FINAL

ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED CLIPPER WINDPOWER, INC. LOW WIND SPEED TURBINE DEMONSTRATION PROJECT, CARBON COUNTY, WYOMING

Prepared for

U.S. Department of Energy
National Renewable Energy Laboratory
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EXECUTIVE SUMMARY

Clipper Windpower, Inc. (Clipper), in partnership with the U.S. Department of Energy (DOE) and the National Renewable Research Laboratory (NREL), has developed a proprietary low wind speed turbine design that is capable of producing more electricity in low wind speed conditions than comparable wind turbines. The Clipper turbine would have a maximum output of 2.5 megawatts of electrical power and has undergone numerous tests, including dynamometer testing at the National Wind Technology Center (NWTC) for at least 6 months. At this point, Clipper needs to test the prototype wind turbine under field conditions before the design can be put into full production. In order to test the low wind speed turbine, Clipper proposes to construct/install and operate the low wind speed turbine demonstration project on privately owned land near Medicine Bow, Wyoming.

The proposed project would be located approximately 5 mi southwest of the community of Medicine Bow, Wyoming, in eastern Carbon County. Access to the site is south from Medicine Bow, Wyoming, via the Elk Mountain to Medicine Bow Road (an unpaved public road). The proposed project would be located in Section 1, T21N, R79W. In addition, the proposed project would be located approximately 850 ft south of a small existing wind farm that consists of 10 existing wind turbines (i.e., the Medicine Bow Wind Project). This small wind farm is owned and operated by the Platte River Power Authority (PRPA). However, the proposed project would not be part of PRPA's Medicine Bow Wind Farm but would be located near that facility so that it could utilize as much of the existing infrastructure (i.e., roads and powerlines) as possible. By co-locating the project area the Medicine Bow Wind Farm, Clipper would minimize additional disturbance and associated impacts.

The Proposed Action would include the construction/installation of a single wind turbine, a single meteorological tower, a small service building, and buried powerlines and cables and would result in less than 10 acres of new short- and long-term disturbance. Clipper anticipates that the equipment would last approximately 20 years, after which time the wind turbine would be decommissioned and all the equipment removed. The Proposed Action would comply with all relevant federal, state, and local laws and regulations.

To minimize potential environmental impacts associated with the Proposed Action, Clipper would undertake various applicant-committed measures including seasonal restrictions on operations in crucial winter range for pronghorn and restrictions in the spring for operations near greater sage-grouse leks. Clipper would also implement storm water pollution prevention measures to minimize impacts to vegetation, soils, and surface water resources. Clipper would also monitor potential impacts to avian and bat species by conducting mortality surveys near the wind turbine and meteorological tower during the first 12 months of operation of the Proposed Action and would paint the small service building a desert tan to blend into its surroundings. Once construction operations have been completed and after the site have been decommissioned, Clipper would implement prompt revegetation operations and return the area to disturbance conditions. Detailed information concerning all applicant-committed practices is presented in Chapter 2 of this Environmental Assessment (EA).

This EA analyzes the potential environmental impacts of the DOE decision to fund the Proposed Action. In accordance with applicable regulations and policies, the DOE conducted internal and external scoping of the Proposed Action. This process determined the scope and the specific critical elements of the human environment to be addressed in this EA. Federal, state, and local government agencies were also contacted to identify potential issues and concerns.

In addition to the Proposed Action, the EA also analyzes the No Action Alternative in detail. Other alternatives were evaluated prior to scoping by Clipper; they either would not meet the needs of Clipper or would obviously result in more disturbance and environmental impacts than the Proposed Action. These alternatives are discussed in the EA but were not analyzed in detail.

Based on public scoping, internal DOE review of the Proposed Action, and additional existing information concerning the proposed project area, DOE has determined that this EA would analyze the potential impacts of the Proposed Action and No Action Alternative on surface water resources (including wetlands); wildlife; vegetation; soils; threatened, endangered, proposed, and candidate species; cultural resources; noise; and visual resources. Numerous other

environmental resources were determined not to be affected by the project or were not present within the general project area and are not discussed in detail in this EA.

The project site is located immediately adjacent to the exiting Medicine Bow Wind Farm, and this area has been utilized for wind development since the 1980s. With Clipper's commitment to implement storm water pollution prevention measures and to promptly conduct reclamation operations, it was determined that the Proposed Action would have negligible short- and long-term impacts on soils, vegetation, and surface water resources (including wetlands). The project area was also surveyed for cultural resources and none were identified; the Proposed Action would have no impacts on historic or prehistoric sites. DOE/NREL has also notified Native American tribes in accordance with federal policy. To date, no sites or areas of traditional cultural importance have been identified within or near the project area. The Proposed Action would also have negligible impacts on noise and visual resources. The Proposed Action would not adversely affect any threatened, endangered, proposed, or candidate species that may occur or traverse through the project area. The Proposed Action (specifically the presence of the meteorological tower and operation of the wind turbine) would likely result in the mortality of 6.7 bats per year, 0.15 raptors per year and, 15.4 passerine birds per year. However, these mortalities would not have an adverse impact on bat, raptor, or passerine bird populations. Clipper would monitor mortalities around the meteorological tower and wind turbine for a 12-month period and would report the results to U.S. Fish and Wildlife Service, DOE/NREL, and Wyoming Game and Fish Department. The Proposed Action would have negligible impacts on other species that may occur in the project area.

The Proposed Action would result in less than 10 acres of disturbance (8.45 acres of temporary disturbance and 1.25 acres of life-of-project disturbance) but would likely cause negligible cumulative impacts because of the limited amount of area that would be affected and the location of the project near the existing Medicine Bow Wind Farm.

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LIST OF ABBREVIATIONS AND ACRONYMS

BLM	Bureau of Land Management
CEQ	Council on Environmental Quality
C.F.R.	*Code of Federal Regulations*
Clipper	Clipper Windpower, Inc.
dBA	A-weighted decibels
DOE	Department of Energy
EA	Environmental assessment
MW	Megawatt(s)
NEPA	*National Environmental Policy Act of 1969*
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
PRPA	Platte River Power Authority
RCRA	*Resource Conservation and Recovery Act*
TEP&C	Threatened, Endangered, Proposed, and Candidate Species
U.S.C.	*United States Code*
USFWS	United States Fish and Wildlife Service
WAPA	Western Area Power Administration
WDEQ/WQD	Wyoming Department of Environmental Quality/Water Quality Division
WGFD	Wyoming Game and Fish Department
WNDD	Wyoming Natural Diversity Database
WSHPO	Wyoming State Historic Preservation Office

1.0 INTRODUCTION

1.1 BACKGROUND

Wind resources in the U.S. are vast. However, less than 1% of the nation's energy needs are currently being provided by renewable wind power. As the U.S. looks to find ways to generate more electricity from wind resources, wind developers are challenged to improve the efficiency of future wind turbines so that more electricity can be produced economically in low wind speed areas--areas where the average annual wind speed is at least 13-14 mph at a height of 33 ft. Currently, most large wind turbines are designed for optimal performance in areas where the average wind speed is at least 15 mph at a height of 33 ft. However, many large population centers and power grids in the U.S. are located in low-wind speed-areas. If low wind speed areas could be used effectively for large-scale power generation, electric transmission losses and costs would be greatly reduced and the total area available for wind project development in the U.S. would be increased twenty-fold (National Renewable Energy Laboratory [NREL] 2002). As a result, government and private researchers are working to develop wind turbines that operate more economically at lower wind speeds that can be integrated into many U.S. power grids.

The NREL is a national laboratory for the U.S. Department of Energy (DOE) and is the nation's premier laboratory for renewable energy research and development. NREL works with the wind energy industry and provides funding for research and development for state-of-the-art wind turbine designs to advance wind power technologies that lower the cost of wind energy.

Clipper Windpower, Inc. (Clipper) has developed a proprietary low-speed wind turbine design that is capable of producing more electricity in low-wind conditions than comparable wind turbines. The Clipper turbine would have a maximum output of 2.5 megawatts (MW) of electrical power. Clipper has designed and constructed a full-scale version of the low-speed wind turbine and has begun the process of obtaining international certification for the low-speed wind turbine model. The National Wind Technology Center (operated by the NREL) administers the wind turbine certification program. Certification is provided by several

international organizations including Underwriters' Laboratories in the U.S. and Germanisher Lloyd in Europe. Although the wind turbine certification program is not a warranty, the certification provides purchasers of wind turbines assurance that a particular wind turbine model has been through the following:

- tested and evaluated by an accredited certification test organization,
- examined by a registered certification agent to ensure compliance with internationally approved standards for identification and labeling, power performance, structural integrity, acoustic emissions, loads, power quality, safety, and other characteristics, and
- demonstrated to have safe operating characteristics, including control systems that reflect sound engineering practice.

Wind turbine model certification is a major step in providing electric service organizations, government agencies, businesses, and private individuals that plan to purchase a wind installation with assurances that wind turbine models have been tested and meet certain design, manufacturing, performance, and safety standards. The Clipper low wind speed turbine design has undergone numerous tests, including drive train testing in the National Wind Test Center dynamometer. At this point, Clipper needs to test the demonstration wind turbine under natural wind conditions before the design can obtain international certification and can be put into full production. In order to test the low-speed wind turbine, Clipper proposes to install/construct and operate the low-speed wind turbine demonstration project on privately owned land near Medicine Bow, Wyoming (refer to Figure 1.1). The DOE/NREL, through a cost-shared research and development subcontract, proposes to provide partial funding for this project throughout the 3-year performance test period.

This environmental assessment (EA) is being prepared under the *National Environmental Policy Act of 1969* (NEPA), as amended (42 *United States Code* [U.S.C.] 4321 et seq.), and its implementing regulations found in 40 *Code of Federal Regulations* (C.F.R.) Part 1500–1508, and DOE's implementing regulations contained in 10 C.F.R. 1021.330 et seq. This EA assesses

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Figure 1.1 Location of Project Area.

the environmental impacts of the Proposed Action and the No Action Alternative, and serves to guide the decision-making process.

Seven critical elements (clearing or excavation [i.e., vegetation and soils], new or modified federal/state permits, threatened and endangered species, archaeological/cultural resources, other protected species, noise, and aesthetics) are present in the proposed project area, may be affected by the Proposed Action, and are discussed in detail in this EA. DOE has determined that 29 of the 36 critical elements of the human environment are not present in the area or are not affected by the Proposed Action and are not discussed further in this EA.

Based on an internal DOE review of the Proposed Action and additional existing information concerning the proposed project area, DOE has determined that this EA would also analyze potential impacts of the Proposed Action and alternatives on surface water resources and wildlife. Air quality, water quality (groundwater), livestock grazing, and wastes (hazardous or solid) were determined to be present in the proposed project area, but they would not be affected by the Proposed Action and would not be discussed further in this EA. Other resources (e.g., geology, health and safety, socioeconomics, noxious weeds, water rights, wild horses, landownership, timber, mineral resources, environmental justice, wilderness areas, etc.) have been determined not to be affected by the proposed project and are therefore not analyzed in detail in this EA.

Based on the discussion presented above and in accordance with DOE NEPA regulations and policies, the following resource issues/topics will be addressed in this EA: cultural resources, noise, soil resources, threaten, endangered, proposed, and candidate species, vegetation, aesthetic/visual resources, water resources (surface water including wetlands), and wildlife resources.

1.2 PURPOSE AND NEED

DOE/NREL's purpose is to fund the installation/construction and operation of a single low-speed wind turbine and associated facilities. The project would collect electrical production and reliability data from the wind turbine and wind data that would be necessary to evaluate the economic and technical feasibility of the demonstration wind turbine and its design. In addition, Clipper would also utilize a new design for the concrete pad for the wind turbine and would monitor performance of the pad.

This project is important to DOE/NREL because previous wind turbine design studies indicate that several new design configurations offer significant opportunities for reducing costs over current wind turbine configurations. Three major elements factor into opportunities for reducing the cost of wind energy. First, reduction in the cost of and improvements in the efficiency of wind turbine components including the drive train; second, increases in energy capture by taking advantage of higher wind speeds due to wind shear by placing turbines on innovative tall towers; third, increases in energy capture by increasing rotor diameter and taking advantage of innovative rotor configurations. These studies have indicated that several techniques can be used to achieve these results. Many of these techniques are interrelated, such as decreasing drive train weight that makes use of taller towers more cost effective, or introduction of novel rotor designs that decrease loads and allow larger rotor diameters. Application of emerging controls strategies, coupled with increased instrumentation, promises to aid in the cost-effective integration of these major elements.

Clipper has proposed a new turbine design that attempts to take into account all three of these elements. This new turbine design will use a novel gearbox with multiple generators. This new design is expected to be significantly lighter and less costly and allow use of taller towers to take advantage of wind shear at higher altitudes. The proposed Clipper turbine, if successful, is expected to be a major step toward realizing the advantages of low wind speed technology.

Many barriers impede the rapid advancement of wind turbine technologies, warranting cooperative development efforts between the federal government and the private sector. As a result, DOE/NREL has implemented financial programs that encourage partnerships with members of the U.S. wind industry, with the ultimate goal of developing large wind turbine systems capable of producing electricity for 3.0 ¢/kilowatt hour in Class 4 wind areas by 2007. A portion of the cost of Clipper's current low wind speed turbine demonstration project is being provided through one of DOE/NREL's partnership programs. In October 2002, Clipper won (through competitive bidding process) approximately $13 million for the partial funding of the development of new low wind speed turbine technologies being tested and evaluated under the Proposed Action.

1.3 ENVIRONMENTAL REVIEW PROCESS

1.3.1 *National Environmental Policy Act* and this NEPA Document

The DOE is the federal lead agency for evaluating the project under NEPA, and the DOE must determine whether to provide funding for the proposed project. As required by NEPA, this EA examines the expected individual and cumulative impacts of the proposed project. The DOE is the only federal agency with responsibility for approving or denying the partial funding for the project and therefore is the lead agency in preparing this EA.

The DOE/NREL prepared this EA to provide the public and responsible agencies with information about the project and its potential effects on the local and regional environment. This EA was prepared in compliance with NEPA requirements.

