greater than one dumpster per week. Types of waste generated would be waste paper, shipping and packing materials for spare parts, and waste generated from equipment repair. It is anticipated that all solid, non-hazardous waste will be stored in onsite dumpsters and hauled away to a State landfill in accordance with applicable regulations.

At the end of the wind farm lifetime, large amounts of construction salvage would result from decommissioning of the proposed Project. Most Project components would be recycled, and the remaining solid waste materials would be taken to an appropriate licensed waste disposal facility. Draining of hazardous materials from turbine equipment and disposal of these materials are discussed in section 4.16.2.3.

It is anticipated that much of the construction salvage would be recycled, so the remaining solid waste generated would not be expected to place an increased burden on local solid waste facilities and would not significantly impact a State's existing landfill capacities.

4.16.3.3 Emergency Services and Emergency Response

The increased number of workers in the area during construction of the proposed Project and the risk associated with construction activities may affect local emergency services such as police services, fire protection, and emergency medical services.

4.16.3.3.1 Law Enforcement

Law enforcement at the proposed Project site is the responsibility of the Albany County Sheriff's Office and the police department in Laramie. Assuming that approximately 212 non-local workers would be employed at peak construction at the proposed Project site, and that most would live in and around Laramie, then the number of crimes committed annually is calculated to potentially increase by 6—an increase of less than 1 percent above current levels (BSR 2010). There are currently about 1.9 police officers per 1,000 residents in Laramie, which is below the national average and that of many other cities in Wyoming. On the other hand, the presence of construction workers and SWE employees on the Project site may result in the reporting of criminal acts by non-Project individuals to the Sheriff's Office, such as trespassing, poaching, and vandalism.

4.16.3.3.2 Fire Services

The nearest fire departments that serve the Project area are the Tie Siding volunteer fire department and the Vedauwoo volunteer fire department. The Laramie Fire Department also serves the study area. The addition of up to 214 non-local workers at peak construction would not affect the level of service provided by these fire departments.

Scenarios involving increased fire risk associated with construction and operation is remote. During construction a fire could occur due to welding near the grass areas or from heavy equipment mufflers in high grass which could be addressed. Turbine fires are rare and not part of normal operations. If a fire were to occur, the objective for fire control is to contain any potential ground fires caused by falling debris. SWE would not attempt to control the fire at the source if it is up-tower. The local fire departments we have encountered in our other windfarms have been adequate to meet ground fire challenges. SWE would provide for training of all local fire departments that may be called on to assist the project should there be a fire. Training is focused on rescues from heights which is a greater safety concern than fire. It is common for SWE to provide high rescue training to local fire departments.

4.16.3.3.3 Emergency Medical Services

There are a variety of circumstances when emergency medical service (EMS) could be needed during Project construction and operation, including incidents on the proposed Project site and vehicle accidents involving workers commuting to and from the work areas. The Laramie Fire Department is responsible for providing EMS to all of Albany County and would be the principal responder to the proposed Project site. Emergency medical evacuation (Medevac) receiving facilities are available through Ivinson Memorial Hospital in Laramie, but the hospital does not have a Medevac unit onsite and instead relies on the unit based at the North Colorado Medical Center in Greeley, Colorado. Given the distances and time involved in getting ground-based EMS to the Project site, EMS is a concern in relation to both potential effects to overall service in the local area and in terms of response to incidents at the proposed Project site during construction and operations. SWE offers high-rescue training to the local fire department and to operations and maintenance workers in case of emergency.

4.16.3.3.4 Emergency Response

In Albany County, the Albany County Emergency Management Office is coordinated by the Laramie Fire Department and is responsible for responding to natural disasters and hazardous materials spills and for implementing the County's Hazard Mitigation Plan. Construction, operation and maintenance, and decommissioning of the proposed Project would not interfere with the County's Hazard Mitigation Plan. Incidents at the proposed Project site could require an EMS response, but such incidents would be within the normal EMS operational area and would not occur at a rate that would degrade overall EMS response or service.

4.16.3.4 Fire Prevention and Control

Small quantities of flammable liquids and compressed gases would be stored onsite during construction, and the risk of fire or explosion resulting from the storage of these materials is low. Flammable liquids used onsite would include construction equipment fuels, paints, and cleaning solvents. Accidental fires could occur resulting from human activities such as smoking cigarettes, the use of construction equipment in dry grassy areas, accidental ignition of flammable liquids, and mechanical malfunction associated with the wind turbines, electrical transformers, substation, switching station, and tie line.

While most fires occurring within the Project site would likely be responded to by the local volunteer fire department in a timely manner and would not be difficult to access, there are not sufficient quantities of water available onsite to fight a large fire. Additionally, fires occurring within the nacelle of a wind turbine would not likely be within the capabilities of the Tie Siding Volunteer Fire Department or the Laramie Fire Department. The local firefighters would be able to keep such a fire from spreading on the ground and confine the fire to the individual turbine site. Fires occurring within the nacelle are rare and sensors within the wind turbine would detect interior fires and immediately shut down machinery.

4.16.3.5 Electric and Magnetic Fields

EMFs are present in transmission lines and all household and electrical appliances, and are produced by voltage and current, respectively. In North America, electric fields are produced at a frequency of 60 Hz. All electric transmission lines and electric devices produce electric and magnetic fields. In the case of transmission lines, the strength of the EMFs varies depending on the configuration of the transmission line. EMFs are usually highest directly under the conductor and diminish as one moves further away from the conductor. Table 4.16-3 shows typical 60-Hz EMF levels produced by different voltage transmission lines at varying distances away from the centerline of the transmission line. The short gen-tie line is proposed to operate at 345 kV and EMF levels associated with it are expected to be similar to those listed in Table 4.16-3.

Table 4.16-3:
Typical Electric and Magnetic Field Levels

Gen-tie Line Voltage[1]	Centerline	Approximate Edge of Right-of-Way	100 feet from Centerline	200 feet from Centerline	300 feet from Centerline
115-kV					
Electric Field (kV/M)	1.0	0.5	0.07	0.01	0.003
Magnetic Field (mG)	30	6.5	1.7	0.4	0.2
230-kV					
Electric Field (kV/M)	2.0	1.5	0.3	0.05	0.01
Magnetic Field (mG)	57.5	19.5	7.1	1.8	0.8
345-kV					
Electric Field (kV/M)	3.75	1.6	0.9	0.1	0.04
Magnetic Field (mG)	125	30.0	22.0	6.0	2.76
500-kV					
Electric Field (kV/M)	7.0	3.0	1.0	0.3	0.1
Magnetic Field (mG)	86.7	29.4	12.6	3.2	1.4

Source: Western (2010a)

1 Electric fields from power lines are relatively stable because voltage does not change. Magnetic fields fluctuate greatly as current changes in response to changing load. The magnetic fields above are calculated for 321 power lines for 1990 mean loads.

EMFs will also be produced by the switching station and electric substation associated with the Project, but given the spacing of electrical equipment, measured field strengths are low outside the fence line (Western 2010a). EMFs in close proximity to a substation are mainly produced by the entering power lines (Western 2010a).

EMFs associated with the turbines would not be detectible at ground level due to the distance between the nacelle and the base of the turbine. Pad mounted transformers used for Wind Energy Facilities are very similar to those used by electrical utilities in residential neighborhoods all over North America. Any EMF coming from a transformer assembly core is shielded by the transformer tank, which is grounded. In addition to reducing any EMF that may exist, the transformer tank and grounding minimizes the radio interference or possibility of de-magnetism of magnetic storage devices that are near to the pad mounted transformers.

The short gen-tie line associated with this Project would be designed to minimize electric and magnetic fields. In general, the electric and magnetic fields associated with the proposed gen-tie line at the edge of the right-of-way would be similar to those associated with household electric appliances and would diminish rapidly to ambient background (zero) outside of the gen-tie line right-of-way. It should be noted that these levels are also expected to be similar to those associated with the existing 345 kV and 230 kV transmission lines that traverse the Project site. Given the remote location of the proposed gen-tie line, substation and switching station and other electrical infrastructure, and therefore limited potential exposure to EMF, there would be no potential impacts to the public associated with EMF.

The edge of the right-of-way would generally mark the boundary of any long-term residential exposure levels that could be considered a possible health concern. Since there would be no residences or occupied buildings within the right-of-way of the gen-tie line, distribution line, or near other electrical infrastructure, no such long-term exposures would occur.

Nuisance shocks would be avoided through proper equipment operation in the gen-tie line right-of-way and through adequate grounding techniques.

4.16.3.5.1 Corona

Effects resulting from corona would not impact residents in the vicinity of the new 345-kV gen-tie line or associated Project facilities because the nearest residences are at least 2 miles away from it.

The corona produced by a transmission line also produces a small amount of ozone very near the conductors. The concentration of ozone would be a few parts per million near the conductor and would not be measurable at any distance from the conductor.

4.16.4 Impact Assessment of the No Project Option

Under the no Project option, Western would not execute an interconnection request with SWE. It is assumed that under this alternative the proposed Project would not be built and there would be no impacts to public and worker health and safety.

4.16.5 Mitigation Measures

4.16.5.1 Worker Health and Safety

The following BMPs and mitigation measures have been identified and committed to by SWE to avoid resource impacts or reduce potential impact levels. They are considered an integral part of the proposed Project and would be implemented by SWE as requirements in SWE's contract with their construction contractor. BMPs and mitigation measures applicable to operation and maintenance activities would be incorporated in SWE's Operation and Maintenance Plan for the Hermosa facility, and those related to decommissioning would be incorporated in SWE's Decommissioning Plan. Mitigation measures would also be required by law, regulation, or permit conditions, and compliance would be overseen by the responsible regulatory authorities. While Western has no authority or jurisdiction over SWE's proposed Project, Western's decision to execute an interconnection agreement would consider SWE's commitments to implement these BMPs and mitigation measures, and the reduction in environmental impacts that would result.

To mitigate potential risks to workers during construction, all work at the Project site would be conducted following Federal OSHA and Wyoming Department of Employment, Occupational Health and Safety standards as well as requirements set forth in the WISA Chapters 1 and 2 to reduce the potential occurrence of injury to workers.

BMPs

- PHS-1: All site personnel, regardless of job responsibilities, will receive Project orientation addressing environmental and health and safety Project procedures, requirements and site rules. In addition to reviewing this information with all employees, SWE will review the plan with the Tie Siding Volunteer Fire Department personnel, Laramie Fire Department personnel, and emergency services personnel to ensure response or evacuation plans and procedures are part of construction and operation activities and planning.
- PHS-2: Fueling of vehicles will be conducted in accordance with procedures that will minimize the risk of fires and spills.
- PHS-3: Selected crew leads will be trained in first aid, automated external defibrillator operation, and CPR. Adequate materials and resources for onsite treatment, first aid, and stabilization will be available onsite at all times. Handling of spills is addressed in section 4.15.2.1.

