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Environmental Impact Statement

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Draft Environmental Impact Statement for the Proposed China Mountain Wind Project and Resource Management Plan Amendment

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ACRONYMS

AAQS	Ambient Air Quality Standards
ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
AERMET	A Meteorological Preprocessor for AERMOD
AERMOD	AMS/EPA Regulatory Model
AERSURFACE	AMS/EPA Regulatory Model Surface Characteristics Development Tool
AFS	Air Facility System
AMP	Allotment Management Plan
AMR	Appropriate Management Response
AMS	American Meteorological Society
aMW	Average Megawatt
Applicants	China Mountain Wind LLC and NV Energy
ANSI	American National Standards Institute
APE	Area of Potential Effects
APLIC	Avian Power Line Interaction Committee
ARPA	Archeological Resources Protection Act
AQI	Air Quality Index
ASTM	American Society for Testing of Materials
AUM	Animal Unit Month
BA	Biological Assessment
BAR	Burned Area Rehabilitation
BLM	Bureau of Land Management
BMP	Best Management Practices
C	Celsius
CAA	Clean Air Act
CDC	Conservation Data Center
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	Methane
CMW	China Mountain Wind, LLC
CO	Carbon monoxide
CO_2	Carbon Dioxide
CORRACTS	RCRA Corrective Actions
cps	Cycles Per Second
CRMMP	Cultural Resources Mitigation and Monitoring Plan
dB	Decibel
dBA	A-weighted decibel

DNA	Determination of NEPA Adequacy
DRMP	Draft Resource Management Plan
DTI	Department of Trade and Industry
dv	Deciview
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
EPS	Economic Profiling System
ERNS	Emergency Response Notification System
ES	Emergency Stabilization
ESA	Endangered Species Act
ESI	Ecological Site Inventory
ESR	Emergency Stabilization and Rehabilitation
°F	Degrees Fahrenheit
FAA	Federal Aviation Administration
FAR	Functioning at-risk
FAR-DOWN	Function at-risk with a Downward Trend
FAR-NA	Function at-risk with no apparent trend
FAR-UP	Functioning at-risk with an Upward Trend
FHWA	Federal Highway Administration
FLAG	Federal Land Managers' Air Quality Related Values Workgroup
FLPMA	Federal Land Policy and Management Act
FM	Fuel model
FMP	Fire Management Plan
FMU	Fire Management Unit
FONSI	Finding of No Significant Impact
FRCC	Fire Regime Condition Class
FRM	Federal Reference Monitors
FTA	Federal Transit Administration
g/cc	Soil Per Unit Volume
G rank	Global Rank
GHG	Greenhouse gas
GIS	Geographic Information System
GMU	Game Management Unit
HCR	Habitat Condition Ranking
HFR	Historic Fire Regimes
HSE	Health Safety and Environmental
Hz	Hertz
IAAQS	Idaho Ambient Air Quality Standards
IBLA	Interior Board of Land Appeals
IDAPA	Idaho Administrative Procedures Act

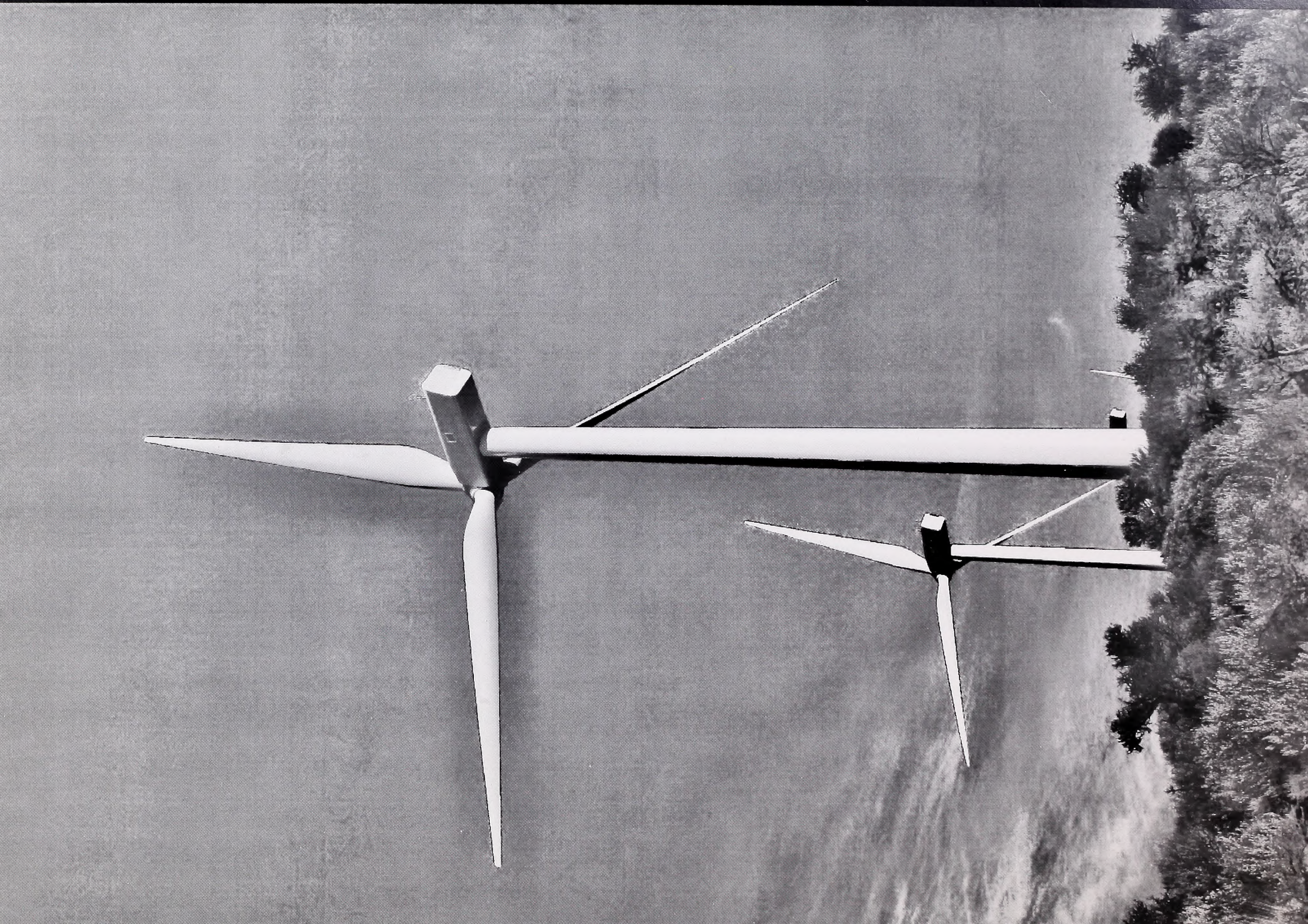
IPDES	Idaho Pollutant Discharge Elimination System
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IDL	Idaho Department of Lands
ID Team	Interdisciplinary Team
IDVMD	Idaho Vertebrate Modeling Database
IDWR	Idaho Department of Water Resources
IFWIS	Idaho Fish and Wildlife Information System
ISAC	Idaho Sage-grouse Advisory Committee
ITD	Idaho Transportation of Department
kHz	Kilohertz
km	Kilometer
KOP	Key Observation Point
kV	Kilovolt
kW	Kilowatt
L_{dn}	Day-Night Average Noise Level
L_{eq}	Equivalent Sound Level
Leks	Sage-Grouse Strutting Ground
LEPA	Lepidium papilliferum
LLC	Limited Liability Corporation
L_{max}	Maximum Equivalent Sound Level
L_{min}	Minimum Equivalent Sound Level
LORS	Laws, Ordinances, Regulations and Standards
LT	Long-term Measurement Location
m	Meter
mi^2	Square miles
MOA	Memorandum of Agreement
mph	Miles Per Hour
MUA	Multiple Use Area
MW	Megawatt
N_2O	Nitrous Oxide
N/A	Not Applicable
NAAQS	National Ambient Air Quality Standards
NAD	North American Datum
NAGPRA	Native American Graves Protection and Repatriation Act
NDEP	Nevada Division of Environmental Protection
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NEAP	Natural Events Action Plan
NEPA	National Environmental Policy Act
NEPT	National Environmental Performance Track
NF	Non-functioning

NHD	US Geological Survey National Hydrography Dataset
NHPA	National Historic Preservation Act of 1966
NOI	Notice of Intent
NO_2	Nitrogen dioxide
NO_X	Nitrogen Oxides
NHR	Northern haul route
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NRRS	Natural Resource Recreation Setting
NRS	Nevada Revised Statutes
NvAAQS	Nevada Ambient Air Quality Standards
NVCRIS	Nevada Cultural Resource Information System
NWCG	National Wildfire Coordinating Group
O_3	Ozone
O&M	Operation and Maintenance
OHV	Off-highway Vehicle
ORV	Off-road-Vehicle
PA	Project Area
Pb	Lead
PCS	Permit Compliance System
PEIS	Programmatic Environmental Impact Statement
PFC	Proper Functioning Condition
PLS	Pure live seed
PM	Particulate Matter
$PM_{2.5}$	Particulate matter with an aerodynamic diameter equal to or less than 2.5 microns
PM_{10}	Particulate matter with an aerodynamic diameter equal to or less than 10 microns
PPM	Parts Per Million
PNC	Potential Natural Community
POD	Plan of Development
project	China Mountain Wind Power Project
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
ReGAP	Regional Gap Analysis Project
RES	Renewable Energy Systems America Development Inc.
RFFA	Reasonable Foreseeable Future Action
RHCA	Riparian Habitat Conservation Area
RMP	Resource Management Plan
ROD	Record of Decision

ROS	Recreational Opportunities Spectrum
ROW	Right-of-Way
RPS	Renewable Portfolio Standard
RSC	Recreation Setting Characteristics
S rank	State Rank
SAD	Surface Area Disturbance
SCADA	Supervisory Control and Data Acquisition
SCIIDC	South Central Idaho Interagency Dispatch Center
SH	State Highway
SH-51	State Highway 51
SHPO	State Historic Preservation Officer
SHR1	Southern Haul Route Option 1
SHR2	Southern Haul Route Option 2
SIC	Standard Industrial Classification Codes
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SOP	Standard Operating Procedure
SPCCP	Spill Prevention Control and Countermeasures Plan
SPL	Sound Pressure Level
SQRU	Scenic Quality Rating Units
SRMA	Special Recreation Management Area
SRP	Snake River Plain
SSA	Stipulated Settlement Agreement
SSP	Special Status Plant
SSURGO	Soil Survey Geographic Database
ST	Short-term Measurement Location
SWIP	Southwest Intertie Project
SWPPP	Storm Water Pollution Prevention Plan
TAC	Technical Advisory Committee
TCP	Traditional Cultural Property
TES	Threatened, Endangered and Sensitive
TMDL	Total Maximum Daily Load
TRI	Toxic Release Inventory
TSD	Treatment Storage and Disposal
TWA	Time-weighted Average
µg	Microgram, 10^{-6} Gram
$\mu g/m^3$	Micrograms per Cubic Meter
µm	Micrometer, 10^{-6} Meter
USGS	United States Geological Survey
U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code

USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
US-30	United States Highway Route 30
US-93	United States Highway Route 93
USTs	Underground Storage Tanks
USU	Utah State University
VHF	Very High Frequency
VMA	Vegetation Management Areas
VRM	Visual Resource Management
VSG	Vegetation Sub-group(s)
WOMP	Wildlife Operations Monitoring Plan
WUI	Wildland Urban Interface
WSA	Wilderness Study Area
WSR	Wild and Scenic River
WWG	Wildlife Working Group

CHAPTER 4 – ENVIRONMENTAL CONSEQUENCES



4.0 ENVIRONMENTAL CONSEQUENCES

4.0.1 INTRODUCTION

This chapter describes the environmental consequences, also referred to as "impacts" or "effects," of implementing the alternatives, haul routes, and proposed amendments to the 1987 Jarbidge Resource Management Plan (RMP). Considering the existing condition of the environment that would be affected by the project (Chapter 3) and imposing the descriptions of the alternatives (Chapter 2), the types of impacts were identified and quantified to the extent practicable for the purposes of this Environmental Impact Statement (EIS). Impacts are defined as modifications to the environment over existing conditions (the No Action Alternative) that are caused by a proposed action. General impacts of wind energy facilities to resources and resource uses are described in the *Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States* (Bureau of Land Management [BLM], 2005). This document is incorporated by reference.

The impact analysis is designed to show relative differences in alternatives as they pertain to specific resources, resource uses, or social and economic features. It is not intended to predict the exact amount, timing, or location of effects that could occur should the alternative be selected for implementation. The numbers generated and used for comparison of impacts are approximated and intended for analysis purposes only. The exact location of project features cannot be determined until a final design is completed. Therefore, the exact areas of impact on specific resources, resource uses, or social and economic features are estimates based on the best available information at the time of this writing.

Knowledge is, and always will be, incomplete regarding many aspects of the terrestrial species, vegetative communities, the economy, and communities and their interrelationships. The ecology, inventory, and management of ecosystems are a complex and evolving discipline. However, basic ecological relationships are well established, and a substantial amount of credible information about ecosystems in the project area is known. The alternatives were evaluated using the best available information about these ecosystems. While additional information may add precision to estimates or better specify relationships, new information would be unlikely to appreciably change the understanding of the relationships that form the basis for the evaluation of effects.

Much of the information on the Affected Environment (Chapter 3) and Environmental Consequences (Chapter 4) is derived from detailed technical reports prepared by URS and subcontractors. These reports are available for review as part of the Project File maintained for the China Mountain Wind Project at the Jarbidge Field Office.

4.0.2 HOW TO READ THE IMPACT ANALYSIS

Impacts associated with the alternatives and haul routes are discussed in a section for each resource, resource use, or social and economic feature. Each resource section begins by describing the analysis area, indicators, analysis methods, and assumptions specific to that resource, resource use, or social and economic feature. Following a discussion of analysis methods, each resource section presents direct and indirect impacts of the wind energy facility, followed by direct and indirect impacts of the

haul routes. Then, a section summarizing the impacts of the project as a whole (wind energy facility in combination with the haul route options) is presented. Each section closes with an analysis of cumulative impacts.

The project area includes the right-of-way (ROW) preference area and a 250-foot buffer around all linear ROW grant areas outside of the ROW preference area (i.e., transmission interconnect lines and project roads) (Figure 2.3-1). The project disturbance area consists of all areas where the surface would be disturbed as a result of the project, including roads, turbine pads, laydown areas, batch plants, disturbance areas around project features, and quarry sites. The haul routes consist of the inbound and outbound routes that would be used to transport construction equipment and project infrastructure to and from the project area (Figures 2.4-1, 2.4-2, and 2.4-3). Three inbound haul routes are being considered in this analysis (Section 2.4.2.4).

4.0.2.1 Analysis Methods

This section identifies the indicators, analysis area, methods, and assumptions used in the analysis for each resource. Indicators are used to provide a framework for the impact analysis. They are intended to be quantitative where possible, to allow for clearer comparisons among alternatives. Although most indicators are measurable; that is, they are quantitatively assessed, other indicators are qualitative.

The methods section describes how the impact analysis was conducted and includes a description of the data used in the analysis, quantitative models, relevant scientific literature, previously prepared environmental documents, and professional judgment of resource specialists. This section also presents the underlying assumptions that were used when analyzing impacts of the project on a specific resource, resource use, or social and economic feature.

4.0.2.2 Direct and Indirect Impacts of the Wind Energy Facility

Direct or indirect impacts are described in terms of their expected duration, intensity, and spatial extent.

There are three types of impacts discussed:

- Direct impacts are caused by the proposed action and occur at the same time and place.
- Indirect impacts are caused by the proposed action and are later in time or farther in distance, but still reasonably foreseeable.
- Cumulative impacts result from incremental impacts when added to other past, present, and reasonably foreseeable future actions regardless of what person or agency (Federal or non-Federal) undertakes those actions.

Duration of impacts is considered as:

- Temporary impacts occur during project construction and/or decommissioning and persist for less than or equal to 2 years.
- Short-term impacts persist up to 5 years after construction is complete.
- Long-term impacts persist for more than 5 years after construction.
- Permanent impacts persist beyond project decommissioning.

Intensity of impacts is considered as:

- Negligible impacts are not discernible; there would be no apparent change.
- Minor impacts are slight but detectable; there would be a small change.
- Moderate impacts are readily apparent; there would be a noticeable change.
- Major impacts are large and highly noticeable.

Each impact intensity level is not necessarily used in every analysis. Impacts on some resources, resource uses, or social and economic features do not need, or lend themselves to, all four levels of intensity definitions.

The scale of impacts is considered as:

- Localized impacts occur at a specific site, or within a relatively small area.
- Extensive impacts occur within a larger area, but not throughout the entire analysis area.
- Area-wide impacts occur throughout all or most of the analysis area.

These definitions apply across all resources, resources uses, or social and economic features, unless a resource discussion required more specific definitions; in that case, they are described in that specific section.

Direct and indirect impacts of the wind energy facility are described beginning with an analysis of the No Action Alternative (Alternative A). This is followed by a detailed presentation of the impacts common to all action alternatives (to avoid repeating these impacts for each action alternative). Next, an analysis of impacts of each action alternative is presented. The impacts are described in the context of the analysis indicators, and where applicable, for each stage of the project (construction, operation and maintenance [O&M], and decommissioning). The type, duration, and intensity of impacts are also discussed where applicable. Impacts presented for the action alternatives represent the change from existing conditions (the No Action Alternative). Also included in the analysis is a discussion of design features (Best Management Practices and RMP stipulations) and mitigation measures (presented in Chapter 2 and Appendices 2A and 2B) that would be applied to reduce impacts. Initially, impacts are described without consideration of the design features and mitigation measures, and then, impacts are assessed with design features and mitigation applied. Proposed amendments to the 1987 Jarbidge RMP and their resource impacts are also discussed, where applicable.

The impact analysis of the phased alternatives (Alternatives B2a, B2b, and B2c) is separated into three parts: Phase I, Phase II, and Phase I plus Phase II. Ground disturbance would occur twice in some portions of the project area for the phased alternatives, once in Phase I and again in Phase II. Therefore, the disturbance acres for the full build-out of the phased alternatives (Phase I plus Phase II) described in some of the resource sections is slightly greater than the disturbance acres presented for Alternative B1, even though the full build out would have the same number of turbines, roads, and other facilities.

4.0.2.3 Direct and Indirect Impacts of the Haul Routes

Following the impact analysis of the wind energy facility, direct and indirect impacts of the haul routes are described. If amendments to the 1987 Jarbidge RMP are granted for the alternative selected in the Record of Decision, those amendments would also be applied to activities proposed for the inbound and outbound haul routes. Impacts of the RMP amendments on specific resources, as they relate to the haul routes, would be the same as described for each alternative; therefore, impacts of the RMP amendments are not discussed separately for the haul routes.

4.0.2.4 Project as a Whole

The project as a whole section summarizes the impacts of each alternative added to the impacts of the northern inbound haul route and both options of the southern inbound haul route. It compares the impacts of an action alternative in conjunction with one of the haul routes, as only one inbound haul route would be authorized as part of the ROW grant. It also provides a side-by-side comparison of alternatives in a tabular format.

4.0.2.5 Cumulative Impacts

The Council on Environmental Quality regulations for implementing the National Environmental Policy Act requires assessment of cumulative effects in the decision-making process for Federal projects. Cumulative effects are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 *Code of Federal Regulations* (CFR) 1508.7). A cumulative effects analysis area was developed for each individual resource or type of land use, depending on how far cumulative direct and indirect impacts are anticipated to occur. Potential cumulative impacts are analyzed at the end of each resource, resource use, or social and economic feature section within this chapter.

Cumulative impacts were determined by combining the effects of the alternatives with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other past, ongoing, or reasonably foreseeable future actions in the analysis areas and surrounding landscape. All resource impacts would be added to these actions to present the cumulative picture or incremental contribution this project would have on the resources.

Past, current, and future foreseeable management activities occurring in the cumulative impact areas include livestock grazing, firefighting activities, range improvements, recreation (hunting, off-highway vehicle use [OHV], sightseeing, camping, horseback riding, and wildlife sightseeing), wind energy projects, meteorological towers, transmission lines, telephone lines, and communication towers. Other disturbances that are ongoing include wildfire and establishment and spread of noxious weeds and invasive plant species. Past, present, and future foreseeable infrastructure projects that would occur within a 50-mile radius of the project area are displayed in Table 4.0.2-1 and Figure 4.0.2-1.

Table 4.0.2-1. China Mountain Wind Project Cumulative Actions Summary Table.

Timing of Project	Type of Project	Location	Project Description
Present	Wind	Bell Rapids	21 1.5 megawatt (MW) turbines installed between 2005 and 2007. Currently in operation.
Present	Wind	Spread across 10,000 acres in southern Idaho's Magic Valley; Twin Falls County; near towns of Hagerman, Burley, and Bliss, Idaho	An estimated 122 1.5 MW wind turbines are permitted for this project; the project would take place on 11 different wind farms, spread over 10,000 acres on active and inactive farmland in southern Idaho's Magic Valley (near the Oregon Trail). This would be Idaho's largest wind energy project and is also known as the Oregon Trail Wind Farm. The turbines would be located on private land. Construction should be completed by Fall 2011. For clarification purposes, 9 of the 11 proposed sites are listed below. Project sites (by Exergy) include the following: • Cassia County: Burley Butte (7 turbines) • Twin Falls County: Golden Valley Wind Park (7 turbines); Oregon Trails (7 turbines); Pilgrim Stage (7 turbines); Thousand Springs (7 turbines); Tuana Gulch (7 turbines); Lava Beds (12 turbines); Milner Dam (12 turbines); Notch Butte (12 turbines); Salmon Falls (14 turbines)
Future	Wind	Cotterel Mountain; Cassia County, Idaho	Shell Wind Energy proposes to develop the Cotterel Mountain Wind project. The project would be located on land administered by the Bureau of Land Management (BLM) atop Cotterel Mountain in Cassia County, Idaho. The project would include up to 100 turbines The project received a ROW grant from BLM in 2006 but has not yet been constructed. It is unknown when construction would start on this project.
Present	Wind	Cassia County, Idaho	Milner Butte (13 turbines), Burley Butte (13 Turbines), and Golden Valley (8 Turbines) consist of 34 - 1.5 MW turbines. Currently nearing completion and should be in operation by early 2011. The wind turbines have been constructed but are not yet operational. All are on private land. The power would be sold to Idaho Power.
Present	Met Towers	China Mountain	There are currently 10 meteorological towers sited at China Mountain. These towers have been constructed over the years since 2005. These towers are 180 feet in height and are either an 8 inch guyed steel pole or guyed lattice structures. These towers would be removed once the larger wind project is either approved or denied.
Present	Met Towers	20 miles southwest of Burley, Idaho	Two 180-foot meteorological towers authorized by BLM in Buckhorn Canyon in 2008 for a 3-year grant period.
Present	Met Tower	Varies	Additional miscellaneous meteorological towers are sited on private lands throughout the 50-mile cumulative impact area boundary.
Future	Transmission Line	West of Salmon Falls Creek Reservoir and United States Highway Route 93 (US-93)	Southwest Intertie Project (SWIP) – 500 kilovolt (kV) Transmission Line project. Proposed project Extending from Midpoint Substation south of Shoshone, Idaho to Dry Lake, Nevada. The line would total 540 miles in length, use lattice towers, and have a 200-foot ROW. A total of 130 miles of this line is within the 50-mile cumulative impact boundary.

Table 4.0.2-1. China Mountain Wind Project Cumulative Actions Summary Table (continued).

Timing of Project	Type of Project	Location	Project Description
Future	Transmission Line	South of Twin Falls and north of Rogerson, Idaho, running in an east to west direction	Gateway West – 500 kV transmission line project. Approximately 1,148 miles in length. The line originates near Glenrock, Wyoming and extends to the west to near Boise, Idaho. A total of 140 miles of this transmission line could be sited within the 50-mile cumulative impact boundary. The transmission line would be sited on steel lattice towers that would be 145-180 feet in height in a 250-foot ROW. As a part of this project, a new substation would be constructed approximately 20 miles southwest of Twin Falls, Idaho. The substation would be approximately 45 acres in size and would be sited on private land that is currently in agricultural production or rangeland.
Past	Transmission Line	East of Salmon Falls Creek and US-93 in Idaho, west of Salmon Falls Creek and US-93 in Nevada	Idaho Power and NV Energy Midpoint to Humboldt 345 kV transmission line built in 1979. This is the line that the China Mountain Wind Project would tie into in Nevada. The ROW is 140 feet in width and is steele H-frame and lattice mixed. A total of 90 miles of this transmission line is sited within the 50-mile cumulative impact boundary.
Past	Transmission Line	East of Salmon Falls Creek but west of US-93	Upper Salmon Dam to Wells 138 kV power line. The line parallels Salmon Falls Creek and reservoir on wooden H-frame structures. Built in 1960 on a 60-foot ROW (IDI-011544). A total of 70 miles of this transmission line is sited within the 50-mile cumulative impact boundary.
Past	Transmission Line		Borah to Hunt 230 kV transmission line. Built in 1982 the line is supported on wooden H-frame structures and has a 100-foot ROW (ID Power – IDI-18212).
Past	Transmission Line	Varies	Additional miscellaneous transmission lines are sited on BLM, United States Forest Service, state and private lands throughout the 50-mile cumulative impact area boundary. Most of these lines are 130 kV and smaller.
Past	Communication Towers	Straddles the state line just west of US-93	Stateline Site (cellular and microwave uses) • Authorized by Communications Site Leases IDI-33842 and NVN-75664 • Idaho legal description T. 16 S., R. 15 E., Sec. 27: Lot 1 • Nevada legal description T. 47 N., R. 64 E., Sec. 1: Lot 16 • Held by Idaho Tower Company • 300-foot self-supporting tower
Past	Communication Towers	Just north of Jackpot, Nevada	Jackpot North Site (cellular and microwave uses) • Authorized by IDI-33843 • Legal description T. 16 S., R. 15 E., Sec. 23: NW¼SW¼ • Held by SBA Towers II, LLC • 200-foot self-supporting tower

Table 4.0.2-1. China Mountain Wind Project Cumulative Actions Summary Table (continued).

Timing of Project	Type of Project	Location	Project Description
Past	Communication Towers	5 miles northeast of Hollister, east of US-93	Hub Butte Site (cellular, wifi and microwave uses) • Has four towers • Authorized by IDI-22695, IDI-28679, IDI-33236 and IDI-36259 • Legal description T. 11 S., R. 17 E., Sec. 32: NE¼NE¼ • IDI-22695 is held by Northwest Pipeline Co. and has a 65-foot self-supporting tower • IDI-28679 is held by Edge Wireless (AT&T) and has a 100-foot guyed tower • IDI-33236 is held by Verizon Wireless and has a 300-foot guyed tower • IDI-36259 is held by Filer Mutual Telephone Co. and has an 80-foot guyed tower
Past	Communication Towers	3 miles northwest of Hollister, Idaho, west of US-93	Berger Butte Site (cellular and microwave uses) • Authorized by IDI-33840 • Legal description T. 12 S., R. 16 E., Sec. 8: NW¼SE¼ • Held by SBA Towers II, LLC • 250-foot guyed tower
Past	Communication Towers	Just east of BLM Lud Drexler park and south of Three Creek Road	Salmon Butte Site (cellular and microwave uses) • Has 3 towers: 2 on BLM and 1 on private land • Authorized by IDI-33848 and IDI-31425 • Legal description T. 14 S., R. 15 E., Sec. 17: SW¼NE¼, SE¼NW¼ • IDI-33848 is held by Idaho Tower Co. and has a 250-foot self-supporting tower • IDI-31425 is held by Cellular, Inc. Network Corp. and has a 100-foot self-supporting tower • Private land, user unknown but has a 300-foot guyed tower
Present	Communication Towers	Varies	Additional miscellaneous communication towers are sited on private lands throughout the 50-mile cumulative impact area boundary.
Past	Transmission Line	Marys River area, 30-50 miles southwest of the project area	Overhead distribution line: • 66,323 feet long by 25 feet wide • Authorized by NVN-001027
Past	Transmission Line	Ellen D Mountain, Cold Springs Mountain, O'Neil Basin, Loomis Mountain, 5 to 30 miles south of the project area	About 43 miles of differing transmission lines servicing O'Neil Basin and facilities between O'Neil Basin and US-93 on a 15-25 foot ROW. Authorized by NVN-002110, NVN-061890, and NVN-043736.