NEPA, as amended (42 U.S.C. 4321 et seq.), the President's Council on Environmental Quality (CEQ) regulations for implementing the procedural provision of NEPA (40 C.F.R. 1500-1508), and DOE's implementing procedures for compliance with NEPA (10 C.F.R. 1021) require that DOE, as a federal agency:

- assess the environmental impacts of any Proposed Action,

- identify any adverse environmental effects that cannot be avoided, should the Proposed Action be implemented,
- evaluate alternatives to the Proposed Action, including a No Action Alternative,
- describe the relationship between the local short-term use of the environment and the maintenance and enhancement of long-term productivity, and
- characterize any irreversible and irretrievable commitments of resources that would be involved should the Proposed Action be implemented.

These provisions must be addressed before the final decision is made to proceed with any proposed federal action that has the potential to cause impacts to the human environment, including providing federal funding to a project. This EA evaluated the potential individual and cumulative effects of the Proposed Action and the No Action Alternative on the physical, human, and natural environment. The EA is intended to (1) meet DOE's regulatory requirements under NEPA and (2) provide DOE with the information needed to make an informed decision in connection with the proposed project.

Existing NEPA documents that may be related to the proposed project include the following:

- EA, wind energy, Wyoming (Bureau of Reclamation 1979),
- environmental survey report, wind energy project, Medicine Bow, Wyoming (Platte River Power Authority 2000),
- environmental impact statement for the Carbon Basin coal project (Bureau of Land Management [BLM] 1999), and
- environmental impact statement for the Kenetech/PacifiCorp windpower project (BLM 1995).

1.3.2 Scoping and Public Involvement

A public scoping notice was mailed to approximately 52 federal, state, and local government agencies, companies, individuals, and organizations, giving them until November 10, 2004 (14 days), to submit comments. Five comment letters were received by the DOE. All five letters

were from government agencies--none were from private corporations or non-government organizations. Copies of the public scoping letters are presented in Appendix A.

Issues raised by government organizations and the public include the following:

- potential impacts to threatened, endangered, proposed, and candidate (TEP&C) species (e.g., black-footed ferret, bald eagle, Ute ladies'-tresses);
- potential impacts to raptors, migratory birds, greater sage-grouse, crucial winter range for pronghorn antelope, white-tailed prairie dogs, other mammals, and wetlands;
- alternatives to the Proposed Action and cumulative impacts;
- livestock grazing on state and federal leases;
- construction procedures; and
- reclamation and stabilization procedures.

This EA presents DOE/NREL's analysis of the Proposed Action and No Action Alternative and findings of the potential environmental effects of the Proposed Action. The EA is being distributed for public review to interested members of the public, Tribal organizations, and federal, state, and local agencies, and for review and comment prior to any final decision by DOE on the proposed project.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

2.1.1 Overview

The Proposed Action would be located on privately owned lands in portions of Section 1, T21N, R79W, and Section 36, T22N, R79W (refer to Figure 1.1) and would involve the construction of a single 262-ft tall tubular tower and wind turbine, a 240-ft tall meteorological tower, a 400-ft^2 service building, and approximately 4,300 ft of underground powerline (refer to Figure 2.1). Associated cables and powerlines would be buried between the proposed meteorological tower, the wind turbine, and the service building. In addition, approximately 1,000 ft of 10-ft wide service road would be constructed to provide access to the facilities (refer to Figure 2.1).

The proposed project would be located approximately 850 ft south of seven existing wind turbines (i.e., the Medicine Bow Wind Project) owned and operated by the Platte River Power Authority (PRPA). The proposed project would not be part of PRPA's Medicine Bow Wind Project but would be located near that facility so that it could utilize as much of the existing infrastructure (i.e., roads and powerlines) as possible. This would minimize additional disturbance and associated impacts. The Proposed Action would likely result in less than 10 acres of new disturbance (refer to Table 2.1).

Access to the site would be south from Medicine Bow, Wyoming, via the Elk Mountain to Medicine Bow road (an unpaved county road) to a series of unpaved private access roads located near the existing Medicine Bow Wind Project (refer to Figure 2.2).

Clipper anticipates that the equipment would last approximately 20 years, after which time the wind turbine would be decommissioned and all the equipment removed. The Proposed Action would comply with all relevant federal, state, and local laws and regulations.

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Figure 2.1 Layout of Medicine Bow Low Wind Speed Turbine Facilities.

This figure is a separate file Fig 2-2.pdf.

Figure 2.2 Location of Existing Development near the Project Area.

Table 2.1 Proposed Project New Disturbance[1].

Component	Temporary Disturbance	Life-of-Project Disturbance	Total Disturbance
Access road	1.00	0.50	1.50
Wind turbine	3.75	0.25	4.00
Meteorological tower and service building	3.50	0.50	4.00
Underground powerline	0.20	0.00	0.20
Total	8.45	1.25	9.70

[1] In acres.

2.1.2 Construction and Installation Phase

The construction and installation phase of the Proposed Action would begin as soon as all required authorizations are obtained from DOE and any related state or local regulatory agencies. Locations of the various components (e.g., roads, wind turbine, meteorological tower, service building, buried cables) would be surveyed and staked. The existing access road from the southern portion of Section 36, T22N, R79W, would be extended approximately 200 ft to the proposed wind turbine site and would provide access to the wind turbine. An additional 800 ft of access road would be constructed between the meteorological tower and the service building (refer to Figure 2.1). The proposed access road would be approximately 10 ft wide and would likely result in 0.5 acre of life-of-project disturbance. There would also be an additional 1.0 acre of temporary disturbance created by the construction of the access route. The road would be surfaced with locally available gravel or crushed stone to provide year-round access to the project site.

The wind turbine would be anchor-bolted to a concrete foundation consisting of an octagon-shaped pad that would have a diameter of 53 ft and approximately 4 ft thick. The turbine erection site would likely require approximately 0.25 acre of life-of-project disturbance. The pad would be excavated with a backhoe, and the excess material would be transported off-site for disposal. The concrete forms would be placed into the excavation, and concrete poured. The

262-ft tall turbine tower would be transported in pieces and assembled on-site. The turbine tower, turbine nacelle, and 148-ft long blades would be painted white and would match the color of the existing wind turbines. A large crane would be transported to the site and used to erect the tower and to lift the turbine, hub, and rotor blades into place. The self-supporting tower would not require any guy wires or other support system (refer to Figure 2.3). There would be an additional 3.75 acres of temporary disturbance created by construction/installation of the wind turbine.

The 240-ft tall meteorological tower (with three sets of guy wires) and 400-ft^2 service building would be transported to the site and erected and would comply with manufacturer installation recommendations. The meteorological tower is a standard lattice-design and would be placed on a small concrete pad and supported with guy wires. The 400-ft^2 service building would be a 10-ft tall metal building that would be placed on a concrete slab (refer to Figure 2.1). The service building would be painted desert tan color to blend into the surrounding environment. Electrical power and communication service would be available in the service building. Construction of both the meteorological tower and service building would likely result in approximately 0.5 acre of life-of-project disturbance and an additional 3.5 acres of temporary disturbance.

Portable self-contained chemical toilet(s) would be provided for human waste disposal during the construction, operations, and decommissioning phases of the Proposed Action. Bottled drinking water would be provided during the construction and operations phase of the Proposed Action. All solid waste (i.e., trash) and waste materials generated during the construction, operations, and decommissioning phases of the Proposed Action would be collected in portable dumpsters or trash containers and would be transported off-site to an authorized solid waste disposal facility. Clipper does not anticipate that any flammable waste materials or hazardous waste would be generated as a result of the Proposed Action; however, Clipper and its contractors would comply with all applicable federal and state laws and regulations governing the handling and disposal of any flammable or hazardous waste. No solid or liquid wastes would be disposed within the project area.

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Figure 2.3 Low Wind Speed Turbine.

Approximately 4,300 ft of 34.5-kV underground powerline would be installed from the proposed wind turbine to a terminal riser pole owned by the Western Area Power Administration (WAPA) (refer to Figure 2.4). The terminal riser pole is the connection point to the power grid and is located approximately 300 ft northeast of the existing Medicine Bow Wind Project. Approximately 400 ft of buried powerline would be installed between the terminal riser pole and PRPA's electric substation. This would result in approximately 0.1 acre of temporary disturbance. Approximately 3,700 ft of underground powerline would be buried in the center of the existing access road using conventional trenching techniques. This actually would result in no new disturbance. The remaining 200-ft of underground powerline would be buried across undisturbed ground (using the same installation technique) and would result in a minimal amount of temporary disturbance (less than 0.1 acre). Additionally, 1,300 ft of communication and power cables would be buried among the meteorological tower, turbine, and service building along the side of the new access road and would not result in any additional disturbance. Under the Proposed Action, no aboveground powerlines or cables would be constructed or installed.

The construction/installation phase of the Proposed Action would require approximately 10-15 people, and typical construction equipment (e.g., backhoe, crane, pickup, dump truck, cable plow, etc.) and would require approximately 2 months to complete starting in December 2004. Off-road travel within the project area would be limited to area between the proposed wind turbine, meteorological tower, and service building. Total disturbance associated with the Proposed Action (including off-road travel) would result in less than 10 acres of new disturbance.

Clipper would apply to the Wyoming Department of Environmental Quality, Water Quality Division (WDEQ/WQD) for permit coverage for potential storm water pollution (i.e., erosion from construction activities). In addition, Clipper would prepare and implement a storm water pollution prevention plan to prevent disturbed runoff from leaving the project site.

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Figure 2.4 Location of Underground Powerline.

2.1.3 Operations Phase

Once the construction and installation phase is complete, Clipper would begin the operations phase of the Proposed Action. During this phase, wind energy would be converted into rotational energy and then into electricity through the use of generators located in the wind turbine nacelle. The wind turbine would be computer-controlled for maximum performance and for safety when wind speeds exceed design parameters. Typically, the wind turbine would start spinning at approximately 9 mph (i.e., the "cut-in speed"), and the typical shut-down speed would be between 55 and 63 mph (i.e., "cut-out speed"). The wind turbine would have a blade sweep area of 73,093 ft^2, a nominal rotor speed of 9.6 to 15.5 revolutions per minute, and a blade tip speed of 167 mph at optimal operating speed. The wind turbine system would be designed to stand hurricane-force winds.

During the first 9-12 months of operations, the site would be manned by a technician on 24-hr per day/7-day per week basis. After the initial start-up period, a technician would typically visit the site once per week. Other than regularly scheduled maintenance (e.g., gearbox inspection, oil and oil filter replacement, etc.), the wind turbine would require little routine maintenance. Utility company technical staff would integrate electricity generated by the wind turbine into the power grid.

One of the primary purposes of the Proposed Action would be the collection and analysis of various power generation and reliability data from the demonstration wind turbine and wind data. Data collection would be automated and would utilize a local area network-based web caching data collection system. The data would be collected and transmitted in real-time to Clipper personnel at their corporate offices in Carpinteria, California, where the data would be analyzed.

2.1.4 Decommissioning Phase

Clipper expects the operating life of the wind turbine and associated equipment to be approximately 20 years. At the end of the useful operating life, the turbine, tubular tower, meteorological tower, and service building would be removed and recycled as appropriate. Those materials that are not recyclable would be disposed of at an authorized solid waste landfill facility. All used lubricating fluids would be non-hazardous and would be recycled or disposed in accordance with state regulations. The concrete pads and buried cables and powerlines would be recycled or disposed at an authorized solid waste landfill facility.

Once the equipment has been removed from the site, all disturbed and/or compacted areas (i.e., areas with roads, pads, and buried cables) not needed for on-going operations or desired to be left in-place by the private landowner would be reclaimed and revegetated. Disturbed areas would be recontoured and disced to prepare a suitable seedbed and, at the seasonally appropriate time, the area would be seeded and mulched as directed by the private landowner. The specific seed mixture would be determined by the private landowner and would likely contain grasses, forbs, and shrubs, and the reclaimed areas would be mulched.

It is possible that, at the end of the 20-year life of the project, the proposed wind turbine site might not be decommissioned. Rather than be decommissioned, the site may be equipped with a new or different wind turbine (i.e., repowered). If the site is repowered, it would continue to operate and generate electricity. However, at this time Clipper does not anticipate repowering the site, and the Proposed Action is limited to a 20-year life. Repowering of the project site may require further environmental review and analysis, and for the purpose of this project the repowering situation is outside the scope of this EA and is not addressed in this EA. Additional environmental review and analysis may be conducted if a decision was made to repower the site.

2.1.5 Applicant-committed Practices

Clipper proposes to implement the following applicant-committed measures and procedures to minimize or avoid potential environmental impacts. These measures would be applied on all lands affected by the project.

2.1.5.1 Air Quality

- Clipper would not burn garbage or refuse at the site or other facilities.

2.1.5.2 Soils and Vegetation

- To minimize impacts to soil and vegetation resources, Clipper would reduce the area of disturbance to the absolute minimum necessary for construction operations while providing for safe operating conditions. Clipper would also restrict off-road vehicle traffic where it is not necessary for construction of the Proposed Action.

- Where feasible, buried powerlines and cables would be located in common corridors to avoid creating separate areas of disturbance.

- Upon completion of construction/installation phase and decommissioning phase of the Proposed Action, Clipper would restore topography to near pre-existing contours on the project site, including access roads and other facilities. Clipper would also revegetate all disturbed areas not required for on-going operations. Clipper would apply fertilizer as required, would seed, and would apply mulch to all disturbed areas. The landowner would determine the species to be seeded and the quantity of fertilizer and mulch to be used during vegetation operations.

- Any materials used during reclamation activities (e.g., seed, mulch) would be certified free of noxious weed seed and reproductive plant parts as determined by appropriate county or state officials.

- Clipper would implement noxious weed control measures within the area disturbed by construction activities. Noxious weed control measures would include chemical or mechanical treatment to contain or eradicate any new noxious weed populations that develop in disturbances created by construction activities. Prompt reclamation of disturbed sites would also minimize potential for weed infestations.

- Clipper would obtain permit coverage for storm water pollution from construction sites from the Wyoming Department of Environmental Quality/Water Quality Division. Clipper would also develop a storm water pollution prevention plan that would include measures (such as interception ditches, sediment traps, water bars, and silt fences) to minimize storm water pollution.