Mitigation Measures

- PHS-4: HSSE Plans will be prepared for worker protection, as required by OSHA, with emphasis on safety and health regulations for construction and operations and maintenance. During Project construction, operations, and maintenance, all employees would be required to conform to safety procedures and to receive appropriate training for their job responsibilities. The HSSE Plans will include requirements for first aid and other emergency medical material to be stored on site and in maintenance vehicles.
- PHS-5: Heavy equipment will be outfitted with OSHA-required safety devices. Hard hats, safety boots, ear and eye protective equipment, and other safety equipment will be used on the construction site.
- PHS-6: To minimize workplace dangers, all construction activities will comply with applicable State and Federal worker health and safety regulations which are the primary responsibility of the Wyoming Department of Employment, Occupational Health and Safety and OSHA, respectively. OSHA regulations that are applicable to the proposed Project include 29 CFR 1910 (general industry standards and 29 CFR 1926 (construction industry standards).

Additionally, the State of Wyoming has an occupational safety and health program in accordance with Section 18 of the Occupational Safety and Health Act of 1970. Adherence to these regulations is mandatory and will minimize risk to workers.

4.16.5.2 Public Health and Safety and Site Security

The State-owned land within the Project site would remain open to public access except during construction. The proposed Project's operations and maintenance facility would be permanently staffed during normal business hours with a combination of approximately 20 to 40 workers from SWE and contractors from the wind turbine manufacturer. To protect the public from potential risks associated with the construction of the proposed Project, the following mitigation measure will be implemented.

BMPs

- PHS-7: Wind turbines will be shut down under wind conditions exceeding manufacturer's operational parameters.
- PHS-8: Staff would be driving the Project site frequently to conduct a visual inspection of the operation during routine maintenance, including wind turbines, road conditions, fencing, other infrastructure, and any incidences of waste disposal, theft, or vandalism. Frequent visual monitoring of the site will also reduce the potential use of the Project site for illegal activities such as drug labs and illegal hunting.
- PHS-9: Permanent chain-link fencing will be installed at the substation and switchyard, at the outdoor storage area adjacent to the operations and maintenance building, and in additional areas where security or theft might be a concern.
- PHS-10: During construction, temporary plastic mesh fencing will be installed to protect public and worker safety near excavated wind turbine foundations, electrical collection system trenches, material laydown areas, or any other areas deemed hazardous. Open holes and trenches without fencing will be covered or fenced to deter wildlife and livestock from becoming trapped or injured.
- PHS-11: The International Electrotechnical Commission has published International Standard 61400-1, which outlines the minimum design requirements for wind turbines. These design requirements are intended to ensure safe operation of wind turbines. The turbines used by SWE for this Project will conform to or exceed these standards.
- PHS-12: The general public will not be permitted to enter the Project construction site. Most private property within the Project area is fenced off. If trespassers are identified on privately owned land, they will be escorted off of the property by SWE personnel. Some of the property that the Project will be constructed on is State land that is open to the public. During inspections, staff will ensure that there are no members of the public disturbing turbines or other project features that are located on lands that are open to the public.

Mitigation Measures

- PHS-13: Wind turbines will be set back from residences, public roads, and railroads in accordance with Albany County Wind Energy Siting Regulations. This will minimize hazards associated with turbulence, ground blizzards, and drifting snow caused by wind turbines, and in the rare event of blade breakage or ice throw.

Mitigation associated with construction-related noise, visual resources, air emissions, construction-related traffic, and hazardous materials resulting from construction, are discussed in detail in sections 4.5, 4.6, 4.7, 4.8, and 4.14 respectively.

4.16.5.3 Solid Waste

Mitigation measures proposed to reduce impacts of solid waste are as follows.

BMPs

- PHS-14: Dumpsters for solid waste will be used during construction, operation, and decommissioning of the proposed Project and materials will be recycled to the extent feasible.
- PHS-15: Solid waste resulting from the implementation of the proposed Project will be transported by a commercial trash company and disposed of in a designated landfill and will be disposed of in accordance with all local, State, and Federal regulations.

4.16.5.4 Emergency Services

Construction, operation, and decommissioning of the proposed Project could potentially place increased pressure on local emergency services such as law enforcement, emergency medical services, and emergency responders. The following mitigation measures would reduce impacts to less than significant levels.

BMPs

- PHS-16: SWE will prepare an Emergency Response Plan and will consult with Albany County emergency services to ensure that policies and procedures are consistent with those already established for the county.
- PHS-17: SWE will coordinate with local emergency services to determine whether an increase in staff during times when emergency services may be stressed (most likely during construction phase) is warranted.
- PHS-18: SWE operations and contractor personnel are trained and equipped for emergency response and SWE will coordinate with local emergency response providers to supply ongoing additional support.

4.16.5.5 Fire Prevention and Control

Construction, operation, and decommissioning of the proposed Project could potentially place increased pressure on local emergency services such as fire services. Implementation of industry-approved design measures and BMPs as described in section 2.6 for all facility components would reduce the risk of mechanical fire. Electrical design will comply with the National Electric Safety Code and National Fire Protection Association standards. The following BMPs and mitigation measures would assure that impacts related to fire services are less than significant.

BMPs

- PHS-19: Onsite personnel will routinely inspect the wind farm facilities for fire hazards.
- PHS-20: Wind turbines will be outfitted with lightning protection systems that will reduce the chance of fires igniting from lightning. Each wind turbine and associated electrical equipment will be constructed with non-flammable material around the base of the equipment to reduce the spread of fire should electrical equipment ignite.
- PHS-21: Construction and maintenance vehicles will be equipped with fire extinguishers in the event of an equipment fire. Should an onsite fire occur, onsite personnel will call 911 to alert the Laramie Fire Department.
- PHS-22: Throughout the lifetime of the proposed Project, SWE will coordinate with the Tie Siding Volunteer Fire Department and Laramie Fire Department to minimize safety hazards and ensure adequate response times.

4.16.5.6 Electric and Magnetic Fields

Electric and magnetic fields within the Project site would be expected to be negligible given the design of the facilities, the lack of demonstrated health effects associated with EMF, and the distance between the substation, switching station, and gen-tie line and existing residences. Additionally, because there are currently two high voltage transmission lines that traverse the Project site, the potential effects associated with EMF would not be considered a new issue.

Standard utility design features and BMPs for grounding the gen-tie line effectively mitigate the possibility of nuisance shocks from induced currents on stationary objects, such as fences and buildings, and no additional mitigation is required. Furthermore, the collector system would be buried and no nuisance shocks from induced currents on stationary objects would occur.

4.16.6 Conclusion

Impacts to public health and safety during all phases of the proposed Project would be expected to be less than significant and would be reduced further by implementing the design features, BMPs, and mitigation measures identified in section 2.6 and the above-listed mitigation measures.

5.0 CUMULATIVE EFFECTS

5.1 Introduction

This cumulative impacts assessment for the proposed Project is based on Council on Environmental Quality regulations. These regulations require the discussion of cumulative impacts include a list of past, present, and reasonably foreseeable anticipated future projects producing related or cumulative impacts. The discussions of cumulative impacts should consider the likelihood that impacts would occur and reflect the severity of the anticipated impacts.

This section identifies those past, present, and reasonably foreseeable projects in the vicinity of the proposed Project that could affect the same resources as those of the proposed Project and provides the following analysis:

- Determine whether the impacts of the proposed Project and the other projects would overlap in time or geographic extent
- Determine whether the impacts of the proposed Project would interact with or intensify the impacts of the other projects
- Identify and potentially significant cumulative impacts

This chapter presents the analysis of the proposed Project's potential to result in cumulative impacts as a result of the combination of its impacts with those of the identified cumulative projects in table 5.3-1. The goal of the analysis of cumulative effects is to quantify the impact on the environment resulting from the *incremental* effects of the proposed Project when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR 1508.7). The analysis ensures that the proposed Project's potential effects are not considered in isolation. According to Council on Environmental Quality guidance, cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

This chapter contains a discussion of the methods used to identify past, present, and reasonably foreseeable future projects; a description of these projects; and a discussion of cumulative impacts to resources.

5.2 Methodology

To simplify the discussion and reduce confusion, the cumulative impact analysis in this section focuses on the much larger SWE proposed Project as it relates to other similar projects being proposed in the region. The cumulative impact analysis in this section also applies to and supports the cumulative impact findings presented for Western's proposed Federal action that are summarized below.

The impacts of Western's proposed Federal action are expected to be minor given the small footprint of the proposed interconnection facilities. Western's proposed action consists of 10 acres of permanent disturbance and 2.8 acres of temporary disturbance, whereas, SWE's proposed Project consists of 140 acres of permanent disturbance and 409 acres of temporary disturbance. The impact analysis in this chapter provides a summary of potential impacts as they relate to all of the issue areas analyzed in this EIS. Western would comply with those mitigation measures applicable to its much smaller action as well as those listed in chapter 2. Western would also comply with Western Area Power Administration's Construction Standard 13. Table 4.1-1 provides a list of the resources analyzed, the anticipated level of impact after mitigation measures are implemented, and the mitigation measures that are proposed to be implemented.

The analysis of potential cumulative effects associated with the proposed Project requires identification of past, present, and reasonably foreseeable future projects in the vicinity of the proposed Project. A geographic scope and timeframe must be established to conduct the cumulative effects analysis for the proposed Project. The cumulative impacts to resources caused by these projects may be evaluated using a different scope and timeframe; criteria for cumulative impacts analysis is described by resource in section 5.4.

Because the Federal no action alternative has no direct or indirect effects on any resources, it would have no cumulative impacts and is not further evaluated in this chapter

The geographic scope for this analysis was determined, in part, by considering public scoping comments received for the proposed Project. A number of public scoping comments questioned the cumulative effect of multiple projects interconnecting to Western's 345-kV transmission line and the cumulative effects from the proposed Project in combination with other wind energy projects in neighboring areas of Wyoming. Interconnection with Western's 345-kV transmission line is addressed in section 2.2.2. The cumulative effects of other wind energy projects are addressed in this chapter. To capture a wide geographic area for other wind energy projects, the analysis considers wind energy and other large energy-related projects in the five-county area contiguous to Albany County. Those counties include Carbon, Converse, Laramie, Natrona, and Platte. In addition, the analysis considers other large construction projects in Albany County. The projects considered are listed in table 5.3-1. The projects were identified using Internet-based resources, such as wind energy, business development, and county websites, input from Western, and through follow-up telephone interviews with county planning departments.