Table 4.0.2-1. China Mountain Wind Project Cumulative Actions Summary Table (continued).

Timing of Project	Type of Project	Location	Project Description
Past	Transmission Line	US-93 Near Knoll Mountain then southwest over Loomis Mountain to near Mary's River, 25 to 50 miles south of the project area	About 30 miles of 345 kV overhead distribution line on a 140 foot wide ROW (NVN-007639C).
Past	Transmission Line, Communication Site	Wildhorse Reservoir area, 50 miles Southwest of the project area	Various ROWs for power transmission and other infrastructure supporting development at Wild Horse, Nevada. Authorized by NVN-036592, NVN-005421, NVN-007833, NVN-052574, NVN-039962, and NVN-088591.
Present & Future	Wind Energy Site	Loomis Mountain Area, 35 miles south of the project area	Wind energy test area with 3 Met Towers.
Past	Transmission Line, Telephone Line	US-93 corridor, 5 miles east to 50 miles south of the project area	Overhead transmission and telephone lines within and near the US-93 corridor in Nevada. Authorized by NVN-0-058476, NVN-039184, NVN-039938, and NVN-007639C.
Past	Communication Site	Near Wells, Nevada, 50 miles south of the project area	Communication site near Wells, Nevada: • 80 feet x 80 feet • Authorized by NVN-000522
Past	Various	Near Jackpot, Nevada, 5 miles east of the project area	Various ROWs for power transmission and communication sites, an airport lease, and other infrastructure supporting development at Jackpot, Nevada. Authorized by NVN-075664, NVN-075664, NVN-0-025474, NVN-0-050805, and NVN-041007.
Past	Communication Site	10 miles south of the project area	Ellen Dee Mountain Communication sites. Authorized by NVN-025816, NVN-053994, NVN-057870, and NVN-066358.
Past	Telephone Line	US-93 west to Oneil Basin, 15 miles south of the project area	11-mile overhead telephone line, authorized by NVN-032154.
Past	Transmission Line	45 miles of the project area, running northwest to southeast	6-mile transmission line, authorized by NVN-032213.
Past	Communication Site	30 miles south of the project area along US-93	Weather station at Red Point, authorized by NVN-047147.
Present & Future	Transmission Line	5 miles east to 50 miles south	SWIP-North 500 kV transmission line, authorized by NVN-049781.

Table 4.0.2-1. China Mountain Wind Project Cumulative Actions Summary Table (continued).

Timing of Project	Type of Project	Location	Project Description
Past	Transmission Line	Near Goose Creek, 30 to 40 miles east of the project area	10-mile transmission line on a 25 foot ROW, authorized by NVN-004801.
Past	Communication Site	25 miles southwest of the project Area	Knoll Mountain Communication Sites, authorized by NVN-013316 and NVN-047887.
Past	Communication Site	40 miles southeast of the project area	Delano repeater site, authorized by NVN-075982.
Present & Future	Transmission Line	35 miles east of the project area	About 6 miles of proposed transmission lines, authorized by NVN-087228, NVN-087229, and NVN-089270.
Present	Pipeline	40 miles south of the project area	About 60 miles of buried 42-inch natural gas pipeline occur within the project area. Construction is occurring presently. About 1,500 acres of disturbance would occur in a 50-mile radius of the project area.
Present	Mine	30 miles south of the project area	Open pit Barite Mine west of US-93 in the Snake Mountain Range.
Future	Hydroelectric Power	Southern portion of project area near the Idaho/Nevada border.	The Corral Creek South Hydroelectric project has submitted a Federal Energy Regulatory Commission application. An application has not yet been received by the BLM. If and when an application is received by the BLM, this will be considered for the cumulative impact analysis in the Final EIS.

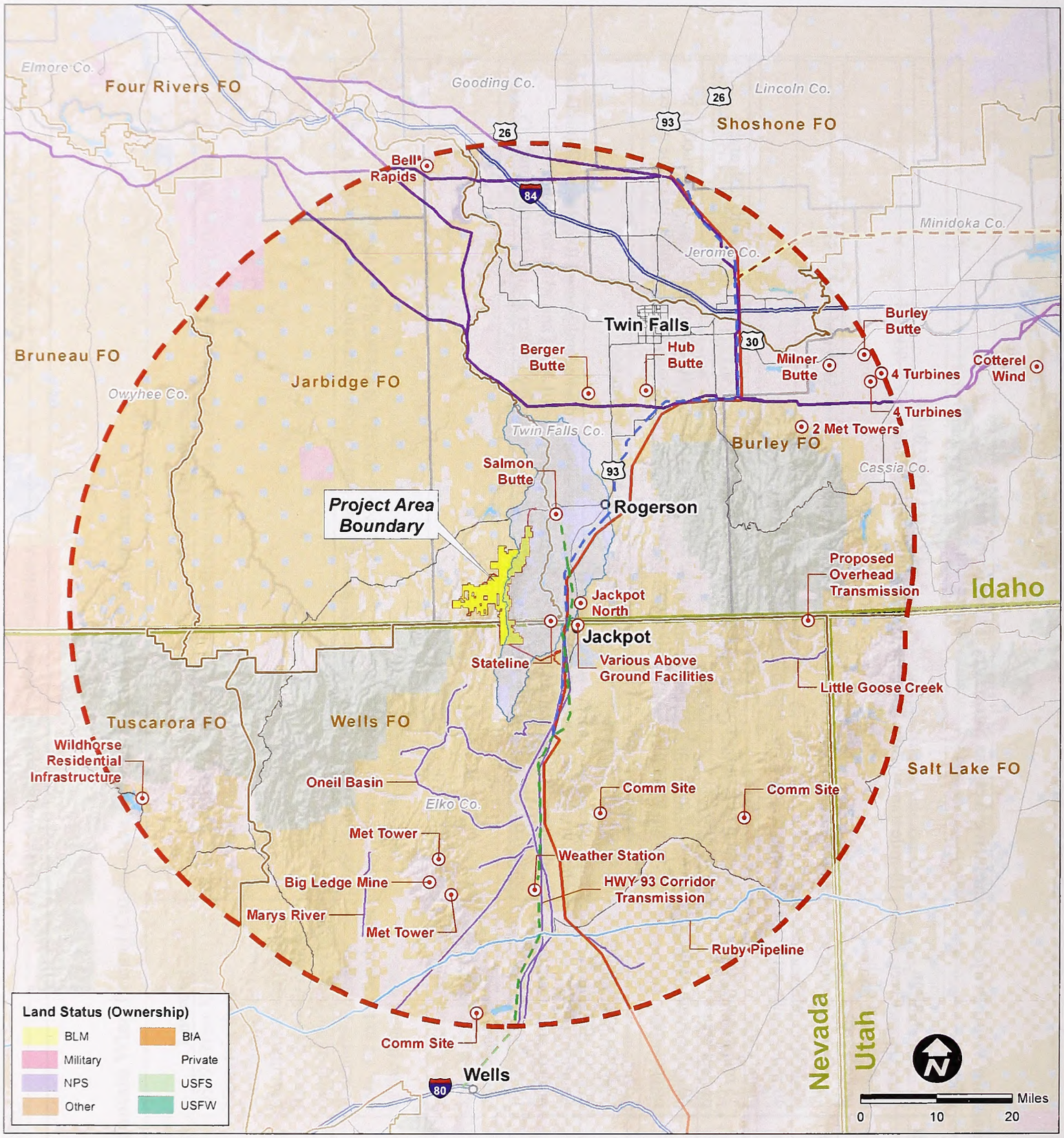


Figure 4.0.2-1.
Cumulative Projects Map
(Current and Future Projects)

CHINA MOUNTAIN WIND PROJECT EIS

IDAHO - NEVADA

No warranty is made by the Bureau of Land Management for useof the data for purposes not intended by BLM. No warranty is made by the BLM as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

Assumptions:

There are several assumptions used in the impact analysis that apply to all of the resources, resources uses, or social and economic features; these assumptions include:

- Application of design features would successfully minimize impacts.
- Addition and reconstruction of project roads would result in increased use of the area. Increased use of the area would result in additional indirect impacts on resources.
- Revegetation efforts would be successful. If revegetation efforts are unsuccessful after the first attempt, the Applicants would reapply treatments until successful.
- Construction activity, including hauling, would occur only during daylight hours.
- Directional drilling of the underground collection system would be used for stream or wetland crossings.
- All roads would be considered for snow removal during construction and operation and maintenance (O&M).
- Blasting could occur anywhere ground disturbance is proposed since the amount, location, and intensity of blasting are not known.
- Decommissioning would begin at 30 years, the end of the ROW grant.
- Blasting would not be used during decommissioning.
- Alternatives B1, C, D, and F would take 2 years to construct; Alternative E would take 4 years. For Alternatives B2a, B2b, and B2c, Phase I would take 2 years to construct and Phase II would take 1 year.
- For the phased alternatives (B2a, B2b, and B2c), it is assumed that Phase II would be authorized as proposed.
- Phase II would be operational on year 10 of the ROW grant.
- Turbines technology and construction methodology would not change between Phase I and Phase II for Alternatives B2a, B2b, and B2c.
- Full revegetation would occur after construction of Phase I. Revegetated areas at the location of the batch plant, crushing plant, a laydown yard (B2a and B2b only), and staging areas that would be needed for construction of Phase II would be redisturbed during Phase II construction.

Additional assumptions specific to individual resources, resource uses, or social and economic features are listed in each section.

4.1 PHYSICAL RESOURCES

4.1.1 AIR QUALITY

This section describes air quality impacts that could result from construction, O&M, and decommissioning of the project.

4.1.1.1 Analysis Methods

The air quality analysis area includes the project area with the inbound and outbound haul routes. Air quality in the project area vicinity is currently measured from data received by the closest monitoring stations, which are located in Twin Falls County, Idaho and Elko County, Nevada. In order to evaluate the project impacts on ambient air quality, emissions were categorized as construction emissions, O&M emissions, and decommissioning emissions. Construction emissions are associated with fugitive dust and emissions caused by heavy-duty equipment traveling to and from each component site with the addition of activities related to revegetation of disturbed areas. O&M emissions would result mainly from motor vehicles associated with maintenance work. Decommissioning emissions would be similar to construction emissions. Air quality impacts would be related to vehicle tailpipe emissions and fugitive dust associated with the three categories of activities for the proposed project.

Quantitative air quality data was obtained through a modeling exercise representative of conditions that could occur during the two-year construction period for the proposed action. Significance criteria were based on National Ambient Air Quality Standards (NAAQS) thresholds established by the Environmental Protection Agency (EPA) and administered by Idaho Department of Environmental Quality and Nevada Department of Environmental Protection.

Indicators

The indicators for impacts on air quality include the following:

- Exceeded levels of the principal air pollutants as set by the EPA NAAQS;
- Increases in fine particulate matter ($PM_{2.5}$) for Idaho locations; and
- Increases in course particulate matter (PM_{10}) for Nevada locations.

In addition to the quantitative indicators, there is a qualitative discussion of local effects from project features such as the concrete batch plant, rock crusher, and gravel quarry.

Methods and Assumptions

By comparison, construction and decommissioning activities are generally similar and would account for more potential impact on air quality than those impacts associated with O&M activities (BLM, 2005). In addition to assumptions common to all, the following general assumptions were used when analyzing effects of the project on air quality:

- Wind power projects do not involve the combustion of fuels to generate electricity and therefore no air quality impacts from the generation of power would occur.
- Increasing surface disturbance increases the potential for fugitive dust.
- Dust suppression activities, defined by the project design features presented in Appendix 2A, would effectively reduce fugitive dust emissions.
- Revegetation activities would be successful and would ultimately reduce potential for fugitive dust. This is for analysis purposes only and may not reflect actual success rates.

- Impacts on air quality from construction and decommissioning activities would be similar.
- Source emissions from local activities (such as road construction, maintenance and use, farming, prescribed burning, etc.) would degrade the regional air quality.
- No activities associated with the project would violate The Clean Air Act.
- Compliance of Federal and state air quality regulations would be met during construction, O&M, and decommissioning activities.
- Activities at all project sites would be carried out in conformance with applicable State Implementation Plans.
- Smoke emissions from prescribed burning or wildfires would generally dissipate toward the southeast, in the direction of the dominant prevailing winds.
- New and reconstructed roads would cause an increase in the occurrence of user-created roads. User-created roads would increase potential for fugitive dust and tailpipe emissions in the area.

Air emissions inventory and modeling was performed to provide a quantitative assessment of the predicted air quality impacts associated with the action alternatives. The primary emissions that would be generated during the project life are $PM_{10,}$ and $PM_{2.5}$. These emissions are generated from vehicular travel on the project roads (including haul roads), wind erosion of exposed areas, vehicle exhaust, blasting, drilling, bulldozing, and road grading. Emissions of other NAAQS criteria pollutants from vehicles tailpipe emissions nitrogen oxides, carbon monoxide (CO), and sulfur dioxide (SO_2) were also considered in the analysis.

The modeling exercise was conducted for the construction period of the most developed alternative under the following general assumptions:

- Fugitive dust emissions would be controlled 50 percent by applying water to roads.
- 1.55 miles (2.50 kilometers) of road would be constructed per day.
- For every 0.62 miles (1 kilometer) of road construction, 400 tons of aggregate would be loaded from an aggregate loading site and hauled to the crushing plant each day.
- Wind erosion occurs once per day for the disturbed road segment.
- Emissions inventory accounts for vehicle generated emissions traveling within the radius emissions inventory domain.
- Two turbine foundations would be developed per day.
- 200 tons of rock would be processed daily at the crushing plant.
- 200 tons of crushed rock would be processed daily at the batch plant.

Detailed construction activity assumptions made in the calculations and full details of the air quality model are provided in the Air Quality Modeling Report prepared for this project and stored in the project file (URS Corporation [URS], 2010).

Only Alternative B1 was modeled for air quality, as the operations under this alternative represent the highest level of construction activity, compared to all eight action alternatives. If air quality standards are met for this alternative, they would be met under all action alternatives.

4.1.1.2 Direct and Indirect Impacts of the Wind Energy Facility

Direct impacts on air quality would be caused by localized surface disturbing activities at construction sites that would generate short-term fugitive dust and vehicle tailpipe emissions. Indirect impacts would be caused by the creation of new project roads that could result in increased user-created roads with associated dust and tailpipe emissions. Fugitive dust emissions caused by surface disturbing activities could also cause indirect impacts on air quality in downwind locations outside the analysis area. Given the duration of the project, the action alternatives are anticipated to result in long-term impacts on air quality; however, Clean Air Act standards would be met.

Alternative A (No Action Alternative)

Federal and state air quality standards for PM_{10} and $PM_{2.5}$ would continue to be met, and the project area would continue to be managed as a Class II airshed. The wind energy project would not be developed and no associated new sources of emissions would be generated. Current influences on air quality would continue to be a result of fugitive dust caused by recreation use, wind effects on exposed soils, travel on 144 miles of existing gravel roads, as well as vehicle emissions, wildland fires, and Bureau of Land Management (BLM) fire management activities. These influences would continue to be dispersed and temporary. The continuation of existing influences and management guidelines, directed by the 1987 Jarbidge RMP and 1985 Wells RMP would maintain air quality in the analysis area in current conditions.

Impacts Common to All Action Alternatives

Under all action alternatives, the sources of emissions would be the same. Dust would be generated from road grading, vehicle travel on unpaved roads, and blasting, coring, trenching, and bulldozing for construction sites. Fugitive dust from disturbed soils would be a major source of particulate emissions (BLM, 2005). Tailpipe emissions from construction, O&M, and decommissioning equipment would be generated. These pollutants would temporarily degrade air quality in the project area and immediate vicinity but would then dissipate once the machines are turned off.

Construction

Construction activities generally occur in four stages: site access, clearing, and grade alterations; foundation excavations and installations; tower erection and nacelle and rotor installation; and miscellaneous ancillary construction. Emissions generated during these activities would include tailpipe emissions from worker vehicles, material delivery trucks, and water trucks, and the emissions from diesel equipment, such as bulldozers, scrapers, dump trucks, loaders, and rollers.

Construction equipment would generate fugitive dust from vehicle travel and the movement and transportation of soil (grading, excavation, backfilling, and dumping). Diesel engines would be the

primary source of tailpipe emissions. Additional tailpipe emissions would be generated by worker and delivery vehicles and the operation of ancillary construction equipment. Use of on-site power from diesel generators for the batch plant and smaller generators for equipment, such as concrete vibrators and pumps, would also result in emissions of the same pollutants as vehicle tailpipes.

Concrete batching would produce fugitive dust particles associated both with truck travel and mixing of concrete. Storage piles associated with the concrete batching would be sources of fugitive dust if wind erodes the piles. Fugitive dust and tailpipe emissions would also be generated from crushing operations.

Blasting, if required, would produce small amounts of CO, nitrogen oxides, and particulates. Drilling and pile driving would produce fugitive dust as well as tailpipe emissions from the associated power units (BLM, 2005).

Three large lifting cranes would be needed to erect each turbine. Activities associated with the erection of the wind turbine towers and installation of the nacelles and rotors would include such activities as: worker traffic on access and site roads; traffic associated with the transportation of the dismantled cranes to and from the construction site and movement of the cranes between towers; and delivery vehicle traffic for the tower sections and turbine parts. Emissions from these activities would generate fugitive dust and tailpipe emissions.

Ancillary construction activities involving earthmoving, backfilling, and grading would produce fugitive particulates and tailpipe emissions. Trenching for buried electrical lines and the erection of utility poles would produce fugitive particulate emissions. All electrical collector lines shall be buried in a manner that minimizes additional surface disturbance (e.g., along roads or other paths of surface disturbance (BLM, 2008), which would help reduce generation of fugitive dust.

Dust suppression techniques outlined by the project design features, such as reduced travel speeds and the application of water to roads and other disturbed sites, would reduce the levels of particulate matter in the air (Appendix 2A). As required by the Air Quality permit, the crusher would contain several dust-suppression features and dust-control measures would be operating at all emission points during use of the crusher. Fugitive dust from wind erosion of surface disturbed areas would be generated but would be reduced or eliminated following regrading and revegetation of the disturbed areas during all construction activities. Once successful revegetation has occurred, the generation of particulate matter from the site would be similar to that generated prior to construction of the wind energy facility.

Operation and Maintenance

The O&M of the project would not adversely impact air quality (BLM, 2005). Activities would include operation of the wind turbines and routine maintenance with possible major overhauls and repairs. General O&M activities would be conducted by project pick-up trucks or sport-utility vehicles and no additional vehicles would likely be needed. Major overhauls and repairs would

involve bringing a crane and heavy truck onsite to remove and transport the component needing attention. Possible routine brush clearing could also occur as part of O&M activities. Some minor volatile organic compound emissions during routine changes of lubricating and cooling fluids and greases would be generated. Other O&M would generate fugitive dust from road travel, vehicular exhaust, and brush clearing in addition to the tailpipe emissions associated with vehicle travel. However, all of these activities would be limited in duration and extent and should have no appreciable air quality impact (BLM, 2005).

Decommissioning

Decommissioning activities would generally be the reverse of the construction process. Turbines and towers would need to be removed. Disturbed land would need to be reclaimed and up to three feet of the turbine foundations would be removed. New roads constructed for the project would be graded and revegetated. Decommissioning activities would produce particulates from road dust, earthmoving, and vehicle tailpipe emissions. In addition, other tailpipe emissions would be associated with the operation of cranes, trucks, and earthmoving equipment. These emissions would be limited in duration and extent.

Design features would reduce impacts the same as described in the Construction section.

Alternative B1 (Proposed Action)

Construction

Impacts on air quality would generally occur as a result of surface disturbance and vehicle tailpipe emissions.

In addition to impacts discussed in *Impacts Common to All Action Alternatives*, potential direct, localized impacts on air quality would be associated with the placement of 83 miles of project roads and 170 wind turbines, which would cause approximately 812 acres of total surface disturbance. Impacts on air quality would be temporary. Up to 585 acres of disturbed ground would be revegetated with BLM-approved seed mix which would reduce potential for wind erosion of exposed soil.

Alternative B1 was modeled for air quality impacts that could occur during construction activities of the project (Section 4.1.1.1). Near-field air dispersion models were developed for Alternative B1 to quantify and show potential air dispersion patterns associated with projected construction activities that are expected to occur within a 2.88 miles (3.75 kilometer) radius emissions inventory domain over a daily and yearly timeframe. For the purposes of this analysis, the emission inventory domain was defined as a 2.88-mile radius measured from a location centered on a planned area having high turbine pad and road development and accounts for several project facilities, including a rock crushing and cement batch plant. The emission inventory domain was established as a buffer to account for fugitive dust and tailpipe emissions generated by the project. The receptor density was set at 328 feet (100-meter) spacing within the emissions inventory domain and at a 820 foot (250-meter) spacing out to an approximately 104,410 square feet or 23,250 acres (9,700 meters by 9,700 meters square) from the location selected central to the project area.

Maximum 24-hour and annual average ambient air concentrations of PM_{10} and $PM_{2.5}$ were estimated at gridded receptors for an approximately 104,410 square feet (9,700 meters by 9,700 meters) square impact domain with the same center point as the emissions inventory domain.

Impacts for Alternative B1 were modeled using the calculated annual emission rates. In order to estimate an annual average impact at each receptor, these annual emissions were divided equally over an entire year (8,760 hours). Additionally, a realistic scenario for the highest level activity in any 24-hour period for Alternative B1 construction activities was developed, and emissions were calculated for this worst-case 24-hour scenario (i.e., the maximum temporary activity levels). Construction activities were estimated to occur for 12 hours a day and the 24-hour scenario was emitted from 7 am to 7 pm daily to develop PM concentration models by the American Meteorological Society/EPA Regulatory Model (AERMOD; Version 09292) modeling program. The concentrations were compared to the 24-hour PM air quality standards. The annual and the 24-hour worst case scenario emissions under Alternative B1 construction activities are presented in Table 4.1.1-1.

The AERMOD program predicted maximum annual and 24-hour average ambient air concentrations of PM_{10} and $PM_{2.5}$ from project development activities under Alternative B1. The concentrations are shown in Table 4.1.1-2. The AERMOD-predicted values are comparable in format to the EPA NAAQS; NAAQS are not-to-exceed values based on statistical measurements of air quality data (e.g., compliance with the 24-hour $PM_{2.5}$ NAAQS is based on comparison to the 98th percentile value). The particulate matter AERMOD-predicted concentrations for project development emissions were added to the actual monitored, existing ambient background concentration value for each pollutant and the sums were compared to the NAAQS.

Table 4.1.1-1. Modeled Emission Rates for Project Related Construction Activities for Alternative B1.

ANNUAL EMISSIONS SCENARIO -- AS MODELED (grams per second)[1]

Pollutant	Aggregate Hauling - Unpaved Road	Water and Cement Hauling - Unpaved Road	Turbine Component Hauling - Unpaved Road	Worker Commuting - Unpaved Road	Turbine Pads Construction and Reclamation	O&M Construction, Quarry, Batch and Crushing Plants	Road Construction and Maintenance	Total
PM_{10}	0.071	0.451	0.268	1.499	0.159	0.336	0.057	2.841
$PM_{2.5}$	0.006	0.045	0.027	0.150	0.030	0.064	0.014	0.335

MAXIMUM 24-HOUR EMISSIONS SCENARIO -- AS MODELED (grams per second)[2]

Pollutant	Aggregate Hauling - Unpaved Road	Cement Hauling - Unpaved Road	Turbine Component Hauling - Unpaved Road	Water Hauling - Unpaved Road	Worker Commuting - Unpaved Road	Turbine Pad and O&M Construction, Batch and Crushing Plants	Resource Road Construction	Total
PM_{10}	0.801	2.003	1.853	0.731	2.462	8.899	1.494	18.243
$PM_{2.5}$	0.080	0.201	0.186	0.073	0.246	1.742	0.232	2.760

[1] AERMOD emissions rates for determining maximum annual average concentrations.

[2] AERMOD and VISCREEN (EPA Model) emissions rates for determining "worst case" daily concentrations and visibility impairment. Emissions were released at these rates in AERMOD for 12 hours a day.

Table 4.1.1-2. Near-Field Modeling/AERMOD Results.

Pollutant	Averaging Period	Maximum Predicted Concentration (µg/m³) 2001	2002	2003	Max[5]	Background Concentration (µg/m³)[4]	Combined Concentration (µg/m³)	NAAQS/ IAAQS/ NvAAQS (µg/m³)	Exceed Air Quality Standard?
PM_{10}	24-hour[1]	112.43	114.28	109.18	114.28	35.00	149.28	150/150/150	No
	Annual[3]	5.15	5.63	5.56	5.63	26.00	31.63	-/50/50	No
$PM_{2.5}$	24-hour[2]	20.79	17.51	16.63	16.66	18.10	34.76	35/35/35	No
	Annual[3]	0.87	0.96	0.95	0.93	7.80	8.73	15/15/15	No

µg/m3 = microgram (10^{-6} gram) per cubic meter

1. Highest second-high values
2. Highest 98th percentile values
3. Highest values
4. Idaho background $PM_{2.5}$ concentrations data for 2009 obtained from Idaho Department of Environmental Quality website for monitor AQS ID 16-083-0010 (Twin Falls), website: http://airquality.deq.idaho.gov. (Idaho Department of Environmental Quality, 2010). Nevada background PM_{10} concentrations data for 2008 obtained from EPA website for monitor ID 320070004 (Elko). EPA website http://www.epa.gov/air/data/geosel.html. (Environmental Protection Agency, 2010).
5. Highest 3-year average of 98th percentile and annual means for $PM_{2.5}$ 24-hour and annual average, respectively.

Notes: Idaho Ambient Air Quality Standards (IAAQS); Nevada Ambient Air Quality Standards (NvAAQS)
The years 2001, 2002 and 2003 meteorology was used for the Maximum Predicted Concentration value because it was available in-house and also represent the same years for the Western Regional Air Partnership Fifth Generation Mesoscale Model datasets that was used for regional modeling should that be necessary for an air quality assessment.

Greenhouse gas pollutant (carbon dioxide [CO_2], Methane [CH_4] and Nitrous Oxide [N_2O]) emissions from combustion of diesel and gasoline from project equipment and vehicles were calculated and compared to state, national, and global emissions. Greenhouse gas emissions were calculated based on the total amount of fuel combustion associated with all project development equipment and traffic. Total emissions for Alternative B1 were converted to CO_2 and the results are shown in Table 4.1.1-3.

Table 4.1.1-3. Project Greenhouse Gas Emissions.

	CO_2 emissions	CO_2 equivalent emissions
	million metric tons	
China Mountain Wind Project (Alternative B1)	0.001	0.001
State of Idaho[1]	15.6	-
United States[1]	5,934	7,076
Total World[1]	**26,922**	**-**

[1] Emissions of Greenhouse Gases in the United States 2006, Energy Information Administration (Energy Information Administration, 2007).

The model results demonstrate compliance with all the PM NAAQS, Idaho Ambient Air Quality Standards and Nevada Ambient Air Quality Standards for both the worst-case 24-hour scenario and the annual scenario for Alternative B1. Based on these results, it can be concluded that none of the action alternatives would exceed the NAAQS, Idaho Ambient Air Quality Standards, or Nevada Ambient Air Quality Standards.

Operation and Maintenance

Vehicle traffic would occur on approximately 83 miles of project roads during O&M activities resulting in short-term localized impacts on air quality from fugitive dust and tailpipe emissions.

Decommissioning

Impacts on air quality would generally occur as a result of surface disturbance and vehicle tailpipe emissions. Potential direct, localized impacts on air quality would be associated with the decommissioning of 170 wind turbines and up to 83 miles of project roads (depending on BLM/Idaho Department of Lands (IDL)/counties decision to retain or remove some roads), and approximately 284 acres of total surface disturbance. Impacts on air quality would be temporary and short-term. Up to 284 acres of disturbed ground would be revegetated with BLM-approved seed mix which would reduce potential for wind erosion of exposed soil.