2.1.5.3 Wildlife (Including Special Status Species)

- To minimize potential impacts to all wildlife species, Clipper would prohibit all unnecessary off-site activities by project personnel. Clipper would inform all project personnel of applicable wildlife laws and penalties associated with unlawful taking or harassment of wildlife.

- To minimize potential impacts to raptors and avian species, Clipper would ensure that all project-related powerline structures would be constructed in accordance with *Suggested Practices for Raptor Protection on Powerline: The State of the Art in 1994* (Avian Power Line Interaction Committee 1996).

- To minimize potential impacts to active greater sage-grouse leks during the construction of the Proposed Action, Clipper would not conduct any surface-disturbing activities within 0.25 mi of any active lek during the greater sage-grouse mating season between February 1 and May 15. In addition, in order to minimize potential impacts to nesting greater sage-grouse, no surface-disturbing activities would be conducted within 2 mi of any active lek between April 1 and July 1 without permission from the Wyoming Game and Fish Department (WGFD). Reclamation activities would be conducted prior to April 1, unless prior permission is obtained from WGFD.

- To minimize potential impacts to pronghorn, construction activities would be limited during severe winter conditions. Specifically, Clipper would maintain contact with local WGFD personnel, and if it is determined by WGFD that severe winter conditions exist, Clipper would notify DOE/NREL of any restrictions required by WGFD and would limit the number of construction vehicles that would be allowed to access the site. In addition, Clipper would minimize the amount of time personnel would be at the construction site. Reclamation and revegetation procedures would be followed to minimize the long-term loss of habitat.

- To document potential impacts to avian and bat species, Clipper would conduct mortality surveys near the wind turbine and meteorological tower during the first 12 months of operation of the Proposed Action. Clipper would utilize mortality survey methods similar to those developed for the nearby Foote Creek Rim Wind Plant (Young et al. 2003). Personnel would conduct one survey every 2 weeks, and each survey would involve walking transects established within 250 ft of each tower. Search transects would be set approximately 25-30 ft apart and the searcher would walk at a rate of approximately 2 mi/hr along the transect searching both sides out approximately 12-15 ft for casualties. It is estimated that it should require 0.75 hour to survey both towers. For each casualty identified,

data recorded would include species, sex, and age when possible, date, and time collected, location, condition, and any comments that may indicate the time and cause of death. All carcasses located would be photographed as found and mapped. If the species information cannot be determined, the carcass would be bagged and transported to local biologists for proper identification. At the end of the 12-month survey period, the data would be compiled, summarized, and submitted to the DOE, USFWS, and WGFD. The U.S. Fish and Wildlife Service (USFWS) would be notified immediately by telephone if carcasses of raptors or other species of concern were located at any time during turbine operation.

2.1.5.4 Noise

- Clipper would ensure that muffles and motorized equipment are maintained according to manufacturers' specifications.

2.1.5.5 Cultural Resources

- Clipper would inform all construction personnel that they are working on private property and not to search for or remove any cultural resource materials.

- If any cultural resources are discovered during construction operations, all construction activities within the immediate area being conducted by Clipper would be suspended and DOE and Wyoming State Historic Preservation Office (WSHPO) personnel and appropriate tribal representatives would be immediately notified. The materials would be evaluated by the archaeologist or historian meeting the Secretary of Interior's Professional Qualification Standards (48 FR 22716, September 1983). Work in the area would not resume until the status of the find is determined and any appropriate mitigation plans (if necessary) are developed and implemented.

- If a cultural resource site, considered eligible for the National Register of Historic Places (NRHP) is identified, Clipper would utilize avoidance as the preferred method of minimizing potential adverse effects to the property.

- Clipper would minimize adverse effects to cultural/historical properties that cannot be avoided by the preparation and implementation of a cultural resources mitigation plan approved by the WSHPO and DOE /NREL.

2.1.5.6 Health and Safety

- Clipper would provide potable drinking water and portable self-contained toilets for human waste disposal. All sewage and refuge (i.e., trash) generated on-site would be collected and routinely transported off-site to a Department of Environmental Quality-approved waste disposal facility.

- Clipper plans to avoid the creation of hazardous wastes as defined by *Resource Conservation and Recovery Act* (RCRA) wherever possible. Clipper would ensure that any hazardous waste, as defined by RCRA, that is generated by Clipper would be transported and/or disposed of in accordance with all applicable federal, state, and local regulations.

2.1.5.7 Aesthetics

- The service building would be painted a desert tan color to blend into the surrounding.

2.2 NO ACTION ALTERNATIVE

The No Action Alternative is required under Section 1502.14(d) of NEPA and DOE implementing regulations. A No Action Alternative is considered in this EA and provides a

benchmark, enabling decision-makers to compare the magnitude of environmental effects of the alternatives (including the Proposed Action). Under the No Action Alternative, the DOE would not fund the proposed project. To create the basis for a meaningful analysis, it is assumed that the low wind speed turbine demonstration project would not be constructed at the proposed location. However, it is possible that Clipper could construct the project using other funds independent of DOE.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

In accordance with CEQ and DOE NEPA regulations, several alternatives to the proposed project were identified and considered but eliminated by Clipper from detailed study in this EA. One of the alternative sites was eliminated (i.e., screened out) because of scheduling conflicts. In addition, some of the potential sites were eliminated from detailed study because they would clearly result in more environmental impacts than the Proposed Action. The following alternatives were identified and considered but eliminated from detailed study.

2.3.1 Locate the Proposed Project at a Site in Southern California

Under this alternative, Clipper would construct and operate the low-speed wind turbine demonstration project at a site located near Birds Landing in southern Solano County in northern California. This site would be part of the repowering effort in a portion of an existing wind farm. Recent information submitted to the Solano County Board of Supervisors for this location indicates that incidents of bird strikes on wind turbines were much higher than originally expected. As a result, the Solano County Board of Supervisors is reviewing current information and has delayed its decision to permit and allow the repowering of this site (including a possible site for the Clipper's low wind speed turbine). As a result, this site would not be available for use for the immediate future (personal communication, October 18, 2004, with Mr. Tom Feiler, Clipper, Boulder, Colorado). The permitting delay would not meet the scheduling needs of Clipper or DOE and could potentially have more impacts to avian species than under the

Proposed Action. Therefore, this alternative was determined not to meet the schedule required for this project, was eliminated from further consideration, and is not studied in detail in this EA.

2.3.2 Locate the Proposed Project at a Site in Jackson County, Minnesota

Under this alternative, Clipper would construct and operate the low wind speed turbine demonstration project at a site located in Jackson County in southwestern Minnesota. At this site, the proposed low-speed wind turbine demonstration project would be the only wind turbine in the immediate area (i.e., it would not be part of an existing wind farm). At the Jackson County alternative site, the low-speed wind turbine demonstration project would be located in an area that does not currently have any wind farms. As a result, the proposed wind turbine would be noticeable to the casual observer when compared to the Proposed Action. In addition, this alternative would likely result in more disturbance than under the Proposed Action (personal communication, October 18, 2004, with Mr. Tom Feiler, Clipper, Boulder, Colorado).

This alternative would result in increased aesthetic impacts and visual intrusions into the viewshed of the project area and would result in increased disturbance compared to the Proposed Action. Therefore, this alternative was determined not to be environmentally sound when compared to the Proposed Action, was eliminated from further consideration, and is not studied in detail in this EA.

2.3.3 Locate the Proposed Project at a Site 0.5 mi South of the Proposed Project Location

Under this alternative, Clipper would construct and operate the low-speed wind turbine at a site located approximately 0.5 mi south of the proposed construction site. The alternative site would be located in an area that would be similar in all environmental aspects to the site of the Proposed Action. The primary disadvantage of the alternative site is that it would be located farther away from the existing infrastructure (i.e., roads and powerlines) and would cost more and would require more disturbance for the access road and underground powerline compared to the Proposed Action.

The Proposed Action, however, would be located approximately 850 ft south of an existing Medicine Bow Wind Project. Under the Proposed Action, the additional wind turbine and associated facilities would be similar in appearance to the existing wind turbines and would hardly be noticeable to the casual observer. Under this alternative, the low-speed wind turbine would be located 0.5 mi south of the existing Medicine Bow Wind Project, and it would be more noticeable to the casual observer when compared to the Proposed Action.

This alternative would result in increased costs and disturbance and would cause increased visual intrusion into the viewshed of the general project area compared to the Proposed Action. In addition, the USFWS recommends siting wind turbines in groups or strings to minimize impacts to avian species (USFWS 2003). Therefore, this alternative was determined not to be economically feasible or environmentally sound when compared to the Proposed Action, was eliminated from further consideration, and is not studied in detail in this EA.

3.0 AFFECTED ENVIRONMENT

3.1 LOCATION, SETTING, AND HISTORICAL USE

The proposed project would be located approximately 5 mi southwest of the community of Medicine Bow, Wyoming, in eastern Carbon County (refer to Figure 1.1). Access to the site is south from Medicine Bow, Wyoming, via the Elk Mountain to Medicine Bow Road (an unpaved public road) to unpaved private access roads located near the existing Medicine Bow Wind Project (refer to Figure 2.2). The proposed project would be located in Section 1, T21N, R79W, and the property is privately owned.

The proposed project would be located on the eastern flanks of the Hanna Basin (Lageson and Spearing 1998). The proposed project area is also located within the Upper Platte River drainage basin (Knight 1994), and the Medicine Bow River is located approximately 1.5 mi southeast of the project area. Elevation of the project area is approximately 6,750 ft above mean sea level and is relatively flat except for the western portion of the project area that gently slopes toward the west-southwest. The general project area is also relatively flat with some areas of rolling hills (refer to Figure 3.1).

Based upon 1:100,000-scale mapping, the mixed-grass prairie is the only ecological region within 1 mi of the proposed project area (U.S. Geological Survey 1996). Mixed-grass prairie is composed of grasses, forbs, and shrubs (such a needle-and-thread grass, western wheatgrass, Sandberg bluegrass, Junegrass, Indian ricegrass, scarlet globemallow, fringed sagewort, Hood's phlox, black sagebrush, and cushionplants) (Knight 1994).

Climatic conditions within the general project area are characteristic of the Foothills and Basin area of south-central Wyoming. According to weather data collected at Medicine Bow, Wyoming (approximately 5 mi northeast of the project area), record high and low temperatures are approximately 97ºF and –46ºF, respectively, with an average annual air temperature of

This figure is a separate file Fig 3-1.pdf.

Figure 3.1 Location of Project and PRPA Wind Turbines.

41.6ºF. Summer temperatures range widely, typically with warm sunny days and cool nights. On average, there are approximately 90 frost-free days a year in the general project area (Martner 1986). The proposed project area receives approximately 10.25 inches of precipitation per year, and the prevailing winds are from the southwest (Soil Conservation Service 1988).

The general project area historically has been utilized for livestock grazing, wind energy development, oil and gas development, utility corridors, and wildlife habitat. Currently, the PRPA owns and operates the Medicine Bow Wind Farm located immediately north of the project area. This wind farm consists of 10 large (>600-kilowatt) wind turbines, two 400-ft tall guyed meteorological towers, an 800-ft^2 service building, and associated outbuildings and facilities. The seven of the existing wind turbines are located south of the service building and configured in a single row of turbines, and the three remaining turbines are located near of the service building. WAPA operates and maintains a 115-kilovolt powerline and electric substation that connects the PRPA wind farm to the power grid. The existing electric substation is located approximately 500 ft east of the PRPA service building, and the powerline runs northeast from the PRPA wind farm toward the community of Medicine Bow. A 69-kV transmission powerline (owned and operated by Carbon Power and Light Inc., a rural electric cooperative) runs from the northeast to the southwest through the general project area. This line provides electric service to the community of Elk Mountain but is not associated with or connected to the PRPA wind farm or WAPA powerline (refer to Figure 2.2).

3.2 AFFECTED RESOURCES

3.2.1 Cultural Resources (Including Native American Concerns)

Cultural resources are the nonrenewable physical remains of past human activity and are protected under Section 106 of the *National Historic Preservation Act of 1966*, as amended (16 U.S.C. §470 et seq), the *Archaeological Resources Protection Act of 1979,* as amended (16 U.S.C. §470aa et seq), and other laws. Archaeological investigations in south-central Wyoming indicate that human activity has occurred across the landscape over the past 10,000 years, beginning during the Paleoindian period and continuing up to the present (Frison 1991).

Results of a BLM Class I survey (i.e., file search) did not indicate that any previously identified historic or prehistoric sites were located within the project area. A Class III inventory (i.e., pedestrian survey) of the project area that included 34.4 acres did not identify any cultural resource sites (TRC Mariah Associates Inc. 2004). Several historic trails including the Overland Trail, Cherokee Trail, and the Fort Halleck to Fort Fetterman Wagon Road occur within the vicinity of the project area, but none of these trails are located within 10 mi of the project area.

Numerous Native American groups including but not limited to Crow, Shoshone, Comanche, Arapaho, Cheyenne, and Sioux have utilized the general project area and numerous sites of traditional cultural interest have previously been identified within 10 mi of the project area. Some of these sites are located near the Foote Creek Wind Farm project, the Carbon Basin Coal project, and a fiber optic project (personal communication, December 21, 2004, with Mark Soldier Wolf, Northern Arapaho Tribal Archaeological Consultant). Tribes and/or individuals were sent letters requesting their comments concerning any religious or significant cultural areas within or near the project area. To date, no historic or prehistoric sites of Native American origin, or sites or areas of traditional cultural significance have been identified within the project area.

3.2.2 Noise

The A-weighted sound pressure level, or A-scale, is used extensively in the U.S. to measure community and transportation noise and is a measure of noise in A-weighted decibels (dBA), which is directly correlated with some commonly heard sounds. Table 3.1 presents a list of commonly heard sounds with the corresponding noise level (Rau and Wooten 1980).

Table 3.1 Comparison of Measured Noise Levels with Commonly Heard Sounds.[1]

Source	dBA	Description
Normal breathing	10	Barely audible
Rustling leaves	20	
Soft whisper (at 16 ft)	30	Very quiet
Library	40	
Quiet office	50	Quiet
Normal conversation (at 3 ft)	60	
Busy traffic	70	Noisy
Noisy office with machines; factory	80	
Heavy truck traffic (at 49 ft)	90	Constant exposure endangers hearing

[1] Source: Rau and Wooten (1980).