The timeframe for the analysis considers other past, present, and reasonably foreseeable future projects. This analysis considers projects dating from 1999. That year represents construction of the first utility-scale wind energy project in the five-county study area. How far back the cumulative effects analysis can be conducted generally is determined by the availability of information and the reasonable cost associated with data collection (DOE 2004). Consideration of reasonably foreseeable future projects also is limited. In this case, reasonably foreseeable future projects are those with a reasonable expectation of development, such as projects having a commitment of funding or significant project engineering completed, and other indicators of development activity such as filing of permit applications or preparation of environmental impact documents. For the purposes of this analysis, "under development" may include a range of activities from preliminary investigations and initial permitting, to actual construction.

5.3 Past, Present, and Reasonably Foreseeable Future Projects

The projects listed in table 5.3-1 include wind energy projects from 1999 through those currently under development, other energy-related projects, one State highway project, and two miscellaneous industrial or residential developments.

Table 5.3-1:
Past, Present, and Reasonably Foreseeable Future Projects

Project	County	Description	Timeframe
Wind Energy			
Dunlap Ranch Wind Energy Project (PacifiCorp)	Carbon County	111 MW	Under development
North Rim Wind Energy Conversion System (AES Wind Generation)	Albany County and Carbon County	55.5 MW	Under development
Chokecherry and Sierra Madre Wind Energy Project (Anschutz Corporation)	Carbon County	2,000 MW	Under development
Lewis Ranch (Ridgeline Energy)	Albany County	200 MW	Under development
Top of the World Windpower Project (Duke Energy)	Converse County	200 MW	2010
F.E. Warren Air Force Base (F.E. Warren Air Force Base)	Laramie County	3.2 MW	2009
Silver Sage Windpower Project (Duke Energy)	Laramie County	42 MW	2009
Casper Wind Power Project (Chevron Global Power Company)	Natrona County	16.5 MW	2009
McFadden Ridge I Wind Project (PacifiCorp)	Albany County	28.5 MW	2009
High Plains Wind Project (PacifiCorp)	Albany County and Carbon County	99 MW	2009
Campbell Hill Windpower Project (Duke Energy)	Converse County	99 MW	2009
Glenrock III Wind Energy Project (PacifiCorp)	Converse County	39 MW	2009
Rolling Hills Wind Energy Project (PacifiCorp)	Converse County	99 MW	2009
Seven Mile Hill (PacifiCorp)	Carbon County	99 MW	2008
Seven Mile Hill II (PacifiCorp)	Carbon County	19.5 MW	2008
Happy Jack Windpower Project (Duke Energy)	Laramie County	29 MW	2008
Glenrock Wind Energy Project (PacifiCorp)	Converse County	99 MW	2008
Liberty Turbine Test Windfarm (Platter River Power Authority)	Carbon County	2.5 MW	2005
Rock River Wind Park (SWE)	Carbon County	50 MW	2001
Medicine Bow Wind Farm (Platte River Power Authority)	Carbon County	1.32 MW	2000
Foote Creek Rim IV (SeaWest WindPower, Inc.)	Carbon County	16.8 MW	2000

Table 5.3-1:
Past, Present, and Reasonably Foreseeable Future Projects

Project	County	Description	Timeframe
Foote Creek Rim III (SeaWest WindPower, Inc. and M&N Wind Power)	Carbon County	24.75 MW	1999
Foote Creek Rim II (SeaWest WindPower, Inc.)	Carbon County	1.8 MW	1999
Foote Creek Rim I (PacifiCorp)	Carbon County	41.4 MW	1999
Electrical Transmission and Natural Gas			
Wyoming–Colorado Intertie Project/TOT 3 Upgrade (LS Power)	Platte County and Laramie County	180-mile high-voltage transmission line from Wheatland, Wyoming, to Brush, Colorado	Under development
Rockies Express Gas Pipeline (Kinder Morgan, Sempra Pipelines and Storage, and ConocoPhillips)	Carbon County, Albany County, Laramie County	1,680-mile, 36-inch to 42-inch natural gas pipeline from Meeker, Colorado, to Cheyenne, Wyoming, and continuing east	2009
TransWest Express	Carbon County	Proposed 725-mile 600-kV transmission line from southern Wyoming through Utah to southern Nevada	Scoping Meetings held, preliminary ROW application and plan of development submitted to BLM
Transportation			
U.S. Highway 287 (Wyoming Department of Transportation)	Albany County	Federal project NH-HP-N232045 for a 4.2-mile highway expansion beginning at reference marker 419.72, approximately 15 miles south of Laramie	2010
Snowy Range Road in the vicinity of the UPRR bridge	Albany County	New construction along the segment of Snowy Range Road in the vicinity of the UPRR bridge.	2013
Snowy Range Road bridge over the UPRR yard	Albany County	Rehabilitation of the Snowy Range Road bridge over the UPRR yard, which is scheduled for construction in fiscal year (FY) 2012.	2012
Other			
Coal to Liquid Gasification Plant (Medicine Bow Fuel & Power LLC)	Carbon County	Coal to liquid gasification plant	Under development
Residential			
Unnamed subdivision (Asay Design, Inc.)	Albany County	Subdivision of six lots on 37 acres adjacent to Soldier Springs Road, approximately 1.5 miles south of the intersection of Soldier Springs Road and Skyline Road. Project is located in the NW¼ of T15N, R73W, Sec. 15	Under development
The Buttes	Albany County	Subdivision of 5- and 10-acre ranchettes 7.1 mi. NW of Tie Siding on the east side of SR 287, Township 14 North, Range 73 West	Existing
Fish Creek Ranch	Albany County	3,752-acre development with 14 35-acre homesteads 1 mile west of Project site	Existing

5.4 Cumulative Effects Analysis

The cumulative effects analysis below presents potential effects first by industry type and specific projects, followed by effects specific to each resource.

5.4.1 Industry-Specific Cumulative Effects

5.4.1.1 Wind Energy

The newest wind energy facility in Wyoming is the 200 MW, 110-turbine Top of the World Windpower project installed by Duke Energy in 2010 in Converse County, near Casper, Wyoming. Of the four additional wind energy projects under development in the five-county cumulative analysis area, the Lewis Ranch project under development by Ridgeline Energy would be located closest to the proposed Project. Lewis Ranch would be approximately 10 to 15 miles west of the proposed Project site on the western side of Boulder Ridge. The interconnection location for this project has not yet been made public. PacifiCorp's proposed Dunlap Ranch Wind Energy project would be approximately 7.5 miles north of Medicine Bow, Wyoming, would interconnect with the Miners to Difficulty 230-kV transmission line, and is located approximately 70 miles northwest of the proposed Project site. AES' proposed North Rim Wind Energy Conversion System project would be approximately 3 miles west of Rock River, Wyoming, and approximately 65 miles northwest of the proposed Project site. Anschutz Corporation's proposed Chokecherry and Sierra Madre Wind Energy project would be approximately 7 miles south of Rawlins, Wyoming, and approximately 90 miles west of the Project site.

Public scoping comments expressed concern about the potential need for modifications or upgrades to the existing Craig to Ault 345-kV transmission line if energy generation projects constructed in the future were to interconnect with this line. Publicly available knowledge about the energy generation projects described above does not currently provide information about specific interconnection points. As a result, this concern cannot be addressed at this time. However, the proposed Project would commit the remaining capacity on the Craig to Ault 345-kV transmission line, and anyone else wanting to use that path would be responsible for significant system upgrades. The system upgrade costs would be prohibitive for most, if not all, conceivable energy generation projects.

Wind energy projects have the potential to introduce the following temporary effects related to construction activities:

- Potential disruption to wildlife habitat and use patterns
- Disturbance to vegetation from site clearing and preparation resulting in erosion
- Increase in noise associated with construction-related equipment and traffic
- Visual effects associated with construction-related site preparation and the presence of construction crews and equipment
- Increase in fugitive dust from vegetation clearing and vehicle travel on unpaved roads
- Increase in vehicles accessing local road network
- Increased need for temporary housing and use of local services and amenities with concomitant increase in local and State revenue stream

Wind energy projects have the potential to introduce the following permanent effects from facility operation:

- Potential effects to avian and bat species from bird migration or use of the site
- Potential effects to wildlife habitat
- Conversion of land use to a wind energy facility
- Permanently disturbed land used for facility structures
- Potential visual effects for viewers in the vicinity of the facility
- Permanent employment and tax revenue generated from the facility

5.4.1.2 Electrical Transmission and Natural Gas Pipelines

There are two high-voltage gen-tie projects under development in Wyoming in the counties surrounding Albany County. The Wyoming-Colorado Intertie project would consist of a 180-mile, 345-kV transmission line from Wheatland, Wyoming, to Brush, Colorado, affecting Platte and Laramie Counties. It is being developed in a public/private partnership between LS Power and the Wyoming Infrastructure Authority with technical assistance from Western. If built, the project would be approximately 70 miles east of the proposed Project site. Transwest Express would consist of a 725-mile, 600-kV transmission line from southern Wyoming to southern Nevada, affecting Carbon County. It is being developed by the Anschutz Corporation. If built, the project would be approximately 60 miles west of the proposed Project site.

The Rockies Express natural gas pipeline was completed in 2009. It consists of 1,680 miles of 36-inch to 42-inch buried natural gas pipeline from Meeker, Colorado, to Clarington, Ohio, crossing portions of Albany, Carbon, and Laramie Counties along the I-80 corridor. The project was developed by Kinder Morgan, Sempra Pipelines, and ConocoPhillips.

The electrical gen-tie and natural gas pipeline projects have the potential to introduce the following temporary effects related to construction activities:

- Potential disruption to wildlife habitat and use patterns
- Disturbance to vegetation from site clearing and preparation resulting in erosion
- Increase in noise associated with construction-related equipment and traffic
- Visual effects associated with construction-related site preparation and the presence of construction crews and equipment
- Increase in fugitive dust from vegetation clearing and vehicle travel on unpaved roads
- Increase in vehicles accessing local road network
- Increased need for temporary housing and use of local services and amenities with concomitant increase in local and State revenue streams

Permanent effects from high-voltage gen-tie projects are similar to the effects from the 230-kV and 345-kV transmission lines already crossing the Project site and include:

- Potential effects to avian species from bird migration or use of the site
- Potential effects to wildlife habitat

- Permanently disturbed land used for facility structures
- Potential visual effects for viewers in the vicinity of the facility
- Permanent employment and tax revenue generated from the facility

Construction-related effects from Rockies Express Gas Pipeline are complete. Permanent surface effects for the buried natural gas pipeline outside of compressor and metering stations are minimal because the pipeline is a narrow linear structure located underground with revegetation of areas disturbed by trenching. SWE would identify the location of all underground infrastructure located within the Project site prior to ground disturbing activities, thereby minimizing the potential for impacting such infrastructure.