Alternative B2a

Construction

Impacts on air quality would be similar to Alternative B1, but would occur in two separate phases. Phase I construction activities would involve 63 miles of new roads or road reconstruction (20 fewer than Alternative B1), 100 wind turbines (70 fewer than Alternative B1), and 536 acres of total surface disturbance (276 fewer than Alternative B1). Under Phase I, 370 acres of the 536 total acres of ground disturbance would be revegetated. Under both Phase I and Phase II, 602 acres of the total 837 acres of disturbed ground would be revegetated with BLM-approved seed mix, which would reduce potential for wind erosion of exposed soil (Appendices 2A and 2B). Phase II construction activities would occur for a shorter duration than either Phase I or Alternative B1. Construction of both phases would result in more short-term and long-term impact on air quality than Alternative B1. Based on the air quality modeling results, it can be concluded that construction of Alternatives B2a would comply with the PM NAAQS, Idaho and Nevada Ambient Air Quality Standards.

Operation and Maintenance

Impacts on air quality from O&M would be the same as those described under *Impacts Common to All Action Alternatives*. During Phase I, approximately 63 miles of roads would be in use; during Phase II, approximately 20 miles of roads would be in use. The impact on air quality for the O&M of both phases is similar to Alternative B1 but would vary temporally.

Decommissioning

Decommissioning Phase I and Phase II would have the same impacts as described for Alternative B1.

Alternative B2b

Construction

Impacts on air quality would be similar to Alternative B1, but would occur in two separate phases. Phase I construction activities would involve 62 miles of new roads or road reconstruction (21 fewer than Alternative B1), 100 wind turbines (70 fewer than Alternative B1), and 523 acres of total surface

disturbance (289 fewer than Alternative B1). Under Phase I, 367 acres of the 523 total acres of ground disturbance would be revegetated. Under both Phase I and Phase II, up to 602 acres of the total 836 acres of disturbed ground would be revegetated with BLM-approved seed mix which would reduce potential for wind erosion of exposed soil. Phase II construction activities would occur for a shorter duration than either Phase I or Alternative B1. Construction of both phases would result in more short-term and long-term impact on air quality than Alternative B1. Based on the air quality modeling results, it can be concluded that construction of Alternatives B2b would comply with the PM NAAQS, Idaho and Nevada Ambient Air Quality Standards.

Operation and Maintenance

Impacts on air quality from O&M would be the same as those described under *Impacts Common to All Action Alternatives*. During Phase I, approximately 62 miles of roads would be in use; during Phase II, approximately 21 miles of roads would be in use. The impact on air quality for the O&M of both phases is similar to Alternative B1 but would vary temporally.

Decommissioning

Decommissioning Phase I and Phase II would have the same impacts as described for Alternative B1.

Alternative B2c

Construction

Impacts on air quality would be similar to Alternative B1, but would occur in two separate phases. Phase I construction activities would involve 70 miles of new roads or reconstruction (13 fewer than Alternative B1), 100 turbines (70 fewer than Alternative B1), and 564 acres of total surface disturbance (248 fewer acres than Alternative B1). Under Phase I, 386 acres of the 564 acres of total ground disturbance would be revegetated. Under both Phase I and Phase II, up to 595 acres of the total 831 acres of disturbed ground would be revegetated with BLM-approved seed mix which would reduce potential for wind erosion of exposed soil. Phase II construction activities would occur for a shorter duration than either Phase I or Alternative B1. Construction of both phases would result in more short-term and long-term impact on air quality than Alternative B1. Based on the air quality modeling results, it can be concluded that construction of Alternatives B2c would comply with the PM NAAQS, Idaho and Nevada Ambient Air Quality Standards.

Operation and Maintenance

Impacts on air quality from O&M would be the same as those described under *Impacts Common to All Action Alternatives*. During Phase I, approximately 70 miles of roads would be in use; during Phase II, approximately 13 miles of roads would be in use. The impact on air quality for the O&M of both phases is similar to Alternative B1 but would vary temporally.

Decommissioning

Decommissioning Phase I and Phase II would have the same impacts as described for Alternative B1.

Alternative C

Construction

Construction activities under this alternative would involve: 80 miles of new roads or road reconstruction (3 fewer miles than Alternative B1); 152 turbines (18 fewer than Alternative B1); and 745 acres of total surface disturbance (67 fewer acres than Alternative B1). Of the total 745 acres of ground disturbance, 531 acres would be revegetated with BLM-approved seed mix which would reduce potential for wind erosion of exposed soil. Construction activities would be similar to those described under B1, but impacts on air quality would be less because the project layout would eliminate 18 turbines, 3 miles of new roads, and result in smaller disturbed area with less tailpipe emissions. Based on air quality modeling results, it can be concluded that construction of Alternative C would comply with the PM NAAQS, Idaho and Nevada Ambient Air Quality Standards.

Operation and Maintenance

Impacts on air quality from O&M would be the same as those described under *Impacts Common to All Action Alternatives*. Approximately 80 miles of roads would be in use. The impacts on air quality would be less than Alternative B1.

Decommissioning

Decommissioning activities would have the same impacts as described for Alternative B1. However, Alternative C would require decommissioning of 18 fewer turbines and 3 less miles of road which would result in fewer impacts on air quality than Alternative B1.

Alternative D

Construction

Construction activities under this alternative would involve: 72 miles of new roads or road reconstruction (11 fewer miles than Alternative B1); 124 turbines (46 fewer than Alternative B1); and 631 acres of total surface disturbance (181 fewer acres than Alternative B1). Of the total 631 acres of ground disturbance, 443 acres would be revegetated with BLM-approved seed mix which would reduce potential for wind erosion of exposed soil. Construction activities would be similar to those described under B1 but impacts on air quality would be less because the project layout would eliminate 46 turbines, 11 miles of new roads, and result in smaller disturbed area with less tailpipe emissions. Based on air quality modeling results, it can be concluded that construction of Alternative C would comply with the PM NAAQS, Idaho and Nevada Ambient Air Quality Standards.

Operation and Maintenance

Impacts on air quality from O&M would be the same as those described under *Impacts Common to All Action Alternatives*. Approximately 72 miles of roads would be in use. The impacts on air quality would be less than Alternative B1.

Decommissioning

Decommissioning activities would have the same impacts as described for Alternative B1. However, Alternative D would require decommissioning of 46 fewer turbines and 11 less miles of road which would result in fewer impacts on air quality than Alternative B1.

Alternative E

Construction

Construction activities under this alternative would involve: 76 miles of new roads or road reconstruction (7 fewer miles than Alternative B1); 120 turbines (50 fewer than Alternative B1); and 656 acres of total surface disturbance (156 fewer acres than Alternative B1). Of the total 656 acres of ground disturbance, 461 acres would be revegetated with BLM-approved seed mix which would reduce potential for wind erosion of exposed soil. Construction activities would be similar to those described under B1 but impacts on air quality would be less because the project layout would eliminate 50 turbines, 7 miles of new roads, and result in smaller disturbed area with less tailpipe emissions. Based on air quality modeling results, it can be concluded that construction of Alternative C would comply with the PM NAAQS, Idaho and Nevada Ambient Air Quality Standards.

Operation and Maintenance

Impacts on air quality from O&M would be the same as those described under *Impacts Common to All Action Alternatives*. Approximately 76 miles of roads would be in use. The impacts on air quality would be less than Alternative B1.

Decommissioning

Decommissioning activities would have the same impacts as described for Alternative B1. However, Alternative E would require decommissioning of 50 fewer turbines and 7 less miles of road which would result in fewer impacts on air quality than Alternative B1.

Alternative F

Construction

Construction activities under this alternative would involve: 66 miles of new roads or road reconstruction (17 fewer miles than Alternative B1); 105 turbines (65 fewer than Alternative B1); and 544 acres of total surface disturbance (268 fewer acres than Alternative B1). Of the total 544 acres of ground disturbance, 375 acres would be revegetated with BLM-approved seed mix which would reduce potential for wind erosion of exposed soil. Construction activities would be similar to those described under B1 but impacts on air quality would be less because the project layout would eliminate 65 turbines, 17 miles of new roads, and result in smaller disturbed area with less tailpipe emissions. Based on air quality modeling results, it can be concluded that construction of Alternative C would comply with the PM NAAQS, Idaho and Nevada Ambient Air Quality Standards.

Operation and Maintenance

Impacts on air quality from O&M would be the same as those described under *Impacts Common to All Action Alternatives*. Approximately 66 miles of roads would be in use. The impacts on air quality would be less than Alternative B1.

Decommissioning

Decommissioning activities would have the same impacts as described for Alternative B1. However, Alternative F would require decommissioning of 65 fewer turbines and 17 less miles of road which would result in fewer impacts on air quality than Alternative B1.

4.1.1.3 Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Construction

Reconstruction on up to 119 miles of the existing road and travel on 96 miles of gravel road would create fugitive dust and tailpipe emissions. Approximately 39 acres of total permanent surface disturbance would occur based on the level of reconstruction needed. Use of this route would increase for 2 years during the time of project construction (3 years for the phased alternatives). Fugitive dust and tailpipe emissions from use of this route would result in potential direct, short- and long-term impacts on air quality. However, project design features for road construction would minimize impacts on air quality during construction.

Operation and Maintenance

O&M of this haul route is expected to have minimal impacts on air quality in the project area.

Decommissioning

Fugitive dust and tailpipe emissions from use of this route would result in potential direct, short-term impacts on air quality. However, project design features for road use would minimize impacts on air quality during decommissioning. This haul route is an existing roadway and would not be decommissioned; therefore, no impacts on air quality would result from regrading and revegetation of disturbed road area.

Southern Inbound Haul Route Option 1

Construction

Approximately 6 miles of this haul route are existing roadway that would be extended another 5 miles for the project. The reconstruction and construction of 11 miles of road would cause 86 acres of total surface disturbance, including 23 acres used as staging area. For the phased alternatives, the staging area would be revegetated after construction of Phase I and redisturbed later during the Phase II construction. Upon completion of Phase II, the staging area would again be revegetated. Use of this haul route would increase for 2 years during the time of project construction (3 years for the phased alternatives). Fugitive dust and tailpipe emissions from use of this route would result in potential

direct, short- and long-term impacts on air quality. However, project design features for road construction would minimize impacts on air quality during construction.

Operation and Maintenance

Approximately 11 miles of roads would be impacted as a result of continued vehicle traffic during O&M activities. The O&M of this haul route is expected to have minimal impacts on air quality in the project area.

Decommissioning

Fugitive dust and tailpipe emissions from use of this route would result in potential direct, short-term impacts on air quality. However, project design features for road use would minimize impacts on air quality during decommissioning. This haul route would not be decommissioned; therefore, no impacts on air quality would result from regrading and revegetation of disturbed road area.

Southern Inbound Haul Route Option 2

Construction

Approximately 6 miles of this haul route are existing roadway that would be extended another 7 miles for the project. The reconstruction and construction of 13 miles of road would cause 90 acres of total surface disturbance, including 23 acres used as staging area. For the phased alternatives, the staging area would be revegetated after construction of Phase I and redisturbed later during the Phase II construction. Upon completion of Phase II, the staging area would again be revegetated. Use of this haul route would increase for 2 years during the time of project construction (3 years for the phased alternatives). Fugitive dust and tailpipe emissions from use of this route would result in potential direct, short- and long-term impacts on air quality. However, project design features for road construction would minimize impacts on air quality during construction.

Operation and Maintenance

Approximately 13 miles of roads would be impacted as a result of continued vehicle traffic during O&M activities. The O&M of the haul route is expected to have minimal impacts on air quality in the project area.

Decommissioning

Fugitive dust and tailpipe emissions from use of this route would result in potential direct, short-term impacts on air quality. However, project design features for road use would minimize impacts on air quality during decommissioning. This haul route would not be decommissioned; therefore, no impacts on air quality would result from regrading and revegetation of disturbed road area.

Outbound Haul Route

Construction

No road construction or reconstruction is anticipated for the outbound haul route. This route would only be used during the construction stages of the wind energy facility for unloaded equipment

leaving the project area. Fugitive dust emissions from travel on portions of gravel road and tailpipe emissions could result in direct, short- and long-term impacts on air quality.

Operation and Maintenance

This route would not be used during O&M activities and no impacts on air quality would occur.

Decommissioning

This route would not be used during decommissioning activities. This is an established roadway and would not be decommissioned; therefore, no impacts on air quality would occur.

4.1.1.4 Project as a Whole

Potential impacts on air quality that could result from implementing the project as a whole are fugitive dust and tailpipe emissions that would be generated during construction, O&M, and decommissioning activities (Table 4.1.1-4). Primary sources of emissions are based on the amount of surface disturbance and miles of road traveled. Based on acres of surface disturbance and the potential for air emissions, Alternative B1 and the phased alternatives would result in the greatest impact on air quality; Alternative F would result in the least impact.

Table 4.1.1-4. Impact Summary Table – Air Quality.

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Routes	
		Option 1	Option 2
Alternative A: No Action	No new impacts on air quality would occur.	No new impacts on air quality would occur.	No new impacts on air quality would occur.
Alternative B1	Total surface disturbance – 812 acres plus 39 acres from road reconstruction of the northern inbound haul route. Miles of road travel – 83 miles of project area plus 96 miles (gravel surfaced) for the northern inbound haul route.	Total surface disturbance – 812 acres plus 86 acres from road reconstruction of southern inbound haul route. Miles of road travel – 83 miles of project area plus 11 miles for the southern inbound haul route.	Total surface disturbance – 812 acres plus 90 acres from road reconstruction of southern inbound haul route. Miles of road travel – 83 miles of project area plus 13 miles for the southern inbound haul route.

Table 4.1.1-4. Impact Summary Table – Air Quality (continued).

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Routes	
		Option 1	Option 2
Alternative B2a	**Phase I** Total surface disturbance – 536 acres plus 39 acres from road reconstruction on northern inbound haul route. Miles of road travel – 63 miles of project area plus 96 miles (gravel surfaced) for the northern inbound haul route. **Phase II** Total surface disturbance – 301 acres plus 39 acres from road reconstruction on northern inbound haul route. Miles of road travel – 20 miles of project area plus 96 miles (gravel surfaced) for the northern inbound haul route. **Phase I & II** Total surface disturbance – 837 acres plus 39 acres from road reconstruction on northern inbound haul route. Miles of road travel – 83 miles of project area plus 96 miles (gravel surfaced) for the northern inbound haul route.	**Phase I** Total surface disturbance – 536 acres plus 86 acres from road reconstruction on southern inbound haul route. Miles of road travel – 63 miles of project area plus 11 miles for the southern inbound haul route. **Phase II** Total surface disturbance – 301 acres plus 86 acres from road reconstruction on southern inbound haul route. Miles of road travel – 20 miles of project area plus 11 miles for the southern inbound haul route. **Phase I & II** Total surface disturbance – 837 acres plus 86 acres from road reconstruction on southern inbound haul route. Miles of road travel – 83 miles of project area plus 11 miles for the southern inbound haul route.	**Phase I** Total surface disturbance – 536 acres plus 90 acres from road reconstruction on southern inbound haul route. Miles of road travel – 63 miles of project area plus 13 miles for the southern inbound haul route. **Phase II** Total surface disturbance – 301 acres plus 90 acres from road reconstruction on southern inbound haul route. Miles of road travel – 20 miles of project area plus 13 miles for the southern inbound haul route. **Phase I & II** Total surface disturbance – 837 acres plus 90 acres from road reconstruction on southern inbound haul route. Miles of road travel – 83 miles of project area plus 13 miles for the southern inbound haul route.

Table 4.1.1-4. Impact Summary Table – Air Quality (continued).

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Routes	
		Option 1	Option 2
Alternative B2b	**Phase I** Total surface disturbance – 523 acres plus 39 acres from road reconstruction on northern inbound haul route. Miles of road travel – 62 miles of project area plus 96 miles (gravel surfaced) for the northern inbound haul route. **Phase II** Total surface disturbance – 313 acres plus 39 acres from road reconstruction on northern inbound haul route. Miles of road travel – 21 miles of project area plus 96 miles (gravel surfaced) for the northern inbound haul route. **Phase I & II** Total surface disturbance – 836 acres plus 39 acres from road reconstruction on northern inbound haul route. Miles of road travel – 83 miles of project area plus 96 miles (gravel surfaced) for the northern inbound haul route.	**Phase I** Total surface disturbance – 523 acres plus 86 acres from road reconstruction on southern inbound haul route. Miles of road travel – 62 miles of project area plus 11 miles for the southern inbound haul route. **Phase II** Total surface disturbance – 313 acres plus 86 acres from road reconstruction on southern haul route. Miles of road travel – 21 miles of project area plus 11 miles for the southern inbound haul route. **Phase I & II** Total surface disturbance – 836 acres plus 86 acres from road reconstruction on southern inbound haul route. Miles of road travel – 83 miles of project area plus 11 miles for the southern inbound haul route.	**Phase I** Total surface disturbance – 523 acres plus 90 acres from road reconstruction on southern inbound haul route. Miles of road travel – 62 miles of project area plus 13 miles for the southern inbound haul route. **Phase II** Total surface disturbance – 313 acres plus 90 acres from road reconstruction on southern inbound haul route. Miles of road travel – 21 miles of project area plus 13 miles for the southern inbound haul route. **Phase I & II** Total surface disturbance – 836 acres plus 90 acres from road reconstruction on southern inbound haul route. Miles of road travel – 83 miles of project area plus 13 miles for the southern inbound haul route.

Table 4.1.1-4. Impact Summary Table – Air Quality (continued).

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Routes	
		Option 1	Option 2
Alternative B2c	**Phase I** Total surface disturbance – 564 acres plus 39 acres from road reconstruction on northern inbound haul route. Miles of road travel – 70 miles of project area plus 96 miles for the northern inbound haul route. **Phase II** Total surface disturbance – 267 acres plus 39 acres from road reconstruction on northern inbound haul route. Miles of road travel – 13 miles of project area plus 96 miles for the northern inbound haul route. **Phase I & II** Total surface disturbance – 831 acres plus 39 acres from road reconstruction on northern inbound haul route. Miles of road travel – 83 miles of project area plus 96 miles (gravel surfaced) for the northern inbound haul route.	**Phase I** Total surface disturbance – 564 acres plus 86 acres from road reconstruction on southern inbound haul route. Miles of road travel – 70 miles of project area plus 11 miles for the southern inbound haul route. **Phase II** Total surface disturbance – 267 acres plus 86 acres from road reconstruction on southern inbound haul route. Miles of road travel – 13 miles of project area plus 11 miles for the southern inbound haul route. **Phase I & II** Total surface disturbance – 831 acres plus 86 acres from road reconstruction on southern inbound haul route. Miles of road travel – 83 miles of project area plus 11 miles for the southern inbound haul route.	**Phase I** Total surface disturbance – 564 acres plus 90 acres from road reconstruction on southern inbound haul route. Miles of road travel – 70 miles of project area plus 13 miles for the southern inbound haul route. **Phase II** Total surface disturbance – 267 acres plus 90 acres from road reconstruction on southern inbound haul route. Miles of road travel – 13 miles of project area plus 13 miles for the southern inbound haul route. **Phase I & II** Total surface disturbance – 831 acres plus 90 acres from road reconstruction on southern inbound haul route. Miles of road travel – 83 miles of project area plus 13 miles for the southern inbound haul route.
Alternative C	Total surface disturbance – 745 acres plus 39 acres from road reconstruction on northern inbound haul route. Miles of road travel – 80 miles of project area plus 96 miles (gravel surfaced) for the northern inbound haul route.	Total surface disturbance – 745 acres plus 86 acres from road reconstruction on southern inbound haul route. Miles of road travel – 80 miles of project area plus 11 miles for the southern inbound haul route.	Total surface disturbance – 745 acres plus 90 acres from road reconstruction on southern inbound haul route. Miles of road travel – 80 miles of project area plus 13 miles for the southern inbound haul route.

Table 4.1.1-4. Impact Summary Table – Air Quality (continued).

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Routes	
		Option 1	Option 2
Alternative D	Total surface disturbance – 631 acres plus 39 acres from road reconstruction on northern inbound haul route. Miles of road travel – 72 miles of project area plus 96 miles (gravel surfaced) for the northern inbound haul route.	Total surface disturbance – 631 acres plus 86 acres from road reconstruction on southern inbound haul route. Miles of road travel – 72 miles of project area plus 11 miles for the southern inbound haul route.	Total surface disturbance – 631 acres plus 90 acres from road reconstruction on southern inbound haul route. Miles of road travel – 72 miles of project area plus 13 miles for the southern inbound haul route.
Alternative E	Total surface disturbance – 656 acres plus 39 acres from road reconstruction on northern inbound haul route. Miles of road travel – 76 miles of project area plus 96 miles (gravel surfaced) for the northern inbound haul route.	Total surface disturbance – 656 acres plus 86 acres from road reconstruction on southern inbound haul route. Miles of road travel – 76 miles of project area plus 11 miles for the southern inbound haul route.	Total surface disturbance – 656 acres plus 90 acres from road reconstruction on southern inbound haul route. Miles of road travel – 76 miles of project area plus 13 miles for the southern inbound haul route.
Alternative F	Total surface disturbance – 544 acres plus 39 acres from road reconstruction on northern inbound haul route. Miles of road travel – 66 miles of project area plus 96 miles (gravel surfaced) for the northern inbound haul route.	Total surface disturbance – 544 acres plus 86 acres from road reconstruction on southern inbound haul route. Miles of road travel – 66 miles of project area plus 11 miles for the southern inbound haul route.	Total surface disturbance – 544 acres plus 90 acres from road reconstruction on southern inbound haul route. Miles of road travel – 66 miles of project area plus 13 miles for the southern inbound haul route.

4.1.1.5 Cumulative Impacts

The cumulative analysis area for air quality coincides with the hydrologic watersheds present within the area. These include portions of the Salmon Falls Subbasin, the C.J. Strike Reservoir Subbasin, the Bruneau Subbasin, and the Upper Snake-Rock Subbasin (Figure 3.1.4-8). Air quality data from the cumulative analysis area is currently obtained from the two closest monitoring stations located in northeast Twin Falls County, Idaho and southwest Elko County, Nevada. Influences on air quality in the area generally consist of agricultural operations, recreation use, local travel on gravel surfaced roads, and mining activities in proximity to Elko, Nevada. Few, if any, other activities such as major industrial or commercial activities occur in the area that would degrade the air quality. Wildland fire smoke may result in temporarily exceeding NAAQS for particulate matter. Fire management practices are specified in several management documents for both the Jarbidge and Wells Field

Offices (Section 3.3.10). Public lands are managed to prevent wildland fires with wildland fire suppression emphasized in most areas (BLM, 2010).

Under the No Action Alternative, motorized vehicle use is expected to continue at current or increased levels. Direct and indirect impacts on air quality from this and other projects in the area have and will continue to have localized impacts in areas of concentrated activity, such as other wind facilities, communication towers, metrological towers, transmission lines, and roads.

All action alternatives for the project would meet the air quality objective and particulate matter would not exceed the yearly standards for NAAQS. Where prescribed burn activity coincides with nearby wildfire activity or agricultural burning, there would be temporary impact on air quality by combined emission rates. Under all action alternatives, temporary and long-term cumulative impacts would occur.

4.1.2 GEOLOGY

This section discusses impacts on geology that could result from implementing the proposed alternatives for the project. The analysis area for geology is the project area and the inbound haul routes.

4.1.2.1 Analysis Methods

Indicators

The indicators for geology include bedrock disturbance related to:

- Geotechnical borings/corings associated with construction of wind turbines;
- Acres of surface disturbance associated with new or reconstructed roads;
- Acres of surface disturbance associated with construction of wind turbines; and
- Acres of project disturbance due to blasting or trenching for underground collection system.

Indicators for geologic hazards (e.g., landslides, rock falls) include:

- Acres of project disturbance on slopes from 12 to 20 percent and greater than 20 percent.

Short-term surface disturbance is the removal of existing vegetation resulting in exposure of soil to erosion, which is then reseeded during reclamation activities. Long-term surface disturbance is the removal of vegetation resulting in exposure of soil to erosion for project facilities that would remain through the anticipated 30-year project. Permanent disturbance would result from removing existing vegetation and disturbing soils for project features that would not be decommissioned, such as reconstruction of existing roads and haul routes. Total disturbance is the sum of short-term, long-term, and permanent disturbance.

Methods and Assumptions

The primary impacts on geology from the proposed project are tied to the area of bedrock disturbance and potential for geologic hazards identified for each alternative.
The analysis is based on the following assumptions:

- Geological resources are nonrenewable and disturbance could irrevocably alter or destroy geological resources.
- There is moderate potential for seismic activity in the region. It is unlikely that any project construction activity proposed would impact the seismic risk of the project area.
- All action alternatives would require some amount of blasting and coring, which would impact the local geology.
- There would be no impacts on geology due to O&M or decommissioning of the wind energy facility.
- There would be no impacts on fluid or solid leasable minerals or locatable minerals, as there are none located within the project area (Section 3.1.2).

4.1.2.2 Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

Geologic resources would not be impacted from project activities under the No Action Alternative. Natural erosion processes would continue to occur.

Impacts Common to All Action Alternatives

Construction

Impacts on geological resources could result from surface and subsurface disturbing activities. Both surface and subsurface geology could be damaged (fractured) or destroyed during project construction activities that disturb bedrock such as blasting, coring, trenching, and grading to place roads, wind turbine pads, underground collection facilities, substations, transmission lines, meteorological towers, and O&M facilities. Blasting, coring and trenching would fracture and permanently alter bedrock resulting in adverse, long-term impacts on geology. The type of bedrock disturbance would be different for each of these features. Every action alternative would impact geology on all or portions of these project features that are common to all:

- 25 acres associated with 19 miles of transmission interconnect lines;
- 9 acres associated with substations;
- 3 acres associated with three meteorological towers;
- 8 acres associated with a quarry and;
- 4 acres associated with 2 O&M facilities.

Construction activities that promote surface disturbance; for example trenching, excavation, and blasting, and subsequent removal of established vegetation, could create steep slope angles and geologic hazards such as landslides and rock falls (Hungr, Evans, Bovis, & Hutchinson, 2001).

Geologic instability from project disturbance would be expected on slopes from 12 to 20 percent and greater than 20 percent.

Soils with medium or greater potential for water erosion compound the risk of landslides and rock fall on steep slopes. Refer to Section 4.1.3 for a discussion about the number of acres of disturbance to soils based on water erosion potential.

Design features in Appendix 2A that reduce construction on steep or unstable slopes and require revegetation on exposed soils as soon as possible could help reduce adverse potential for geologic hazards.

Operation and Maintenance

There would be no impacts on geology due to O&M of the wind energy facility because there would be no expected activities that disturb bedrock.

Decommissioning

There would be no impacts on geology due to decommissioning of the wind energy facility because there would be no expected activities that disturb bedrock.

Alternative B1 (Proposed Action)

Construction

Direct, localized, long-term impacts on geology would be associated with placement of project roads, wind turbines, underground collection system, substations, transmission lines, meteorological towers, and O&M facilities where trenching of bedrock or blasting would occur. Coring for geotechnical site evaluations prior to construction of 170 wind turbines would create direct, minor, localized, permanent impacts on geological resources by removing bedrock from those locations.

In addition to impacts discussed in *Impacts Common to All Action Alternatives*, this alternative would have the potential to impact geology on all, or portions of: 296 acres associated with the construction and reconstruction of 83 miles of roads; 360 acres associated with wind turbine construction; and 84 acres associated with 51 miles of underground collection system.

Geologic hazard potential from steep slope angles and geologic hazards such as landslides and rock falls would be associated with approximately 27 acres of surface disturbance, 19 short-term and 8 long-term on slopes greater than 20 percent; approximately 93 acres of surface disturbance, 67 short-term and 26 long-term, on slopes from 12-20 percent.

In addition to design features in Appendix 2A discussed in *Impacts Common to All Action Alternatives*, design features in Appendix 2B that would require a blasting plan and require a vegetation management plan that includes restoring vegetation on exposed soils as soon as possible would help reduce potential for geologic hazards.