No site-specific noise level data are available for the project area. However, major sources of noise include the wind and the PRPA wind turbines that generate noise only when they are operating. Rural areas like the project area have an average noise level of 30-45 dBA (Rau and Wooten 1980). Median noise levels for rural areas likely range from 20 to 40 dBA in the morning and evening and from 50 to 60 dBA in the afternoon when wind speeds are typically greatest. These noise levels correspond to a soft whisper (30 dBA), a library (40 dBA), a quiet office (50 dBA), a small town (40-50 dBA), and normal conversation (60 dBA). Traffic along an interstate highway typically averages noise levels greater than 70 dBA (Wyle Laboratories 1971). When operating at the optimal wind speed (33 mph), the existing PRPA wind turbines likely produce approximately 40-50 dBA of noise 800 ft downwind of the turbines (Madison Gas and Electric 2004). In high winds, the background noise produced by the wind would generally mask most of the noise from the operating wind turbines.

Noise-sensitive areas in the general project area include private residences (the closest residence is approximately 1.5 mi north of the project area), occupied raptor nests (the closest raptor nest is approximately 1.4 mi southwest of the project area), and greater sage-grouse leks during the breeding and nesting season (the closest greater sage-grouse lek is 0.4 mi south of the project area).

3.2.3 Soil Resources

The Natural Resources Conservation Service has not published a detailed soil survey report for the eastern portion of Carbon County. However, the College of Agriculture at the University of Wyoming has prepared 1:100,000 scale digital soil maps including the proposed project area (Munn and Arneson 1998). The project area includes soils from the High Plains Southeast zone, which is typically comprised of mountains and foothills. In the general project area, the surface 12 inches of soil is typically gravelly loam, and the subsoil is highly calcareous, very gravelly, and cobbly loam to sandy loam. Water erosion is slight, and wind erosion potential is moderate. These soils support a vegetative cover that typically serves as rangeland and wildlife habitat (Soil Conservation Service 1988).

3.2.4 Threatened, Endangered, Proposed, and Candidate (TEP&C) Species

3.2.4.1 Introduction

The federal *Endangered Species Act* (16 U.S.C. 1531-1543) protects federally listed threatened and endangered plant and animal species and their critical habitats. A list of federally listed TEP&C species that potentially occur in the vicinity of the proposed project was compiled from the Wyoming State Supervisor Office of the USFWS (2004) and the Wyoming Natural Diversity Database (WNDD) (2004).

TEP&C species are those that have been specifically designated as such by the USFWS. Endangered species are those that are in danger of extinction throughout all or a significant portion of their range. Threatened species are those that are likely to become endangered in the foreseeable future throughout all or a significant portion of their range. Candidate species are those for which the USFWS has sufficient data to list as threatened or endangered but for which proposed rules have not yet been issued. Proposed species are those for which the USFWS has published proposed rules in the *Federal Register* for listing of the species but for which a final rule has not been adopted.

3.2.4.2 TEP&C Animal and Plant Species

The black-footed ferret (*Mustela nigripes*), a federal endangered species; bald eagle (*Haliaeetus leucocephalus*), a federal threatened species; Ute ladies'-tresses (*Spiranthes diluvalis*), a federal threatened species; and Platte River system species--whooping crane (*Grus americana*), interior least tern (*Sterna antillarum*), piping plover (*Charadrius melodus*), pallid sturgeon (*Scaphirhynchus albus*), bald eagle (*Haliaeetus leucocephalus*), Eskimo curlew (*Numenius borealis*), and western prairie fringed orchid (*Platanthera praeclara*)--may potentially occur within the project area or may be affected by the Proposed Action (refer to Table 3.2). No other TEP&C species as designated by the USFWS have been identified to potentially occur within the project area (USFWS 2004).

Black-footed Ferret. The black-footed ferret, a federally listed endangered species, was once distributed throughout the high plains of the Rocky Mountain and western Great Plains regions (Clark and Stromberg 1987; Forrest et al. 1985). Prairie dogs are the main food of black-footed ferrets (Sheets et al. 1972), and historically a few black-footed ferrets have been collected away from prairie dog towns (Forrest et al. 1985). The last known wild population of black-footed ferrets was discovered in the Pitchfork area near Meeteetse in 1981. Due to the fear that canine distemper would wipe out this population, the remaining black-footed ferrets were captured from the Pitchfork area and placed into a captive breeding project in 1985 (Wyoming Game and Fish Department [WGFD] 1997).

Table 3.2 Federal Threatened, Endangered, Proposed and Candidate Species and Their Potential Occurrence Within the Project Area, 2004.[1]

Common Name	Scientific Name	Federal Status[2]	Potential Occurrence Within the Proposed Project Area[3]
MAMMALS			
Black-footed ferret	*Mustela nigripes*	E	X
BIRDS			
Bald eagle[4]	*Haliaeetus leucocephalus*	T	R
PLANTS			
Ute ladies'-tresses	*Spiranthes diluvialis*	T	X
PLATTE RIVER SYSTEM SPECIES	Various[5]	n/a	n/a

1 Adapted from USFWS (2004).
2 Federal status (USFWS 2004):
E = listed as federally endangered.
T = listed as federally threatened.
n/a = not applicable.
3 Species occurrence:
R = Rare; species may be in the project area for just a few days or hours (e.g., stopping over during migration). Encounters during project construction is very unlikely.
X = Unlikely; there has been no recent historical record of the species's occurrence in the project area; probability of encountering the species during powerline construction is very unlikely.
n/a = not applicable.
4 Proposed for removal from federal listing.
5 Includes whooping crane (*Grus americana*), interior least tern (*Sterna antillarum*), piping plover (*Charadrius melodus*), pallid sturgeon (*Scaphirhynchus albus*), bald eagle (*Haliaeetus leucocephalus*), Eskimo curlew (*Numenius borealis*), and western prairie fringed orchid (*Platanthera praeclara*).

As a result of the captive breeding and reintroduction program, black-footed ferrets have been successfully released into several areas in the west including the Shirley Basin Ferret Management Area located approximately 30 mi north of the project area. Eighty-eight black-footed ferrets were counted during surveys conducted in August 2004. This is an increase of 36 black-footed ferrets (69%) more than the 52 individuals counted during August 2003 (Casper-Star Tribune 2004).

The *Black-footed Ferret Survey Guidelines for Compliance with the Endangered Species Act* (USFWS 1989) defines potential black-footed ferret habitat as any white-tailed prairie dog

towns or complexes greater than 200 acres in size. Based on the results of a reconnaissance survey conducted by TRC Mariah Associates Inc. on October 28, 2004, no prairie dogs were identified within the project area. In addition, while potential black-footed ferret may travel through the general project area, the project area is located outside of any area requiring black-footed ferret surveys (USFWS 2004). In addition, no recent black-footed ferret observations have been recorded in the vicinity of the project area (USFWS 2004; WNDD 2004). Therefore, it is unlikely that any black-footed ferrets would occur in the project area.

Bald Eagle. The bald eagle is a federally listed threatened species (downlisted from endangered and now proposed for removal from federal listing). This species requires cliffs, large trees, or sheltered canyons associated with concentrated food sources (e.g., fisheries or waterfowl concentration areas) for nesting and/or roosting areas. Bald eagles forage over wide areas during the non-nesting season (i.e., fall and winter) and scavenge on animal carcasses such as pronghorn antelope, deer, and elk (Edwards 1969; Snow 1973; Call 1978; Steenhof 1978; Peterson 1986).

No bald eagle nests or winter roosts are known to occur in the project area or within the general project area, due to the lack of suitable nesting or winter roosting habitats. There are no known bald eagle nests with 15 mi of the proposed project area (BLM 2003) and there have been no documented mortalities of bald eagles associated with the Phase I portion of the Foote Creek Rim Windpower project located approximately 10 mi southeast of the proposed project area (Young et al. 2003). Although searches of the WNDD revealed no records of bald eagles in the vicinity of the proposed project area (WNDD 2004), it is possible that individuals may occasionally forage in or fly through the general project area.

Ute Ladies'-tresses. Ute ladies'-tresses, a federally listed threatened species, is a perennial member of the orchid family that inhabits moist streambanks, wet meadows, and abandoned stream channels at elevations of 4,500-6,800 ft (Fertig 1994; Spackman et al. 1997). Although the species will tolerate mildly alkaline conditions, it is unlikely to be found in association with Gardner's saltbush, greasewood, or other alkaline vegetation. Where it occurs in ephemeral drainages, groundwater is typically shallow (i.e., within approximately 18 inches of the ground

surface) (personal communication, March 16, 2000, with Pat Deibert, USFWS; personal communication, March 22, 2000, with Walt Fertig, WNDD).

The species has been documented in Goshen, Converse, and Niobrara Counties in Wyoming (Fertig 1994) and along the Front Range in northern and central Colorado (Spackman et al. 1997). Although much time has been devoted in recent years to determining areas in Wyoming where the species occurs, it has not been documented within the proposed project area, the general project area, or Carbon or Albany Counties (WNDD 2004). Based on visual observation of the project area and descriptions for vegetation communities in the project area, there is no suitable habitat for Ute ladies'-tresses within the project area or immediate project area. There would be no affect from the project, and the species is not discussed further in this EA.

Platte River System Species. The USFWS has determined that water depletion to the Platte River system may adversely affect the federally listed whooping crane (*Grus americana)*, interior least tern (*Sterna antillarum*), piping plover (*Charadrius melodus*), pallid sturgeon (*Scaphirhynchus albus*), bald eagle (*Haliaeetus leucocephalus*), Eskimo curlew (*Numenius borealis*), and western prairie fringed orchid (*Platanthera praeclara*). Water depletions include evaporative losses or consumptive use including, but not limited to, ponds, lakes, reservoirs, created or enhanced wetlands, hydrostatic testing of pipelines, wells, diversion structures, dust abatement, etc. The Proposed Action would not result in any water depletions from the Platte River system and would not result in any adverse indirect impacts to these species; therefore they are not discussed further in this EA.

Boreal Toad. The boreal toad is not a listed species (threatened, endangered, proposed, or candidate) under the federal *Endangered Specie Act*. However, the USFWS has determined that sufficient information exists to list the species as a candidate species, but the USFWS has not proposed the species for listing because of higher priority listing actions (USFWS 2004). The boreal toad (*Bufo boreas boreas*) is one of two subspecies of the western toad that is found throughout much of the western U.S. The range of the boreal toad currently extends from western British Columbia to southern Nevada and east to parts of Wyoming. Wyoming is on the

southeastern periphery of the boreal toad distribution, and it has been found in the south-central and northwestern portion of the state. In Wyoming, boreal toads generally occur between 7,500 to 12,000 ft above mean sea level and are usually found in wetlands near ponds, lakes, reservoirs, rivers, and streams. There are no recorded occurrences of boreal toads in the general project area (WNDD 2004; WGFD 1999), and there is no suitable habitat within the project area. Therefore, there would be no affect from the project and the species is not discussed further in this EA.

3.2.5 Vegetation Resources

Based upon 1:100,000-scale mapping, the mixed-grass prairie is also the only ecological region within 1 mi of the proposed project area (U.S. Geological Survey 1996). Mixed-grass prairie is composed of grasses, shrubs, and forbs such a needle-and-thread grass, western wheatgrass, Sandberg bluegrass, Junegrass, Indian ricegrass, scarlet globemallow, fringed sagewort, Hood's phlox, black sagebrush, and cushion plants (Knight 1994).

3.2.6 Visual Resources

The Proposed Action would be located on Spade Flats, which generally provides a 360-degree perspective of portions of the surrounding plains, foothills, and mountains. PRPA's Medicine Bow Wind Farm dominates the view to the north of the project area.

Approximately 800 ft north of the proposed wind turbine is the southern most PRPA wind turbine, followed in a line by the remaining six wind turbines. The other three wind turbines, not located in the row of wind turbines, as well as the two meteorological towers, the service building, the electric substation, the WAPA and Carbon Power and Light powerlines and associated facilities, are also visible north of the project area.

To the east, there is little evidence of human encroachment except for the top of numerous wind turbines associated with the Foote Creek Wind Farm that are located along the horizon southeast of the project area. These wind turbines are located approximately 10 mi away from the project area.

To the south, there is also limited evidence of human encroachment except for tops of additional wind turbines associated with the Foote Creek Wind Farm that are located along the horizon south of the project area. These wind turbines are located approximately 12 mi south of the project area. Portions of Carbon Power and Light's electric transmission powerline and the Medicine Bow to Elk Mountain road are both visible southwest of the project area and continue beyond out of view of the project area.

To the west, another portion of Carbon Power and Light's small electric transmission powerline and the Medicine Bow to Elk Mountain road are both visible.

Because of topographic diversity in the area (i.e., rolling hills), the proposed project would not be visible from the communities of Medicine Bow, Rock River, McFadden, Arlington, Hanna, or Elk Mountain. However, the existing Medicine Bow Wind Farm and the proposed Clipper wind turbine would be visible from portions of U.S. Highway 30.

3.2.7 Water Resources (Surface Water Including Wetlands)

The project area lies within the Upper Platte River drainage basin; however, there are no defined ephemeral, intermittent, or perennial drainage channels in the project area (refer to Figure 3.2).

This figure is a separate file Fig 3-2.pdf.

Figure 3.2 Surface Water Features near the Project Area.

The project area is on the northwestern side of Spade Flats and is extremely flat, and the fact that little surface water runoff is produced is evidenced by the lack of any defined drainage channels and the presence of several small playas in the general project area. Any surface water runoff that is produced would eventually flow into the Medicine Bow River located approximately 1.5 mi southeast of the project area.

No surface water quality data are available from the project area. However, water quality is expected to be highly variable depending upon the nature and intensity of the runoff event and the nature of the affected soils. A comparison of water quality from the general area to WDEQ/WQD Chapter 8 water class standards (WDEQ/WQD 2000) indicates that surface water quality would typically meet Class III (livestock class of use) criteria (U.S. Geological Survey 2004). The Medicine Bow River in the general project area is designated as having Class 2AB surface water quality as defined by the WDEQ/WQD. The Class 2AB designation means that these waters can support game and non-game fish species (WDEQ/WQD 2001). There are no drainage channels or reservoirs within the general project area that are included in the WDEQ/WQD (2002) 2000 303(d) list of water bodies with water quality impairments.