Because the proposed Wyoming-Colorado Intertie project and Transwest Express project are in preliminary study stages and are not sufficiently advanced in project development, they have been excluded from the cumulative impact analysis. Impacts would be expected to be similar to other transmission line projects, however.

5.4.1.3 Transportation

A 4.2-mile section of U.S. Highway 287 was widened in 2010 to four lanes from two lanes in the vicinity of Tie Siding. The project added two northbound lanes and resurfaced the original highway lanes into two southbound lanes. The project was intended to improve highway safety after multiple accidents along that portion of roadway. Construction-related effects from the highway widening are complete. Permanent effects are associated with a linear band of permanently disturbed land allocated to new highway lanes.

5.4.1.4 Other Projects

Other projects in the study area include a mine-mouth coal-to-liquid gasification plant on 120 acres of land near Medicine Bow, Wyoming, in Carbon County. The project is planned by Medicine Bow Fuel & Power LLC. It would be located approximately 70 miles from the Project site. Closer to the Project site, there is a new planned residential subdivision containing six lots on 37 acres of land proposed 1.5 miles south of the intersection of Soldier Springs Road and Skyline Road in Albany County. The subdivision would be approximately 2 miles south of I-80 in Laramie.

Both projects would have construction-related effects and would permanently convert land to industrial and residential uses with the associated loss of vegetation on the project site and potential displacement of wildlife. The projects also would introduce visual effects from new infrastructure on previously undeveloped land.

5.4.1.5 Resource-Specific Cumulative Effects

The analysis of cumulative effects by resource category considers the projects described above and the significance criteria applied to individual resource categories in chapter 4. In this way, the analysis examines the potential effects to individual resources from the proposed Project in combination with other past, present, and reasonably foreseeable future projects.

The geographic scope and timeline for the cumulative effects analysis is identified for each resource. The discussions of cumulative effects by resource are commensurate with the anticipated level of potential effects. Where cumulative effects are anticipated to be minor, the associated discussion is less detailed than resources for which there would be a greater level of potential effects. This is because the proposed Project's incremental contribution to cumulative impacts would also be small as compared to the several other known future projects and expected trends.

5.4.1.6 Land Use

The geographic scope for evaluation of potential cumulative land use effects is the study area along U.S. Highway 287 between Laramie and the Colorado border. The geographic scope was determined based on existing and proposed uses in the study area and comprehensive planning efforts by Albany County.

Documents and agencies consulted in the evaluation of cumulative land use effects are as follows:

- Albany County Comprehensive Plan (August 2008)
- Albany County Zoning Resolution (May 2011)
- Personal communication with Albany County Planning Department (Gertsch 2010)
- Aerial photographs accessed via Google Earth (July 2010)

The analysis considers the proposed Project's potential incremental effect on the rural character of the study area in combination with other effects from conversion of farm and ranchland to other uses.

The Albany County Long Range Growth Plan assigns development priorities and compatible land uses to areas in accordance with the vision of the County Comprehensive Plan. The Albany County Long Range Growth Plan identifies land use objectives. They include promoting development patterns that are growth efficient and logically sequenced to be efficiently served by public services, and directing development to specific areas facilitated by phasing infrastructure and service investments. The Plan minimizes potential environmental impacts by defining areas where certain types of development would be allowed, and imposing a logical, orderly framework that accommodates and promotes well-planned development.

The County Comprehensive Plan uses two concepts to determine suitable locations for growth: growth efficiency and landscape sensitivity. The County Comprehensive Plan then designates four categories of growth and development areas, known as PGAs. The PGA 3 designation is defined as Community Centers and other Growth-efficient Nodes. PGA 3 areas are areas of Albany County that have existing development but are outside the Laramie Urban Growth Area (UGA). In general, PGA 3 areas are contiguous to existing development nodes, at least within a 0.5 mile of existing development in areas more characteristically rural, or on the outskirts of the urban areas of the County. The town of Tie Siding is identified as an existing PGA 3 community center. The proposed Project site lies immediately south/southwest of the Tie Siding PGA.

Changes to the rural character of the study area are currently occurring and land is being converted from farming and ranching to other uses as described below:

- Subdivision of land is occurring in the study area, east and west of U.S. Highway 287. The Buttes is a subdivision of 5- and 10-acre ranchettes. Fish Creek Estates, immediately west of the proposed Project, occupies a portion of Boulder Ridge.
- Historic subdivisions exist, mostly to the north, closer to and within the City of Laramie and the Laramie UGA. An unnamed subdivision by Asay Design, Inc., included in the list of cumulative projects, is located in Albany County within the Laramie UGA. This is a residential subdivision of six lots under development on 37 acres of land adjacent to Soldier Springs Road, approximately 1.5 miles south of the intersection of Soldier Springs Road and Skyline Road.

The potential for cumulative land use effects from the proposed Project through an increased reduction of available farming and ranch land would be expected to be minimal because wind farm components have relatively small footprints, spread over a large area. Wind farms are generally compatible with agricultural uses, because farming and grazing can occur in and around the facilities. In addition, wind lease payments would provide a supplemental source of income for agricultural producers, offsetting uncertainties of agricultural yields and prices.

Additional wind energy development from the proposed Project would incrementally increase cumulative effects on land use conditions in the study area. Changes to the rural character of the study area are occurring primarily as a result of residential development. Land is being converted from farming and ranching to other uses as described above. The potential for cumulative effects from the proposed Project would be minimized by compliance with Albany County land use requirements, wind energy siting requirements, and continued access for grazing on the proposed Project site. Because the project will allow the current land use of grazing livestock to continue, the incremental contribution to cumulative land use impacts would be quite small.

5.4.1.7 Water

The geographic scope for evaluation of potential cumulative effects on waters, wetlands, and floodplain resources focused on the Upper Laramie Sub-basin (HUC 10180010). The Upper Laramie Sub-basin, and baseline water quality and quantity are described in section 3.3.1. The six water resources evaluated in this cumulative effects section are water quality, groundwater, surface water, springs and seeps, wetlands, and floodplains.

Seven projects were considered as part of the cumulative effects evaluation for water resources. The seven projects are located partially or totally within Albany County, Wyoming. They include North Rim Wind Energy Conversion System, Lewis Ranch, McFadden Ridge I Wind Project, High Plains Wind Project, Rockies Express Gas Pipeline project, U.S. Highway 287 expansion project, and a proposed residential subdivision.

The proposed Project would incrementally increase cumulative effects on water quality in the cumulative effect analysis area as a result of construction. However, water quality BMPs within the Stormwater Management Plan, SWPPP, and other water quality BMPs as required, would reduce the Project's incremental cumulative effects to water quality to a less than significant level. The water used for the proposed Project would not be hydrologically connected to the Platte River system. Consequently, the Project would not contribute cumulatively to the depletion of the Platte River.

The proposed Project would not incrementally increase cumulative impacts to groundwater, surface water, springs and seeps, or floodplains.

5.4.1.8 Wildlife

The analysis of cumulative effects on wildlife differs with respect to species. Generally, the geographic scope for evaluation of potential cumulative effects on wildlife focuses on the Project site, the southern portion of Albany County, Wyoming, and the adjacent northern portion of Larimer County, Colorado. Cumulative effects to mobile wildlife such as big game and migratory birds have been evaluated where past, present, and reasonably foreseeable projects occur beyond this area. Baseline wildlife habitat and observational occurrence data, and threatened and endangered species data, were developed for the proposed Project (WEST 2010b, 2011; ERM 2010f). Information provided by the WGFD and USFWS also was included in the analysis.

Seven projects were considered as part of the cumulative effects evaluation for wildlife resources. The seven projects are located partially or totally within Albany County, Wyoming. They include North Rim Wind Energy Conversion System, Lewis Ranch, McFadden Ridge I Wind Project, High Plains Wind Project, Rockies Express Gas Pipeline project, U.S. Highway 287 expansion project, and the Asay Design, Inc. proposed residential subdivision.

The McFadden Ridge I and High Plains Wind projects are approximately 50 miles northwest of the Project site. The projects are located in the Central Flyway (USFWS 2008). As such, migratory birds may be affected by having to navigate around or through multiple wind energy projects in relatively close proximity. The projects also may affect large mammals such as elk, mule deer, and antelope that can travel between project areas by reducing the quality and quantity of habitat and cause animals to avoid these areas. An unknown amount of small mammal habitat has been lost from construction of wind energy projects. It is unknown, however, whether resident populations of small mammals have returned to preconstruction numbers. The other wind projects anticipated in Albany County would be expected to have similar effects to wildlife as the McFadden Ridge I and the High Plains Wind projects.

The Rockies Express Gas Pipeline project caused temporary surface disturbance during construction of the underground pipeline that has been reclaimed. Permanent effects to wildlife are unlikely and therefore this project did not contribute incrementally to impacts to wildlife.

The 4.2-mile U.S. Highway 287 expansion project created two new highway lanes, each assumed to be 12 feet wide. This equates to a permanent loss of approximately 122 acres of mixed-grass prairie wildlife habitat. The road expansion potentially increases the level of habitat fragmentation for large and medium sized mammals. Small mammal and reptile populations also may lose habitat and have an increased potential for isolation on either side of the highway. The project would likely also result in higher vehicle mortality rates as a result of the additional lanes facilitating heavier traffic.

The proposed residential subdivision south of Laramie would remove or change some portion of the proposed 37 acres of existing wildlife habitat resulting from increased traffic and human activity in the area.

Some biological resources would be lost due to the construction and operation of the proposed Project. Construction of the proposed Project would result in the permanent loss of a small amount of native vegetation and wildlife habitat, and could result in a minor number of mammal, reptile, and amphibian mortalities. Impacts to these biological resources resulting from the proposed Project would be minimal within the Project site, and incremental impacts would not materially contribute to cumulative impacts.