Alternative B2a

Construction

The types of impacts on geology from geotechnical site evaluations under both Phase I and Phase II would be similar to Alternative B1. Phase I construction would result in impacts on geology from geotechnical site evaluations prior to construction of 100 wind turbines. Phase II construction would result in impacts on geology from geotechnical site evaluations prior to construction of 70 wind turbines. Phase I and Phase II construction would result in geotechnical site evaluations prior to construction of 170 wind turbines; resulting in the same disturbance as Alternative B1.

In addition to impacts discussed in *Impacts Common to All Action Alternatives*, Phase I would have the potential to impact geology on all, or portions of: 202 acres associated with the construction and reconstruction of 63 miles of roads; 211 acres associated with wind turbine construction; and 51 acres associated with 35 miles of underground collection system. Phase II would have the potential to impact geology on all, or portions of: 94 acres associated with the construction and reconstruction of 20 miles of roads; 150 acres associated with wind turbine construction; and 32 acres associated with 15 miles of underground collection system. The result of both Phase I and Phase II being built is the same acres of impact as Alternative B1, therefore the impacts would be the same, but would vary temporally.

Geologic hazard potential from steep slope angles and geologic hazards such as landslides and rock falls would be associated with approximately 19 acres of surface disturbance, 13 short-term and 6 long-term on slopes greater than 20 percent and approximately 64 acres of surface disturbance, 45 short-term and 19 long-term on slopes from 12-20 percent for Phase I. Phase II would have approximately 7 acres of surface disturbance, 6 short-term and 1 long-term on slopes greater than 20 percent and approximately 30 acres of surface disturbance, 23 short-term and 7 long-term on slopes from 12-20 percent. The result of both Phase I and Phase II is the same acres of impact as Alternative B1, therefore the impacts would be the same, but would vary temporally.

Design features in Appendix 2A that reduce construction on steep or unstable slopes and require revegetation on exposed soils as soon as possible could help reduce adverse potential for geologic hazards.

Alternative B2b

Construction

The types of impacts on geology from geotechnical site evaluations under both Phase I and Phase II would be similar to Alternative B1. Phase I construction would result in impacts on geology from geotechnical site evaluations prior to construction of 100 wind turbines. Phase II construction would result in impacts on geology from geotechnical site evaluations prior to construction of 70 wind turbines. Phase I and Phase II construction would result in geotechnical site evaluations prior to construction of 170 wind turbines; resulting in the same disturbance as Alternative B1.

In addition to impacts discussed in *Impacts Common to All Action Alternatives*, Phase I would have the potential to impact geology on all, or portions of: 192 acres associated with the construction and reconstruction of 62 miles of roads; 212 acres associated with wind turbine construction; and 48 acres associated with 30 miles of underground collection system. Phase II would have the potential to impact geology on all, or portions of: 103 acres associated with the construction and reconstruction of 21 miles of roads; 148 acres associated with wind turbine construction; and 36 acres associated with 21 miles of underground collection system. The result of both Phase I and Phase II being built is the same acres of impact as Alternative B1, therefore the impacts would be the same, but would vary temporally.

Geologic hazard potential from steep slope angles and geologic hazards such as landslides and rock falls would be associated with approximately 18 acres of surface disturbance, 12 short-term and 6 long-term, on slopes greater than 20 percent and approximately 60 acres of surface disturbance, 43 short-term and 17 long-term, on slopes from 12-20 percent for Phase I. Phase II would have approximately 10 acres of surface disturbance, 8 short-term and 2 long-term on slopes greater than 20 percent and approximately 33 acres of surface disturbance, 24 short-term and 9 long-term on slopes from 12-20 percent. The result of both Phase I and Phase II is the same acres of impact as Alternative B1, therefore the impacts would be the same, but would vary temporally.

Design features in Appendix 2A that reduce construction on steep or unstable slopes and require revegetation on exposed soils as soon as possible could help reduce adverse potential for geologic hazards.

Alternative B2c

Construction

The types of impacts on geology from geotechnical site evaluations under both Phase I and Phase II would be similar to Alternative B1. Phase I construction would result in impacts on geology from geotechnical site evaluations prior to construction of 100 wind turbines. Phase II construction would result in impacts on geology from geotechnical site evaluations prior to construction of 70 wind turbines. Phase I and Phase II construction would result in geotechnical site evaluations prior to construction of 170 wind turbines; resulting in the same disturbance as Alternative B1.

In addition to impacts discussed in *Impacts Common to All Action Alternatives*, Phase I would have the potential to impact geology on all, or portions of: 234 acres associated with the construction and reconstruction of 70 miles of roads; 212 acres associated with wind turbine construction; and 50 acres associated with 30 miles of underground collection system. Phase II would have the potential to impact geology on all, or portions of: 60 acres associated with the construction and reconstruction of 13 miles of roads; 149 acres associated with wind turbine construction; and 35 acres associated with 21 miles of underground collection system. The result of both Phase I and Phase II being built is the same acres of impact as Alternative B1, therefore the impacts would be the same, but would vary temporally.

Geologic hazard potential from steep slope angles and geologic hazards such as landslides and rock falls would be associated with approximately 20 acres of surface disturbance, 13 short-term and 7 long-term on slopes greater than 20 percent and approximately 65 acres of surface disturbance, 44 short-term and 21 long-term on slopes from 12-20 percent for Phase I. Phase II would have approximately 7 acres of surface disturbance, 6 short-term and 1 long-term on slopes greater than 20 percent and approximately 33 acres of surface disturbance, 24 short-term and 9 long-term on slopes from 12-20 percent. The result of both Phase I and Phase II is the same acres of impact as Alternative B1, therefore the impacts would be the same, but would vary temporally.

Design features in Appendix 2A that reduce construction on steep or unstable slopes and require revegetation on exposed soils as soon as possible could help reduce adverse potential for geologic hazards.

Alternative C

Construction

Impacts on geology from geotechnical site evaluations would be similar to Alternative B1; however, there would be fewer geotechnical site evaluations since there would be 18 fewer turbines (152 total). In addition to impacts discussed in *Impacts Common to All Action Alternatives*, this alternative would have the potential to impact geology on all, or portions of: 280 acres associated with the construction and reconstruction of 80 miles of roads; 322 acres associated with wind turbine construction; and 72 acres associated with 44 miles of underground collection system. Impacts on geology from construction activities would be less than those described under Alternatives B1.

Geologic hazard potential from steep slope angles and geologic hazards such as landslides and rock falls would be associated with 26 acres of surface disturbance, 19 short-term and 7 long-term on slopes greater than 20 percent and approximately 86 acres of surface disturbance, 61 short-term and 25 long-term on slopes from 12-20 percent. Alternative C would have 8 fewer acres of impact than Alternative B1.

Design features in Appendix 2A that reduce construction on steep or unstable slopes and require revegetation on exposed soils as soon as possible could help reduce adverse potential for geologic hazards.

Alternative D

Construction

Impacts on geology from geotechnical site evaluations would be similar to Alternative B1; however, there would be fewer geotechnical site evaluations since there would be 46 fewer turbines (124 total). In addition to impacts discussed in *Impacts Common to All Action Alternatives*, this alternative would have the potential to impact geology on all, or portions of: 240 acres associated with the construction and reconstruction of 72 miles of roads; 263 acres associated with wind turbine construction; and 59

acres associated with 36 miles of underground collection system. Impacts on geology from construction activities would be less than Alternative B1.

Geologic hazard potential from steep slope angles and geologic hazards such as landslides and rock falls would be associated with approximately 22 acres of surface disturbance, 15 short-term and 7 permanent on slopes greater than 20 percent and approximately 71 acres of surface disturbance, 50 short-term and 21 long-term on slopes from 12-20 percent. Alternative D would have 27 fewer acres of impact than Alternative B1.

Design features in Appendix 2A that reduce construction on steep or unstable slopes and require revegetation on exposed soils as soon as possible could help reduce adverse potential for geologic hazards.

Alternative E

Construction

Impacts on geology from geotechnical site evaluations would be similar to Alternative B1; however, there would be fewer geotechnical site evaluations since there would be 50 fewer turbines (120 total). In addition to impacts discussed in *Impacts Common to All Action Alternatives*, this alternative would have the potential to impact geology on all, or portions of 259 acres associated with the construction and reconstruction of 76 miles of roads, 254 acres associated with wind turbine construction, and 71 acres associated with 42 miles of underground collection system. Impacts on geology from construction activities would be less than Alternative B1.

Geologic hazard potential from steep slope angles and geologic hazards such as landslides and rock falls would be associated with approximately 22 acres of surface disturbance, 15 short-term and 7 long-term, that would occur on slopes greater than 20 percent and approximately 69 acres of surface disturbance, 48 short-term and 21 long-term, would occur on slopes from 12-20 percent. Alternative E would have 29 fewer acres of impact than Alternative B1.

Design features in Appendix 2A that reduce construction on steep or unstable slopes and require revegetation on exposed soils as soon as possible could help reduce adverse potential for geologic hazards.

Alternative F

Construction

Impacts on geology from geotechnical site evaluations would be similar to Alternative B1; however, there would be fewer geotechnical site evaluations since there would be 65 fewer turbines (105 total). In addition to impacts discussed in *Impacts Common to All Action Alternatives*, this alternative would have the potential to impact geology on all, or portions of: 214 acres associated with the construction and reconstruction of 67 miles of roads; 221 acres associated with wind turbine construction; and 41

acres associated with 26 miles of underground collection system. Impacts on geology from construction activities would be less than those described under all other action alternatives.

Geologic hazard potential from steep slope angles and geologic hazards such as landslides and rock falls would be associated with approximately 16 acres of surface disturbance, 10 short-term and 6 long-term, that would occur on slopes greater than 20 percent and approximately 57 acres of surface disturbance, 39 short-term and 18 long-term, would occur on slopes from 12-20 percent. Alternative F would have 47 fewer acres of impact than Alternative B1.

Design features in Appendix 2A that reduce construction on steep or unstable slopes and require revegetation on exposed soils as soon as possible could help reduce adverse potential for geologic hazards.

4.1.2.3 Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Construction

Direct, localized, long-term impacts on geology could occur on all, or portions of 39 acres associated with road reconstruction for the northern inbound haul route where geotechnical coring and blasting may occur.

Geologic hazard potential from steep slope angles and geologic hazards such as landslides and rock falls would be associated with approximately 0.4 acres of permanent surface disturbance on slopes greater than 20 percent and approximately 1.4 acres of permanent surface disturbance on slopes from 12-20 percent. Approximately 27 acres of surface disturbance (69% of the total disturbance) would occur within areas with medium or greater potential for water erosion (Section 4.1.3).

Southern Inbound Haul Route Option 1

Construction

Direct, localized, long-term impacts on geology would occur on all, or portions of 86 acres associated with placement of 5 miles of new road and reconstruction of 6 miles of road for the southern inbound haul route option 1 where geotechnical coring and blasting may occur.

Geologic hazard potential from steep slope angles and geologic hazards such as landslides and rock falls would be associated with approximately 14.4 acres of surface disturbance, 0.4 acres of short-term and 14 acres of permanent disturbance on slopes greater than 20 percent and approximately 17.8 acres of surface disturbance, 14 acres of short-term and 3.8 acres of permanent disturbance on slopes from 12-20 percent. The entire southern inbound haul route would be contained within areas with medium or greater potential for water erosion (Section 4.1.3).

Southern Inbound Haul Route Option 2

Construction

Direct, localized, long-term impacts on geology would occur on all, or portions of 90 acres associated with placement of 7 miles of new road and reconstruction of 6 miles of road for the southern inbound haul route option 2 where geotechnical coring and blasting may occur.

Geologic hazard potential from steep slope angles and geologic hazards such as landslides and rock falls would be associated with approximately 14.8 acres of surface disturbance, 0.2 acres of short-term and 14.6 acres of permanent disturbance on slopes greater than 20 percent and approximately 15.9 acres of surface disturbance, 2.9 acres of short-term and 13 acres of permanent disturbance on slopes from 12-20 percent. The entire southern inbound haul route would be contained within areas with medium or greater potential for water erosion (Section 4.1.3).

Outbound Haul Route

Construction

There would be no impacts on geology on the outbound haul route, as no road construction or reconstruction is anticipated.

4.1.2.4 Project as a Whole

The project as a whole includes the project disturbance area and inbound haul route (northern or southern). The primary impacts on geology from the project would be tied to the area of bedrock disturbance from the construction of the wind energy facility, and the potential for geologic hazards identified for each alternative. These primary analysis indicators are summarized below for each alternative (Table 4.1.2-1).

Alternative B1 and the phased alternatives would have the most impacts on geology due to geotechnical borings/corings and Alternative F would have the least. Alternative B1and Alternative B2a would have the most acres and miles of surface disturbance due to new or reconstructed roads and Alternative F would have the least. The phased alternatives would have the most acres of surface disturbance associated with the construction of wind turbines and Alternative F would have the least. Alternative B1 and the phased alternatives would have the most acres and miles of surface disturbance due to trenching and Alternative F would have the least. Alternative B1 would have the most acres of surface disturbance on slopes from 12-20 percent and Alternative F would have the least. Alternative B1 when combined with southern inbound haul route option 1 would have the most acres of surface disturbance on slopes from 12-20 percent. Alternative F when combined with the northern inbound haul route would have the least surface disturbance on slopes from 12-20 percent. Alternative B1 would have the most acres of surface disturbance on slopes from greater than 20 percent and Alternative F would have the least. Alternative B1 when combined with southern inbound haul route option 2 would have the most acres of surface disturbance on slopes greater than 20 percent. Alternative F when combined with the northern inbound haul route would have the least surface disturbance on slopes greater than 20 percent.

Table 4.1.2-1. Summary of Impacts on Geology for the Project by Primary Indicators.

ALT	Borings/ Corings[1]	Roads[2]				Wind Turbines[3]	Acres/ Miles of Trenching	Slopes[4] 12-20%				Slopes[4] >20%			
	PA[5]	PA	NHR[6]	SHR1[7]	SHR2[7]	PA	PA	PA	NHR	SHR1	SHR2	PA	NHR	SHR1	SHR2
B1	170	296/83	335	382	386	360	84/51	67/26 (93)	67/27 (94)	81/30 (111)	70/39 (109)	19/8 (27)	19/8 (27)	19/22 (41)	19/23 (42)
B2a Phase I	100	202/63	241	288	292	211	51/35	45/19 (64)	45/20 (65)	59/23 (80)	48/32 (80)	13/6 (19)	13/6 (19)	13/20 (33)	13/21 (34)
B2a Phase II[8]	70	94/20 (296/83)	335	382	386	150 (360)	32/15 (84/51)	23/7 (30)	23/8 (31)	37/11 (112)	26/20 (46)	6/1 (7)	6/1 (7)	6/15 (54)	6/16 (22)
B2b Phase I	100	192/62	231	278	282	212	48/30	43/17 (60)	43/18 (61)	57/21 (78)	46/30 (76)	12/6 (18)	12/6 (18)	12/20 (32)	12/21 (33)
B2b Phase II[8]	70	103/21 (295/83)	334	381	385	148 (360)	36/21 (84/51)	24/9 (33)	24/10 (34)	38/13 (51)	27/22 (49)	8/2 (10)	8/2 (10)	8/16 (56)	8/17 (25)
B2c Phase I	100	234/70	272	319	323	212	50/30	44/21 (65)	44/22 (66)	58/25 (83)	47/34 (81)	13/7 (20)	13/7 (20)	13/21 (34)	13/22 (35)
B2c Phase II[8]	70	60/13 (294/83)	332	379	383	149 (360)	35/21 (84/51)	24/9 (33)	24/10 (34)	38/13 (51)	27/22 (49)	6/1 (7)	6/1 (7)	6/15 (55)	6/16 (22)
C	152	280/80	318	365	369	322	72/44	61/25 (86)	61/26 (87)	75/29 (104)	64/38 (102)	19/7 (26)	19/7 (26)	19/21 (40)	19/22 (41)
D	124	240/72	279	326	330	263	59/36	50/21 (71)	50/22 (72)	64/25 (89)	53/34 (87)	15/7 (22)	15/7 (22)	15/21 (36)	15/22 (37)
E	120	259/76	298	345	349	254	71/42	48/21 (69)	48/22 (70)	62/25 (87)	51/34 (85)	15/7 (22)	15/7 (22)	15/21 (36)	15/22 (37)
F	105	214/67	253	300	304	221	41/26	39/18 (57)	39/19 (58)	53/22 (75)	42/31 (73)	10/6 (16)	10/6 (16)	10/20 (30)	10/21 (31)

Project area (PA); southern haul route option 1 (SHR1); southern haul route option 2 (SHR2); northern inbound haul route (NHR). Totals may not appear to add due to rounding of acres in table.

[1] Includes the total number of turbines associated with which geotechnical boring/coring.

[2] Acres of surface disturbance associated with new or reconstructed roads: acres/miles.

[3] Acres of surface disturbance associated with construction of wind turbines.

[4] Acres of surface disturbance occurring on slopes from 12-20 percent and on slopes greater than 20 percent: short-term/long-term (total). For NHR, SHR1 and SHR2 long-term includes long-term from PA and permanent from NHR, SHR1 or SHR2.

[5] PA = acres of surface disturbance within the project area.

[6] NHR = acres of surface disturbance from roads within the project area and northern inbound haul route.

[7] SHR1 or SHR2 = acres of surface disturbance from roads within the project area and either option 1 or option 2 of the southern inbound haul route.

[8] Alternatives B2a – B2c propose a phased development approach. Acres of disturbance Phase II (total disturbance Phase I + Phase II).

4.1.2.5 Cumulative Impacts

Cumulative impacts on geology consist of incremental effects of the alternatives when added to other past, present, and reasonably foreseeable future actions. These effects can occur over a long period of time, resulting in gradual changes in geology. The cumulative effects analysis area for geology is the project area and both options of the southern inbound haul route because direct and indirect impacts are not expected to extend beyond this area. The primary actions that affect geology include bedrock disturbance and geologic hazards associated with slope instability.

Alternative A (No Action Alternative)

The No Action Alternative in combination with the past and present actions can result in incremental increases in disturbance of bedrock or slope instability. Natural erosion processes and past uses of geology in the project area consisting of Native American Indian use of obsidian and the creation/construction of 144 miles of existing roads has resulted in a relatively minor impact on geology. Past impacts when added to future surface disturbing activities could result in bedrock disturbance and minor adverse impacts on slope stability in the area.

All Action Alternatives

The present or reasonably foreseeable future natural erosion processes and past uses of geology in the project area consisting of Native American Indian use of obsidian and the creation/construction of 144 miles of existing roads has resulted in a relatively minor impact on geology. When combined with these impacts, cumulative impacts on geology would be negligible under all action alternatives.

4.1.3 SOILS

This section presents potential impacts on soils through soil degradation, including soil compaction, and the undesirable mixing of soil horizons that could result from implementing the proposed alternatives for the project. The analysis area for soils is the project disturbance area. In addition, potential impacts on soils from surface disturbance associated with the construction or reconstruction of inbound haul routes are presented.

4.1.3.1 Analysis Methods

Indicators

Potential effects on soils are described for each alternative in the context of relevant indicators. The indicators for soils include:

- Project disturbance within areas rated as having medium or greater potential for water erosion and moderate or greater potential for wind erosion;
- Project disturbance in areas previously burned during the 2007 Murphy Complex Fires;
- Project disturbance resulting in soil compaction; and
- Project disturbance due to trenching for the underground collection system.

In addition to the quantitative indicators listed above, qualitative indictors include the potential changes to the structure and function of soils, and how these changes could affect the revegetation potential of a disturbed site.

Methods and Assumptions

Impacts on soils are assessed by determining the number of acres of surface disturbance that could result in accelerated soil degradation. Short-term surface disturbance occurs in areas that are disturbed during construction but are revegetated shortly thereafter. Long-term surface disturbance occurs in areas that are disturbed for the life of the project until they are reclaimed during decommissioning. Permanent surface disturbance occurs in areas that are not reclaimed or decommissioned.

Geographic Information System data layers were used to identify areas with relatively high potential for soil erosion by wind and water. For analysis comparisons, acres for wind and water erosion potential categories are listed separately because spatial overlap exists within the wind classifications and water classifications. The potential for soil degradation in recently burned areas was assessed based on the number of acres of surface disturbance within the boundary of the 2007 Murphy Complex Fires. The potential for soil compaction was assessed based on the type and duration of surface disturbance; only project features that result in consistent and repeated pressure to the soil surface were used to assess this indicator. These include all project features (e.g., wind turbines, project roads, substations, O&M facilities, and laydown yards) except the underground collection system because soil compaction would likely not result from this activity. The underground collection system would; however, result in soil displacement and could affect soil structure and function through undesirable mixing of soil horizons. Therefore, soil displacement, or the potential mixing of soil, was assessed based on the number of miles and acres of trenching associated with the underground collection system.

Assumptions:

- Surface disturbance would impact soils (areas lacking soil, such as rock outcrops, were not considered in the analysis).
- Surface disturbance increases the potential for accelerated soil degradation.
- Soils rated as having medium or greater potential for water erosion, and moderate or greater potential for wind erosion, are more likely to erode than soils rated as having low potential for water erosion and slight potential for wind erosion.
- Surface disturbing activities would cause localized unavoidable impacts on soils by increasing the potential for wind and water erosion before the land is revegetated.
- Long-term surface disturbance would result in more soil compaction compared to short-term surface disturbance.
- Adequate ground cover for site stabilization would occur within 2 to 5 years following surface disturbing activities (Stevens & Monsen, 2004).

- The construction and reconstruction of project roads and haul routes would increase use of the area and result in the creation of new roads by the public. This would result in additional impacts on soils.
- Construction of Phase II of the three phased alternatives (B2a, B2b, B2c) would be approximately 7 years after completion of Phase I. Separation of impacts between phased alternatives would be between 7 to 10 years due to the 2 year construction period of Phase I, 7 years of monitoring post Phase I construction, and 1 year construction period of Phase II.

4.1.3.2 Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

Soils would not be impacted from project construction, O&M, or decommissioning activities under the No Action Alternative. Soils in the analysis area would remain in existing conditions.

Impacts Common to All Action Alternatives

Construction

Most of the impacts on soils would occur during project construction as a result of the removal of vegetation or other ground cover. Construction activities that result in surface disturbance could cause moderate to major soil degradation in localized areas. Soil degradation could indirectly result in a loss of topsoil productivity and increased susceptibility of the soil to wind and water erosion (Tiedemann & Lopez, 2004). Soil erosion caused by wind is closely linked to air quality and many of the same activities that increase soil erosion potential would also impact air quality. Similarly, soil erosion caused by water is closely linked to water quality and many of the same activities that increase soil erosion potential would also impact water resources. These impacts are tied to the amount of surface disturbance identified for each alternative and the susceptibility of soils to erosion based on soil type. Excessive erosion could occur in areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion (Figures 3.1.3-1 and 3.1.3-2). The majority of surface disturbance would result from the construction of turbines and either newly constructed, or reconstructed roads. Road erosion rates are usually highest when the road is newly constructed because of loose sediment and the lack of vegetation on cut and fill slopes, but rates decline quickly as the road surface becomes more stable and compacted, and cut and fill slopes develop a vegetation cover (Megahan, 1974; Megahan, Wilson, & Monson, 2001).

Construction activities that remove established vegetation or contribute to changes in the composition of vegetation (Section 4.2.1) could indirectly increase fire frequency and severity (Chambers et al., 2005; Ripplinger, 2010). Erosion is probably one of the most common concerns after a wildfire because the loss of vegetation and plant litter leaves the soil exposed. Construction activities that occur within recently burned areas would lead to excessive erosion in those areas.

Activities that consistently and repeatedly apply pressure to soils would increase soil compaction in localized areas resulting in moderate to major impacts on soils (Munshower, 1994; Tate, Dudley,

McDougald, & George, 2004). Moderate soil compaction would occur in disturbed areas that are revegetated shortly after construction and major soil compaction would occur in areas that are disturbed for the life of the project or indefinitely. Soil compaction from heavy equipment used during construction, in areas used to store equipment and stage construction, and in areas with buildings and facilities being constructed would indirectly impact soil structure and function. This could reduce water infiltration, increase surface runoff, and restrict deep root growth (Adams, Stolzy, Enso, Rowlands, & Johnson, 1982; Cline, 2008; Lull 1959; and Wilshire, Nakata, Shipley, & Prestegaard, 1978). The level of soil compaction would influence the establishment and growth of plants and could be a limiting factor in revegetation efforts (Alessa & Earnhart, 2000).

Underground collection system trenching would cause soil displacement or the mixing of soil horizons and would lead to an increase in soil degradation (Brockway, Gatewood, Richard, & Paris, 2002). Indirectly, this could decrease soil site stability, lower soil fertility, and compromise revegetation efforts in disturbed areas.

Several design features would help reduce impacts on soils (Appendix 2A); these include:

- Implementing erosion control measures to stabilize soils;
- Revegetating disturbed areas as soon as possible;
- Ensuring revegetation efforts are successful;
- Burying electrical collection lines along roads or other paths of surface disturbance;
- Backfilling trenches and foundations with originally excavated material; and
- Requiring a fire prevention plan.

Refer to the tables in the Project as a Whole section for a summary of the impacts on soils for each indicator by alternative.

Operation and Maintenance

Vehicle traffic on the project roads during O&M activities would result in continued disturbance to soils and lead to excessive erosion and soil compaction in localized areas (Liddle, 1997). Road maintenance such as grading and disturbance by vehicles could temporarily increase erosion rates by renewing the supply of loose sediment on the road surface (Luce & Black, 1999). Design features listed in Appendix 2A would help reduce impacts on soils.

Decommissioning

Decommissioning the project would have similar impacts as those described for project construction. Decommissioning project roads and wind turbine foundations would result in major short-term impacts on soils through increased erosion and soil loss (Switalski, Bissonette, DeLuca, Luce, & Madej, 2004). Over the long term, road removal and reclamation would limit or reduce the potential for soil erosion in localized areas (Switalski et al., 2004). Areas where existing project roads were reconstructed would not be decommissioned; therefore, major permanent impacts on soils from soil compaction and increased erosion would persist in those areas. Removal of the underground

collection system, transmission line, substations, and other infrastructure would result in similar impacts on soils as construction. Design features listed in Appendix 2A would help reduce impacts on soils.

Alternative B1 (Proposed Action)

Construction

Construction activities would result in 812 acres of disturbance to soils under this alternative. Surface disturbance within areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion would lead to accelerated soil erosion in localized areas. These impacts on soils would persist until the areas are revegetated or reclaimed and the soils are stabilized. Some areas would remain disturbed indefinitely. Out of the 812 acres of total disturbance, 699 acres (86%) would occur within areas with medium or greater potential for water erosion and 330 acres (41%) would occur within areas with moderate or greater potential for wind erosion (Table 4.1.3-1). Roughly three-quarters of the disturbance would be short-term, less than one-quarter of the disturbance would be long-term, and a small percentage of the disturbance would be permanent.

Table 4.1.3-1. Acres of Soil Disturbance within Areas with Medium or Greater Potential for Water Erosion and Moderate or Greater Potential for Wind Erosion under Alternative B1.

	Short-term[1]	Long-term[2]	Permanent[3]	Total[4]
Water Erosion Potential	516	164	19	699
Wind Erosion Potential	253	69	8	330

[1] Short-term Disturbance = acres disturbed during construction and then revegetated shortly thereafter.
[2] Long-term Disturbance = acres disturbed during construction and then reclaimed after decommissioning.
[3] Permanent Disturbance = acres disturbed during construction and then not reclaimed or decommissioned.
[4] Total Disturbance = Short-term + Long-term + Permanent Disturbance.

Construction activities would occur within areas burned during the 2007 Murphy Complex Fires resulting in 135 acres of surface disturbance. Within this area, soil erosion potential is higher and accelerated erosion would likely occur in localized areas as a result of surface disturbance from construction activities.

Construction activities would create varying degrees of soil compaction in localized areas across 728 acres. Moderate soil compaction would occur on 501 acres in areas that would be revegetated shortly after construction. Major soil compaction would occur on 202 acres within areas that would be reclaimed after project decommissioning. Permanent and major soil compaction would occur on 25 acres in areas that would not be decommissioned.