No formal jurisdictional wetland delineations have been conducted within the project area. However, according to National Wetland Inventory maps produced by the USFWS, there are no potential wetlands in the project area or within 0.5 mi of the project area (USFWS 1997).

3.2.8 Wildlife

3.2.8.1 Big Game

According to the WGFD, three big game species--pronghorn, mule deer, and elk--occur within or immediately adjacent to the proposed project area (WGFD 2003b). The population estimates for big game herds provided below are based upon WGFD model estimates (WGFD 2004).

Pronghorn. Pronghorn in the project area belong to the Medicine Bow pronghorn herd (herd unit 525), and the project area is located in crucial winter/yearlong antelope range (WGFD 2004) (refer to Figure 3.3). Pronghorn were observed in and adjacent to the project area during a reconnaissance survey conducted by TRC Mariah Associates Inc. in October 2004. At the end of 2003, the Medicine Bow herd unit had an estimated population of 56,804 pronghorn, which is approximately 5% below the WGFD population objective of 60,000 animals for this herd unit. Drought continues to be one of the biggest factors affecting populations in herd units with populations below WGFD objectives (WGFD 2004).

Mule Deer. Mule deer in the project area belong to the Sheep Mountain mule deer herd (herd unit 539) and the project area lies within winter/yearlong range. The nearest mule deer crucial winter range is located approximately 1 mi southeast of the project area (WGFD 2004). No mule deer were observed in and adjacent to the project area during a reconnaissance survey conducted by TRC Mariah Associates Inc. in October 2004. At the end of 2003, the Sheep Mountain herd unit had an estimated population of 10,885 mule deer, which is approximately 27% below the WGFD population objective of 15,000 animals for this herd unit. Drought continues to be one of the biggest factors affecting mule deer in herd units with populations below WGFD objectives. In addition, chronic wasting disease has been documented in portions of this herd unit and may be having some effect on animal survival (WGFD 2004).

Elk. Elk in the project area belong to the Snowy Range Elk Herd (herd unit 533), and the project area lies within winter/yearlong range. The nearest elk crucial winter range is located approximately 13 mi south of the project area (WGFD 2004). No elk were observed in and adjacent to the project area during a reconnaissance survey conducted by TRC Mariah Associates Inc. in October 2004. At the end of 2003, the Snowy Range herd unit had an estimated population of 5,473 elk-- approximately 9% below the WGFD population objective of 6,000 animals. Drought and habitat issues continue to be important factors affecting elk in herd units with populations below WGFD objectives (WGFD 2004).

This figure is a separate file Fig 3-3.pdf.

Figure 3.3 Pronghorn Ranges near the Project Area.

3.2.8.2 Other Mammals

Typical predators known to occur or to potentially occur in the project area are coyote, red fox, raccoon, long-tailed weasel, badger, mink, striped skunk, mountain lion, and bobcat. Lagomorph species include desert cottontail, mountain (Nuttall's) cottontail, and white-tailed jackrabbit. Squirrels known to occur or to potentially occur include least chipmunk, Richardson/Wyoming ground squirrel, and thirteen-lined ground squirrel, and other rodents include one species of pocket gopher (northern), two species of pocket mouse (olive-backed and northern), Ord's kangaroo rat, beaver, deer mouse, northern grasshopper mouse, bushy-tailed woodrat, five species of vole (southern red-backed, western, meadow, long-tailed, and sagebrush), and western jumping mouse. Porcupine and four species of bats (little brown, hoary, big brown, silver-haired) also likely occur in the general project area (WGFD 1999; Clark and Stromberg 1987).

3.2.8.3 Raptors

Raptor species known to occur or to potentially occur within the project area include peregrine falcon, golden eagle, prairie falcon, American kestrel, merlin, Swainson's hawk, ferruginous hawk, red-tailed hawk, northern harrier, rough-legged hawk, and great horned owl, burrowing owl, long-eared owl, and short-eared owl (WGFD 1999; Clark and Stromberg 1987). A review of BLM historic raptor nest information reveals that there are no known raptor nests within 1.0 mi of the project area. However, there are five raptor nests/eyries within 2.0 mi of the proposed project area--two golden eagle, two prairie falcon, and one ferruginous hawk (refer to Figure 3.4). No monitoring has occurred at these sites; therefore, the historic activity status of these nests is unknown.

3.2.8.4 Upland Game Birds

The project area is located within WGFD Upland Game Bird Management Area Number 24. Several upland game bird species occur on and adjacent to the project area, including greater sage-grouse and mourning dove (WGFD 2002).

This figure is a separate file Fig 3-4.pdf.

Figure 3.4 Raptor Nest Locations near the Project Area.

Two greater sage-grouse leks are known to occur within 2 mi of the project area (WGFD 2003a). The leks are approximately 0.5 mi and 0.7 mi south of the project area (refer to Figure 3.5). According to WGFD records, 1980 was the last time any greater sage-grouse were observed at either of these leks; however, no monitoring was conducted at either lek between 1980 and 1998. Over the past 6 years, both leks were monitored several times each breeding season, except during 2001 when no monitoring was conducted. No greater sage-grouse have been observed at either of these leks during the 1999 to 2004 monitoring period. WGFD and BLM policy states that greater sage-grouse leks are considered active unless there is no grouse attendance at the leks for 10 consecutive years. Despite the lack of monitoring data at the two leks located nearest the project area, it is the WGFD biologists' opinion that these two leks are abandoned (personal communication, October 29, 2004, with Bob Lanka, WGFD biologist, Laramie, Wyoming). However, the WGFD are waiting for additional monitoring data before they make a final determination on the status of these leks.

3.2.8.5 Other Birds (Including Migratory Birds)

Bird species (including migratory birds) potentially occurring within the project area, based upon range and habitat preference, include but are not limited to common nighthawk, Say's phoebe, western kingbird, horned lark, swallows (e.g., violet-green, barn, cliff), black-billed magpie, common raven, American crow, rock wren, mountain bluebird, loggerhead shrike, Brewer's sparrow, vesper sparrow, savannah sparrow, sage sparrow, lark bunting, McCown's longspur, red-winged blackbird, western meadowlark, Brewer's blackbird, common grackle, green-tailed towhee, and brown-headed cowbird (WGFD 1999).

Since there are no permanent surface water bodies (i.e., lakes, ponds, etc.) within the project area, it is unlikely that waterfowl and shorebirds would nest in the project area. However, several species of wading/shore birds--such as great blue heron, black-crowned night-heron, American avocet, willets, killdeer, and spotted sandpiper--and waterfowl may occasionally occur around East Allen Lake (located approximately 3 mi north of the project area), the Medicine Bow River (located approximately 1.5 mi southeast of the project area), and seasonal ponds (i.e.,

This figure is a separate file Fig 3-5.pdf.

Figure 3.5 Greater Sage-grouse Leks near the Proposed Project Area.

playas) (located within 3 mi of the project area). Waterfowl species likely to occur in the general project area include pied-billed grebe, American coot, Canada goose, mallard, green-winged teal northern pintail, blue-winged teal, cinnamon teal, northern shoveler, redhead, ring-necked duck, American wigeon, and common merganser (WGFD 1999).

3.2.8.6 Amphibians, Reptiles, and Fish

Based on range and habitat preference, it is likely that three amphibians and three reptile species may possibly occur within the project area or within 3 mi of the project area. Amphibians include tiger salamander, chorus frog, and northern leopard frog that occur primarily in and adjacent to aquatic habitats. Reptile species include northern sagebrush lizard, prairie rattlesnake, and western garter snake (BLM 1998; WGFD 1999).

There are no perennial waters; therefore, no fish occur within the project area. However, the Medicine Bow River (located approximately 1.5 mi southeast of the project area) is designated by the WGFD as a Class 4 stream. WGFD Class 4 streams are considered low-production trout water that may provide fisheries of local importance but are generally incapable of sustaining substantial fishing pressure. The section of the Medicine Bow River located near the project area likely supports a variety of fish species including brown tout, brook trout, rainbow trout, walleye, longnose dace, longnose sucker, white sucker, common carp, creek chub, silver shiner, and johnny darter (BLM 1998).

4.0 ENVIRONMENTAL CONSEQUENCES

In accordance with 40 C.F.R. 1502.16, this chapter of the EA includes a discussion of the potential environmental consequences of the Proposed Action and the No Action Alternative on each of the affected resources. An environmental impact is defined as a change in the quality or quantity of a given resource due to a modification in the existing environment resulting from project-related activities. Impacts may be beneficial or adverse, may be a primary result (direct) or secondary result (indirect) of an action, and may be permanent and long-term or temporary and of a short duration. Impacts may vary in degree from a slightly discernible change to a total change in the environment. This impact assessment assumes that all applicant-committed measures described in the Proposed Action would be successfully implemented. If such measures are not implemented, additional adverse impacts may occur.

Cumulative impacts are discussed in Section 4.9, irreversible and irretrievable commitments are discussed in Sections 4.10, and short-term use of the environment versus long-term productivity is discussed in Section 4.11.

4.1 CULTURAL RESOURCES (INCLUDING NATIVE AMERICAN CONCERNS)

4.1.1 Proposed Action

Class I and III surveys (i.e., file search and pedestrian inventory) have been completed for the project area, and no historic or prehistoric sites were identified. Therefore, the Proposed Action would not have any direct impacts on identified cultural resources within the project area. In addition, the project area would not be visible from any of the historic trails (Overland Trail, Cherokee Trail, and the Fort Halleck to Fort Fetterman Wagon Road); therefore, the Proposed Action would not have any visual impacts on historic trails in the general area.

As discussed in the Proposed Action (Section 2.0), Clipper and its contractor would stop work if any cultural resources are discovered during construction operations. Work in the area of the

discovery would not resume until the appropriate regulatory agency would be notified and appropriate treatment plans implemented. Construction employees would be instructed that they would be working on private land and are not to search for, scavenge, or remove any cultural resources found while working on the project (refer to applicant-committed practices presented in Chapter 2).

Consultation with Native American groups has been initiated (i.e., letters were sent to the tribes), and no sites of religious or traditional cultural importance have been identified within the project area. Formal consultation is ongoing between DOE and one of the tribal organizations that was previously contacted; however, the consulting tribe has not identified to DOE any traditional cultural properties or specific Native American issues concerning the Proposed Action. There are no known historic, archaeological, or tribal resources within the project site, therefore no impacts are anticipated as a result of the proposed action. If previously unidentified sites of religious or cultural importance are identified within the project area through tribal consultation or during construction of the project, DOE would review the potential impacts consistent with the applicant-committed practices cited in Chapter 2 to verify they are sufficient to minimize any impacts.

Therefore, documented and undocumented cultural resources would be protected during construction, operations, and maintenance operations and no unmitigated cultural resources that are eligible for listing on the NRHP would be impacted by the Proposed Action. No additional mitigation beyond those already included in the Proposed Action would be required. The Proposed Action would not have any significant impacts on cultural resources.

4.1.2 No Action Alternative

Under the No Action Alternative, the DOE would not fund of the Proposed Action, construction of the demonstration wind turbine and associated facilities would not occur, and no impacts to cultural resources would occur.

4.1.3 Mitigation and Monitoring

No additional mitigation or monitoring is recommended beyond the applicant-committed practices identified in Chapter 2.

4.1.4 Residual Impacts

The Proposed Action would not result in any unavoidable adverse impacts to identified unmitigated cultural resources. However, some loss of unidentified cultural resources sites or artifacts may occur, but, if previously unidentified cultural resources are located during construction operations, activity in the area would be halted, the proper regulatory authority would be contacted, and appropriate treatment plans implemented to avoid significant impacts.

4.2 NOISE

4.2.1 Proposed Action

There are no applicable federal, state, or county regulations governing environmental noise levels in the project area. Under the Proposed Action, the noise would be generated during construction/installation and operation of a single 2.5-MW wind turbine that is expected to generate 105 dBA at 415 ft in an 18 mph wind. As a result of the Proposed Action, there would be an increase in noise due to the operation of the additional wind turbine (40-60 dBA for the background and the Medicine Bow Wind Farm compared to 105 dBA from the proposed Clipper wind turbine). As a result, the noise would only occur when the wind turbine is operating and would likely be masked by the background noise level (including wind and existing PRPA wind turbines) that could be as high as 40-60 dBA. The increased level of noise would not likely be highly noticeable more than 1,000 ft away from the wind turbine.

The increase in noise due to the Proposed Action would not be noticeable to the casual observer located on the nearest public road (the Medicine Bow to Elk Mountain Road), which is

approximately 1 mi north and west of the project area, or to the nearest residence approximately 1.5 mi north of the project area. The increased noise would not be expected to adversely impact the nearest raptor nest 1.4 mi southwest (upwind) of the project area. The potential impacts of noise on greater sage-grouse leks is addressed in Section 4.8 of the EA.

The impacts of the increased level of noise would only occur when the turbine is operating and would be eliminated after the wind turbine has been decommissioned and the equipment removed. No additional mitigation beyond those already included in the Proposed Action would be required. Therefore, the Proposed Action would not result in any significant impacts to noise-sensitive receptors.

4.2.2 No Action Alternative

Under the No Action Alternative, the DOE would not fund of the Proposed Action, construction of the demonstration wind turbine and associated facilities would not occur, and noise levels would continue to be primarily influenced by wind and the existing PRPA wind farm.

4.2.3 Mitigation and Monitoring

No additional mitigation or monitoring is recommended beyond the applicant-committed practices identified in Chapter 2.

4.2.4 Residual Impacts

As a result of the Proposed Action, there would be an increase (40-60 dBA compared to 106 dBA) in noise due to the operation of the additional wind turbine. However, the noise would only occur when the wind turbine is operating and would generally be masked by the background noise level (including wind and PRPA wind turbines) that could be as high as 40-60 dBA.

4.3 SOIL RESOURCES

4.3.1 Proposed Action

Under the Proposed Action, less than 10 acres would be newly disturbed by construction/installation operations. Because of the small amount of area (less than 1.25 acres) that would be disturbed for the life-of-the-project for the construction of the wind turbine, service building, and meteorological tower, and cables and powerline no topsoil would be removed or salvaged. Instead, wheeled vehicles that operate off-road would disturb the remaining 8.45 acres. Direct impacts to soils would be limited to compaction of soils when construction equipment operates off of existing roads. These impacts may result in an increase in runoff, erosion, and sedimentation into any local receiving waters.