The analysis of impacts to wildlife in section 4.4 indicates that impacts would be reduced to less than significant levels by implementing appropriate BMPs and mitigation measures. Other BMPs and mitigation measures would serve to mitigate impacts to avian species and bats to the extent practicable. Consequently, the incremental contribution of the proposed Project to overall cumulative impacts to wildlife would be negligible.

5.4.1.9 Vegetation

The geographic scope for evaluation of potential cumulative effects on vegetation includes the Project site, the southeastern portion of Albany County, Wyoming, and the adjacent northeastern portion of Larimer County, Colorado. Section 3.3.2 describes the ecoregional setting. Two ecoregions and associated subregions were evaluated. These included the Laramie Basin Subregion of the Wyoming Basin Ecoregion and the Mid-elevation Forests and Shrublands Subregion of the Southern Rockies Ecoregion. Project site vegetation cover types were mapped for the purposes of habitat analysis (WEST 2010b). Ecoregional vegetation mapping for Wyoming (Chapman et al. 2004) also was reviewed to understand the types and locations of vegetation cover in the cumulative effects area in Albany County, Wyoming. Ecoregional mapping of Colorado (Chapman et al. 2006) was reviewed to understand the types and locations of vegetation cover in the cumulative effects area in adjacent Larimer County, Colorado.

In Albany County, the McFadden Ridge I and High Plains Wind projects are located approximately 50 miles northwest of the Project site in the Rolling Sagebrush Steppe Subregion vegetation cover type. They would not be anticipated to have an adverse cumulative effect to the Mid-elevation Forest and Shrubland Subregion vegetation cover type characteristic of the Project site.

Construction of the Rockies Express Gas Pipeline project resulted in the temporary removal of native vegetation. The acreage has been reclaimed. Noxious weeds may have invaded the gas pipeline corridor as a result of the temporary removal of native vegetation, but data is not available to verify this supposition, or quantify the potential effect.

The U.S. Highway 287 expansion project resulted in an estimated loss of 122 acres of native vegetation, assuming a lane width of 12 feet. Actual vegetation loss would also include some amount of non-vegetated shoulder.

Regarding the other projects planned for development in Albany County, the North Rim Wind Energy Conversion System would be approximately 65 miles northwest of the Project site in the Rolling Sagebrush Steppe Subregion vegetation cover type. North Rim is not anticipated to have an adverse cumulative effect to the Mid-elevation Forest and Shrubland Subregion vegetation cover type characteristic of the Project site.

The footprint for the Lewis Ranch Wind energy project is proposed to be more than twice as large as the proposed Project (25,000 acres versus 11,125 acres). Lewis Ranch would be sited primarily within the Laramie Basin Subregion vegetation cover type. Based on the section 4.3.2 estimate of 105 acres of permanent vegetation loss for the proposed Project, extrapolating this estimate to the size of the Lewis Ranch project yields an estimate of 236 acres of permanent vegetation loss that could occur.

The proposed unnamed residential subdivision would be sited south of Laramie and would be within the Laramie Basin Subregion vegetation cover type. There are six lots planned for a total of 37 acres (6.2 acres per lot on average). As a conservative estimate, it is assumed that each 6.2-acre lot would have 1 acre of permanent vegetation loss for residential structures and access roads. This would result in an estimate of 6 acres of vegetation permanently lost for the project. Some degree of adverse effects may result from noxious weed invasion of temporarily disturbed areas during construction for each of the projects described above.

Table 5.4-1 approximates the cumulative effects of past, present and reasonably foreseeable future projects on vegetation resources. The total estimated cumulative effects to vegetation resources should be considered coarse estimates as project specifications and construction details are developed for various projects. Adverse effects are more likely to occur in the mixed grassland cover type of the Laramie Basin Subregion, the most abundant cover type present. (It accounts for more than 98 percent of the Project site.) Relatively minor amounts of riparian and wetland vegetative cover (the least common cover types) are predicted to be affected.

Table 5.4-1:
Potential Cumulative Effects on Vegetation Resources (Acres)

Duration of Effect	Past Actions	Present Actions	Proposed Action	Future Actions	Cumulative Effect
Permanent	Unknown	Unknown	105	242	469
Temporary	Unknown	Unknown	227	510	737

While some biological resources would be lost due to the construction and operation of the proposed Project, including the permanent loss of a small amount of native vegetation the incremental contribution to cumulative impacts would be minimal and would not significantly increase them.

5.4.1.10 Cultural Resources and Native American Concerns

With respect to potential cumulative impacts on cultural resources, the study area is defined as the Project site with a surrounding buffer zone of up to 5 miles within which visual impacts might occur.

Three projects were considered as part of the cultural resources cumulative effects analysis. The Projects considered for this analysis include the Rockies Express Pipeline, the U.S. Highway 287 expansion, and homestead developments in Fish Creek Ranch. Cumulative adverse effects or impacts to cultural resources could occur if construction or operation of this Project and those projects listed above contributed to:

- Damage to or loss of a historic property listed on or eligible for listing on the NRHP
- Loss or degradation of a TCP, including creation of conditions that render the locality inaccessible for future use
- Disturbance of human remains, including those interred outside formally-designated cemetery
- Increased visitation to the area as result of improved access from this and other projects
- Introduction of new, intrusive visual elements associated with these three projects, such as new homes, the pipeline ROW disturbance area, or the expansion of the highway

The proposed Project's potential for contributing to cumulative effects on significant cultural resources in combination with other projects within the 5-mile radius is minimal. No significant cultural resources were identified during the study that would meet any of the criteria listed above. Therefore, the Project would not contribute to cumulative effects on cultural resources.

5.4.1.11 Paleontology

With respect to potential cumulative impacts on paleontological resources, the geographic scope is defined as the leased land comprising the Project site.

Because there are no other Projects proposed for development within the Project area, no other projects were considered for this cumulative effects analysis. Given that it is unlikely that impacts to paleontological resources would occur as a result of the proposed Project and because there is no reasonably foreseeable development proposed within the Project area, there would be no cumulative effects resulting from the Project.

5.4.1.12 Noise

The geographic scope for evaluation of potential cumulative noise effects includes the Project site. Cumulative effects were evaluated for both the construction and operation of the proposed Project. As identified in section 4.6, the proposed Project's effects on noise levels are anticipated to be minimal and to primarily occur during the construction period. Another wind energy development would need to be located within approximately 1 to 2 miles of the proposed Project to present a possible cumulative effect on sound (appendix I).

There are no other reasonably foreseeable future projects within 1 to 2 miles of the proposed Project that would have the potential for a net cumulative effect on noise levels. The nearest potential future wind energy project (Lewis Ranch) would be located approximately 10 to 15 miles west of the proposed Project, with sound further attenuated by the ridgeline separating the project areas. Therefore, the proposed Project would not incrementally increase cumulative noise impacts.

5.4.1.13 Visual

The potential for cumulative visual resource effects associated with the proposed Project depends primarily upon the geographic relationship of the proposed Project to the other past, present and reasonably foreseeable projects listed in table 5.3-1. Key factors to be considered are the viewshed and visibility characteristics of the respective projects and the extent to which activity patterns indicate that viewers would likely be exposed to multiple projects.

For visual resources, the potential for cumulative effects associated with the proposed Project primarily involves the potential for interaction with views of other wind projects. Regarding non-wind projects, the U.S. Highway 287 widening project resulted in a relatively minor incremental change to the appearance of the highway in a localized area near the Project site. The proposed subdivision on Soldier Springs Road is small in scale and would cause minor and highly localized visual change. The long-term visual effects of the Rockies Express pipeline project are negligible, given the location of the project in an existing major transportation corridor and the underground placement of virtually all of the project facilities. The two major transmission line projects that are proposed or under development are located 60 miles or more from the Project site and within major transportation corridors where evidence of landscape modification is substantial. Given the landscape context for these development actions and their distance from the proposed Project, it is unlikely that these projects would register noticeably in viewers' perceptions of large-scale changes in visual quality. Consequently, the focus of this analysis is on the potential for viewer perceptions to be affected by multiple wind projects.

5.4.1.13.1 Viewer Locations and Activity Patterns

It is unlikely that viewers would be exposed to simultaneous views of the proposed Project and one or more other wind projects along the routes described above. Geographically, the proposed Lewis Ranch wind project is closest to the proposed Project. Because this project is 10 to 15 miles distant and located on the west side of Boulder Ridge, there are not likely to be locations at which a viewer would see turbines from both projects at the same time.

The viewshed analysis conducted for the proposed Project (AWS Truewind 2009) indicates there is a roughly 3-mile segment of I-80 southeast of Laramie from which some Project turbines would intermittently be visible at a distance of approximately 10 miles. The Silver Sage and Happy Jack wind projects appear to be approximately 18 to 20 miles to the east from this location on I-80. It is questionable that motorists traveling on I-80 would be able to discern turbines from one or both projects at this distance, and even less likely they would be able to view turbines from Silver Sage and/or Happy Jack and the proposed Project in this segment of highway.

Based on the geographic distribution of the projects, cumulative visual effects associated with the proposed Project would primarily be limited to viewers traveling relatively long distances within the study area on routes that would take them within range of the proposed Project in conjunction with one or more other wind projects. The most likely set of viewers experiencing such impacts would be people traveling on U.S. 287 past the Project site and then continuing on U.S. 287 to Medicine Bow or beyond. A cluster of wind projects is located near the area between U.S. 287 and I-80 in the vicinity of the towns of Rock River, McFadden and Medicine Bow, and all or most of these projects may be visible from U.S. 287. The proposed Project would add to the overall perception of visual change resulting from wind energy development for viewers along this route, although views of the proposed Project would be separated in time by approximately 1 hour from scenes, including the other wind projects in this cluster.

Similar long-distance visual experiences would be possible for travelers making trips on I-80 that included the segment between Cheyenne and Rawlins. Within this 150-mile trip, travelers would likely have distant views of a very large project (Chokecherry and Sierra Madre) at the western end, near Rawlins; multiple smaller projects in the middle part of the trip, near Elk Mountain and Arlington; the large proposed Project in the area east and southeast of Laramie; and two smaller projects (Happy Jack and Silver Sage) at the eastern end near Cheyenne.

These repeated views of relatively large numbers of wind turbines from I-80 and U.S. Highway 287 would occur at background viewing distances and would be intermittent during a trip of several hours. Nevertheless, viewers would likely recall seeing extensive wind energy development in this portion of Wyoming. A similar impression would also occur, possibly on a more consistent basis, for residents of and frequent visitors to the study area. While residents of Laramie or Cheyenne, for example, might not see multiple wind projects on a daily basis, they would likely experience repetitive views of multiple projects through their local and regional travels over an extended period of time. Consequently, some local residents and frequent visitors might perceive a substantial change to the overall character of the study area landscape from the development of the wind projects identified in table 5.3-1. Others might become used to views of wind turbines, to the point that they would become so familiar as to not attract attention.