Under Alternative B1, construction of 51 miles of underground collection trenches would result in 84 acres of surface disturbance. Trenching activities would result in major long-term impacts on soils through soil mixing and result in changes to soil structure and function.

During construction, design features would be applied to minimize impacts on soils (Appendix 2A). Additional design features are required in various construction plans, such as the Storm Water Pollution Prevention Plan (SWPPP) and the vegetation management plan (Appendix 2B).

Operation and Maintenance

Vehicle traffic would occur on 83 miles of project roads during O&M activities resulting in minor impacts on soils from soil compaction and excessive erosion in localized areas.

Decommissioning

Decommissioning the project would have similar impacts as described for construction. Decommissioning 62 miles of project roads and 170 wind turbine foundations would result in major short-term impacts on soils through increased erosion and soil loss. Over the long term, 62 miles of road removal and reclamation would limit or reduce the potential for soil erosion in localized areas. Removal of the underground collection system would result in the same impact as described for construction.

Alternative B2a

Construction

Phase I

Construction activities would result in 536 acres of disturbance to soils under Phase I of this alternative. Surface disturbance within areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion would lead to accelerated soil erosion in localized areas. These impacts on soils would persist until the areas are revegetated or reclaimed and the soils are stabilized. Some areas would remain disturbed indefinitely. Out of the 536 acres of total disturbance, 431 acres (80%) would occur within areas with medium or greater potential for water erosion and 255 acres (48%) would occur within areas with moderate or greater potential for wind erosion (Table 4.1.3-2). Roughly three-quarters of the disturbance would be short-term, about one-quarter of the disturbance would be long-term, and a small percentage of the disturbance would be permanent.

Construction activities would occur within areas burned during the 2007 Murphy Complex Fires resulting in 74 acres of surface disturbance. There is greater potential for soil erosion within recently burned areas and surface disturbance from construction activities would result in accelerated erosion in localized areas.

Construction activities would create varying degrees of soil compaction in localized areas across 485 acres. Moderate soil compaction would occur on 319 acres in areas that would be revegetated shortly after construction. Major soil compaction would occur on 149 acres within areas that would be reclaimed after project decommissioning. Permanent and major soil compaction would occur on 17 acres in areas that would not be decommissioned.

Under Phase I of Alternative B2a, construction of 35 miles of underground collection trenches would result in 51 acres of surface disturbance. Trenching activities would result in major long-term impacts on soils through soil mixing and result in changes to soil structure and function.

Table 4.1.3-2. Acres of Soil Disturbance within Areas with Medium or Greater Potential for Water Erosion and Moderate or Greater Potential for Wind Erosion under Alternative B2a.

	Short-term[1]		Long-term[2]		Permanent[3]		Total[4]	
	Phase I	Phase II	Phase I	Phase II	Phase I	Phase II	Phase I	Phase II
	Phase I& II		Phase I & II		Phase I & II		Phase I & II	
Water Erosion	306	227	114	58	11	8	431	293
Potential	533		172		19		724	
Wind Erosion	193	74	55	14	7	1	255	89
Potential	267		69		8		344	

[1] Short-term Disturbance = acres disturbed during construction and then revegetated shortly thereafter.
[2] Long-term Disturbance = acres disturbed during construction and then reclaimed after decommissioning.
[3] Permanent Disturbance = acres disturbed during construction and then not reclaimed or decommissioned.
[4] Total Disturbance = Short-term + Long-term + Permanent Disturbance.

Phase II

Construction activities would result in 301 acres of disturbance to soils under Phase II of this alternative. Surface disturbance within areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion would lead to accelerated soil erosion in localized areas. These impacts on soils would persist until the areas are revegetated or reclaimed and the soils are stabilized. Some areas would remain disturbed indefinitely. Out of the 301 acres of total disturbance, 293 acres (97%) would occur within areas with medium or greater potential for water erosion and 89 acres (30%) would occur within areas with moderate or greater potential for wind erosion (Table 4.1.3-2).

Construction activities would occur within areas burned during the 2007 Murphy Complex Fires resulting in 62 acres of surface disturbance. Phase II construction would occur 7 to 10 years after the construction of Phase I and soils within these previously burned areas would have become stabilized. Therefore, under Phase II, additional impacts on soils from surface disturbance occurring within the boundary of the Murphy Complex Fires would be negligible.

Construction activities would create varying degrees of soil compaction in localized areas across 268 acres. Moderate soil compaction would occur on approximately 199 acres in areas that would be revegetated shortly after construction. Major soil compaction would occur on approximately 60 acres within areas that would be reclaimed after project decommissioning. Permanent and major soil compaction would occur on 9 acres in areas that would not be decommissioned.

Under Phase II of Alternative B2a, construction of 15 miles of underground collection trenches would result in 33 acres of surface disturbance. Trenching activities would result in major long-term impacts on soils through soil mixing and result in changes to soil structure and function.

Phase I and Phase II

Construction activities would result in 837 acres of disturbance to soils under Phases I and II of this alternative. Surface disturbance within areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion would lead to accelerated soil erosion in localized areas. These impacts on soils would persist until the areas are revegetated or reclaimed and the soils are stabilized. Some areas would remain disturbed indefinitely. Out of the 837 acres of total disturbance, 724 acres (86%) would occur within areas with medium or greater potential for water erosion and 344 acres (41%) would occur within areas with moderate or greater potential for wind erosion (Table 4.1.3-2). Roughly three-quarters of the disturbance would be short-term, less than one-quarter of the disturbance would be long-term, and a small percentage of the disturbance would be permanent.

Construction activities would occur within areas burned during the 2007 Murphy Complex Fires resulting in 136 acres of surface disturbance. Of this total disturbance, 62 acres would be disturbed during Phase II, 7 to 10 years after the construction of Phase I. Soils within these areas would be have become stabilized by this time and excessive erosion as a result of construction within a recently burned area would not be a factor. Therefore, the impacts on soils from surface disturbance within recently burned areas would be the same as for Phase I, and result in accelerated erosion in localized areas across 74 acres.

Construction activities would create varying degrees of soil compaction in localized areas across 753 acres. Moderate soil compaction would occur on 518 acres in areas that would be revegetated shortly after construction. Major soil compaction would occur on 209 acres within areas that would be reclaimed after project decommissioning. Permanent and major soil compaction would occur on 26 acres in areas that would not be decommissioned.

Under Phases I and II of Alternative B2a, construction of 51 miles of underground collection trenches would result in up to 84 acres of surface disturbance. Trenching activities would result in major long-term impacts on soils through soil mixing and result in changes to soil structure and function.

Design features described for Alternative B1 would apply to Alternative B2a.

Operation and Maintenance

During Phase I, vehicle traffic would occur on 63 miles of project roads during O&M activities, resulting in minor impacts on soils from soil compaction and excessive erosion in localized areas. During Phase II, vehicle traffic would occur on an additional 20 miles of project roads during O&M activities resulting in minor impacts on soils from soil compaction and excessive erosion in localized areas. During Phases I and II, vehicle traffic would occur on 83 miles of project roads during O&M activities, resulting in minor impacts on soils from soil compaction and excessive erosion in localized areas.

Decommissioning

Decommissioning Phase I and Phase II of the project would have similar impacts as described for construction. Decommissioning 62 miles of project roads and 170 wind turbine foundations would result in major short-term impacts on soils through increased erosion and soil loss. Over the long term, 62 miles of road removal and reclamation would limit or reduce the potential for soil erosion in localized areas. Removal of the underground collection system would result in the same impact as described for construction.

Alternative B2b

Construction

Phase I

Construction activities would result in 523 acres of disturbance to soils under Phase I of this alternative. Surface disturbance within areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion would lead to accelerated soil erosion in localized areas. These impacts on soils would persist until the areas are revegetated or reclaimed and the soils are stabilized. Some areas would remain disturbed indefinitely. Out of the 523 acres of total disturbance, 485 acres (93%) would occur within areas with medium or greater potential for water erosion and 248 acres (47%) would occur within areas with moderate or greater potential for wind erosion (Table 4.1.3-3). Roughly three-quarters of the disturbance would be short-term, about one-quarter of the disturbance would be long-term, and a small percentage of the disturbance would be permanent.

Construction activities would occur within areas burned during the 2007 Murphy Complex Fires resulting in 21 acres of surface disturbance. There is greater potential for soil erosion within recently burned areas and surface disturbance from construction activities would result in accelerated erosion in localized areas.

Construction activities would result in varying degrees of soil compaction in localized areas across 475 acres. Moderate soil compaction would occur on 319 acres in areas that would be revegetated shortly after construction. Major soil compaction would occur on 131 acres within areas that would be reclaimed after project decommissioning. Permanent and major soil compaction would occur on 25 acres in areas that would not be decommissioned.

Under Phase I of Alternative B2b, construction of 29 miles of underground collection trenches would result in up to 48 acres of surface disturbance. Trenching activities would result in major long-term impacts on soils through soil mixing and result in changes to soil structure and function.

Table 4.1.3-3. Acres of Soil Disturbance within Areas with Medium or Greater Potential for Water Erosion and Moderate or Greater Potential for Wind Erosion under Alternative B2b.

	Short-term[1]		Long-term[2]		Permanent[3]		Total[4]	
	Phase I	Phase II	Phase I	Phase II	Phase I	Phase II	Phase I	Phase II
	Phase I & II		Phase I & II		Phase I & II		Phase I & II	
Water Erosion	354	179	112	60	19	0	485	239
Potential	533		172		19		724	
Wind Erosion	190	76	49	20	8	0	248	97
Potential	267		69		8		345	

[1] Short-term Disturbance = acres disturbed during construction and then revegetated shortly thereafter.
[2] Long-term Disturbance = acres disturbed during construction and then reclaimed after decommissioning.
[3] Permanent Disturbance = acres disturbed during construction and then not reclaimed or decommissioned.
[4] Total Disturbance = Short-term + Long-term + Permanent Disturbance.

Phase II

Construction activities would result in 313 acres of disturbance to soils under Phase II of this alternative. Surface disturbance within areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion would lead to accelerated soil erosion in localized areas. These impacts on soils would persist until the areas are revegetated or reclaimed and the soils are stabilized. Some areas would remain disturbed indefinitely. Out of the 313 acres of total disturbance, 239 acres (76%) would occur within areas with medium or greater potential for water erosion and 97 acres (31%) would occur within areas with moderate or greater potential for wind erosion (Table 4.1.3-3). Roughly three-quarters of the disturbance would be short-term, about one-quarter of the disturbance would be long-term, and a small percentage of the disturbance would be permanent.

Construction activities would occur within areas burned during the 2007 Murphy Complex Fires resulting in 115 acres of surface disturbance. Phase II construction would occur 7 to 10 years after the construction of Phase I and soils within these previously burned areas would have become stabilized. Therefore, under Phase II, additional impacts on soils from surface disturbance occurring within the boundary of the Murphy Complex Fires would be negligible.

Construction activities would result in varying degrees of soil compaction in localized areas across 277 acres. Moderate soil compaction would occur on 199 acres in areas that would be revegetated shortly after construction. Major soil compaction would occur on 78 acres within areas that would be reclaimed after project decommissioning. Permanent and major soil compaction would not occur as a result of Phase II construction.

Under Phase II of Alternative B2b, construction of 21 miles of underground collection trenches would result in up to 36 acres of surface disturbance. Trenching activities would result in major long-term impacts on soils through soil mixing and result in changes to soil structure and function.

Phase I and Phase II

Construction activities would result in 836 acres of disturbance to soils under Phases I and II of this alternative. Surface disturbance within areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion would lead to accelerated soil erosion in localized areas. These impacts on soils would persist until the areas are revegetated or reclaimed and the soils are stabilized. Some areas would remain disturbed indefinitely. Out of the 836 acres of total disturbance, 724 acres (87%) would occur within areas with medium or greater potential for water erosion and 345 acres (41%) would occur within areas with moderate or greater potential for wind erosion (Table 4.1.3-3). Roughly three-quarters of the disturbance would be short-term, less than one-quarter of the disturbance would be long-term, and a small percentage of the disturbance would be permanent.

Construction activities would occur within areas burned during the 2007 Murphy Complex Fires resulting in 136 acres of surface disturbance. Of this total disturbance, 115 acres would be disturbed during Phase II, 7 to 10 years after the construction of Phase I. Soils within these areas would have become stabilized by this time and excessive erosion as a result of construction within a recently burned area would not be a factor. Therefore, the impacts on soils from surface disturbance within recently burned areas would be the same as for Phase I, and result in accelerated erosion in localized areas across 21 acres.

Construction activities would result in varying degrees of soil compaction in localized areas across 752 acres. Moderate soil compaction would occur on 518 acres in areas that would be revegetated shortly after construction. Major soil compaction would occur on 209 acres within areas that would be reclaimed after project decommissioning. Permanent and major soil compaction would occur on 25 acres in areas that would not be decommissioned.

Under Phases I and II of Alternative B2b, construction of 51 miles of underground collection trenches would result in up to 84 acres of surface disturbance. Trenching activities would result in major long-term impacts on soils through soil mixing and result in changes to soil structure and function.

Operation and Maintenance

During Phase I, vehicle traffic would occur on 62 miles of project roads during O&M activities resulting in minor impacts on soils from soil compaction and excessive erosion in localized areas. During Phase II, vehicle traffic would occur on an additional 21 miles of project roads during O&M activities resulting in minor impacts on soils from soil compaction and excessive erosion in localized areas. During Phases I and II, vehicle traffic would occur on 83 miles of project roads during O&M activities resulting in minor impacts on soils from soil compaction and excessive erosion in localized areas.

Decommissioning

Decommissioning Phase I and Phase II of the project would have similar impacts as described for construction. Decommissioning 62 miles of project roads and 170 wind turbine foundations would

result in major short-term impacts on soils through increased erosion and soil loss. Over the long term, 62 miles of road removal and reclamation would limit or reduce the potential for soil erosion in localized areas. Removal of the underground collection system would result in the same impact as described for construction.

Alternative B2c

Construction

Phase I

Construction activities would result in 564 acres of disturbance to soils under Phase I of this alternative. Surface disturbance within areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion would lead to accelerated soil erosion in localized areas. These impacts on soils would persist until the areas are revegetated or reclaimed and the soils are stabilized. Some areas would remain disturbed indefinitely. Out of the 564 acres of total disturbance, 450 acres (80%) would occur within areas with medium or greater potential for water erosion and 189 acres (34%) would occur within areas with moderate or greater potential for wind erosion (Table 4.1.3-4). Roughly three-quarters of the disturbance would be short-term, about one-quarter of the disturbance would be long-term, and a small percentage of the disturbance would be permanent.

Table 4.1.3-4. Acres of Soil Disturbance within Areas with Medium or Greater Potential for Water Erosion and Moderate or Greater Potential for Wind Erosion under Alternative B2c.

	Short-term[1]		Long-term[2]		Permanent[3]		Total[4]	
	Phase I	Phase II	Phase I	Phase II	Phase I	Phase II	Phase I	Phase II
	Phase I & II		Phase I & II		Phase I & II		Phase I & II	
Water Erosion Potential	317	209	115	57	18	1	450	267
	526		172		19		717	
Wind Erosion Potential	137	127	45	25	7	1	189	152
	263		69		8		341	

[1] Short-term Disturbance = acres disturbed during construction and then revegetated shortly thereafter.
[2] Long-term Disturbance = acres disturbed during construction and then reclaimed after decommissioning.
[3] Permanent Disturbance = acres disturbed during construction and then not reclaimed or decommissioned.
[4] Total Disturbance = Short-term + Long-term + Permanent Disturbance.

Construction activities would occur within areas burned during the 2007 Murphy Complex Fires resulting in 135 acres of surface disturbance. There is greater potential for soil erosion within recently burned areas and surface disturbance from construction activities would result in accelerated erosion in localized areas.

Construction activities would result in varying degrees of soil compaction in localized areas across 514 acres. Moderate soil compaction would occur on 336 acres in areas that would be revegetated shortly after construction. Major soil compaction would occur on 153 acres within areas that would be reclaimed after project decommissioning. Permanent and major soil compaction would occur on 25 acres in areas that would not be decommissioned.

Under Phase I of Alternative B2c, construction of 30 miles of underground collection trenches would result in up to 50 acres of surface disturbance. Trenching activities would result in major long-term impacts on soils through soil mixing and result in changes to soil structure and function.

Phase II

Construction activities would result in 267 acres of disturbance to soils under Phase II of this alternative. Surface disturbance within areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion would lead to accelerated soil erosion in localized areas. These impacts on soils would persist until the areas are revegetated or reclaimed and the soils are stabilized. Some areas would remain disturbed indefinitely. Out of the 267 acres of total disturbance, 267 acres (100%) would occur within areas with medium or greater potential for water erosion and 152 acres (57%) would occur within areas with moderate or greater potential for wind erosion (Table 4.1.3-4).

Surface disturbance would not occur within areas burned during the 2007 Murphy Complex Fires. Therefore, under Phase II, there would be no additional impacts on soils from surface disturbance occurring within the boundary of the Murphy Complex Fires.

Construction activities would result in varying degrees of soil compaction in localized areas across 233 acres. Moderate soil compaction would occur on 175 acres in areas that would be revegetated shortly after construction. Major soil compaction would occur on 57 acres within areas that would be reclaimed after project decommissioning. Permanent and major soil compaction would occur on 1 acre in areas that would not be decommissioned.

Under Phase II of Alternative B2c, construction of 21 miles of underground collection trenches would result in up to 35 acres of surface disturbance. Trenching activities would result in major long-term impacts on soils through soil mixing and result in changes to soil structure and function.

Phase I and Phase II

Construction activities would result in 831 acres of disturbance to soils under Phases I and II of this alternative. Surface disturbance within areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion would lead to accelerated soil erosion in localized areas. These impacts on soils would persist until the areas are revegetated or reclaimed and the soils are stabilized. Some areas would remain disturbed indefinitely. Out of the 831 acres of total disturbance, 717 acres (86%) would occur within areas with medium or greater potential for water erosion and 341 acres (41%) would occur within areas with moderate or greater potential for wind erosion (Table 4.1.3-4). Roughly three-quarters of the disturbance would be short-term, less than one-quarter of the disturbance would be long-term, and a small percentage of the disturbance would be permanent.

Construction activities would occur within areas burned during the 2007 Murphy Complex Fires resulting in 135 acres of surface disturbance. Soil erosion potential is higher within these areas and

accelerated erosion would occur in localized areas as a result of surface disturbance from construction activities.

Construction activities would result in varying degrees of soil compaction in localized areas across 747 acres. Moderate soil compaction would occur on 511 acres in areas that would be revegetated shortly after construction. Major soil compaction would occur on 210 acres within areas that would be reclaimed after project decommissioning. Permanent and major soil compaction would occur on 26 acres in areas that would not be decommissioned.

Under Phases I and II of Alternative B2c, construction of 51 miles of underground collection trenches would result in up to 84 acres of surface disturbance. Trenching activities would result in major long-term impacts on soils through soil mixing and result in changes to soil structure and function.

Operation and Maintenance

During Phase I, vehicle traffic would occur on 70 miles of project roads during O&M activities resulting in minor impacts on soils from soil compaction and excessive erosion in localized areas. During Phase II, vehicle traffic would occur on an additional 13 miles of project roads during O&M activities resulting in minor impacts on soils from soil compaction and excessive erosion in localized areas. During Phases I and II, vehicle traffic would occur on 83 miles of project roads during O&M activities resulting in minor impacts on soils from soil compaction and excessive erosion in localized areas.

Decommissioning

Decommissioning Phase I and Phase II of the project would have similar impacts as described for construction. Decommissioning 62 miles of project roads and 170 wind turbine foundations would result in major short-term impacts on soils through increased erosion and soil loss. Over the long term, 62 miles of road removal and reclamation would limit or reduce the potential for soil erosion in localized areas. Removal of the underground collection system would result in the same impact as described for construction.

Alternative C

Construction

Construction activities would result in 745 acres of disturbance to soils under this alternative. Surface disturbance within areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion would lead to accelerated soil erosion in localized areas. These impacts on soils would persist until the areas are revegetated or reclaimed and the soils are stabilized. Some areas would remain disturbed indefinitely. Out of the 745 acres of total disturbance, 632 acres (85%) would occur within areas with medium or greater potential for water erosion and 309 acres (41%) would occur within areas with moderate or greater potential for wind erosion (Table 4.1.3-5). Roughly three-quarters of the disturbance would be short-term, about one-quarter of the disturbance would be long-term, and a small percentage of the disturbance would be permanent.

Table 4.1.3-5. Acres of Soil Disturbance within Areas with Medium or Greater Potential for Water Erosion and Moderate or Greater Potential for Wind Erosion under Alternative C

	Short-term[1]	Long-term[2]	Permanent[3]	Total[4]
Water Erosion Potential	462	152	18	632
Wind Erosion Potential	235	67	7	309

[1] Short-term Disturbance = acres disturbed during construction and then revegetated shortly thereafter.
[2] Long-term Disturbance = acres disturbed during construction and then reclaimed after decommissioning.
[3] Permanent Disturbance = acres disturbed during construction and then not reclaimed or decommissioned.
[4] Total Disturbance = Short-term + Long-term + Permanent Disturbance.

Construction activities would occur within areas burned during the 2007 Murphy Complex Fires resulting in 135 acres of surface disturbance. Soil erosion potential is higher within recently burned areas and accelerated erosion would occur in localized areas as a result of surface disturbance from construction activities.

Construction activities would result in varying degrees of soil compaction in localized areas across 672 acres. Moderate soil compaction would occur on 458 acres in areas that would be revegetated shortly after construction. Major soil compaction would occur on 189 acres within areas that would be reclaimed after project decommissioning. Permanent and major soil compaction would occur on 25 acres in areas that would not be decommissioned.

Under Alternative C, construction of 44 miles of underground collection trenches would result in up to 72 acres of surface disturbance. Trenching activities would result in major long-term impacts on soils through soil mixing and result in changes to soil structure and function.

Operation and Maintenance

Vehicle traffic would occur on 80 miles of project roads during O&M activities resulting in minor impacts on soils from soil compaction and excessive erosion in localized areas.

Decommissioning

Decommissioning the project would have similar impacts as described for construction. Decommissioning 59 miles of project roads and 152 wind turbine foundations would result in major short-term impacts on soils through increased erosion and soil loss. Over the long term, 59 miles of road removal and reclamation would limit or reduce the potential for soil erosion in localized areas. Removal of the underground collection system would result in the same impact as described for construction.

Alternative D

Construction

Construction activities would result in 631 acres of disturbance to soils under this alternative. Surface disturbance within areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion would lead to accelerated soil erosion in localized areas. These impacts on

soils would persist until the areas are revegetated or reclaimed and the soils are stabilized. Some areas would remain disturbed indefinitely. Out of the 631 acres of total disturbance, 586 acres (93%) would occur within areas with medium or greater potential for water erosion and 286 acres (45%) would occur within areas with moderate or greater potential for wind erosion (Table 4.1.3-6). Roughly three-quarters of the disturbance would be short-term, about one-quarter of the disturbance would be long-term, and a small percentage of the disturbance would be permanent.

Table 4.1.3-6. Acres of Soil Disturbance within Areas with Medium or Greater Potential for Water Erosion and Moderate or Greater Potential for Wind Erosion under Alternative D.

	Short-term[1]	Long-term[2]	Permanent[3]	Total[4]
Water Erosion Potential	426	141	18	586
Wind Erosion Potential	217	63	7	286

[1] Short-term Disturbance = acres disturbed during construction and then revegetated shortly thereafter.
[2] Long-term Disturbance = acres disturbed during construction and then reclaimed after decommissioning.
[3] Permanent Disturbance = acres disturbed during construction and then not reclaimed or decommissioned.
[4] Total Disturbance = Short-term + Long-term + Permanent Disturbance.

Construction activities would occur within areas burned during the 2007 Murphy Complex Fires resulting in 85 acres of surface disturbance. Soil erosion potential is higher within recently burned areas and accelerated erosion would occur in localized areas as a result of surface disturbance from construction activities.

Construction activities would result in varying degrees of soil compaction in localized areas across 572 acres. Moderate soil compaction would occur on 384 acres in areas that would be revegetated shortly after construction. Major soil compaction would occur on 163 acres within areas that would be reclaimed after project decommissioning. Permanent and major soil compaction would occur on 25 acres in areas that would not be decommissioned.

Under Alternative D, construction of 36 miles of underground collection trenches would result in up to 59 acres of surface disturbance. Trenching activities would result in major long-term impacts on soils through soil mixing and result in changes to soil structure and function.

Operation and Maintenance

Vehicle traffic would occur on 72 miles of project roads during O&M activities resulting in minor impacts on soils from soil compaction and excessive erosion in localized areas.

Decommissioning

Decommissioning the project would have similar impacts as described for construction. Decommissioning 51 miles of project roads and 124 wind turbine foundations would result in major short-term impacts on soils through increased erosion and soil loss. Over the long term, 51 miles of road removal and reclamation would limit or reduce the potential for soil erosion in localized areas.

Removal of the underground collection system would result in the same impact as described for construction.

Alternative E

Construction

Construction activities would result in 656 acres of disturbance to soils under this alternative. Surface disturbance within areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion would lead to accelerated soil erosion in localized areas. These impacts on soils would persist until the areas are revegetated or reclaimed and the soils are stabilized. Some areas would remain disturbed indefinitely. Out of the 656 acres of total disturbance, 545 acres (83%) would occur within areas with medium or greater potential for water erosion and 258 acres (39%) would occur within areas with moderate or greater potential for wind erosion (Table 4.1.3-7). Roughly three-quarters of the disturbance would be short-term, about one-quarter of the disturbance would be long-term, and a small percentage of the disturbance would be permanent.

Table 4.1.3-7. Acres of Soil Disturbance within Areas with Medium or Greater Potential for Water Erosion and Moderate or Greater Potential for Wind Erosion under Alternative E.

	Short-term[1]	Long-term[2]	Permanent[3]	Total[4]
Water Erosion Potential	393	133	19	545
Wind Erosion Potential	194	56	8	258

[1] Short-term Disturbance = acres disturbed during construction and then revegetated shortly thereafter.
[2] Long-term Disturbance = acres disturbed during construction and then reclaimed after decommissioning.
[3] Permanent Disturbance = acres disturbed during construction and then not reclaimed or decommissioned.
[4] Total Disturbance = Short-term + Long-term + Permanent Disturbance.

Construction activities would occur within areas burned during the 2007 Murphy Complex Fires resulting in 131 acres of surface disturbance. Soil erosion potential is higher within recently burned areas and accelerated erosion would occur in localized areas as a result of surface disturbance from construction activities.

Construction activities would result in varying degrees of soil compaction in localized areas across 585 acres. Moderate soil compaction would occur on 390 acres in areas that would be revegetated shortly after construction. Major soil compaction would occur on 170 acres within areas that would be reclaimed after project decommissioning. Permanent and major soil compaction would occur on 25 acres in areas that would not be decommissioned.

Under Alternative E, construction of 42 miles of underground collection trenches would result in up to 71 acres of surface disturbance. Trenching activities would result in major long-term impacts on soils through soil mixing and result in changes to soil structure and function.

Operation and Maintenance

Vehicle traffic would occur on 76 miles of project roads during O&M activities resulting in minor impacts on soils from soil compaction and excessive erosion in localized areas.

Decommissioning

Decommissioning the project would have similar impacts as described for construction. Decommissioning 55 miles of project roads and 120 wind turbine foundations would result in major short-term impacts on soils through increased erosion and soil loss. Over the long term, 55 miles of road removal and reclamation would limit or reduce the potential for soil erosion in localized areas. Removal of the underground collection system would result in the same impact as described for construction.

Alternative F

Construction

Construction activities would result in 544 acres of disturbance to soils under this alternative. Surface disturbance within areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion would lead to accelerated soil erosion in localized areas. These impacts on soils would persist until the areas are revegetated or reclaimed and the soils are stabilized. Some areas would remain disturbed indefinitely. Out of the 544 acres of total disturbance, 501 acres (92%) would occur within areas with medium or greater potential for water erosion and 227 acres (42%) would occur within areas with moderate or greater potential for wind erosion (Table 4.1.3-8). Roughly three-quarters of the disturbance would be short-term, about one-quarter of the disturbance would be long-term, and a small percentage of the disturbance would be permanent.