Short-term control of surface runoff would be accomplished by implementation of storm water pollution control measures required by the WDEQ/WQD and described in the Proposed Action. In addition, long-term control of surface runoff would be accomplished by successful implementation of the stabilization and reclamation operations described in the Proposed Action. Stabilization and reclamation procedures would be designed to reduce the susceptibility of disturbed areas to soil erosion in both the short-term and for the life of the project. No additional mitigation beyond those already included in the Proposed Action would be required. The Proposed Action would not have significant impacts on soil resources.

4.3.2 No Action Alternative

Under the No Action Alternative, the DOE would not fund the Proposed Action, construction of the demonstration wind turbine and associated facilities would not occur, and existing impacts (e.g., erosion, etc) to soil resources in the project area would continue to occur at current rates.

4.3.3 Mitigation and Monitoring

No additional mitigation or monitoring is recommended beyond the applicant-committed practices identified in Chapter 2.

4.3.4 Residual Impacts

The Proposed Action would result in some increased and unavoidable soil loss through wind and water erosion. Soils on approximately 8.45 acres (i.e., temporary disturbance areas) would be compacted as a result of off-road vehicle traffic. Productivity of some disturbed soils would be slightly reduced due to the compaction of soils; however, these impacts would be short-term (i.e., 3-5 years) and would be mitigated by implementation of the reclamation and stabilization procedures.

4.4 THREATENED, ENDANGERED, PROPOSED, AND CANDIDATE (TEP&C) SPECIES

4.4.1 Proposed Action

4.4.1.1 Black-footed Ferrets

No prairie dogs are known to occur with the project area, and there have been no black-footed ferrets sightings or signs have been documented within the project area. In addition, the project area is located outside of any areas requiring black-footed ferret surveys (USFWS 2004). Therefore, the Proposed Action would have no adverse affects to black-footed ferrets.

4.4.1.2 Bald Eagle

Migrating bald eagles may occasionally forage or fly through the project area; however, such use of the project area is likely intermittent and for relatively short periods. There is a chance that bald eagles might collide with the operating wind turbine or the meteorological tower and guy

wires. However, given this intermittent use, the lack of nesting and roosting habitat in the immediate project area, and the lack of any new aboveground powerlines, it is anticipated that the Proposed Action may affect, but would not adversely affect, bald eagles.

4.4.1.3 Summary

Based on the discussion presented above and assuming all appropriate mitigation measures are implemented, the Proposed Action would not have any significant impacts on any TEC&P species.

4.4.2 No Action Alternative

Under the No Action Alternative, the DOE would not fund the Proposed Action, construction of the demonstration wind turbine and associated facilities would not occur, and impacts to TEC&P species would continue at present levels, with fluctuations due primarily to weather, disease, and other natural causes.

4.4.3 Mitigation and Monitoring

No additional mitigation or monitoring is recommended beyond the applicant-committed practices identified in Chapter 2.

4.4.4 Residual Impacts

Under the Proposed Action, there would be a negligible increase in the risk of collisions of bald eagles with the proposed wind turbine and/or meteorological tower. There would also be negligible additional impacts to any other TEC&P species that may occur in the project area.

4.5 VEGETATION RESOURCES

4.5.1 Proposed Action

Under the Proposed Action, less than 10 acres would be disturbed by construction operations. Because less than 1.25 acres would be disturbed for the life-of-the-project for the construction of the wind turbine, service building, meteorological tower, and cables and powerline, no topsoil would be removed or salvaged. Instead, wheeled vehicles that drive cross-country would disturb the remaining 8.45 acres. Direct impacts would be limited to compaction/destruction of vegetation when construction equipment operates off any roads. These impacts may result in a limited increase in runoff, erosion, and sedimentation into any receiving waters. All disturbed vegetation would be of a kind that is common and widespread in the project area and vicinity.

Short-term control of surface runoff would be accomplished by implementation of storm water pollution control measures required by the WDEQ/WQD and described in the Proposed Action. In addition, long-term control of surface runoff would be accomplished by successful implementation of the stabilization and reclamation operations described in the Proposed Action. No additional mitigation beyond those already included in the Proposed Action would be required. The Proposed Action would not have any significant impacts on vegetation.

4.5.2 No Action Alternative

Under the No Action Alternative, the DOE would not fund the Proposed Action, construction of the demonstration wind turbine and associated facilities would not occur, and impacts to vegetation resources would continue to occur at current rates.

4.5.3 Mitigation and Monitoring

No additional mitigation or monitoring is recommended beyond the applicant-committed practices identified in Chapter 2.

4.5.4 Residual Impacts

The Proposed Action would result in long-term disturbance of 1.25 acres of vegetation and approximately 8.45 acres of short-term vegetation disturbance. Once construction operations are updated, stabilization and reclamation operations would be conducted, and vegetation would be re-established on all but 1.25 acres. Once the project has been decommissioned, all disturbed areas would be reclaimed. These impacts assume that the site would not be repowered.

4.6 VISUAL RESOURCES

4.6.1 Proposed Action

The Proposed Action would result in limited changes and impacts to existing visual resources and aesthetics of the general project area. The general project area has already been altered by human encroachment including the PRPA Medicine Bow Wind Farm, the Elk Mountain to Medicine Bow unpaved road, and the WAPA and Carbon Power and Light powerlines. The existing PRPA Medicine Bow Wind Farm dominates the view of and from the project area. The 10 wind turbines, two meteorological towers, service building, and access roads are the most visible components. The turbine towers for the seven existing wind turbines (Vestas [brand] 660-kW units), located south of the service building, are 164-ft tall, and the maximum height at the top of each turbine blade is 241 ft. The turbine tower for the proposed demonstration wind turbine would be 262 ft high (approximately 100 ft higher than the existing towers) and the maximum height at the top of the blade would be approximately 410 ft (approximately 169 ft higher than the maximum height of the existing turbines). The proposed wind turbine would be taller than the existing turbines but would likely be only slightly more visible (because of the height) from a distance than the existing wind turbines. The existing wind turbine towers and blades are painted white, and the proposed wind turbine (tower and blades) would also be painted white. While approximately 60% taller than the existing wind turbines, the proposed wind turbine would not dominate the local viewshed and would likely blend into the existing PRPA wind farm.

The proposed wind turbine as viewed from the unpaved Elk Mountain to Medicine Bow road would likely appear to be an additional and larger wind turbine that from a distance would blend in with the existing wind turbines. The proposed service building would be painted a desert tan color to blend into the existing environment. The meteorological tower would be a lattice design and would not be noticeable from more than 1 mi from the project area. Therefore, the Proposed Action would blend into the existing wind farm and would not dominate the local viewshed. Nor would the Proposed Action dominate the viewshed beyond 3 mi as the size difference between the proposed wind turbine and the existing wind turbines would appear less as the distance from the viewer increases. In addition, the Proposed Action would not be visible from Medicine Bow, Rock River, McFadden, Arlington, Hanna, or Elk Mountain. No additional mitigation beyond those already included in the Proposed Action would be required. The Proposed Action would be a continuation of existing wind energy development in the general area, would not attract additional or new attention, and would have nonsignificant impacts on visual resources and aesthetics.

4.6.2 No Action Alternative

Under the No Action Alternative, the DOE would not fund the Proposed Action, construction of the demonstration wind turbine and associated facilities would not occur, and no additional impacts to visual resources would occur.

4.6.3 Mitigation and Monitoring

No additional mitigation or monitoring is recommended beyond the applicant-committed practices identified in Chapter 2.

4.6.4 Residual Impacts

The construction and operation of the Proposed Action would result in some additional impacts to visual resources. The wind turbine would be the most visible component of the Proposed

Action. Vegetation would be compacted when vehicles operate off-road, and these impacts would be visible for 2-4 years. Visual impacts would be minimized to the casual observer with the Proposed Action being located immediately adjacent to the existing PRPA wind farm. Impacts would continue for approximately 20 years until the wind turbine and associated facilities are decommissioned, removed, and the disturbed areas reclaimed and revegetated.

4.7 WATER RESOURCES (SURFACE WATER INCLUDING WETLANDS)

4.7.1 Proposed Action

The Proposed Action would result in limited short-term impacts to surface water resources. Direct impacts would result from approximately 10 acres of soil disturbance and excavation associated with construction of the pads for the wind turbine, meteorological tower, and service building, from the construction of the access road, and from compaction of vegetation and soil due to equipment operating off of existing access roads. These actions would cause a limited increase in sedimentation and off-site channel erosion. However, these impacts would be mitigated by implementation of the storm water pollution prevention plan (TRC Mariah Associates Inc. 2004) and by pollution prevention measures such as interceptor ditches, sediment traps/silt fences, water bars, and silt fences. Implementation of prompt reclamation and stabilization procedures presented in the Proposed Action would also minimize potential impacts to surface water resources. There are no jurisdictional wetlands in the project area; therefore, the Proposed Action would not have any impacts on wetlands. No additional mitigation beyond those already included in the Proposed Action would be required. The Proposed Action would have negligible short-term and no long-term impacts on water quality and no short-term or long-term impacts on water quantity to receiving waters or any surface water resources.

4.7.2 No Action Alternative

Under the No Action Alternative, the DOE would not fund the Proposed Action, construction of the demonstration wind turbine and associated facilities would not occur, and impacts to surface water resources would continue at current rates.

4.7.3 Mitigation and Monitoring

No additional mitigation or monitoring is recommended beyond the applicant-committed practices identified in Chapter 2.

4.7.4 Residual Impacts

Even with the implementation of the Storm Water Pollution Prevention Plan, there would be a negligible short-term increase in sedimentation during the construction/installation phase of the Proposed Action. However, there would no reduction in surface water flow due to the Proposed Action. Impacts that occur during the construction/installation phase of the Proposed Action would be pro-actively mitigated as discussed above. Compared to the construction phase, the annual rate of sedimentation would decrease during the operations phase of the project. Following decommissioning and removal of the project and successful completion of permanent reclamation and stabilization operations, surface water quality would eventually return to preconstruction levels.

4.8 WILDLIFE

4.8.1 Proposed Action

Direct impacts to wildlife would result from the direct loss of habitat due to the construction/installation of project-related facilities and vegetation compaction; displacement of wildlife due to disturbance by project-related activities; direct mortality due to construction- and

operational-related activities; increased mortality due to poaching and harassment; and an increased likelihood of vehicle/animal collisions due to increased traffic. Because the Proposed Action would be located immediately adjacent to the existing PRPA wind farm, the addition of the Proposed Action would not be likely to have any significant short- or long-term impacts on wildlife populations.

Construction/installation activities would likely cause some wildlife species that currently utilize the project area to temporarily vacate the area (up to 0.5 mi or more) around the active area while construction operations are occurring. The temporary loss of big game habitat due to the construction related facilities and vegetation compaction would be mitigated by the fact that the project area would be limited to less than 10 acres, construction operations would likely require only 2 months to complete, and applicant-committed measures included in the Proposed Action would minimize surface disturbance. Once construction operations have been completed, most affected species would likely re-utilize the impacted portion of the project area.

4.8.1.1 Big Game

The project area is located in crucial winter/yearlong range for pronghorn and winter/yearlong range for mule deer and elk. However, the Proposed Action would directly impact less than 10 acres of native vegetation. During severe winters, crucial winter ranges are important because these areas can provide animals with exposed vegetation and topographic protection from extremely harsh weather conditions. In addition, crucial winter ranges are important in maintaining a self-sustaining population at or above WGFD population objectives over the long term. During the 2-month construction period, there could be an indirect impact of the temporary displacement of pronghorn that would normally occupy the immediate project area. In addition to the project area, the temporary displacement could also include a 0.5-mi area around the project area or a total of 503 acres (0.79 mi^2).

The project area is located in a crucial winter/yearlong range for pronghorn that contains 361,000 acres (564 mi^2). Therefore, the construction/installation phase of the Proposed Action (that may

occur during a severe winter) could potentially displace pronghorn from approximately 0.2% of the crucial winter big game range located in the general vicinity of the project area. It is expected that any displaced pronghorn would relocate to unaffected portions of the 564-mi^2 crucial winter/yearlong habitat that exists near the project area. While some pronghorn may be temporarily displaced from the project area, the displacement would be temporary, would impact only 0.2% of the crucial winter/yearlong habitat within the general project area. To minimize potential impacts to pronghorn, construction activities would be limited during severe winter conditions. Specifically, Clipper would maintain contact with local WGFD personnel, and if it is determined by WGFD that severe winter conditions exist, Clipper would limit the number of construction vehicles that would be allowed to access the site. In addition, Clipper would minimize the amount of time personnel would be at the construction site. Reclamation and revegetation procedures would be followed to minimize the long-term loss of habitat. The Proposed Action would not have a significant impact on the local pronghorn population.

If the project area does not experience a severe winter during the construction phase, the Proposed Action could likely still result in the temporary displacement of pronghorn from the project area and the 0.5-mi^2 buffer area (a total of 503 acres). However, the impacts would be less important because the area contains yearlong habitat, the animals would be under less stress than during a severe winter, and could easily move and find alternative areas for forage and cover. Therefore, the Proposed Action (if the construction phase does not occur during a severe winter) would have negligible impacts to the pronghorn population in the herd unit. Once construction operations have been completed, pronghorn would likely acclimate to human disturbance and utilize habitat at near pre-disturbance levels.

Mule deer and elk that may occur within the project area and the 0.5-mi^2 buffer area may be temporarily displaced to other suitable habitats due to the construction phase of the Proposed Action. If construction occurs during a severe winter, many of the mule deer and elk in the area will likely move to crucial winter range that is located approximately 1 mi southeast and 13 mi south of the project area, respectively. The Proposed Action would not have direct or indirect impacts on any crucial winter range for mule deer or elk. Once the 2-month construction phase

is completed, mule deer and elk would likely re-utilize the unaffected portion of the project area. Therefore, the construction phase of the Proposed Action would have negligible impacts on mule deer and elk populations.