Additional gen-tie line installation and wind energy development from the proposed Project would incrementally increase cumulative effects on the visual landscape in the study area for evaluation of potential cumulative effects on visual resources caused by the addition of man-made elements to a landscape that is primarily natural or agricultural. Cumulative visual effects associated with the proposed Project would primarily be limited to viewers traveling relatively long distances within the study area on routes that would take them within range of the proposed Project in conjunction with one or more other wind projects. Exposure to views of multiple projects would be limited to a relatively small subset of all viewers, primarily those traveling long distances on specific routes within the study area and people exposed to views of wind projects over an extended period of time. In addition, these effects would be limited to viewer sensitivity from individuals who consider views of wind turbines to be adverse.

5.4.1.14 Air Quality

Cumulative effects associated with air quality could result if construction of multiple projects occurred simultaneously (table 5.3-1) and in close proximity to the Project site (Lewis Ranch Wind Project, Rockies Express Gas Pipeline project, U.S. Highway 287 expansion project). This is because air quality effects are primarily associated with construction activities of these types of projects. Two of these projects have already been constructed, and there would be no cumulative impacts associated with their construction in combination with the proposed Project. The Lewis Ranch Project would not be built concurrently with the proposed Project as it is expected to be constructed after the proposed Hermosa West project construction period.

The positive cumulative effect associated with air quality from the proposed Project and other known or expected wind projects in the region would be the offset to reliance on fossil fuel emissions provided by the proposed Project and other wind energy projects in the study area. Fossil fuel emissions, particularly from coal, introduce long-term, combustion-related fine particles, and sulfur dioxide to the atmosphere.

5.4.1.15 Transportation

Potential cumulative effects to transportation resources from the proposed Project in combination with the projects in table 5.3-1 were evaluated for the timeframe of construction, operations (approximately 20-year lifespan through 2037), and decommissioning. The potential transportation impacts during these phases of the proposed Project were evaluated using the significance criteria in section 4.9 and the findings of the transportation study for the proposed Project (ERM 2010g).

Based on evaluation of publicly available data for the past, present, and reasonably foreseeable future projects, the following two projects could potentially coincide with the expected construction schedule for the proposed Project, have the potential to use portions/segments of the same haul routes, and are located in the Project study area. The brief project descriptions and potential effects to the Project study area are described below:

- Lewis Ranch: This project is currently in the planning and development stages and would be located 10 to 15 miles west of the proposed Project. It is expected that this project would use I-80, U.S. Highway 287 (for brief section between Laramie and County Road 34) and then access the project site via Sand Creek Road (County Road 34). A secondary route could potentially be State Highway 230 to State Highway 10 on the western side of project area. Based on the location, potential construction schedule, and potential haul routes, it is expected that this project in conjunction with the Hermosa West Wind Project would not incrementally increase cumulative effects on the transportation system in the Project study area.

- Unnamed residential subdivision project: This proposed development would be a residential subdivision consisting of 6 lots on 37 acres of land adjacent to Soldier Springs Road, approximately 1.5 miles south of the intersection of Soldier Springs Road and Skyline Road near Laramie, Wyoming. Material deliveries for the project would not consist of many, if any, oversized trucks and would mainly consist of “normal” heavy duty truck traffic (e.g., deliveries of housing materials, concrete, asphalt, piping, and other housing construction materials), as well as daily traffic from construction workers. Workers and deliveries would travel to the site either through Laramie to U.S. Highway 287 to Soldier Springs Road and/or I-80 to U.S. Highway 287 to Soldier Springs Road, and then travel south along Soldier Springs Road to the development site. Any construction traffic related to this project would only overlap haul routes for the Hermosa West Wind Project on either I-80 or brief 0.25-mile section of U.S. Highway 287, both of which would have minimal impact to the traffic infrastructure or LOS for these roads. The schedule for construction of this project is currently unknown. If this construction of this project development is performed at the same time as the Hermosa West Wind Project, it would not be expected to incrementally increase cumulative effects on the transportation system in the Project study area.

In addition to the two projects above, there are several road improvement projects that may potentially occur in the Project study area. They would not be expected to result in cumulative effects because they consist primarily of roadway and bridge rehabilitation and safety measures. They include the following:

- Rehabilitation of the Snowy Range Road Bridge over the UPRR yard, which is scheduled for construction in FY 2012.
- New construction along the segment of Snowy Range Road in the vicinity of the UPRR bridge, which is scheduled for construction in FY 2013.
- Reconstruction and widening for the segment of U.S. Highway 287 north of Tie Siding to Laramie. WYDOT is also planning to refurbish the decking on the U.S. Highway 287 bridge over the UPRR north of Tie Siding. No start date has been identified within the 2010 STIP’s six-year timeframe for these projects. However, it is expected that such work would be constructed alongside and or overhead of U.S. Highway 287 and cause minimal disruption or impacts to traffic on the existing roadway.
- WYDOT has also identified potential funds for rehabilitation of the existing Clark Street bridge over the UPRR yard and the City of Laramie’s 2007 Comprehensive Plan and the 2010 Major Street Plan (prepared jointly by Laramie and Albany County) discuss plans to replace the existing Clark Street bridge with a new bridge at Haney Street, located approximately 0.5 mile north of Clark Street. Any future bridge would offer a direct arterial connection to Snowy Range Road, and thus would not have a major impact on haul routes associated with the Project.

SWE would consult with USFWS regarding design of the turbine lighting scheme to take into account USFWS recommendations, and the exact marking plan would be submitted to the FAA for review and approval. Based on this approach, the proposed Project would not incrementally increase cumulative effects to aviation. SWE will work with the NTIA regarding potential wind turbine siting options to reduce the impacts on the weather surveillance radar and mitigate potential cumulative effects to this resource.

Based on the proposed Project impacts evaluation as discussed in section 4.9 and the discussion as summarized above, the proposed Project would not incrementally increase cumulative impacts to transportation.

5.4.1.16 Recreation

The geographic scope for evaluation of potential cumulative effects on recreation includes the Project site, Albany County, Wyoming, and northeast Larimer County, Colorado. These areas represent the locations where construction workers would likely live during peak workforce conditions.

Sources consulted in the analysis of cumulative effects included the recreational and land use assessment report (ERM 2010a), recreational atlases, local tourism websites, and land management agency websites. County, forest, and municipal planning documents were reviewed to identify planned recreational facilities that could be impacted by the proposed Project in combination with the projects in table 5.3-1.

The following discussion describes potential cumulative effects to hunting opportunities; Federal, State, and local recreation areas; and private campgrounds.

5.4.1.16.1 Hunting

Cumulative effects to hunting could occur from the proposed Project in combination with other projects if multiple projects caused the closure of a significant acreage of public access hunting areas. Because the current level public access for hunting would be maintained on the Project site, however, the proposed Project is not expected to contribute to a cumulative loss of publicly-available hunting areas in Albany County. The impacts the other identified projects might have on hunting is not known, but since the proposed Project would not affect hunting access, it would not incrementally increase cumulative impacts on the quantity of hunting opportunities.

Cumulative effects on the quality of hunting on the Project site and in Albany County also could occur if multiple projects adversely affected game populations. Because temporarily dispersed game populations would be expected to return to pre-construction levels at the Project site during facility operation, the proposed Project would not contribute to incrementally increase cumulative impacts to game populations and hunting quality in Albany County.

5.4.1.16.2 Federal, State, and Local Recreation Areas

Cumulative impacts to recreation areas would occur if several projects were constructed at the same time in the same area, drawing a large number of temporary construction workers and potentially causing crowding at recreation areas. The projects identified as reasonably foreseeable for the purpose of this analysis do not meet these criteria, as peak workforce numbers are not anticipated to coincide. The proposed Project, therefore, would not incrementally increase cumulative impacts to recreation areas in Albany and Larimer Counties. The same conclusion can be drawn for municipal recreation areas in Albany County. The addition of a temporary construction workforce which is unlikely to seek access to recreation areas in significant numbers, and the relatively small number of permanent workers (20 to 40 workers for the proposed Project) would likely not significantly contribute to further population increases.

5.4.1.16.3 Private Campgrounds

If other projects employing large, temporary construction workforces were to be constructed in the same timeframe as the proposed Project in Albany County, cumulative effects to private camping facilities are possible by reducing public access to RV campsites that offer full-hookups. Because peak workforce numbers are not anticipated to coincide, cumulative effects to private camping facilities in Albany County are not anticipated.

Potential cumulative effects to private camping facilities are not anticipated in Fort Collins because very few construction workers are expected to camp in RV campsites with full hookups in the Fort Collins area, and because the Fort Collins area offers an adequate supply of such campsites to meet construction worker demand.

The proposed Project, therefore, would not be expected to incrementally increase cumulative impacts to private campgrounds in Albany and Larimer Counties.

5.4.1.17 Socioeconomics

The geographic scope for evaluation of potential cumulative effects on socioeconomics includes the five-county area contiguous to Albany County, as well as northeast Larimer County, Colorado. These areas include the closest urban populations (Laramie, Wyoming, and Fort Collins, Colorado) and represent the locations where construction workers are most likely to live during peak workforce conditions. These areas also represent areas that might be affected economically during construction of the proposed Project. Long-term cumulative economic effects would be relevant to Albany County and the State of Wyoming.

In addition to the significance criteria considered in section 4.11, a significant cumulative effect on socioeconomics in the study area would result if there were competing needs from other projects listed in table 5.3-1, as measured by the significance criteria below:

- Substantial employment competition for the available temporary workforce among similar projects under construction at the same time
- Housing shortages or substantial competition for the available local housing among projects under construction at the same time
- Substantial increased demand for public services (fire, police, medical) and other necessary private services among projects under construction at the same time.

Most of the projects listed in table 5.3-1 are complete and competing needs for a workforce, housing, and public and private services are not indicated. The remaining projects under development are sufficiently spaced in geography and peak construction time that they would not be expected to compete for available workforce and housing. PacifiCorp's Dunlap Ranch Wind Energy project, for example, is located 7.5 miles north of Medicine Bow, Wyoming, and is currently under construction with workers temporarily housed in both Laramie and Rawlins, Wyoming. Likewise, AES Wind Generation's North Rim Wind Energy Conversion System is located 3 miles west of Rock River, Wyoming, and workers for the project will be dispersed between Laramie and Rawlins. Anschutz Corporation's Chokecherry and Sierra Madre Wind Energy project is south of Rawlins, and workers for the project will be temporarily housed in Rawlins.