Table 4.1.3-8. Acres of Soil Disturbance within Areas with Medium or Greater Potential for Water Erosion and Moderate or Greater Potential for Wind Erosion under Alternative F.

	Short-term[1]	Long-term[2]	Permanent[3]	Total[4]
Water Erosion Potential	359	123	18	501
Wind Erosion Potential	171	49	7	227

[1] Short-term Disturbance = acres disturbed during construction and then revegetated shortly thereafter.
[2] Long-term Disturbance = acres disturbed during construction and then reclaimed after decommissioning.
[3] Permanent Disturbance = acres disturbed during construction and then not reclaimed or decommissioned.
[4] Total Disturbance = Short-term + Long-term + Permanent Disturbance.

Construction activities would occur within areas burned during the 2007 Murphy Complex Fires resulting in 74 acres of surface disturbance. Soil erosion potential is higher within recently burned areas and accelerated erosion would occur in localized areas as a result of surface disturbance from construction activities.

Construction activities would result in varying degrees of soil compaction in localized areas across 503 acres. Moderate soil compaction would occur on 334 acres in areas that would be revegetated shortly after construction. Major soil compaction would occur on 144 acres within areas that would

be reclaimed after project decommissioning. Permanent and major soil compaction would occur on 25 acres in areas that would not be decommissioned.

Under Alternative F, construction of 26 miles of underground collection trenches would result in up to 41 acres of surface disturbance. Trenching activities would result in major long-term impacts on soils through soil mixing and result in changes to soil structure and function.

Operation and Maintenance

Vehicle traffic would occur on 66 miles of project roads during O&M activities resulting in minor impacts on soils from soil compaction and excessive erosion in localized areas.

Decommissioning

Decommissioning the project would have similar impacts as described for construction. Decommissioning 46 miles of project roads and 105 wind turbine foundations would result in major short-term impacts on soils through increased erosion and soil loss. Over the long term, 46 miles of road removal and reclamation would limit or reduce the potential for soil erosion in localized areas. Removal of the underground collection system would result in the same impact as described for construction.

4.1.3.3 Direct and Indirect Impacts of the Haul Routes

Refer to Tables 4.1.3-9 and 4.1.3-10 for a summary of the impacts on soils for each indicator by alternative and inbound haul route option.

Northern Inbound Haul Route

Construction

Reconstruction of portions of the 119-mile northern inbound haul route would result in 39 acres of disturbance to soils. Surface disturbance within areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion would lead to excessive soil erosion in localized areas. Out of the 39 acres of total disturbance, 27 acres (69%) would occur within areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion. All 27 acres of surface disturbance would be permanent.

Less than 1 acre of surface disturbance would occur within areas burned during the 2007 Murphy Complex Fires, or other fires since 2007; therefore, impacts on soils within recently burned areas would be negligible.

Road reconstruction and pullouts would cause 39 acres of major and permanent soil compaction in small, localized areas dispersed along the northern inbound haul route.

Use of this route would increase for 2 years during the time of project construction (3 years for the phased alternatives and 4 years for Alternative E) and would cause accelerated erosion and soil compaction during construction activities along portions of this 119-mile route.

Operation and Maintenance

The northern inbound haul route would be used approximately once per year for major maintenance of the wind energy facility; therefore, maintenance of this haul route is expected to have negligible impacts on soils.

Decommissioning

This haul route is an already established roadway and would not be decommissioned; there would be no impacts on soils from decommissioning. Not decommissioning the reconstructed portions of the northern inbound haul route would result in 39 acres of major and permanent impacts on soils through soil degradation, especially by soil compaction.

Southern Inbound Haul Route Option 1

Construction

The reconstruction of existing roads and construction of new roads for option 1 of the southern inbound haul route would impact soils through increased erosion along 11 miles of roadway that would result in up to 86 acres of surface disturbance. Option 1 of the southern inbound haul route is rated as having medium or greater potential for water erosion; only 7 out of 86 acres are within areas with moderate or greater potential for wind erosion.

Approximately 80 out of the 86 acres (93%) of total surface disturbance proposed for this option of the southern inbound haul route would occur within areas burned during the 2007 Murphy Complex Fires. Construction activities within recently burned areas would result in accelerated soil erosion within these localized areas.

Moderate soil compaction would occur on 23 acres within the staging area that would be revegetated shortly after construction. Major and permanent soil compaction would occur on 63 acres of this option of the southern inbound haul route.

Under the phased development approach (Alternatives B2a, B2b, and B2c), the 23-acre staging area would be revegetated after Phase I construction, redisturbed during Phase II construction, and then revegetated after the completion of Phase II construction. This would result in additional impacts on soils through soil degradation and soil compaction within this area.

Use of this route would increase for 2 years during the time of project construction (3 years for the phased alternatives and 4 years for Alternative E) and would cause accelerated erosion and soil compaction during construction activities along this 11-mile route.

Operation and Maintenance

Option 1 of the southern inbound haul route would be used approximately once per year for major maintenance of the wind energy facility; maintenance of this haul route is expected to have negligible impacts on soils.

Decommissioning

Option 1 of the southern inbound haul route would not be decommissioned. There would be no impacts on soils from decommissioning; however, not decommissioning this option of the southern inbound haul route would result in major and permanent impacts on soils through soil compaction and soil degradation across 63 acres.

Southern Inbound Haul Route Option 2

Construction

The reconstruction of existing roads and construction of new roads for option 2 of the southern inbound haul route would impact soils through increased erosion along 13 miles of roadway that would result in up to 90 acres of surface disturbance. All 90 acres of disturbance for option 2 of the southern inbound haul route are within areas rated as having medium or greater potential for water erosion; only 9 out of 90 acres are within areas with moderate or greater potential for wind erosion.

Approximately 75 out of the 90 acres (83%) of total surface disturbance proposed for this option of the southern inbound haul route would occur within areas burned during the 2007 Murphy Complex Fires. Construction activities within recently burned areas would result in accelerated soil erosion within these localized areas.

Moderate soil compaction would occur on 23 acres within the staging area that would be revegetated shortly after construction. Major and permanent soil compaction would occur on 67 acres of this option of the southern inbound haul route.

Under the phased development approach (Alternatives B2a, B2b, and B2c), the 23-acre staging area would be revegetated after Phase I construction, redisturbed during Phase II construction, and then revegetated after the completion of Phase II construction. This would result in additional impacts on soils through soil degradation and soil compaction within this area.

Use of this route would increase for 2 years during the time of project construction (3 years for the phased alternatives and 4 years for Alternative E) and would cause accelerated erosion and soil compaction during construction activities along this 13-mile route.

Operation and Maintenance

Option 2 of the southern inbound haul route would be used approximately once per year for major maintenance of the wind energy facility; maintenance of this haul route is expected to have negligible impacts on soils.

Decommissioning

Option 2 of the southern inbound haul route would not be decommissioned. There would be no impacts on soils from decommissioning; however, not decommissioning this option of the southern inbound haul route would result in major and permanent impacts on soils through soil compaction and soil degradation across 63 acres.

Outbound Haul Route

Construction

No construction would take place along the outbound haul route. However, use of this 60-mile route would increase for 2 years during the time of project construction (3 years for the phased alternatives and 4 years for Alternative E). Increased use of this route would have negligible impacts on soils.

Operation and Maintenance

The outbound haul route would be used approximately once per year for major maintenance of the wind energy facility; maintenance of this haul route is expected to have negligible impacts on soils.

Decommissioning

This haul route is an already established roadway and because construction of new roads or reconstruction of existing roads would not be necessary, there would be no decommissioning, and no impacts on soils.

4.1.3.4 Project as a Whole

The project as a whole includes the project disturbance area and haul routes. Potential impacts on soils that could result from implementing the project as a whole include: disturbance to soils, especially in areas with medium or greater potential for water erosion and moderate or greater potential for wind erosion; increased soil compaction; and the undesirable mixing of soil horizons. These primary analysis indicators are summarized for each alternative in Table 4.1.3-9 (all alternatives) and Table 4.1.3-10 (phased alternatives), in combination with the inbound haul routes. There is no disturbance proposed along the outbound haul route; therefore, there would be no impacts on soils.

Surface disturbance proposed within areas with medium or greater water erosion potential varies between 501 and 724 acres depending on alternative. The phased alternatives (B2a, B2b, and B2c) would result in the most surface disturbance to soils because several acres would need to be disturbed during Phase I construction and then again during Phase II construction. Alternative B1 would result in similar impacts on soils as the phased alternatives. Alternatives C, D, and E would result in less surface disturbance and impacts on soils compared to the phased alternatives and Alternative B1. Alternative F would result in the least amount of surface disturbance and impacts on soils within areas with medium or greater potential for water erosion. In addition to the acres of surface disturbance from the project area, the northern inbound haul route would add 27 acres, option 1 of the southern inbound haul route would add 86 acres, and option 2 of the southern inbound haul route

would add 90 acres of disturbance to soils within areas with medium or greater potential for water erosion.

Surface disturbance proposed within areas with moderate or greater potential for wind erosion varies between 277 and 344 acres depending on the alternative. The phased alternatives (B2a, B2b, and B2c) would result in the most surface disturbance to soils because several acres would need to be disturbed during Phase I construction and then again during Phase II construction. Alternative B1 would result in similar impacts on soils as the phased alternatives. Alternatives C, D, and E would result in less surface disturbance, and impacts on soils, compared to the phased alternatives and Alternative B1. Alternative F would result in the least amount of surface disturbance and impacts on soils within areas with moderate or greater potential for wind erosion. In addition to the acres of surface disturbance from the project area, the northern inbound haul route would add 27 acres, option 1 of the southern inbound haul route would add 7 acres, and option 2 of the southern inbound haul route would add 9 acres of disturbance to soils within areas with moderate or greater potential for wind erosion.

Major soil compaction from repeated and continued pressure applied to the soil surface would result from long-term and permanent surface disturbance. Major soil compaction varies between 169 and 236 acres depending on the alternative. The phased alternatives (B2a, B2b, and B2c) and Alternative B1 would result in the most acres of soil compaction. Alternatives C, D, and E would result in less major soil compaction than the phased alternatives or Alternative B1. Alternative F would result in the least amount of soil compaction. In addition to the acres of soil compaction within the project area, the northern inbound haul route would add 39 acres, option 1 of the southern inbound haul route would add 63 acres, and option 2 of the southern inbound haul route would add 67 acres of major soil compaction.

Recently burned areas have higher soil erosion potential and surface disturbance occurring within those areas could result in increased erosion and soil loss. Surface disturbance proposed within recently burned areas varies between 21 and 135 acres, depending on the alternative. Alternatives B1, B2c (Phase I), C, and E propose the most surface disturbance within recently burned areas. Alternatives B2b, B2a, F, and D would result in the least surface disturbance to soils within recently burned areas. In addition to the acres of surface disturbance from the project area, the northern inbound haul route would add less than 1 acre, option 1 of the southern inbound haul route would add 80 acres, and option 2 of the southern inbound haul route would add 75 acres of disturbance to soils within recently burned areas.

Trenching for the underground collection system would disturb between 41 and 84 acres of soils. Alternatives B1, B2a, B2b, and B2c would result in the most acres of disturbance to soils, followed by Alternatives C, D, and E. Alternative F would result in the least acres of disturbance to soils from trenching the underground collection system. Trenching would not occur along the inbound haul routes.

Table 4.1.3-9. Summary of Impacts on Soils (in acres) from the Project as a Whole.

ALT	Total Disturbance[1]								Major Soil Compaction[3]				Wildfire[4]				Soil Mix[5]
	Water Erosion Potential[2]				Wind Erosion Potential[2]												
	PA[6]	NHR[7] PA+27	SHR1[8] PA+86	SHR2[9] PA+90	PA	NHR PA+27	SHR1 PA+7	SHR2 PA+9	PA	NHR PA+39	SHR1 PA+63	SHR2 PA+67	PA	NHR PA+<1	SHR1 PA+80	SHR2 PA+75	PA
B1	699	726	785	789	330	357	337	339	227	266	290	294	135	135	215	210	84
B2a[10]	724	751	810	814	344	371	351	353	235	274	298	302	74	74	154	149	84
B2b[10]	724	751	810	814	345	372	352	354	234	273	297	301	21	21	101	96	84
B2c[10]	717	744	803	807	341	368	348	350	236	275	299	303	135	135	215	210	84
C	632	659	718	722	309	336	316	318	214	253	277	281	135	135	215	210	72
D	586	613	672	676	286	313	293	295	188	227	251	255	85	85	165	160	59
E	545	572	631	635	258	285	265	267	195	234	258	262	131	131	211	206	71
F	501	528	587	591	227	254	234	236	169	208	232	236	74	74	154	149	41

1 Total Disturbance = Short-term + Long-term + Permanent; Short-term Disturbance = acres disturbed during construction that are revegetated shortly thereafter; Long-term Disturbance = acres disturbed during construction that are reclaimed after decommissioning; Permanent Disturbance = acres disturbed during construction that are not reclaimed or decommissioned.

2 Soil erosion potential includes the number of acres of soil disturbance based on wind and water erosion potential. Soils rated as medium or greater potential for water erosion, and moderate or greater potential for wind erosion, are included in the acreage calculations.

3 Soil compaction includes surface disturbance that results in major soil compaction from either long-term or permanent soil disturbance. Soil disturbance not expected to cause compaction (underground collection systems) is not included in this acreage calculation.

4 Acres of proposed disturbance within the boundary of the 2007 Murphy Complex Fires.

5 Soil mixing includes acreage of soil disturbance from the underground collection system. Trenching would not occur along haul routes.

6 PA = project area;

7 NHR = project area and northern inbound haul route (PA+ additional acres from NHR);

8 SHR1 = project area and option 1 of the southern inbound haul route (PA+ additional acres from SHR1);

9 SHR2 = project area and option 2 of the southern inbound haul route (PA+ additional acres from SHR2).

10 Alternatives B2a, B2b, and B2c propose a phased development approach: Acres presented in this table are the total acres of Phase I and Phase II.

Table 4.1.3-10. Summary of Impacts on Soils (in acres) from the Project as a Whole – Phased Alternatives.

ALT		Total Disturbance[1]								Major Soil Compaction[3]				Wildfire[4]				Soil Mix[5]
		Water Erosion Potential[2]				Wind Erosion Potential[2]												
		PA[6]	NHR[7] PA+27	SHR1[8] PA+86	SHR2[9] PA+90	PA	NHR PA+27	SHR1 PA+7	SHR2 PA+9	PA	NHR PA+39	SHR1 PA+63	SHR2 PA+67	PA	NHR PA+<1	SHR1 PA+80	SHR2 PA+75	PA
B2a	Phase I	431	458	517	521	255	282	262	264	166	205	229	233	74	74	154	149	51
	Phase II	293	293	293	293	89	89	89	89	69	69	69	69	N/A	N/A	N/A	N/A	33
	Phase I&II	**724**	**751**	**810**	**814**	**344**	**371**	**351**	**353**	**235**	**274**	**298**	**302**	**74**	**74**	**154**	**149**	**84**
B2b	Phase I	485	512	571	575	248	275	255	257	156	195	219	223	21	21	101	96	48
	Phase II	239	239	239	239	97	97	97	97	78	78	78	78	N/A	N/A	N/A	N/A	36
	Phase I&II	**724**	**751**	**810**	**814**	**345**	**372**	**352**	**354**	**234**	**273**	**297**	**301**	**21**	**21**	**101**	**96**	**84**
B2c	Phase I	450	477	536	540	189	216	196	198	178	217	241	245	135	135	215	210	50
	Phase II	267	267	267	267	152	152	152	152	58	58	58	58	N/A	N/A	N/A	N/A	35
	Phase I&II	**717**	**744**	**803**	**807**	**341**	**368**	**348**	**350**	**236**	**275**	**299**	**303**	**135**	**135**	**215**	**210**	**84**

1 Total Disturbance = Short-term + Long-term + Permanent; Short-term Disturbance = acres disturbed during construction that are revegetated shortly thereafter; Long-term Disturbance = acres disturbed during construction that are reclaimed after decommissioning; Permanent Disturbance = acres disturbed during construction that are not reclaimed or decommissioned.

2 Soil erosion potential includes the number of acres of soil disturbance based on wind and water erosion potential. Soils rated as medium or greater potential for water erosion, and moderate or greater potential for wind erosion, are included in the acreage calculations.

3 Soil compaction includes surface disturbance that results in major soil compaction from either long-term or permanent soil disturbance. Soil disturbance not expected to cause compaction (underground collection systems) is not included in this acreage calculation.

4 Acres of proposed disturbance within the boundary of the 2007 Murphy Complex Fires.

5 Soil mixing includes acreage of soil disturbance from the underground collection system. Trenching would not occur along haul routes.

6 PA = project area;

7 NHR = project area and northern inbound haul route (PA+ additional acres from NHR);

8 SHR1 = project area and option 1 of the southern inbound haul route (PA+ additional acres from SHR1);

9 SHR2 = project area and option 2 of the southern inbound haul route (PA+ additional acres from SHR2).

4.1.3.5 Cumulative Impacts

The cumulative effects analysis area includes a 10-mile buffer beyond the project area and haul routes because direct and indirect impacts on soils would likely not extend beyond this area.

Alternative A (No Action Alternative)

Past, present, and reasonably foreseeable future actions have impacted soils within and near the project area at differing levels of intensity and scale. Motorized vehicle use, livestock grazing, wildfire, and other surface disturbing activities have altered the amount and type of soil cover causing increased erosion. Livestock grazing, wildfires, and associated impacts on soils are expected to continue within the analysis area on Federal, state, and private lands. Under the No Action Alternative, the frequency and scale of wildfires is expected to occur at current or increased levels. Direct and indirect impacts from past, present, and reasonably foreseeable future projects have, and will continue to have, localized, major impacts on soils in areas of concentrated activities such as roads, fence lines, livestock watering areas, and other areas of high intensity disturbance. Some of these areas have and would be reclaimed and soils would return to their expected structure and function based on site potential. Other areas would remain disturbed indefinitely. On a larger scale, such as within the cumulative effects analysis area, soils are incrementally disturbed by a variety of land uses. For example, an area adjacent to project disturbance may receive livestock grazing impacts, deposition from project erosion, recreational use, road proliferation, and a variety of other cumulative impacts which could negatively impact soil structure and function. Because of the small level of impacts from past, present, and reasonably foreseeable future actions, substantive large scale, long-term impacts on soils are not expected within the cumulative effects analysis area.

All Action Alternatives

Past, present, and reasonably foreseeable future actions have impacted soils within and near the project area at differing levels of intensity and scale. Motorized vehicle use, livestock grazing, wildfire, and other surface disturbing activities have altered the amount and type of soil cover causing increased erosion. Livestock grazing, wildfires, and associated impacts on soils are expected to continue within the analysis area on Federal, state, and private lands. Under all action alternatives, the frequency and scale of wildfires is expected to occur at current or increased levels. Direct and indirect impacts from this and other projects have, and would continue to have, localized, major impacts on soils in areas of concentrated activities such as roads, fence lines, livestock watering areas, and other areas of high intensity disturbance. Some of these areas have and would be reclaimed and soils would return to their expected structure and function based on site potential. Other areas would remain disturbed indefinitely. On a larger scale, such as within the cumulative effects analysis area, soils are incrementally disturbed by a variety of land uses. For example, an area adjacent to project disturbance may receive livestock grazing impacts, deposition from project erosion, recreational use, road proliferation, and a variety of other cumulative impacts which could negatively impact soil structure and function. Because of the small level of impacts from past, present, and reasonably foreseeable future actions, in connection with the project, substantive large scale, long-term impacts on soils are not expected within the cumulative effects analysis area.

4.1.4 WATER RESOURCES

This section presents potential impacts on riparian and wetland vegetation and water resources from implementing the proposed alternatives for the project. Wetland and riparian vegetation communities play a key role in water quality and hydrology. The analysis area is the project area, both options of the southern inbound haul route, the northern inbound haul route, and the outbound haul route.

4.1.4.1 Analysis Methods

Indicators

Potential water resources effects are described for each alternative in the context of relevant indicators. The indicators for water resources include:

- Total project disturbance within the project area;
- Project disturbance created by upgrading existing roads or building new roads within the project area;
- Project disturbance created by trenching for the underground collection system;
- Project disturbance within riparian habitat conservation areas (RHCAs);
- Project disturbance in areas previously burned by the 2007 Murphy Complex Fires;
- Project disturbance within 300 feet of a known snowfield (as defined in URS, 2010);
- Project disturbance on slopes from 12 to 20 percent;
- Project disturbance on slopes greater than 20 percent; and
- Number of stream channel crossings by new roads and reconstructed roads.

In addition to the quantitative indicators above, qualitative indicators include impacts on riparian and wetland vegetation communities assessed by the potential for change in riparian and wetland vegetation composition and the potential for introduction of noxious weeds and invasive plants from construction, O&M, and decommissioning project features and roads for each alternative.

Methods and Assumptions

Potential impacts on wetland and riparian vegetation and water resources are assessed primarily by determining the number of acres of surface disturbance. Impacts were evaluated based on: (a) area of surface disturbance from the construction, O&M, and eventual decommissioning of the wind energy facility; (b) the proximity of surface disturbance to water features; and (c) the potential of altering wetland and riparian vegetation, hydrology, and/or water quality identified for each alternative.

Short-term surface disturbance would result from removing existing vegetation and exposing soil to erosion. The short-term surface disturbance area would then be revegetated after construction. Long-term disturbance would occur from removing vegetation and exposing surfaces to erosion from constructing project facilities and roads. These project features would remain through the anticipated 30-year project time span. Permanent disturbance would result from removing vegetation and disturbing soils for project features that would not be decommissioned, such as reconstruction of

existing roads and haul routes. Total disturbance is the sum of short-term, long-term, and permanent disturbance.

For this project, the1987 Jarbidge RMP would be amended to allow for wind energy developments. The potential impacts from these amendments are discussed for each action alternative. Once an alternative is chosen and published in the Record of Decision, the 1987 Jarbidge RMP amendments would be applied to specific activities proposed for the inbound and outbound haul routes. Impacts on water resources within and adjacent to the haul routes that result from the proposed amendments would be similar to those described for each alternative. Therefore, these impacts are not discussed for the haul routes.

Assumptions:

- The water used for the construction, O&M, and decommissioning for the project would be from a private source with an existing water right within the Salmon Falls Subbasin.
- Snow removal would be conducted annually on all project roads.
- For stream or wetland crossings of the underground collection system, directional drilling would occur.
- Riparian and/or wetland vegetation exists within RHCAs; however, it typically does not occur within the entire RHCA. Of all RHCAs, those associated with intermittent streams would have the least amount of riparian and/or wetland vegetation present.
- Adequate ground cover for site stabilization would occur within two to five years following surface disturbing activities (Stevens & Monsen, 2004).
- Noxious weeds and invasive plants would continue to be introduced and spread because of ongoing vehicle traffic in and out of the analysis area, recreational activities, wildlife and livestock grazing and movements, and wind.
- Increasing surface disturbance increases the potential for the establishment and spread of noxious weeds and invasive plant species.
- Construction of Phase II of the three phased alternatives (B2a, B2b, B2c) would be approximately 7 years after completion of Phase I. Separation of impacts between phased alternatives would be between 7 to 10 years due to the 2 year construction period of Phase I, 7 years of monitoring post Phase I construction, and 1 year construction period of Phase II.

4.1.4.2 Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

Riparian and wetland vegetation communities in the analysis area would remain in existing conditions. These communities are relatively small and dispersed across the project area (Section 3.1.4). The composition and structure of riparian and wetland vegetation would be expected to be maintained or improved based on current policy. Riparian and wetlands would be maintained by

continuing to manage these as avoidance areas for ROW activities. Riparian areas within the Wells Field Office would continue to be managed to maintain good condition.

Under this alternative, hydrology and water quality would be not be impacted from project construction, O&M, or decommissioning activities. BLM follows current policies to prevent degradation of stream conditions; therefore, stream conditions are likely to be maintained or improved over time.

Impacts Common to All Action Alternatives

This section describes the types of impacts common to all action alternatives that would occur during construction, O&M, and decommissioning of the project and haul routes and is outlined in the order of the indicators presented above.

Construction

Impacts on riparian and wetland vegetation and water resources would result from surface and subsurface disturbing activities that would occur during the construction of roads, wind turbine pads, underground collection facilities, substations, transmission lines, meteorological towers, and O&M facilities. Construction-disturbing activities include removing vegetation, coring, blasting, trenching, and grading.

Each action alternative would have the potential to impact water resources from all, or portions of the following project features common to all action alternatives:

- 25 acres associated with 19 miles of transmission interconnect lines;
- 9 acres associated with substations;
- 3 acres associated with 3 meteorological towers;
- 8 acres associated with a quarry;
- 4 acres associated with 2 O&M facilities;
- 18 intermittent stream crossings; and
- the use of 20 to 40 million gallons of water.

Construction impacts on water quality are closely linked to vegetation removal and soil disturbance. Surface disturbing activities including removal of vegetation, change in vegetation composition, and soil disturbance indirectly impacting water quality, air quality (Section 4.1.1), fish and wildlife habitat and forage (Section 4.2.2), and forage available to livestock (Section 4.4.2).
Hydrology and water quality would be indirectly impacted from project disturbances to riparian and wetland vegetation through mortality, injury, or removal of vegetation. Indirect impacts from project disturbances on riparian and wetland vegetation could occur through the introduction and establishment of noxious weeds and invasive plants (BLM, 2005). The project would also cause direct impacts on water resources by localized alteration of hydrology and indirect impacts on water quality through increased potential for nutrient and sediment delivery to water bodies.

Construction activities that result in short-term surface disturbance (areas that would be revegetated shortly after construction) would result in less sedimentation to water bodies than activities that result in long-term surface disturbance (areas that would be disturbed for the life of the project).

Design features common to all alternatives would reduce impacts on riparian and wetland vegetation and water resources (Appendix 2A). For example, to reduce the introduction of noxious weeds and invasive plants in wetland and riparian areas, vehicles would be washed prior to entering the analysis area, and a weed management plan would be implemented. In addition, vegetation would be reestablished on exposed soils as soon as possible and erosion control measures including a SWPPP would reduce sedimentation.

Roads

Impacts on water resources would occur from disturbances associated with roads within the project area. Roads in a watershed contribute to sediment production by concentrating runoff, which increases sediment load to a stream network. Reconstruction of existing roads and building new roads affect watershed hydrology because roads function as extensions of the drainage network and increase peak flows, delivery of runoff to streams, and in-stream erosion. (Foreman & Alexander, 1998; Wemple et al., 1996; Jones et al., 2000). Within a watershed, roads increase the hydrologic drainage density and increase surface runoff of precipitation and snow melt due to the decreased permeability of the road surfaces.

Not all of the sediment that leaves a road surface enters surface water. Frequently, surface runoff leaving a road infiltrates into the hillslope immediately below the road, where it may deposit all of the eroded sediments (Megahan & Ketcheson, 1996). The amount of sediment transported from road surfaces is highly variable within and among road surface types, with variability related to levels of maintenance and road drainage (Clinton & Vose, 2003). Gravel surface roads produce less sediment than native surface roads because the larger gravel particles protect the finer material from being transported off of the road surface (Turaski, 2004; Clinton & Vose, 2003). Project road surfaces would be graveled with controlled drainage and routine maintenance.

Road erosion rates are usually highest when the road is newly constructed because of loose sediment and the lack of vegetation on cut and fill slopes, but rates decline quickly as the road surface becomes more stable and compacted, and cut and fill slopes develop a vegetation cover (Megahan, 1974; Megahan, Wilson, & Monson, 2001). Compacted road surfaces decrease the infiltration capacity and soil permeability, which increases surface runoff, resulting in accelerated water erosion, removal of vegetation, and increases in the production of fine sediment (Foreman & Alexander, 1998; Jones et al., 2000). Drainage water may then be rapidly delivered to stream networks, causing not only increases in magnitude, but increases in the frequency of peak discharge as well (Wemple et al., 1996; Jones et al., 2000).