Surveys of pronghorn, mule deer, and elk at SeaWest's Foote Creek Rim Wind Farm (located approximately 9 mi south of the project area) conducted from 1995 through 1998 during the operational phase of this project indicate that abundance and distribution of these species did not appear to be significantly affected by the presence of the 183 turbine wind farm (Johnson et al. 2000). Therefore, the addition of the Proposed Action next to the existing PRPA wind farm would have only negligible impacts on pronghorn antelope, mule deer, and elk during the operational phase of the project.

It is also possible the individual pronghorn, mule deer, and/or elk may be killed (an indirect impact) as a result of vehicular/animal collisions on the 5-mi segment of the Medicine Bow to Elk Mountain Road that would be associated with the Proposed Action. However, the anticipated level of traffic would be limited to less than 20 trips per day between the community of Medicine Bow and the project area during the construction phase and less than four trips per day during the operational phase of the project. Maintenance personnel would also occasionally visit the project facilities during the operational phase of the Proposed Action. The level of traffic during the operational phase of the project would be similar to that currently observed at the adjacent PRPA wind farm and would result in negligible impacts to pronghorn, mule deer, and elk.

Once the project has been terminated, the equipment decommissioned and removed, and reclamation and revegetation operations completed, pronghorn, mule deer, and elk would be able to re-utilize all areas affected by the Proposed Action.

Based upon the small amount of disturbance, the limited amount of vehicular traffic during the project, and the appropriate implementation of reclamation and revegetation procedures, the

Proposed Action would result in nonsignificant short- and long-term impacts to local pronghorn, mule deer, and elk populations.

4.8.1.2 Other Mammals

Impacts to other mammals due to the Proposed Action would include direct mortality during construction activities, especially to those that may take refuge in burrows that would be destroyed by project-related activities, and a potential increase in mortality from vehicle/animal collisions. The relatively small amount of wildlife habitat impacted by the Proposed Action would result in limited impacts to all wildlife species. Most small mammal species are relatively tolerant of human activity and likely would experience reduced populations in direct proportion to the amount of habitat destruction. This would be most likely true for species with relatively small home ranges (rodents, lagomorphs, etc.) and would be less applicable to more wide-ranging species such as coyote. Project impacts to small mammals would likely be masked by natural variations in populations due to weather, disease, and other natural factors.

According to Young et al. (2003), at least four bat species were found dead near wind turbines at SeaWest's Foote Creek Wind Farm located approximately 9 mi south of the project area. The majority--approximately 80%--were hoary bats, 9% were little brown bats, 8% were silver-haired bats, and 1% were big brown bats and 2% could not be identified. Most of the identified bat species likely nest and/or roost in aspen trees, cottonwood trees, and abandoned buildings located near the wind farm. The dead bats were found primarily between June and September, with most of the bats found during August. No bat carcasses were found associated with the lattice meteorological towers. Young et al. (2003) estimated annual mortality at 1.34 bats per wind turbine.

Bat mortality data collected by Young et al. (2003) at the Foote Creek Wind Farm (located approximately 10 mi south of the project area) were based on 69 600-kilowatt Mitsubishi wind turbines that are smaller that the proposed Clipper demonstration wind turbine. The Clipper demonstration wind turbine would also have other design and operational differences compared

to the Mitsubishi wind turbines. The Mitsubishi wind turbines have a rotor and blade diameter of 138 ft, while the Clipper demonstration wind turbine would have a rotor and blade diameter of 305 ft. The Mitsubishi wind turbines have a blade sweep area of 14,950 ft^2 compared to the sweep area of the Clipper demonstration wind turbine of 73,024 ft^2, an increase of almost five-fold.

Various factors likely influence the rate of bat and avian mortalities as a result of the operation of wind turbines such as blade sweep area, rotor speed, blade tip speed, height of the wind turbine, distance to topographic ridges, position of the individual turbine in the turbine string, weather, distance to suitable habitat, flying height of the specific species, etc. (Young et al. 2003). It should be noted that no bat or avian mortality studies have been conducted at the PRPA Medicine Bow Wind Farm (personal communication, October 20, 2004, with Paul Warila, PRPA, Fort Collins, Colorado). In order to compare potential bat moralities between the Mitsubishi wind turbine to the Clipper wind turbine, it is assumed that all factors are constant except for blade sweep area and that the rate of bat mortalities would be based solely upon a comparison of the blade sweep area for each wind turbine model. This approach would likely result in a worst-case scenario since there is limited suitable nesting or roosting habitat in the immediate project area compared to the Foote Creek Wind Farm. It should also be noted that bat mortalities were only recorded at approximately 70% of the monitored wind turbines at the Foote Creek Wind Farm (Young et al. 2003). Therefore, based on these assumptions, the proposed Clipper demonstration wind turbine would result in approximately 6.7 bat mortalities per year compared to 1.34 bat mortalities per year for the small Mitsubishi wind turbines. As a result, the Proposed Action is not expected to adversely impact any of the bat population in the area.

To document potential impacts to bat species, Clipper would conduct mortality surveys near the wind turbines and meteorological tower during the first summer season (June through September 2005) of operation of the Proposed Action. This period coincides with when bats typically utilize the general project area and when bat mortalities were documented at the Foote Creek Wind Farm (Young et al. 2003). Clipper would utilize mortality survey methods similar to those developed for the nearby Foote Creek Rim Wind Farm (Young et al. 2003). Personnel would

conduct one survey every 2 weeks, and each survey would involve walking transects established within 250 ft of each tower. Search transects would be set approximately 25-30 ft apart, and the searcher would walk at a rate of approximately 2 mph along the transect searching both sides approximately 12-15 ft for casualties out approximately 12-15 ft. It is estimated that it should require 0.75 hour to survey both towers. For each casualty identified, data recorded would include species, sex, and age (when possible), date and time collected, location collected, condition, and any comments that may indicate the time and cause of death. All carcasses located would be photographed as found and mapped. If the species information cannot be determined, the carcass would be bagged and transported to a qualified biologist for proper identification. At the end of the survey period, the data would be compiled, summarized, and submitted to the DOE, USFWS, and WGFD.

Rare habitats (e.g., springs, wetlands, and riparian areas) would not be impacted (because none occur in the project area), and applicant-committed practices to minimize impacts to wildlife would mitigate and reduce impacts to other animals. Therefore, the Proposed Action would not have any significant impacts on other mammal species.

4.8.1.3 Raptors

Direct impacts to raptors include mortality due to collisions with the wind turbine and meteorological tower. Other potential impacts to nesting raptors include decreased raptor reproductive success due to the physical disturbance of the nest or to increased human activities near the nest; destruction of nest, egg, and/or young; increased predation of the eggs or young; and impacts to hunting, foraging, and roosting habitat (National Wildlife Federation 1987) and all these would be illegal under the *Migratory Bird Treaty Act* (U.S.C. 703 [1918]). No raptor nests were documented within 1.0 mi of the project area; however, there are five raptor nests/eyries within 2.0 mi of the proposed project area (refer to Figure 3.6). There is no historic nest occupancy or productivity data from any of this nests/eyries. Given the distance from the project area to the nests, it is unlikely that individual nesting raptors or raptor populations would

be impacted by the Proposed Action; however, individual birds could be killed as a result of flying into the rotating wind turbine blades.

No site-specific raptor mortality studies have been conducted at the PRPA wind farm. A single dead golden eagle was found in 2003 near the one of the PRPA wind turbines and the incident was reported to the USFWS. No other raptor mortalities have been documented at the PRPA wind farm since the facility was constructed in 1998 (personal communication, October 28, 2004, with Bill Young, PRPA Wind Site Support Engineer, Medicine Bow, Wyoming).

According to Young et al. (2003), there were only five reported raptor mortalities (which accounted for 8% of the avian mortalities) between November 1998 and June 2002 (3.5 years) at the monitored portion of SeaWest's Foote Creek Wind Farm located approximately 9 mi south of the project area. The remaining 92% of the avian mortalities were passerine birds. Raptor mortalities were low during the study despite high raptor use estimates at the site. For example, no golden eagle mortalities were recorded during the study despite the fact that golden eagles accounted for approximately 40% of all raptor use of the area. On the other hand, use of the study area by American kestrels accounted for only 5% of the total raptor use, but accounted for 60% of the raptor carcasses found in the area. Five raptor carcasses were found--three American kestrels, one northern harrier, and one short-eared owl--during the 3.5-year study period. There were no recorded raptor mortalities associated with any of the meteorological towers. Young et al. (2003) estimated there was an average of 0.03 raptor mortalities per wind turbine per year.

Raptor mortality data collected by Young et al. (2003) at the Foot Creek Wind Farm (located approximately 10 mi south of the project area) were based on 69 600-kilowatt Mitsubishi wind turbines that are smaller that the proposed Clipper demonstration wind turbine. The Clipper demonstration wind turbine would also have other design and operational differences compared to the Mitsubishi wind turbines. The Mitsubishi wind turbines have a rotor and blade diameter of 138 ft, while the Clipper demonstration wind turbine would have a rotor and blade diameter of 305 ft. The Mitsubishi wind turbines have a blade sweep area of 14,950 ft^2 compared to the

sweep area of the Clipper demonstration wind turbine would be 73,024 ft^2 an increase of almost five-fold.

Various factors likely influence the rate of raptor mortalities as a result of the operation of wind turbines such as blade sweep area, rotor speed, blade tip speed, height of the wind turbine, distance to topographic ridges, position of the individual turbine in the turbine string, weather, distance to suitable habitat, flying height of the specific species, etc. (Young et al. 2003). It should be noted that no bat or avian mortality studies have been conducted at the PRPA Medicine Bow Wind Farm (personal communication, October 20, 2004, with Paul Warila, PRPA, Fort Collins, Colorado). In order to compare potential raptor mortalities between the Mitsubishi wind turbine to the Clipper wind turbine, it is assumed that all factors are constant except for blade sweep area and that the rate of raptor mortalities would be based solely upon a comparison of the blade sweep area for each wind turbine model. This approach would likely result in a worst-case scenario since there is limited suitable nesting or roosting habitat in the immediate project area compared to the Foote Creek Wind Farm. It should also be noted that avian mortalities were only recorded at approximately 67% of the monitored wind turbines at the Foote Creek Wind Farm (Young et al. 2003). Therefore, based on these assumptions, the proposed Clipper demonstration wind turbine would result in approximately 0.15 raptor mortalities per year compared to 0.03 raptor mortalities per year for the smaller Mitsubishi wind turbines. As a result, the Proposed Action is not expected to adversely impact any of the raptor populations in the area.

To document potential impacts to raptor species, Clipper would conduct mortality surveys near the wind turbine and meteorological tower during the first 12-month period of operation of the Proposed Action. Clipper would utilize mortality survey methods similar to those developed for the nearby Foote Creek Rim Wind Farm (Young et al. 2003). Personnel would conduct one survey every 2 weeks, and each survey would involve walking transects established within 250 ft of each tower. Search transects would be set approximately 25-30 ft apart, and the searcher would walk at a rate of approximately 2 mph along the transect searching both sides out approximately 12-15 ft for casualties. It is estimated that it should require 0.75 hour to survey

each tower. For each casualty identified, data recorded would include species, sex, and age (when possible), date and time collected, location collected, condition, and any comments that may indicate the time and cause of death. All carcasses located would be photographed as found and mapped. If the species information cannot be determined, the carcass would be bagged and transported to a qualified biologist for proper identification. At the end of the survey period, the data would be compiled, summarized, and submitted to the DOE, USFWS, and WGFD. The USFWS would be notified immediately by telephone if carcasses of raptors or other species of concern were located at any time during turbine operation.

As described in Chapter 2.0 of the EA, electrical components of the Proposed Action would be designed, constructed, operated, and maintained in conformance with the *National Electrical Safety Code* and other applicable codes and standards. In addition, all aboveground electrical facilities would also be designed, constructed, operated, and maintained in accordance with *Suggested Practices for Raptor Protection on Powerlines: The State of the Art in 1996* (Avian Power Line Interaction Committee 1996). Implementation of these standards would reduce the risk of raptor electrocutions with powerline structures. The USFWS guideline recommend grouping wind turbines (i.e., avoid siting individual wind turbines) to reduce potential impacts to raptors and placing wind turbines away from ridges and away from prairie dog colonies (USFWS 2003). The Proposed Action complies with these guidelines.

Construction activities would disturb less than 10 acres; therefore, reductions in prey species abundance would be minimal and are not anticipated to adversely affect raptor populations. Foraging habitat for raptors within the project area would be reduced until revegetation successfully attracts small mammals and birds that serve as the prey base for the raptors. Therefore, the Proposed Action would not have any significant impacts on raptors.

4.8.1.4 Upland Game Birds

The Proposed Action would result in the disturbance of less than 10 acres of native vegetation; however, this amount of disturbance is unlikely to have an adverse affect on greater sage-grouse,

although it is possible the individual greater sage-grouse may be killed as a result of vehicular/bird collisions on the 5-mi segment of the Medicine Bow to Elk Mountain Road. However, the anticipated level of traffic would be less than 20 trips per day between the community of Medicine Bow, and the project area during the construction phase and less than four trips per day during the operational phase of the project. In addition, maintenance personnel would also occasionally visit the project facilities during the operational phase of the Proposed Action. The level of traffic during the operational phase of the project would be similar to that currently observed at the adjacent PRPA wind farm, and potential vehicle/bird collisions would result in negligible impacts to greater sage-grouse.

According to Young et al. (2003), no greater sage-grouse mortalities were recorded at either the wind turbines or meteorological towers during the 3.5-year monitoring period at SeaWest's Foote Creek Rim wind farm. Therefore, greater sage-grouse would not be impacted (by collisions with the meteorological tower or wind turbine).

Noise levels associated with the Proposed Action would likely increase from a maximum of 60 dBA (under windy natural conditions with the existing Medicine Bow Wind Farm) to 105 dBA with the addition of the proposed Clipper wind turbine. However, these noise levels would occur only during periods when the wind is blowing at least 18 mph and the wind turbine is operating. Male greater sage-grouse perform a courtship display in the early morning hours (typically before 8 a.m.) from March through May. Male greater sage-grouse strut, fan their tail feathers, and produce a popping sound by inflating and deflating air sacs in the neck to attract females. Yeo et al. (1984) determined that there was no decrease in greater sage-grouse lek attendance due to the construction or operation of a large wind turbine generators located near the Foote Creek Wind Farm. In addition, variations in lek attendance could not be directly attributed to the presence of the wind turbine generators (Yeo et al. 1984). Therefore, noise from the Proposed Action would likely have negligible impacts on greater sage-grouse.