Long-term effects to public and private services are generally expected to be positive as the tax base and economies in the respective project areas would be affected by significant growth from the projects.

As discussed in section 4.11, a portion of the workforce is expected to reside in northeastern Larimer County, Colorado. The only project identified within this area was the Maxwell Ranch Wind Farm project. This project is in the initial stages of project planning. It is not considered reasonably foreseeable at this time, and would contribute to cumulative effects only if constructed.

Overall effects to socioeconomics would be expected to have positive effects to employment and the local and State economies. While the Laramie, Wyoming, and Fort Collins, Colorado, areas are not anticipated to experience negative cumulative effects from housing and serving worker and construction needs, there would be a positive effect to the Fort Collins area and especially to the Laramie and Albany County economies from multiple construction projects over multiple years. Wyoming's legislated $1 excise tax per megawatt hour of wind-generated electricity alone would produce an estimated $1.1 million in annual revenue from the proposed Project, of which 60 percent, or $660,000, would be retained by Albany County. In conclusion, the proposed Project would not incrementally increase cumulative impacts in regards to competition for available housing, workforce, and public and private services. The proposed Project would incrementally increase cumulative impacts regarding increased revenue generation, which is considered a positive cumulative impact.

5.4.1.18 Environmental Justice

The geographic scope for evaluation of potential cumulative effects on socioeconomics includes Albany County. As described in section 4.12, there would be no anticipated effects to minority and low-income populations from the proposed Project, based on census data from 2000 and estimates for 2006 through 2008 for minority and low-income populations in Albany County.

The proposed Project would not have cumulative impacts to environmental justice. Additional protection from adverse effects to minority and low-income populations would be provided by the environmental justice and/or socioeconomic analyses conducted under NEPA and local permitting for individual projects.

5.4.1.19 Agriculture

The geographic scope for evaluation of potential cumulative effects on agriculture includes the Project site. Overall, the projects listed in table 5.3-1 have relatively small footprints and are spread over a large area. Small cumulative effects could occur by reducing lands available for agriculture, including rangeland and, potentially, prime farmlands, farmlands of statewide importance, conservation easements, and other lands under Federal or State protection. The projects listed in table 5.3-1, however, are generally compatible with agricultural use. Farming and grazing can occur in and around project facilities. In addition, wind lease payments provide a supplemental source of income for ranchers and farmers, offsetting uncertainties of agricultural yields and prices.

The proposed Project would not incrementally increase cumulative impacts to agriculture. State and local land use regulations in Wyoming (under the Wyoming Industrial Information and Siting Act) and in Albany County (under the Albany County Comprehensive Plan, the Albany County Zoning Resolution, and the WISA regulations) would require State and county land use approvals prior to construction of additional facilities for any nearby projects. These permitting processes are designed to prevent incompatible uses and the degradation of farmland. The potential for cumulative effects to agriculture would be substantially minimized by these regulations.

5.4.1.20 Geology and Soils

The geographic scope for evaluation of potential cumulative effects on geology and soils is the Project site. Cumulative effects associated with geology and soils could result if multiple projects in close proximity to the Project site impeded access to mineral resources or created soil instability or degradation. As discussed in section 4.14, there are no mineral resource extraction operations on the Project site and no mineral resources of current economic value. Regarding soils, the preliminary geotechnical studies of the Project site demonstrated that soil conditions are suitable to support wind turbine structures. The suitability of the site would be further protected by facility engineering to site individual wind turbines to avoid steep slopes and isolated areas of unstable or sandy soil. Assuming the cumulative projects implement similar erosion control and topsoil BMPs as the proposed Project, the potential for cumulative effects to soils would be substantially minimized. Therefore, the proposed Project would not incrementally increase cumulative impacts to geology and soils.

5.4.1.21 Hazardous Materials

The geographic scope for evaluation of potential cumulative effects on hazardous materials includes the Project site and reasonably foreseeable projects in proximity to the proposed Project. These projects were reviewed with regard to their potential to increase effects from use of hazardous materials. No significant cumulative effects would be anticipated. Potential effects from hazardous materials that may occur include worker or public exposure to chemicals resulting from transportation accidents or improper handling, and hazardous materials spills.

It is anticipated that few projects would be under construction at the same time as the proposed Project. If construction of these projects coincides, it is unlikely that the same crew of construction workers would be participating in all of the projects at once or that hazardous materials releases would be in large quantities. A localized spill of diesel fuel, for example, would be contained onsite with spill control materials. Additionally, activities associated with the proposed Project and those associated with reasonably foreseeable projects would be required to adhere to local, State, and Federal regulations for handling, storing, and disposing of hazardous materials. As a result, the proposed Project would not incrementally increase cumulative impacts on hazardous materials.

5.4.1.22 Health and Safety

The geographic scope for evaluation of potential cumulative effects on health and safety includes the Project site. Reasonably foreseeable projects in proximity to the proposed Project were reviewed with regard to their potential to increase effects on human health and safety. No significant cumulative effects are anticipated. Potential effects pertaining to public health and safety may include increased pressure on emergency services, increased exposure to EMF, and increased exposure to accidents associated with a construction site.

Cumulative effects from increased pressure on regional emergency services may occur during construction of the proposed Project if other new projects requiring a large workforce and emergency services occur at the same time. Other proposed projects in the area may involve an influx of workers, including two wind energy projects in Albany County that are currently under development (table 5.3-1).The exact number of workers required for the construction of these projects is unknown, as are their construction schedules and timeframe for a peak workforce to be onsite. Effects from these construction projects are likely to be mitigated by their closer proximity to emergency services available in Rawlins, than in Laramie. Other future projects in table 5.3-1 will not be located sufficiently close to the Project site to introduce cumulative effects from EMF or construction-related exposure to accidents. As a result, the proposed Project would not incrementally increase cumulative impacts on health and safety.

6.0 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

Unavoidable adverse environmental effects are those that would occur after implementation of all incorporated BMPs and mitigation measures. Unavoidable adverse environmental effects do not include temporary or permanent impacts which would be mitigated. The potential environmental impacts that could result from the proposed Project have been avoided or greatly reduced by careful design and layout of the Project, and by integrating BMPs, standard utility practices, identified mitigation measures, and known regulatory requirements directly into the proposed Project description. If additional impacts are identified through other Federal, State, or County permitting processes, SWE would develop appropriate mitigation measures in consultation with the requesting agency (i.e., USFWS, USACE). Mitigation measures proposed in this EIS are described in chapter 4 of this EIS.

Western's proposed Federal action is limited to consideration of the interconnection request submitted by SWE and the associated system upgrades that would be required. The unavoidable impacts of Western's proposed Federal action would be limited to environmental impacts due to required system upgrades including the current transformers at both the Craig and Ault Substations, increasing the thermal capacity on the transmission line, and making other improvements.

Constructing and operating SWE's proposed Project would unavoidably convert approximately one percent of available ranchland within the Project boundary. Loss of this ranchland would have a minimal effect on cattle grazing in the area.

Constructing, operating and maintaining the proposed Project could result in unavoidable adverse impacts to biological resources. Some biological resources would be lost due to the construction and operation of the proposed Project. Construction of the proposed Project would result in the permanent loss of a small amount of native vegetation and wildlife habitat, and an unknown amount of habitat through avoidance by certain species. Operation of the Project would likely result in direct avian and bat mortalities that are unavoidable given the present state of technology. A Biological Assessment is being prepared under Section 7 of the ESA for federally-listed species. Determinations of effect will be made in the BA and findings will be summarized in the Final EIS. The agencies will follow USFWS recommendations provided during the Section 7 consultation process.

Construction of wind turbines and associated transmission and road infrastructure would have a direct impact on the visual resources in the study area by introducing a large-scale construction operation to a predominantly rural area with heavy construction equipment and oversized trucks in the area. All of these activities could create a weak to moderate amount of contrast, depending on the pace and schedule of Project construction.

Proposed Project facilities (gen-tie line, operations and maintenance building, meteorological towers, and Project substation/Western switchyard) would not have a significant impact on the visual resources of the Project vicinity landscapes. The degree of contrast they would introduce to the landscapes would be classified as none to weak.

From viewing locations within the proposed Project site boundary, impacts from new Project access roads would create a strong contrast with the existing landscape, which currently has only two main roads, Cherokee Park Road and Boulder Ridge Road. The visual contrasts from the new access roads would decrease to moderate or weak in viewing locations further from the Project, such as along U.S. Highway 287.

The representative 200 1.5-MW wind turbines proposed for the Project would be the single greatest source of visual impacts to the existing landscape. The representative 1.5-MW, 379-foot turbines would be highly visible from all locations within the Project site boundary, and the majority of the turbines proposed would be visible from the open landscapes north of the Project site and from areas with higher elevations, such as Boulder Ridge to the west and the Laramie Mountains to the northeast. The visibility of large utility-scale wind turbines similar to those proposed for the Project cannot be completely avoided or concealed in certain areas because of the size of the turbines, the motion of the turbine blades, and the required installation of nighttime perimeter obstruction lighting (BLM 2005).

While the visual impact of the proposed Project would be substantial and important, the VRM analysis identified an overall visual impact of less than significant. The model output was influenced by the fact that relatively few viewers would be affected. However, Western recognizes that certain groups of nearby residents and recreational users, although small in numbers, would consider the visual impacts of the proposed Project to be significant. To these individuals, the proposed Project would result in an unavoidable adverse significant environmental impact.

SWE's proposed Project would have minor impacts on the other resource areas as identified in chapter 4; although identified as less than significant, unavoidable effects to land use would result from construction, operation, and maintenance of the proposed Project.

7.0 SHORT-TERM USE AND LONG-TERM PRODUCTIVITY

This section discusses the proposed Project's short-term use of the local environment and the anticipated effects on long-term productivity. The impacts and use of resources associated with the proposed Project are described in chapter 4.

Western's proposed Federal action is limited to consideration of the interconnection request submitted by SWE and the associated system upgrades that would be required. The short-term impacts of Western's proposed Federal action would be limited to temporary environmental impacts due to construction of required system upgrades including the current transformers at both the Craig and Ault Substations, increasing the thermal capacity on the transmission line, and making other improvements.