The road density in the project area would increase and would provide increased public access into the area (Section 4.3.5). Areas with increased road density would reduce vegetative cover and

increase impermeable surface areas, resulting in more potential pathways for sediment delivery to headwaters of streams. Road density is frequently used as an overall index of the impacts of roads in a watershed because negative effects (e.g., higher runoff, increased sediment delivery to streams) increase with increased density (Foreman & Alexander, 1998). Increased public access is likely to result in new user-created roads (by OHVs) (Section 4.3.5). This would increase indirect impacts on water quality caused by an increase in runoff and sediment transport from disturbance due to user-created roads.

Impacts can occur from the physical disturbance that occurs from the construction and maintenance of stream crossings. The delivery of sediment to streams is further expedited when roads cross streams or where an insufficient buffer exists between cross-drainage outlets and the streams. Roadside ditches and road surfaces provide a direct conduit to streams for the transport of sediment and other pollutants that may be attached to or washed from the road surface by runoff. Locations where roads and water features intersect, or are in close proximity to one another, create areas of potential concern. Improperly functioning stream crossings can result in loss of the roadway through washouts and channel diversions (Furniss, Flanagan, & McFadin 2010). Roads associated with the project would cross intermittent streams and would be constructed with a gravel surface, which would reduce surface runoff and impacts on water quality.

Underground Collection System

Excavation activities or geologic material extraction for placement of the underground collection system may alter surface overflow and groundwater flow (BLM, 2005). Blasting, coring and trenching would alter the natural flow of water by fracturing bedrock and redirecting the flow path of the water resulting in adverse, long-term impacts on hydrology.

RHCAs

Surface disturbance by construction activities within RHCAs would directly remove riparian and wetland vegetation. This would reduce filtering of nutrients and sediment, and could increase water temperatures. The surface disturbances would result in indirect, adverse, short- and long-term downstream impacts on water quality from increased nutrients and sediment from surface runoff, increased stream temperature, and decreased streambank stability. Surface disturbance could degrade streams rated to be in proper functioning condition, which can withstand an influx of water, and remove excess nutrients and excess sediment from surface runoff. Surface disturbances from construction could also degrade streams rated to be in functional-at-risk with a downward trend, or rated to be in not functional categories. Streams in these categories would have little or no ability to remove excess nutrients and excess sediment from surface runoff, resulting in a greater impact on water quality. Downstream impacts could change the proper functioning condition rating of a stream, or result in a stream being 303(d) listed due to elevated sediment. Within the project area, construction surface disturbance would occur at or near the headwaters of Cedar Creek, House Creek, North Fork Salmon Falls Creek, Cottonwood Creek, China Creek, Browns Creek, Corral Creek, and Whiskey Slough. Each of these streams, with the exception of Browns Creek, is currently listed as impaired with a 303(d) designation (Table 3.1.4-2).

Fire

Construction activities occurring within recently burned areas could increase sedimentation to water bodies, resulting in short- and long-term indirect, adverse impacts to water quality and hydrology. Implementing design features (Appendix 2A) during construction such as erosion control measures to reduce sedimentation; implementing road design to reduce construction on steep or unstable slopes; requiring revegetation on exposed soils as soon as possible; and requiring a SWPPP would minimize adverse impacts on water quality and hydrology in areas that have been recently burned.

Snowpack

Areas with snowpack are important because of their potential to drain snowmelt onto nearby roads and modify the drainage within the larger watershed. A road located at the base of a snowdrift would receive large quantities of water during spring melting events, and subsequently would be damaged. Roads intersecting snowpacks may convert snowmelt infiltration area into locations where surface water runoff occurs via a lower-permeability road surface. These increased lower-permeability surface areas may affect flow to downstream water features such as springs and seeps or stream channels (URS, 2010). Adverse effects associated with roads crossing or within 300 feet of the snowpack are most likely in the spring when surface runoff from snowpack areas is occurring during the snowmelt (URS, 2010). Implementing design features (Appendix 2A) during construction such as erosion control measures to reduce sedimentation would minimize adverse impacts on water quality and hydrology in areas of snowpack and down gradient of snowpack during construction.

Slopes

Runoff from roads located on steep slopes is more likely to reach and adversely affect surface water features due to the additional volume of water that the feature must convey and the increased sediment load delivered by the runoff. The degree to which roads located on steep or moderate slopes would adversely affect watershed hydrology depends upon the presence or absence of other features in the landscape, such as water features, unvegetated lands, thin soils, or previously disturbed locations (URS, 2010). For this analysis, roads located on steep slopes (greater than 20 percent) are considered to have a high potential to adversely affect watershed hydrology. Roads located on moderate slopes (12 to 20 percent) are considered to have a medium potential to adversely affect watershed hydrology. Implementing design features (Appendix 2A) during construction such as erosion control measures to reduce sedimentation; implementing road design to reduce construction on steep or unstable slopes; requiring revegetation on exposed soils as soon as possible; and requiring a SWPPP would minimize adverse impacts on water quality and hydrology on hill slopes and down gradient of hill slopes.

Stream Crossings

Construction activities could affect water quality where project roads cross drainages. Such crossings could result in a major loss of existing riparian and wetland vegetation. This would have indirect, adverse, short- and long-term downstream impacts on water quality from increased nutrients and sediment from surface runoff, increased stream temperature, and decreased streambank stability.

Downstream impacts could change the proper functioning condition rating of a stream, or result in a stream being 303(d) listed due to elevated sediment. The removal of existing riparian and wetland vegetation could increase the establishment of non-native plant species and could indirectly result in major changes to the vegetation composition (Chambers, 2000). Return to pre-disturbance conditions in riparian areas could take between 5 to 10 years or more; therefore, impacts on riparian areas would be long-term in duration (Shaw & Clary 1996; Dwire, Rhoades, & Young, 2010).

Due to the use of vehicles and other motorized equipment during construction, potentially hazardous substances could be released (Section 4.3.7). Impacts on riparian and wetland vegetation and water quality would be likely if a release occurred near a stream or stream crossing. These materials could contaminate surface water through direct contact with water in a stream channel or through runoff to local streams. Implementing a Spill Prevention Control and Countermeasures Plan (SPCCP) (Appendix 2A) would minimize adverse impacts on water quality during construction.

The use of 20 million gallons (61 acre-feet) to 40 million gallons (122 acre-feet) of water for project construction as described in Section 2.4.2.19 would be the equivalent of irrigating approximately 2 acres of alfalfa for one season (Wright, 1988). Since the water source would come from an existing water right within the Salmon Falls Subbasin, the water quantity balance within the subbasin would not be appreciably impacted and are not discussed further.

Operation and Maintenance

Vehicle traffic during O&M activities on project roads, including Monument Springs Road, could directly impact riparian and wetland areas from surface disturbance, particularly at road crossings. Regular snow removal and road maintenance on project roads could impact wetland and riparian vegetation along roads by removing, crushing, or shearing and by increasing soil compaction along roads. The increased frequency of disturbance from road maintenance could result in changes to the species composition in wetland and riparian areas or alter the vegetation structure (Winward, 2000). Indirectly, this could result in a major long-term change to the composition and structure of riparian and wetland vegetation (Stohlgren, Bull, Otsuki, Villa, & Lee, 1998).

During operations, activities would be limited to daily trips by project pick-up trucks or sport-utility vehicles, with primary access to the project area over the Salmon Falls Dam. Vehicle traffic on roads can increase sediment production by generating surface material that can be easily transported during surface flow events, resulting in long-term, adverse impacts on water quality. Routine road maintenance would include grading and filling of ruts as necessary to maintain road useability. Road maintenance such as grading and disturbance by vehicles can temporarily increase erosion rates by renewing the supply of loose sediment on the road surface (Luce & Black, 1999). The gravel surface on the roads would be maintained, which would help to reduce sediment transport and impacts on water quality.

Snow removal and the resulting snow berms change the overland flow pathways and road runoff exit points. This redirects flow along road surfaces, and cause water buildup on the roads. Both may result

in erosion and increased sediment delivery to streams. To avoid water buildup on project roads, recommended snow removal procedures include providing frequent intervals for swales or cross-ditches to drain road surface water that comes from snow berms, and cutting frequent gaps in snow berms at cross-ditches.

Due to the use of vehicles and other motorized equipment during O&M, potentially hazardous substances could be released, such as diesel fuel, gasoline, lubricant oils, hydraulic fluid, antifreeze, transmission fluid, and lubricant grease. Lubricants and hydraulic fluids would also be potentially harmful or hazardous if a release were to occur during replacement of the fluids, as required per normal maintenance. These materials could contaminate surface water through direct contact with water in a stream channel or through runoff to local streams. Impacts would depend on the size of the release.

Design features listed in Appendix 2A would help reduce adverse impacts on water quality; specifically, implementing a SPCCP would minimize adverse impacts on water quality during O&M.

Decommissioning

Decommissioning the project would have similar impacts on riparian and wetland vegetation, water quality, and hydrology as those described for project construction. Direct impacts on wetland and riparian vegetation would occur when project roads, turbine foundations, and other project related infrastructure are removed during decommissioning, similar to construction. Removing these facilities could result in a long-term change to wetland and riparian vegetation community composition and structure due to revegetation after decommissioning. Design features implemented to revegetate disturbed areas with a BLM-approved seed mix, cuttings, and/or woody plantings would reduce the effects on riparian and wetland vegetation (Appendix 2A). Over the long term, fragmentation of riparian and wetland vegetation would be reduced.

Road decommissioning (removing roads from service) methods range from blocking the road entrance to road obliteration, in which the road surface is decompacted, culverts are removed, stream channels are reestablished, and the road bed is recontoured to natural topography (Foltz, Yanosek, & Brown, 2008). In one forest road study, obliterated roads delivered significantly less erosion and sediment to channels than un-obliterated roads (Madej, 2001). This suggests a long-term benefit of sediment reduction to streams by obliterating roads. However, removing culverts and recontouring the streambed are major excavation processes and can produce significant levels of sediment to the stream (Foltz, Yanosek, & Brown, 2008). Removal of the underground utilities, transmission line, substations, and other infrastructure would result in similar impacts on water resources as construction. Design features listed in Appendix 2A would help reduce adverse impacts on water quality as discussed under *Construction* above.

Alternative B1 (Proposed Action)

Construction

Construction activities would result in 812 acres of surface disturbance under this alternative including 296 acres associated with the construction and reconstruction of 83 miles of roads, which would have major, long-term, indirect adverse impacts on water quality.

Design features discussed in *Impacts Common to All Action Alternatives* in Section 4.2.1 would reduce impacts on riparian and wetlands during construction, O&M, and decommissioning. In addition to design features in Appendix 2A discussed in *Impacts Common to All Action Alternatives* above, design features in Appendix 2B would apply which would minimize impacts on riparian and wetland vegetation, water quality, and hydrology during construction. These include, but are not limited to, requiring a SWPPP, requiring a SPCCP, requiring a blasting control plan, requiring immediate revegetation in areas with surface disturbance according to the vegetation management plan, and not allowing construction activities within 200 feet of streams.

Within RHCAs, approximately 11.7 acres of short-term, 6 acres of long-term, and 2.4 acres of permanent surface disturbance would occur. Revegetation activities after construction would establish early seral intermittent riparian vegetation and in localized areas would result in long-term major changes to the riparian vegetation composition (for discussion of seral stages of vegetation, see Section 3.2.1). Wetland and riparian areas would be removed for the life of the project, which would result in a long-term major change to the existing riparian composition and increase fragmentation. Surface disturbance within RHCAs would lead to increased sedimentation in localized areas, which would have major, long-term, indirect adverse impacts on water quality.

Permanent surface disturbance due to construction activities would occur within 300 feet of known snowfields. This would have a major, direct, long-term adverse impact on area hydrology and major, indirect, long-term adverse impact on water quality. The project would create 118 acres of short-term disturbance, 42.2 acres of long-term disturbance, and 4.7 acres of permanent disturbance within 300 feet of known snowfields. Design features would minimize short-term impacts on water quality and hydrology during construction.

There would be 20 new stream crossings by new roads and 14 existing stream crossings by reconstructed roads which have the potential for both short- and long-term impacts on water quality due to potential of increased sedimentation. Wetlands and riparian areas would be removed for the life of the project, which would result in a long-term major change to the existing riparian composition and increase fragmentation.

Approximately 27 acres of surface disturbance, 19 short-term and 8 long-term, would occur on slopes greater than 20 percent. Approximately 93 acres of surface disturbance, 67 short-term and 26 long-term, would occur on slopes from 12-20 percent. Run-off from surface disturbance on steep slopes has the potential for both short- and long-term adverse impacts on water quality.

Under Alternative B1, there would be about 51 miles of underground collection trenches that would result in up to 84 acres of disturbance resulting in direct, adverse, long-term impacts on hydrology and indirect, short- and long-term adverse impacts on water quality.

Approximately 135 acres of surface disturbance is proposed within the 2007 Murphy Complex Fires boundary under Alternative B1, resulting in indirect, adverse, short- and long-term adverse impacts on water quality.

Through an amendment to the 1987 Jarbidge RMP (Section 2.5.3.3), this alternative would allow construction to take place at select locations within 500 feet of reservoirs, ponds, lakes, streams, wetlands, marshes, and riparian areas. There are ten locations where project features are proposed within 500 feet of streams. Impacts on one of the drainages are expected from construction of the site compound and/or northern O&M facility within an intermittent drainage. If transmission line structures are placed within 500 feet of the unnamed intermittent tributary to North Fork Salmon Falls Creek, additional impacts could occur. This RMP amendment would have adverse, indirect short- and long-term impacts on water quality associated with construction of the buildings and possibly transmission line structures, which would be minimized through the use of design features. The RMP amendment would also have adverse, direct, long-term impacts on hydrology by redirecting the flow path of water in the intermittent stream near the northern O&M facility.

Operation and Maintenance

Impacts on water quality and hydrology from O&M would be the same as those described under *Impacts Common to All Action Alternatives*. Under Alternative B1, removal of intermittent riparian and wetland vegetation could occur during road grading and snow removal activities on the 83 miles of project roads. In the long-term, O&M would indirectly result in a moderate change to riparian vegetation structure in the analysis area. The roads would impact water quality and hydrology as a result of increased road density and continued vehicle traffic during O&M activities, resulting in moderate, long-term, adverse impacts on water quality and hydrology.

Decommissioning

Removal of the underground utilities, transmission line, substations, and other infrastructure would result in similar impacts on riparian and wetland vegetation, water quality, and hydrology as construction. Decommissioning the project roads and underground utilities would result in surface disturbance of wetland and riparian vegetation that would be revegetated after project construction. In the long-term, decommissioning project roads and underground utilities would reduce fragmentation of riparian vegetation communities created from the wind energy facility. Decommissioning 62 miles of project roads, 170 wind turbine foundations, and 51 miles of underground collection system would result in adverse impacts on water quality through increased soil erosion and sedimentation. However, as described under *Construction*, design features would be applied that would minimize impacts on riparian and wetland vegetation, water quality, and hydrology.

Alternative B2a

Construction

General impacts on riparian and wetland vegetation, water quality, and hydrology from construction activities under both Phase I and Phase II would be similar to Alternative B1; however, construction of the project would occur in two phases. Phase I construction would result in 536 acres of total surface disturbance including 202 acres associated with the construction and reconstruction of 63 miles of roads. Seven to ten years later, Phase II would result in 301 acres of total surface disturbance, including 94 acres associated with the construction and reconstruction of 20 miles of roads. The total surface disturbance from Phase I and Phase II would be 837 acres, 25 acres more than under Alternative B1. The primary difference between the construction of Alternative B2a and Alternative B1 is that indirect impacts on water quality would be spread out over time. In addition to design features in Appendix 2A discussed in Section 4.1.4.2 *Impacts Common to All Action Alternatives* above, design features in Appendix 2B would apply which would minimize impacts on water quality and hydrology during construction. These include, but are not limited to, requiring a SWPPP, requiring a SPCCP, requiring a blasting control plan, requiring immediate revegetation in areas with surface disturbance according to the vegetation management plan, and not allowing construction activities within 200 feet of streams.

Within RHCAs, approximately 8.2 acres of short-term, 5.2 acres of long-term, and 1.3 acres of permanent surface disturbance is proposed under Phase I. Phase II would have approximately 5.2 acres of short-term disturbance, 1 acre of long-term, and 1.1 acre of permanent surface disturbance. The total surface disturbance within RHCAs for Phase I and Phase II would be 13.4 acres of short-term, 6.2 of long-term, and 2.4 acres of permanent disturbance. The removal of intermittent riparian vegetation communities would result in a long-term major change in vegetation composition. Surface disturbance within RHCAs would lead to increased sedimentation in localized areas which would have major, long-term, indirect adverse impacts on water quality.

Approximately 58.8 acres of short-term, 21 acres of long-term, and 2 acres of permanent surface disturbance due to construction activities during Phase I would occur within 300 feet of a known snowfield and have the potential to have a major, direct, long-term adverse impact on area hydrology and major, indirect, long-term adverse impact on water quality. Approximately 59.2 acres of short-term, 21.1 acres of long-term, and 2.6 acres of permanent surface disturbance due to construction activities in Phase II would occur within 300 feet of a known snowfield and have the potential to have a major, direct, long-term adverse impact on area hydrology and major, indirect, long-term adverse impact on water quality. Phase I and Phase II combined would result in the same number of acres of impact as Alternative B1. Design features would minimize short-term impacts on water quality and hydrology during construction.

There would be 20 new stream crossings by new roads and 9 existing stream crossings by reconstructed roads in Phase I and no new stream crossings by new roads and 5 existing stream crossings by reconstructed roads in Phase II. Stream crossings for Phase I and Phase II result in the

same number of crossings as Alternative B1, therefore the impacts would be the same, but would vary temporally.

The types of impacts on water quality and hydrology from surface disturbance on hill slopes would be similar to Alternative B1. Phase I would have approximately 19 acres of surface disturbance, 13 short-term and 6 long-term, that would occur on slopes greater than 20 percent and approximately 64 acres of surface disturbance, 45 short-term and 19 long-term, would occur on slopes from 12-20 percent. Phase II would have approximately 7 acres of surface disturbance, 6 short-term and 1 long-term, that would occur on slopes greater than 20 percent and approximately 30 acres of surface disturbance, 23 short-term and 7 long-term, would occur on slopes from 12-20 percent. The result of both Phase I and Phase II is the same acres of impact as Alternative B1, therefore the impacts would be the same, but would vary temporally.

The types of impacts on hydrology and water quality from underground collection trenching would be the same as Alternative B1; however, trenching would occur on approximately 35 miles (51 acres) during Phase I construction and approximately 15 miles (32 acres) during Phase II. Underground trenching for Phase I and Phase II result in the same acres of impact as Alternative B1, therefore, the impacts would be the same, but would vary temporally.

The types of impacts on water quality from construction activities occurring within the 2007 Murphy Complex Fires boundary would be the same as Alternative B1; however total surface disturbance from Phase I construction would occur on 74 acres and 62 acres under Phase II. The result of both Phase I and Phase II being built is the same acres of impact as Alternative B1, therefore the impacts would be the same, but would vary temporally.

The amendment to the 1987 Jarbidge RMP to allow construction, maintenance, and decommissioning to take place at select locations within 500 feet of reservoirs, ponds, lakes, streams, wetlands, marshes, and riparian areas would have the same impacts on water quality and hydrology as Alternative B1.

Operation and Maintenance

Impacts on riparian and wetland vegetation, water quality, and hydrology from O&M would be the same as those described under *Impacts Common to All Action Alternatives*. Increased road use during the O&M of Phase I and the construction of Phase II could increase short-term disturbance of riparian vegetation from road maintenance activities. Over the long term, O&M could indirectly result in a minor change to riparian vegetation structure in the analysis area, as described for Alternative B1. During Phase I, indirect impacts on water quality related to the use of 63 miles of roads as a result of continued vehicle traffic during O&M activities would occur. During Phase II, indirect impacts on water quality related to the use of 20 miles of roads as a result of continued vehicle traffic during O&M activities would occur. The result of both Phases I and Phase II being built is the same miles of road as Alternative B1, therefore the impacts on water quality would be the same, but would vary temporally.

Decommissioning

Impacts on riparian and wetland vegetation from decommissioning the project would be similar to those described in Alternative B1; however, impacts would occur in two phases separated by 7 to 10 years. Decommissioning Phase I and Phase II would have the same impacts on water quality as described for Alternative B1.

Alternative B2b

Construction

General impacts on riparian and wetland vegetation, water quality, and hydrology from construction activities under both Phase I and Phase II would be similar to Alternative B1; however, construction of the project would occur in two phases. Phase I construction would result in 523 acres of total surface disturbance including 192 acres associated with the construction and reconstruction of 62 miles of roads. Seven to ten years later, Phase II would result in 313 acres of total surface disturbance including 103 acres associated with the construction and reconstruction of 21 miles of roads. The total surface disturbance from Phase I and Phase II would be 836 acres, 24 acres more than under Alternative B1. The primary difference between the construction of Alternative B2b and Alternative B1 is that indirect impacts on water quality would be temporal. Design features in Appendix 2A, as discussed in Section 4.1.4.2 *Impacts Common to All Action Alternatives* above, would apply which would minimize impacts on water quality and hydrology during construction. These include, but are not limited to, requiring a SWPPP, requiring a SPCCP, requiring a blasting control plan, and requiring immediate revegetation in areas with surface disturbance according to the vegetation management plan.

Within RHCAs, approximately 9.7 acres of short-term, 5.0 acres of long-term, and 2.4 acres of permanent surface disturbance is proposed under Phase I. Phase II would have approximately 3.7 acres of short-term disturbance, 1.2 acres of long-term disturbance, and no permanent surface disturbance. The total surface disturbance within RHCAs for Phase I and Phase II would be 13.4 acres of short-term, 6.2 of long-term, and 2.4 acres of permanent disturbance. The removal of intermittent riparian vegetation communities would result in a long-term moderate change in community composition. Surface disturbance within RHCAs would lead to increased sedimentation in localized areas which would have major, long-term, indirect adverse impacts on water quality.

Approximately 95 acres of short-term, 32.5 acres of long-term, and 4.7 acres of permanent surface disturbance due to construction activities during Phase I would occur within 300 feet of a known snowfield and have the potential to have a major, direct, long-term adverse impact on area hydrology and major, indirect, long-term adverse impact on water quality. Approximately 23.1 acres of short-term and 13.3 acres of long-term surface disturbance due to construction activities would occur in Phase II within 300 feet of a known snowfield. This would have the potential to have a major, direct, long-term adverse impact on area hydrology and major, indirect, long-term adverse impact on water quality. Phase I and Phase II combined would result in the same number of acres of impact as Alternative B1. Design features would minimize short-term impacts on water quality and hydrology during construction.

There would be 19 new stream crossings by new roads and 14 existing stream crossings by reconstructed roads in Phase I and 1 new stream crossing by new roads and no existing stream crossings by reconstructed roads in Phase II. Stream crossings for Phase I and Phase II result in the same number of crossings as Alternative B1, therefore the impacts would be the same, but would vary temporally.

The types of impacts on water quality and hydrology from surface disturbance on hill slopes would be similar to Alternative B1. Phase I would have approximately 18 acres of surface disturbance, 12 short-term and 6 long-term, that would occur on slopes greater than 20 percent and approximately 60 acres of surface disturbance, 43 short-term and 17 long-term, would occur on slopes from 12-20 percent. Phase II would have approximately 10 acres of surface disturbance, 8 short-term and 2 long-term, that would occur on slopes greater than 20 percent and approximately 33 acres of surface disturbance, 24 short-term and 9 long-term, would occur on slopes from 12-20 percent. The result of both Phase I and Phase II is the same acres of impact as Alternative B1, therefore the impacts would be the same, but would vary temporally.

The types of impacts on hydrology and water quality from underground collection trenching would be the same as Alternative B1; however, trenching would occur on approximately 29 miles (48 acres) during Phase I construction and approximately 21 miles (36 acres) during Phase II. Underground trenching for Phase I and Phase II result in the same acres of impact as Alternative B1, therefore, the impacts would be the same, but would vary temporally.

The types of impacts on water quality from construction activities occurring within the 2007 Murphy Complex Fires boundary would be the same as Alternative B1; however, total surface disturbance in burned areas from Phase I construction would occur on 114 acres and 21 acres under Phase II. The result of both Phase I and Phase II being built is the same as Alternative B1; therefore, the impacts would be the same but would vary temporally.

The amendment to the 1987 Jarbidge RMP to allow construction, maintenance, and decommissioning to take place at select locations within 500 feet of reservoirs, ponds, lakes, streams, wetlands, marshes, and riparian areas would have the same impacts on water quality and hydrology as Alternative B1.

Operation and Maintenance

Impacts on riparian and wetland vegetation, water quality, and hydrology from O&M would be the same as those described under *Impacts Common to All Action Alternatives*. Over the long term, O&M could indirectly result in a moderate change to riparian vegetation structure in the analysis area, as described for Alternative B1. During Phase I, indirect impacts on water quality related to the use of 62 miles of roads as a result of continued vehicle traffic during O&M activities would occur. During Phase II, indirect impacts on water quality related to the use of 21 miles of roads could result. The result of both Phases I and Phase II being built is the same miles of road as Alternative B1, therefore the impacts on water quality would be the same, but would vary temporally.

Decommissioning

Impacts on riparian and wetland vegetation from decommissioning the project would be similar to those described in Alternative B1; however, impacts would occur in two phases separated by 7 to 10 years. Decommissioning Phase I and Phase II would have the same impacts on water quality as described for Alternative B1.

Alternative B2c

Construction

General impacts on riparian and wetland vegetation, water quality, and hydrology from construction activities under both Phase I and Phase II would be similar to Alternative B1; however, construction of the project would occur in two phases. Phase I construction would result in 564 acres of total surface disturbance including 234 acres associated with construction and reconstruction of 70 miles of roads. Seven to ten years later, Phase II would result in 267 acres of total surface disturbance including 60 acres associated with the construction and reconstruction of 13 miles of roads. The total surface disturbance from Phase I and Phase II would be 831 acres, 19 acres more than under Alternative B1. The primary difference between the construction of Alternative B2c and Alternative B1 to indirect impacts on water quality would be temporal. Design features in Appendix 2A discussed in Section 4.1.4.2 *Impacts Common to All Action Alternatives* above would apply and would minimize impacts on water quality and hydrology during construction. These include, but are not limited to, requiring a SWPPP, requiring a SPCCP, requiring a blasting control plan, and requiring immediate revegetation in areas with surface disturbance according to the vegetation management plan.

Within RHCAs, approximately 8.5 acres of short-term, 5.0 acres of long-term, and 2.3 acres of permanent surface disturbance is proposed under Phase I. Phase II would have approximately 4.9 acres of short-term disturbance, 1.3 acres of long-term, and no permanent surface disturbance. The total surface disturbance within RHCAs for Phase I and Phase II would be 13.4 acres of short-term, 6.2 of long-term, and 2.4 acres of permanent disturbance. The long-term removal of riparian vegetation communities along intermittent streams and wetlands would result in a long-term moderate change to the existing community composition. Surface disturbance within RHCAs would lead to increased sedimentation in localized areas which would have major, long-term, indirect adverse impacts on water quality.

Approximately 67 acres of short-term, 30 acres of long-term, and 4.7 acres of permanent surface disturbance due to construction activities during Phase I would occur within 300 feet of a known snowfield and have the potential to have a major, direct, long-term adverse impact on area hydrology and major, indirect, long-term adverse impact on water quality. Approximately 51 acres of short-term and 15.7 acres of long-term surface disturbance due to construction activities in Phase II would occur within 300 feet of a known snowfield and have the potential to have a major, direct, long-term adverse impact on area hydrology and major, indirect, long-term adverse impact on water quality. Phase I and Phase II combined would result in the same number of acres of impact as Alternative B1.

Design features would minimize short-term impacts on water quality and hydrology during construction.

There would be 19 new stream crossings by new roads and 13 existing stream crossing by reconstructed roads in Phase I and 1 new stream crossing by new roads and 1 existing stream crossing by reconstructed roads in Phase II. Stream crossings for Phase I and Phase II result in the same number of crossings as Alternative B1, therefore the impacts would be the same, but would vary temporally.