The construction of the Clipper wind turbine could also adversely affect nesting of greater sage-grouse near the project area. After the courtship period, approximately two-thirds of the female

greater sage-grouse nest within 3 mi of where they were bred (WGFD 2003a). Therefore, the project area and the existing Medicine Bow Wind Farm would be located within greater sage-grouse nesting habitat, and this area could have already been impacted by the construction and operation of the existing wind farm. Connelly et al. (2000) noted that nest success is better in areas where the greater sage-grouse nest in sagebrush that is between 16 and 32 inches tall; sagebrush that tall is not found within the project area. As a result, the Proposed Action would likely have negligible additional impacts on nesting greater sage-grouse.

To minimize potential impacts to active greater sage-grouse leks during the construction of the Proposed Action, Clipper would not conduct any surface-disturbing activities within 0.25 mi of any active lek during the greater sage-grouse mating season between February 1 and May 15. In addition, in order to minimize potential impacts to nesting greater sage-grouse, no surface-disturbing activities would be conducted within 2 mi of any active lek between April 1 and July 1 without permission from the WGFD. Reclamation activities would be conducted prior to April 1, unless prior permission is obtained from WGFD.

Mourning doves would likely be impacted in direct proportion to the amount of suitable habitat that is disturbed by the Proposed Action. There would be negligible impacts on mourning dove population because only 10 acres would be disturbed by the Proposed Action. In addition, Young et al. (2003) documented only one mourning dove mortality at either the wind turbines or meteorological towers during the 3.5-year monitoring period at SeaWest's Foote Creek Rim wind farm. This represents less than 0.5% of the total recorded mortalities.

4.8.1.5 Other Birds (Including Migratory Birds)

According to Young et al. (2003) passerine birds and other non-raptor species accounted for 92% of the avian mortalities recorded at wind turbines and 100% of the avian mortalities at metrological towers at the monitored portion of SeaWest's Foote Creek Wind Farm located approximately 9 mi south of the project area. A total of 37 species was killed and approximately half of the species were nocturnal migrants. For example, approximately 29% of the fatalities

were horned lark, 7% were vesper sparrow, 5% were chipping sparrow, and 5% were Brewer's sparrow. Species such as rock wren, house wren, Wilson's warbler, American robin, Townsend's warbler, green-trailed towhee, white-crowned sparrow, mountain bluebird, Lincoln's sparrow, cliff swallow, and brown creeper were documented between 2% and 4% of the total mortalities. The remaining 22 species each represented less than 2% of the total species mortalities documented at the Foote Creek wind farm.

Young et al. (2003) estimated that there was an average of 1.46 passerine mortalities per wind turbine per year and an average of 8.1 passerine mortalities per meteorological tower per year.

Passerine bird mortality data collected by Young et al. (2003) at the Foote Creek Wind Farm (located approximately 10 mi south of the project area) were based on 69 600-kilowatt Mitsubishi wind turbines that are smaller that the proposed Clipper demonstration wind turbine. The Clipper demonstration wind turbine would also have other design and operational differences compared to the Mitsubishi wind turbines. The Mitsubishi wind turbines have a rotor and blade diameter of 138 ft, while the Clipper demonstration wind turbine would have a rotor and blade diameter of 305 ft. The Mitsubishi wind turbines have a blade sweep area of 14,950 ft^2 compared to the sweep area of the Clipper demonstration wind turbine would be 73,024 ft^2, an increase of almost five-fold.

Various factors likely influence the rate of avian mortalities as a result of the operation of wind turbines, such as blade sweep area, rotor speed, blade tip speed, height of the wind turbine, distance to topographic ridges, position of the individual turbine in the turbine string, weather, distance to suitable habitat, flying height of the specific species, etc. (Young et al. 2003). It should be noted that no bat or avian mortality studies have been conducted at the PRPA Medicine Bow Wind Farm (personal communication, October 20, 2004, with Paul Warila, PRPA, Fort Collins, Colorado). In order to compare potential passerine bird mortalities between the Mitsubishi wind turbine to the Clipper wind turbine, it is assumed that all factors are constant except for blade sweep area and that the rate of bird mortalities would be based solely upon a comparison of the blade sweep area for each wind turbine model. This approach would likely

result in a worst-case scenario since there is limited suitable nesting or roosting habitat in the immediate project area compared to the Foote Creek Wind Farm. It should also be noted that avian mortalities were only recorded at approximately 67% of the monitored wind turbines at the Foote Creek Wind Farm (Young et al. 2003).

Therefore, based on these assumptions, the proposed Clipper demonstration wind turbine would result in approximately 7.3 passerine bird mortalities per year compared to 1.46 passerine bird mortalities per year for the smaller Mitsubishi wind turbines. The estimated number of passerine bird mortalities associated with the meteorological tower would be expected to be similar (8.1 passerine birds per year) to that documented by Young et al. (2003) at the Foote Creek Wind Farm. Therefore, the Proposed Action would likely result in approximately 15.4 passerine bird mortalities per year as a result of the meteorological tower and wind turbine.

To document potential impacts to passerine species, Clipper would conduct mortality surveys near the wind turbine and meteorological tower during the first 12-month period of operation of the Proposed Action. Clipper would utilize mortality survey methods similar to those developed for the nearby Foote Creek Rim Wind Plant (Young et al. 2003). Personnel would conduct one survey every 2 weeks, and each survey would involve walking transects established within 250 ft of each tower. Search transects would be set approximately 25-30 ft apart, and the searcher would walk at a rate of approximately 2 mph along the transect searching both sides out approximately 12-15 ft for casualties. It is estimated that is should require 0.75 hour to survey each tower. For each casualty identified, data recorded would include species, sex, and age (when possible), date and time collected, location collection, condition, and any comments that may indicate the time and cause of death. All carcasses located would be photographed as found and mapped. If the species information cannot be determined, the carcass would be bagged and transported to a qualified biologist for proper identification. At the end of the survey period, the data would be compiled, summarized, and submitted to the DOE, USFWS, and WGFD.

Additional impacts would probably occur in direct proportion to the amount of a species' habitat that would be disturbed. Some increased mortality would also be likely from bird collisions as a

result of increased vehicle traffic. Disturbance would be approximately 10 acres, and measures already described above to mitigate surface disturbances and project-related activities would minimize impacts to other bird species as well. Impacts to waterfowl and shorebirds would be minimal because few areas of suitable habitat would be affected and because these birds would temporarily move to adjacent habitats undisturbed by construction. Other birds would also move to suitable adjacent habitats. Therefore, the Proposed Action would not have any significant impacts on the populations of other birds (including migratory birds).

4.8.1.6 Amphibians, Reptiles, and Fish

Impacts to amphibians and reptiles due to the Proposed Action likely would occur in direct proportion to the amount of their habitat disturbed. Applicant-committed practices described in the Proposed Action to minimize surface disturbance and to ensure timely reclamation and stabilization would minimize project-related impacts to amphibians and reptiles. Some reptiles and amphibians could be killed in vehicle/animal collisions, but such impacts would be negligible. The applicant-committed practices described in the Proposed Action to minimize surface disturbance and ensure timely reclamation and stabilization would minimize project-related impacts to fish that occur in Medicine Bow River. Therefore, the Proposed Action would not have any significant impacts on amphibians, reptiles, and fish.

4.8.1.7 Summary

Direct impacts to wildlife would result from the direct loss of habitat due to the construction/installation of project-related facilities and vegetation compaction, displacement of wildlife due to disturbance by project-related activities, direct mortality due to construction- and operational-related activities, increased mortality due to poaching and harassment, and an increased likelihood of vehicle/animal collisions due to increased traffic. In addition, some avian individuals would be killed as a result of collisions with the rotating wind turbine blades or with the meteorological tower. No additional mitigation beyond those already included in the Proposed Action would be required. Despite the potential temporary displacement of big game

individuals during construction/installation of the Proposed Action and the mortalities of individual avian species during operation of the Proposed Action, the Proposed Action would not result in any significant impacts to wildlife populations.

4.8.2 No Action Alternative

Under the No Action Alternative, the DOE would not fund the Proposed Action, construction of the demonstration wind turbine and associated facilities would not occur, and wildlife (i.e., big game, other mammals, raptors, upland game birds, other birds, and amphibians, reptiles, and fish) populations would continue at present levels, with fluctuations due primarily to weather, disease, human impacts (e.g., the PRPA wind farm), and other natural causes.

4.8.3 Mitigation and Monitoring

No additional mitigation or monitoring is recommended beyond the applicant-committed practices identified in Chapter 2.

4.8.4 Residual Impacts

The Proposed Action would result in direct impacts such as disturbance of less than 10 acres of wildlife habitat, including crucial winter/yearlong range for pronghorn and the mortality of a limited number of individual raptors, bats, and passerine and other birds. Construction activities would occur over a 2-month period of time and reclamation and revegetation operations would be conducted upon the decommissioning and removal of the various project facilities and equipment. Some individual bird or animal species would be destroyed as a result of vehicle/animal collisions. In light of the fact that the Proposed Action would result in the addition of a single wind turbine and meteorological tower immediately adjacent to the existing PRPA wind farm, the Proposed Action would result in nonsignificant residual impacts to wildlife resources.

4.9 CUMULATIVE IMPACTS

Cumulative impacts result from the incremental impacts of an action that is added to other past, present, and reasonably foreseeable future actions, regardless of who is responsible for such actions. Cumulative impacts may result from individually minor, but collectively significant, actions occurring over a period of time (40 C.F.R. 1508.7). All environmental resources have been evaluated for cumulative impacts in accordance with DOE and CEQ policy (CEQ 1997).

The general project area has been utilized continuously for agricultural purposes (livestock grazing) and oil and gas development since the early 1900s. In addition, coal mining (the Carbon Basin surface and underground coal mine [approved but not operating]) and wind energy development projects (the existing Foote Creek and PRPA wind farms and the approved but not constructed Simpson Ridge wind farm) are present within the general project area. The Foote Creek Wind Farm currently has 183 wind turbines, and an additional 857 wind turbines have been authorized for construction but have not been constructed at the Simpson Ridge site (BLM 1995). There are also numerous paved and unpaved roads located within the general project area (including Interstate 80, U.S. Highway 30/287, State Highway 487, County Road 72, and the Medicine Bow to Elk Mountain Road). In addition, utility corridors (such as transmission and distribution powerlines and various natural gas pipelines) and the communities of Medicine Bow and Elk Mountain are also located within the general project area (refer to Figure 4.1). Despite these facilities, the natural environment within a major portion of the general project area remains largely unaffected by human-related activities, and the existing development does not appear to having any significant impacts on the existing environment.

There are no other large-scale industrial or commercial developments such as quarrying or mining operations, logging activities, oil and gas development activities, wind developments

This figure is a separate file Fig 4-1.pdf.

Figure 4.1 Existing and Authorized Projects in the General Project Area.

(except for the PRPA Medicine Bow wind far), or other industrial developments within 3 mi of the project area. In addition, the DOE is unaware of any planned or reasonably foreseeable future actions within the general project area that would contribute any cumulative impacts.

The Proposed Action would involve the construction/installation, operation, and after 20 years the removal of a single 2.5-MW wind turbine, a 240-ft tall meteorological tower, a small service building, and associated underground powerlines and cables. The Proposed Action would be located immediately adjacent (within 800 ft) of PRPA's existing Medicine Bow Wind Farm. Within this facility, there are 10 large commercial wind turbines, two meteorological towers, a service building and out-buildings, powerlines, and a substation. There are no other existing, proposed, or planned commercial or industrial projects within the general project area. In addition, there are no plans for expansion of the Medicine Bow Wind Farm (personal communication, October 20, 2004, with Paul Warila, PRPA, Fort Collins, Colorado). It has been determined that cumulative impacts would not be significant because there are no past, present, or reasonable foreseeable future actions that, when combined with the Proposed Action, would result in impacts beyond those that already exist or have already been identified and discussed in Chapter 4.0 of this EA. Therefore, non-significant cumulative impacts to all environmental resources would be anticipated from the implementation of the Proposed Action.

4.10 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

An irreversible and irretrievable commitment of resources is defined as a permanent reduction or loss of a resource that, once lost, cannot be regained. The primary irreversible and irretrievable commitment of resources due to the Proposed Action would be labor, materials, and energy expended utilized to construct the Proposed Action. Other irreversible and irretrievable commitments of resources would include soil lost through wind and water erosion; loss of productivity (i.e., forage and wildlife habitat) from lands involved in project; inadvertent or accidental destruction of unidentified cultural resources; and loss of animals due to mortality by collisions with vehicles, the meteorological tower, and the wind turbine.

4.11 SHORT-TERM USE OF THE ENVIRONMENT VERSUS LONG-TERM PRODUCTIVITY

For purposes of this EA, short-term use of the environment is that use during the life of the project (i.e., approximately 20 years), whereas long-term productivity refers to the period of time after the project has been decommissioned and the equipment has been removed and the area is reclaimed and stabilized. Short-term use of environment would not affect the long-term productivity of the proposed project area. After project has been completed, the equipment and facilities decommissioned and removed, and all disturbed areas reclaimed and stabilized, the same resources that were present prior to the project would be available. It may take 5-7 years after the project has been completed for some of the impacted and reclaimed areas to have vegetation cover and biodiversity comparable to predisturbance conditions. However, reclamation would eventually provide conditions to support wildlife and livestock. Use of the proposed project area during the life of the project would not preclude the subsequent short- or long-term use of the area for any purpose for which it was suitable prior to the project.

5.0 RECORD OF PERSONS, GROUPS, AND GOVERNMENTAL AGENCIES CONTACTED

Table 5.1 Record of Persons, Groups, and Governmental Agencies Contacted.

Company/Agency	Individual	Discipline/Position
Project Proponent – Clipper Windpower, Inc.	Tom Feiler	Project Manager
	Eli Bosco	Project Manager Leader
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APPENDIX A:

COPIES OF PUBLIC SCOPING LETTERS