SWE's proposed Project would require commitments of resources such as soil, water, vegetation, wildlife populations and habitats, noise, visual resources, and land use for the life of the Project. Impacts to transportation resources and social and economic resources would occur primarily during construction. Revenue would likely increase for some local businesses, such as construction suppliers (e.g., sand and gravel operators, machine shops/fabricators, etc.), hotels, restaurants, gas stations, and grocery stores in response to the needs of workers associated with constructing the Project.

Although the proposed Project would not require a large amount of land to be taken out of production, losses of terrestrial plants, animals, and habitats from natural productivity to accommodate the Project components and temporary disturbances during construction would occur. Land-clearing and construction activities, including personnel and equipment moving about a localized area, would disperse wildlife and temporarily eliminate habitats. Constructing the proposed Project components would result in short-term disturbances of biological habitats and could cause minimal long-term reductions in the biological productivity of localized areas near Project facilities.

Constructing and operating the proposed Project would unavoidably convert 128 acres (1 percent) of available ranchland (11,125 acres) within the Project boundary for the life of the Project. The proposed Project would result in few changes to existing agricultural practices because grazing would continue in and around the wind turbines and other Project components and only very small areas (substation, switchyard, and operations and maintenance building) would require fencing.

Introducing a new, renewable energy power project to the regional electrical system would be expected to reduce reliance on carbon-based energy sources, increase domestic energy production and supply, and contribute to long-term improvement of air quality.

When the proposed Project is decommissioned, the facilities would be removed and the area of disturbance would be reclaimed. This future action would restore the long-term productivity to the area.

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8.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

This section describes the irreversible and irretrievable commitments of resources associated with implementing the proposed Project. An “irreversible commitment of resources” occurs when, once committed to a project, the resource would continue to be committed throughout the life of the project. An "irretrievable commitment of resources" refers to those resources that, once used, consumed, destroyed or degraded during construction, operation, or decommissioning of the Project, would cause the resource to be unavailable for use by future generations. Examples of irretrievable types of resources include the use of nonrenewable resources, such as minerals or fuel, damage to cultural resources, as well impact that would cause resources to be unavailable for the use of future generations such as loss of production, harvest, or habitat.

Western’s proposed Federal action is limited to consideration of the interconnection request submitted by SWE and the associated system upgrades that would be required. The irreversible and irretrievable commitments of resources associated with Western’s proposed Federal action would be limited to the irreversible commitment of land, soil, and vegetation within the footprint of Western’s switchyard.

If wind turbines are not upgraded, upon termination of operations, SWE has a contractual obligation to the landowners to remove the wind facilities, including foundations to a depth of 4 feet. SWE also has an obligation to restore the area to a condition reasonably similar to the condition of the surrounding soil. SWE may explore alternatives at the end of the 20-year life of the Project, including extending existing leases or re-powering the turbines with new technology generators. Eventually the proposed Project would reach the end of its useful life, and would be decommissioned. Decommissioning activities would be conducted in compliance with applicable rules and regulations, and in coordination with the lessee landowners.

Constructing and operating the Project components would constitute an irreversible commitment of land, soil and vegetation for the life of the Project. The area of the underground collector and communication systems would be revegetated.

Constructing the wind turbines and transmission structures would remove a minimal amount of ranchland from production and is an irreversible commitment of ranchland. The Project would result in few changes to existing agricultural practices because grazing would continue in and around the wind turbines and other Project components. With decommissioning of the proposed Project and restoration, the loss of ranchlands would not be irretrievable.

Some biological resources would be lost due to the construction and operation of the proposed Project. Construction of the Project components would result in the permanent loss of a small amount of native vegetation and wildlife habitat. Operation of the wind farm would likely result in avian and bat mortalities. While this mortality would permanently remove individuals from the populations, the loss is not expected to have irreversible or irretrievable impacts on the population levels as a whole. A BA is being prepared under Section 7 of the ESA for federally listed species. Findings of the BA will be summarized in the Final EIS.

While no direct impacts to cultural resources are anticipated as known sites would be avoided, compliance with State and Federal regulations require coordination among Native American tribes, the SHPO, Western and other affected Federal agencies.

Visual resources in the Project vicinity would experience impact associated with the installation of the wind turbines. While the VRM analysis indicates that the overall visual impacts would be less than significant, the viewshed in the area would be modified for the life of the Project, and a relatively small number of individuals would be significantly impacted.

9.0 CONSULTATION AND COORDINATION

9.1 Agencies and Persons Contacted/Consulted

Western has consulted with Federal, State, and local agencies, Native American tribes, and non-governmental organizations regarding the potential effects and different alternatives associated with the proposed Project. The following is a list of agencies and persons contacted and/or consulted during the development of this EIS.

9.1.1 Federal Agencies

- Advisory Council on Historic Preservation, Director of the Office of Federal Agency Programs
- Bureau of Indian Affairs, Rocky Mountain Regional Office, Regional Director
- Bureau of Land Management, Wyoming State Office, State Director
- Bureau of Land Management, Rawlins Field Office, Field Manager
- Federal Aviation Administration, Regional Administrator of the Northwest Mountain Region
- Federal Emergency Management Agency, Region VIII, Regional Environmental Manager
- Federal Emergency Management Agency, Wyoming Office of Homeland Security, Director
- Federal Energy Regulatory Commission, Director of the Office of Energy Projects
- Federal Highway Administration, Director of Field Services of the West
- National Park Service, Intermountain Regional Director
- National Weather Service Weather Forecast Office, Cheyenne, Wyoming
- U.S. Army Corps of Engineers, Chief of Public Affairs and Wyoming Regulatory Office
- U.S. Department of Agriculture, State Executive Director
- U.S. Department of Agriculture, Rural Development, State Director of Rural Development
- U.S. Department of the Interior, Director, Office of Environmental Policy and Compliance and Regional Environmental Officer
- U.S. Department of Transportation, Secretary
- U.S. Environmental Protection Agency, Director of the Office of Federal Activities and the Director of the NEPA Program
- U.S. Fish and Wildlife Service, Wyoming Ecological Services Office
- U.S. Forest Service, Arapaho and Roosevelt National Forests, and Pawnee National Grass Land, Forest Supervisor
- U.S. Forest Service, Medicine Bow and Routt National Forests, and Thunder Basin National Grass Land, Forest Supervisor
- U.S. General Services Administration, NEPA Program Manager

9.1.2 State Agencies

- Colorado Air National Guard, 104th Wing Public Affairs
- Colorado Department of Natural Resources, Executive Director
- Colorado Department of Natural Resources, Office of Energy and Minerals
- Colorado Department of Transportation, Region Four Transportation Director
- Colorado Division of Wildlife, Director and Northeast Region Staff

- Colorado Geological Survey, Director and State Geologist
- Colorado Governor's Energy Office, Director
- Colorado Public Utilities Commission, Director, Chairman, and Commissioners
- Colorado State Historic Preservation Office, State Historic Preservation Officer
- Wyoming Department of Environmental Quality, Administrator, Industrial Siting Division*****
- Wyoming Department of State Parks and Cultural Resources, Director
- Wyoming Business Council, Chief Executive Officer
- Wyoming Department of Agriculture, Director and Manager of Natural Resources and Policy
- Wyoming Department of Education, State Superintendent of Public Instruction
- Wyoming Department of Environmental Quality, Director
- Wyoming Department of Health, Director and State Health Officer
- Wyoming Department of Revenue, Director
- Wyoming Department of Transportation, Director and District Engineer
- Wyoming Division of Wildlife, Director
- Wyoming Environmental Quality Council, Executive Secretary
- Wyoming Game and Fish Department, Director
- Wyoming Governor's Office, Energy and Telecommunications Policy Advisor and Deputy Chief of Staff
- Wyoming Infrastructure Authority, Executive Director
- Wyoming Office of State Lands and Investments, Director
- Wyoming Public Service Commission, Chairman and Commissioner
- Wyoming State Climate Office, Wyoming Water Resources Data System Director and State Climatologist
- Wyoming State Engineer's Office
- Wyoming State Geological Survey, Director and State Geologist
- Wyoming State Historic Preservation Office, State Historic Preservation Officer
- Wyoming Wildlife and Natural Resources Trust, Executive Director

9.1.3 Local Government Entities

- Albany County Commissioners, Wyoming
- Albany County Department of Planning, Wyoming, Planning Director
- Albany County Department of Planning, Wyoming, Code Compliance Officer
- Albany County Planning and Zoning Commission, Wyoming
- Albany County Road and Bridge Department, Wyoming
- City of Laramie, Wyoming, Mayor and City Manager
- Laramie Rivers Conservation District, Director
- Larimer County Commissioners, Colorado
- Larimer County Manager, Colorado
- Larimer County Surveyor, Colorado
- Larimer County, Colorado Department of Health and Environment, Department Director
- Larimer County, Colorado Department of Natural Resources, Department Director
- Larimer County, Colorado Department of Planning and Building Services, Department Director

- Larimer County, Colorado Department of Public Works, Department Director
- Larimer County, Colorado Road and Bridge Department, Department Director

9.1.4 Native American Tribes

- Crow Nation
- Eastern Shoshone
- Northern Arapaho
- Northern Cheyenne

9.1.5 Non-Governmental Organizations

- Audubon Colorado
- Audubon Wyoming
- Biodiversity Conservation Alliance
- Center for Resource Conservation
- Colorado Open Lands
- Colorado Renewable Energy Society
- Environmental Defense Fund
- Fort Collins Audubon Society
- Natural Resource Defense Council
- Rocky Mountain Chapter of the Sierra Club
- The Conservation Fund
- The Nature Conservancy
- The Nature Conservancy, Southeast Wyoming Program
- The Wilderness Society
- Trout Unlimited, Colorado Chapter
- University of Wyoming College of Agriculture, Department of Renewable Resources
- University of Wyoming, Ruckelshaus Institute
- University of Wyoming, Wind Energy Resource Center
- University of Wyoming, School of Energy Resources
- Western Environmental Law Center
- Western Interstate Energy Board
- Western Resource Advocates
- Wyoming Chapter of the Sierra Club
- Wyoming Conservation Voters
- Wyoming Energy Council
- Wyoming Native Plant Society
- Wyoming Outdoor Council
- Wyoming Wildlife Federation

9.2 Individuals Notified of Availability of this EIS

In addition to the Federal, State, and local agencies, Native American tribes, and non-governmental agencies listed in section 9.1, the notification of the availability of this EIS with instructions as to where they can view the document will be provided to the 252 individuals and landowners that were notified of scoping in January 2010. Additionally, those individuals or interested parties who signed in at the scoping meetings and indicated that they would like to receive project updates will also be notified of the availability of the EIS.

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