The types of impacts on water quality and hydrology from surface disturbance on hill slopes would be similar to Alternative B1. Phase I would have approximately 20 acres of surface disturbance, 13 short-term and 7 long-term, that would occur on slopes greater than 20 percent and approximately 65 acres of surface disturbance, 44 short-term and 21 long-term, would occur on slopes from 12-20 percent. Phase II would have approximately 7 acres of surface disturbance, 6 short-term and 1 long-term, that would occur on slopes greater than 20 percent and approximately 33 acres of surface disturbance, 24 short-term and 9 long-term, would occur on slopes from 12-20 percent. The result of both Phase I and Phase II is the same acres of impact as Alternative B1, therefore the impacts would be the same, but would vary temporally.

The types of impacts on hydrology and water quality from underground collection trenching would be the same as Alternative B1; however, trenching would occur on approximately 30 miles (50 acres) during Phase I construction and approximately 21 miles (35 acres) during Phase II. Underground trenching for Phase I and Phase II result in the same acres of impact as Alternative B1, therefore, the impacts would be the same, but would vary temporally.

The types of impacts on water quality from construction activities occurring within the 2007 Murphy Complex Fires boundary would be the same as Alternative B1 and would occur during Phase I construction.

The amendment to the 1987 Jarbidge RMP to allow construction, maintenance, and decommissioning to take place at select locations within 500 feet of reservoirs, ponds, lakes, streams, wetlands, marshes, and riparian areas would have the same impacts on water quality and hydrology as Alternative B1.

Operation and Maintenance

Impacts on riparian and wetland vegetation, water quality, and hydrology from O&M would be the same as those described under *Impacts Common to All Action Alternatives*. Over the long term, O&M could indirectly result in a moderate change to riparian vegetation structure in the analysis area, as described in Alternative B1. During Phase I, indirect impacts on water quality would occur related to the use of 70 miles of roads of continued vehicle traffic during O&M activities would occur. During Phase II, indirect impacts on water quality related to the use of 13 miles of roads from continued

vehicle traffic during O&M activities. The result of both Phases I and Phase II being built is the same miles of road as Alternative B1, therefore the impacts would be the same, but would vary temporally.

Decommissioning

Impacts on riparian and wetland vegetation from decommissioning the project would be similar to those described in Alternative B1; however, impacts would occur in two phases separated by 7 to 10 years. Decommissioning Phase I and Phase II would have the same impacts on water quality as described for Alternative B1.

Alternative C

Construction

General impacts on riparian and wetland vegetation, water quality, and hydrology from construction activities would be similar to Alternative B1; however, would result in 745 acres of disturbance including 280 acres associated with the construction and reconstruction of 80 miles of roads. Total surface disturbance would be 67 fewer acres than Alternative B1. Design features in Appendix 2A discussed in Section 4.1.4.2 *Impacts Common to All Action Alternatives* above would apply, which would minimize impacts on water quality and hydrology during construction. These include, but are not limited to, requiring a SWPPP, requiring a SPCCP, requiring a blasting control plan, and requiring immediate revegetation in areas with surface disturbance according to the vegetation management plan.

Within RHCAs, approximately 10 acres of short-term, 5.9 acres of long-term, and 2.3 acres of permanent surface disturbance would occur, which would be 1.7 fewer acres of short-term impacts than Alternative B1. This would result in a moderate loss of riparian vegetation communities and a minor decrease in fragmentation of this type of community relative to Alternative B1. Surface disturbance within RHCAs would lead to increased sedimentation in localized areas, which would have major, long-term, indirect adverse impacts on water quality.

Approximately 116.2 acres of short-term, 42.2 acres of long-term, and 4.7 acres of permanent surface disturbance due to construction activities would occur within 300 feet of a known snowfield and have the potential to have a major, direct, long-term adverse impact on area hydrology and major, indirect, long-term adverse impact on water quality. Design features would minimize short-term impacts on water quality and hydrology during construction, resulting in 1.8 less acres of impact than Alternative B1.

There would be 20 new stream crossings by new roads and 13 existing stream crossing by reconstructed roads in Alternative C, resulting in one less existing stream crossing and less impact on riparian and wetland vegetation and water quality due to potential sedimentation than Alternative B1.

The types of impacts on water quality and hydrology from surface disturbance on hill slopes would be similar to Alternative B1. However, approximately 26 acres of surface disturbance, 19 short-term and 7 long-term, would occur on slopes greater than 20 percent and approximately 86 acres of surface

disturbance, 61 short-term and 25 long-term, would occur on slopes from 12-20 percent. The result is eight fewer acres of impact than Alternative B1.

The types of impacts on hydrology and water quality from underground collection trenching would be the same as Alternative B1; however, trenching would occur on approximately 44 miles (72 acres). This would be 7 miles and 12 acres less than Alternative B1, resulting in fewer impacts on hydrology and water quality.

The types of impacts on water quality from construction activities occurring within the 2007 Murphy Complex Fires boundary would be the same as Alternative B1.

The amendment to the 1987 Jarbidge RMP to allow construction, maintenance, and decommissioning to take place at select locations within 500 feet of reservoirs, ponds, lakes, streams, wetlands, marshes, and riparian areas would have the same impacts on water quality and hydrology as Alternative B1.

Operation and Maintenance

Impacts on riparian and wetland vegetation, water quality, and hydrology from O&M would be the same as those described under *Impacts Common to All Action Alternatives*. Over the long term, O&M could indirectly result in a moderate change to riparian vegetation structure in the analysis area, as described in Alternative B1. The removal of riparian and wetland vegetation could occur during road grading and snow removal activities on the 80 miles of project roads that cross drainages, 3 miles less than Alternative B1. Indirect impacts on water quality related to the use of 80 miles of roads as a result of continued vehicle traffic during O&M activities would occur, resulting in 3 fewer miles of road that would contribute impacts on water quality and hydrology than Alternative B1.

Decommissioning

Indirectly, decommissioning the project would reduce the extent of intermittent riparian community fragmentation in localized areas. However, decommissioning fewer miles of project roads would reduce long-term changes to intermittent riparian vegetation communities relative to Alternative B1. Decommissioning this alternative would have the same type of impacts on water quality as described for Alternative B1, but would impact fewer miles and acres. Alternative C would decommission 59 miles of road (3 miles less than Alternative B1), 152 turbines (18 less than Alternative B1), and 44 miles of underground collection system (7 miles less than Alternative B1), which would result in fewer impacts on hydrology and water quality than Alternative B1.

Alternative D

Construction

General impacts on riparian and wetland vegetation, water quality, and hydrology from construction activities would be similar to Alternative B1; however, would result in 631 acres of total surface disturbance including 240 acres associated with the construction and reconstruction of 72 miles of

roads. Total surface disturbance would be 181 fewer acres than Alternative B1. Design features in Appendix 2A discussed in Section 4.1.4.2 *Impacts Common to All Action Alternatives* above would apply, which would minimize impacts on water quality and hydrology during construction. These include, but are not limited to, requiring a SWPPP, requiring a SPCCP, requiring a blasting control plan, and requiring immediate revegetation in areas with surface disturbance according to the vegetation management plan.

Within RHCAs, approximately 9.7 acres of short-term, 5.7 acres of long-term, and 2.3 acres of permanent surface disturbance would occur, which would be 2.4 fewer acres of short-term impacts than Alternative B1. This would result in a moderate long-term loss of intermittent riparian vegetation communities. Surface disturbance within RHCAs would lead to increased sedimentation in localized areas which would have major, long-term, indirect adverse impacts on water quality.

Approximately 114 acres of short-term, 41.6 acres of long-term, and 4.7 acres of permanent surface disturbance due to construction activities would occur within 300 feet of a known snowfield and have the potential to have a major, direct, long-term adverse impact on area hydrology and major, indirect, long-term adverse impact on water quality. Design features would minimize short-term impacts on water quality and hydrology during construction, resulting in 4.4 less acres of impact than Alternative B1.

There would be 20 new stream crossings by new roads and 13 existing stream crossings by reconstructed roads in Alternative D, resulting in one less existing stream crossing and less impact on riparian and wetland vegetation and water quality due to potential sedimentation than Alternative B1.

The types of impacts on water quality and hydrology from surface disturbance on hill slopes would be similar to Alternative B1. However, approximately 22 acres of surface disturbance, 15 short-term and 7 long-term, would occur on slopes greater than 20 percent and approximately 71 acres of surface disturbance, 50 short-term and 21 long-term, would occur on slopes from 12-20 percent. The result is the 27 fewer acres of impact as Alternative B1.

The types of impacts on hydrology and water quality from underground collection trenching would be the same as Alternative B1; however, trenching would occur on approximately 36 miles (59 acres). This would be 15 miles and 25 acres less than Alternative B1, resulting in fewer impacts on hydrology and water quality.

The types of impacts on water quality from construction activities occurring within the 2007 Murphy Complex Fires boundary would be the same as Alternative B1; but would occur on 86 acres, 49 less acres than Alternative B1.

The amendment to the 1987 Jarbidge RMP to allow construction, maintenance, and decommissioning to take place at select locations within 500 feet of reservoirs, ponds, lakes, streams, wetlands,

marshes, and riparian areas would have the same impacts on water quality and hydrology as Alternative B1.

Operation and Maintenance

Impacts on riparian and wetland vegetation, water quality, and hydrology from O&M would be the same as those described under *Impacts Common to All Action Alternatives*. Long-term, O&M could indirectly result in a moderate change to riparian vegetation structure in the analysis area, as described in Alternative B1. The removal of riparian and wetland vegetation could occur during road grading and snow removal activities on the 72 miles of project roads that cross drainages, 11 miles less than Alternative B1. Indirect impacts on water quality related to the use of 72 miles of roads as a result of continued vehicle traffic during O&M activities would occur, resulting in 11 fewer miles of road that would contribute impacts on water quality and hydrology than Alternative B1.

Decommissioning

Indirectly, decommissioning the project would reduce the extent of intermittent riparian community fragmentation in localized areas. However, decommissioning fewer miles of project roads would reduce long-term changes to intermittent riparian vegetation communities relative to Alternative B1. Decommissioning this alternative would have the same type of impacts on water quality as described for Alternative B1, but would impact fewer miles and acres. Alternative D would decommission 51 miles of road (11 miles less than Alternative B1), 124 turbines (46 less than Alternative B1), and 36 miles of underground collection system (15 miles less than Alternative B1), which would result in fewer impacts on hydrology and water quality than Alternative B1.

Alternative E

Construction

General impacts riparian and wetland vegetation, water quality, and hydrology from construction activities would be similar to Alternative B1; however, would result in 656 acres of surface disturbance including 259 acres associated with the construction and reconstruction of 76 miles of roads. Total surface disturbance would be 156 fewer acres than Alternative B1. Design features in Appendix 2A discussed in Section 4.1.4.2 *Impacts Common to All Action Alternatives* above would apply, which would minimize impacts on water quality and hydrology during construction. These include, but are not limited to, requiring a SWPPP, requiring a SPCCP, requiring a blasting control plan, and requiring immediate revegetation in areas with surface disturbance according to the vegetation management plan.

Within RHCAs, approximately 9.8 acres of short-term, 5.1 acres of long-term, and 2.4 acres of permanent surface disturbance would occur, which would be 1.9 fewer acres of short-term impacts than Alternative B1. This would result in a moderate loss of intermittent riparian vegetation communities. Surface disturbance within RHCAs would lead to increased sedimentation in localized areas which would have major, long-term, indirect adverse impacts on water quality.

Approximately 104.3 acres of short-term, 38.7 acres of long-term, and 4.7 acres of permanent surface disturbance due to construction activities would occur within 300 feet of a known snowfield and have the potential to have a major, direct, long-term adverse impact on area hydrology and major, indirect, long-term adverse impact on water quality. Design features would minimize short-term impacts on water quality and hydrology during construction, resulting in 17.2 less acres of impact than Alternative B1.

There would be 18 new stream crossings by new roads and 13 existing stream crossing by reconstructed roads in Alternative E, resulting in two less new stream crossings by new roads and one less existing stream crossing by reconstructed roads than Alternative B1. This would result in less impact on riparian and wetland vegetation and water quality due to potential sedimentation than Alternative B1.

The types of impacts on water quality and hydrology from surface disturbance on hill slopes would be similar to Alternative B1. However, approximately 22 acres of surface disturbance, 15 short-term and 7 long-term, would occur on slopes greater than 20 percent and approximately 69 acres of surface disturbance, 48 short-term and 21 long-term, would occur on slopes from 12-20 percent. The result is the 29 fewer acres of impact as Alternative B1.

The types of impacts on hydrology and water quality from underground collection trenching would be the same as Alternative B1; however, trenching would occur on approximately 42 miles (71 acres). This would be 9 miles and 13 acres less than Alternative B1, resulting in fewer impacts on hydrology and water quality.

The types of impacts on water quality from construction activities occurring within the 2007 Murphy Complex Fires boundary would be the same as Alternative B1; but would occur on 131 acres, 4 less acres than Alternative B1.

No amendments to the 1987 Jarbidge RMP would be granted under this alternative, so there would be no occupancy within 500 feet of reservoirs, ponds, lakes, streams, wetlands, marshes, and riparian areas. This would result in a slight reroute of a small portion of the transmission line and associated road which would reduce the number of stream crossings by two and reduce the potential for sediment delivery to streams. Not amending the RMP would have less adverse, indirect short- and long-term impacts on water quality and less adverse, direct, long-term impacts on hydrology associated with the construction of the buildings than the other action alternatives.

Operation and Maintenance

Impacts on riparian and wetland vegetation, water quality, and hydrology from O&M would be the same as those described under *Impacts Common to All Action Alternatives*. Over the long term, O&M could indirectly result in a moderate change to riparian vegetation structure in the analysis area, as described in Alternative B1. The removal of riparian and wetland vegetation could occur during road grading and snow removal activities on the 76 miles of project roads that cross drainages, 7 miles less

than Alternative B1. Approximately 76 miles of roads would be impacted as a result of continued vehicle traffic during O&M activities, resulting in 7 fewer miles of road that would contribute impacts on water quality and hydrology than Alternative B1.

Decommissioning

Indirectly, decommissioning the project would reduce the extent of intermittent riparian community fragmentation in localized areas. However, decommissioning fewer miles of project roads would reduce long-term changes to intermittent riparian vegetation communities relative to Alternative B1. Decommissioning this alternative would have the same type of impacts on water quality as described for Alternative B1, but would impact fewer miles and acres. Alternative E would decommission 55 miles of road (7 miles less than Alternative B1), 120 turbines (50 less than Alternative B1), and 42 miles of underground collection system (9 miles less than Alternative B1), which would result in fewer impacts on hydrology and water quality than Alternative B1.

Alternative F

Construction

General impacts on riparian and wetland vegetation, water quality, and hydrology from construction activities would be similar to Alternative B1; however, would result in 544 acres of surface disturbance including 214 acres associated with the construction and reconstruction of 66 miles of roads. Total surface disturbance would be 268 fewer acres than Alternative B1. Design features in Appendix 2A discussed in Section 4.1.4.2 *Impacts Common to All Action Alternatives* above would apply, which would minimize impacts on water quality and hydrology during construction. These include, but are not limited to, requiring a SWPPP, requiring a SPCCP, requiring a blasting control plan, and requiring immediate revegetation in areas with surface disturbance according to the vegetation management plan.

Within RHCAs, approximately 8.9 acres of short-term, 5.7 acres of long-term, and 2.3 acres of permanent surface disturbance would occur, which would be 2.8 fewer acres of short-term impacts than Alternative B1. This would result in a moderate loss of intermittent riparian vegetation communities. Long-term, revegetation activities would reduce fragmentation and would indirectly reduce changes to vegetation community composition relative to Alternative B1. Surface disturbance within RHCAs would lead to increased sedimentation in localized areas which would have major, long-term, indirect adverse impacts on water quality.

Approximately 106.5 acres of short-term, 40.6 acres of long-term, and 4.7 acres of permanent surface disturbance due to construction activities would occur within 300 feet of a known snowfield and have the potential to have a major, direct, long-term adverse impact on area hydrology and major, indirect, long-term adverse impact on water quality. Design features would minimize short-term impacts on water quality and hydrology during construction, resulting in 13.1 less acres of impact than Alternative B1.

There would be 20 new stream crossings by new roads and 13 existing stream crossing by reconstructed roads in Alternative F, resulting in one less existing stream crossing and less impact on riparian and wetland vegetation and water quality than Alternative B1.

The types of impacts on water quality and hydrology from surface disturbance on hill slopes would be similar to Alternative B1. However, approximately 16 acres of surface disturbance, 10 short-term and 6 long-term, would occur on slopes greater than 20 percent and approximately 57 acres of surface disturbance, 39 short-term and 18 long-term, would occur on slopes from 12-20 percent. The result is the 47 fewer acres of impact as Alternative B1.

The types of impacts on hydrology and water quality from underground collection trenching would be the same as Alternative B1; however, trenching would occur on approximately 26 miles (41 acres). This would be 25 miles and 43 acres less than Alternative B1, resulting in fewer impacts on hydrology and water quality.

The types of impacts on water quality from construction activities occurring within the 2007 Murphy Complex Fires boundary would be the same as Alternative B1; but would occur on 74 acres, 61 fewer acres than Alternative B1.

The amendment to the 1987 Jarbidge RMP to allow construction, maintenance, and decommissioning to take place at select locations within 500 feet of reservoirs, ponds, lakes, streams, wetlands, marshes, and riparian areas would have the same impacts on water quality and hydrology as Alternative B1.

Operation and Maintenance

Impacts on riparian and wetland vegetation, water quality, and hydrology from O&M would be the same as those described under *Impacts Common to All Action Alternatives*. Long-term, O&M could indirectly result in a moderate change to riparian vegetation structure in the analysis area, as described in Alternative B1. The removal of riparian and wetland vegetation could occur during road grading and snow removal activities on the 66 miles of project roads that cross drainages, 17 miles less than Alternative B1. Approximately 66 miles of roads would be impacted as a result of continued vehicle traffic during O&M activities, resulting in 17 fewer miles of road that would contribute impacts on water quality and hydrology than Alternative B1.

Decommissioning

Decommissioning this alternative would have the same type of impacts on water quality as described for Alternative B1, but would impact fewer miles and acres. Alternative F would decommission 46 miles of road (16 miles less than Alternative B1), 105 turbines (65 less than Alternative B1), and 26 miles of underground collection system (25 miles less than Alternative B1), which would result in fewer impacts on hydrology and water quality than Alternative B1.

4.1.4.3 Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Construction

General impacts on riparian and wetland vegetation, water quality, and hydrology from construction activities would be similar to those described above in *Impacts Common to All Action Alternatives.* The reconstruction of existing roads and construction of pull outs for the roads comprising the northern inbound haul route (39 acres) could result in short-term increased erosion and sedimentation in localized areas over this 119-mile route in the Bruneau and C. J. Strike Reservoir Subbasins. Design features for road construction would minimize impacts on water quality and hydrology during construction.

Use of this route would increase for 2 years during the time of project construction (3 years for the phased alternatives). Increased use of this route would have the potential to temporarily affect water quality through increased sedimentation and potential for hazardous material spills.

Within RHCAs, approximately 2 acres of permanent disturbance would occur, which would result in a minor permanent loss of wetland and riparian vegetation communities and localized minor changes in wetland and riparian vegetation community composition. Surface disturbance within RHCAs would lead to increased sedimentation in localized areas which would have major, long-term, indirect adverse impacts on water quality.

There would be four existing stream crossings affected by reconstructing roads which have the potential for both short- and long-term impacts on water quality due to potential of increased sedimentation.

The types of impacts on water quality and hydrology from surface disturbance on hill slopes would be similar to those described above in *Impacts Common to All Action Alternatives.* Approximately 0.4 acres of permanent surface disturbance would occur on slopes greater than 20 percent and approximately 1.4 acres of permanent surface disturbance would occur on slopes from 12-20 percent.

Approximately 0.2 acres of surface disturbance is proposed within the Elk Mountain Fire boundary (within the Murphy Complex Fires), resulting in indirect, adverse, short- and long-term adverse impacts on water quality and hydrology.

Operation and Maintenance

As the northern inbound haul route would be used approximately once per year for major maintenance of the wind energy facility, maintenance of this haul route is expected to have negligible impacts on riparian and wetland vegetation, water quality, and hydrology.

Decommissioning

This haul route is an already established roadway and would not be decommissioned; there would be no impacts on riparian and wetland vegetation, water quality, and hydrology from decommissioning.

Southern Inbound Haul Route Option 1

Construction

Option 1 of the southern inbound haul route would adversely impact water quality and hydrology through increased erosion and sedimentation along 11 miles of roadway that would result in up to 63 acres of permanent disturbance.

The creation of a staging area along this option of the southern inbound haul route would result in 23 acres of short-term disturbance. The 23 acres of short-term surface disturbance would have minor, short-term impacts on water quality twice, as the staging area would be revegetated after Phase I and redisturbed during Phase II construction. The staging area would then be revegetated upon the completion of Phase II. This option of the (southern inbound haul route is contained within areas with medium or greater potential for water erosion Section 4.1.3). Use of this route would increase for 2 years during the time of project construction (3 years for the phased alternatives) and would have the potential to affect water quality through increased sedimentation due to construction in the short-term and sedimentation levels would be expected to reduce over the long term. Design features for road construction would minimize impacts on water quality and hydrology during construction.

Within RHCAs, 22 acres of permanent surface disturbance would occur. Wetlands and riparian areas would be permanently removed, which would result in a permanent, major change to the existing riparian composition, increase fragmentation, and increase indirect impacts. Surface disturbance within RHCAs would lead to increased sedimentation in localized areas which would have major, long-term, indirect adverse impacts on water quality.

There would be 18 new or reconstructed stream crossings on option 1 of the southern inbound haul route, resulting in both short- and long-term impacts on hydrology and water quality. Of particular concern is the stream crossing over Cottonwood Creek which is a 303(d) listed water body and would occur on soils with high water erosion potential.

The types of impacts on water quality and hydrology from surface disturbance on hill slopes would be similar to those described under *Impacts Common to All Action Alternatives*. Approximately 14.4 acres of surface disturbance, 0.4 acres of short-term and 14 acres of permanent, would occur on slopes greater than 20 percent and approximately 17.8 acres of surface disturbance, 14 acres of short-term and 3.8 acres of permanent, would occur on slopes from 12-20 percent. Run-off from surface disturbance on steep slopes has the potential for both short- and long-term adverse impacts on water quality.

Approximately 87 acres of surface disturbance is proposed within the 2007 Murphy Complex Fires boundary, resulting in indirect, adverse, short-term and long-term adverse impacts on water quality and hydrology.

Operation and Maintenance

Impacts on water quality and hydrology from O&M would be the same as those described under *Impacts Common to All Action Alternatives*. Approximately 11 miles of roads and 18 stream crossings could be impacted as a result of continued vehicle traffic during O&M activities.

Decommissioning

This option of the southern inbound haul route would not be decommissioned and permanent vegetation loss would not be reclaimed at Cottonwood Creek. Not decommissioning this route would result in long-term use of the road and permanent, adverse, indirect impacts on water quality and hydrology.

Southern Inbound Haul Route Option 2

Construction

The reconstruction of the existing road and construction of new roads for option 2 of the southern inbound haul route would adversely impact riparian and wetland vegetation by removing riparian vegetation. Road reconstruction in areas along option 2 of the southern inbound haul route would result in a minor permanent loss of riparian vegetation communities, which would result in minor changes in riparian vegetation communities. The reconstruction of existing road and construction of new roads for option 2 of the southern inbound haul route would adversely impact water quality and hydrology through increased erosion and sedimentation along 13 miles of roadway that would result in up to 67 acres of permanent disturbance.

The creation of a staging area for option 2 the southern inbound haul route would result in 23 acres of short-term disturbance. The 23 acres of short-term surface disturbance would have minor, short-term impacts on water quality twice, as the staging area would be revegetated after Phase I and redisturbed during Phase II construction. The staging area would then be revegetated upon the completion of Phase II. This option of the southern inbound haul route is contained within areas with medium or greater potential for water erosion (Section 4.1.3). Use of this route would increase for 2 years during the time of project construction (3 years for the phased alternatives) and would have the potential to affect water quality through increased sedimentation due to construction in the short-term and sedimentation levels would be expected to reduce over the long term. Design features for road construction would minimize impacts on water quality and hydrology during construction.

Within RHCAs, 24 acres of permanent surface disturbance would occur. Wetlands and riparian areas would be permanently removed, which would result in a permanent, major impact and change to the existing riparian composition, increase fragmentation, and increase indirect impacts. Surface

disturbance within RHCAs would lead to increased sedimentation in localized areas which would have major, long-term, indirect adverse impacts on water quality.

There would be 18 new or reconstructed stream crossings on option 2 of the southern inbound haul route, resulting in both short- and long-term impacts on water quality and hydrology. Of particular concern is the stream crossing over Cottonwood Creek area which is a 303(d) listed water body and would occur on soils with high water erosion potential.

The types of impacts on water quality and hydrology from surface disturbance on hill slopes would be similar to those described under *Impacts Common to All Action Alternatives*. Approximately 14.8 acres of surface disturbance, 0.2 acres of short-term and 14.6 acres of permanent, would occur on slopes greater than 20 percent and approximately 15.9 acres of surface disturbance, 2.9 acres of short-term and 13 acres of permanent, would occur on slopes from 12-20 percent. Run-off from surface disturbance on steep slopes has the potential for both short- and long-term adverse impacts on water quality.

Approximately 75 acres of surface disturbance is proposed within the 2007 Murphy Complex Fires boundary, resulting in indirect, adverse, short-term and long-term adverse impacts on water quality and hydrology.

Operation and Maintenance

Impacts on water quality and hydrology from O&M would be the same as those described under *Impacts Common to All Action Alternatives*. Approximately 13 miles of roads and 18 stream crossings would be impacted as a result of continued vehicle traffic during O&M activities.

Decommissioning

This option of the southern inbound haul route would not be decommissioned and permanent riparian and wetland vegetation loss would not be reclaimed at Cottonwood Creek. Not decommissioning this route would result in long-term use of the road and permanent, adverse, indirect impacts on water quality and hydrology.

Outbound Haul Route

Construction

No construction would take place along the outbound haul route. However, use of this 60-mile route would increase for 2 years during the time of project construction (3 years for the phased alternatives). Increased use of this route would have the potential to indirectly increase opportunities for noxious weeds and invasive plants establishment in riparian and wetland areas resulting minor changes to riparian and wetland vegetation community composition. It would also temporarily affect water quality through increased sedimentation temporarily during construction.

Operation and Maintenance

The outbound haul route would be used approximately once per year for major maintenance of the wind energy facility, maintenance of this haul route is expected to have negligible impacts on riparian and wetland vegetation, water quality, and hydrology.

Decommissioning

This haul route is already an established roadway and would not be decommissioned; there would be no impacts on riparian and wetland vegetation, water quality, and hydrology from decommissioning.

4.1.4.4 Project as a Whole

The project as a whole includes the project disturbance area and inbound haul route (northern or southern). The primary impacts on riparian and wetland vegetation and water resources from the proposed project are tied to the area of surface disturbance from the construction, operation, and eventual decommissioning of the wind energy facility, the proximity of the disturbance to water features, and the potential of altering riparian and wetland vegetation, water quality, and hydrology identified for each alternative. These primary analysis indicators are summarized below for each alternative and the inbound haul routes (Table 4.1.4-1).

Table 4.1.4-1. Summary of Project Area Surface Disturbance (in acres) from Construction Including the Northern Inbound Haul Route and Both Options of the Southern Inbound Haul Route by Primary Indicators for Riparian and Wetland Vegetation, Water Quality, and Hydrology.

ALT	Roads (acres/ miles)	RHCAs[1]				Snow-fields[2]	Number of Stream Crossings[3]				Slope[4] 12-20%				Slope[4] >20%				Acres/ Miles of Trenching	2007 Murphy Complex Fires		
	PA	PA[5]	NHR[6]	SHR1[7]	SHR2	PA	PA	NHR	SHR1	SHR2	PA	NHR	SHR1	SHR2	PA	NHR	SHR1	SHR2	PA	PA	SHR1	SHR2
B1	296/83	20	22	42	44	165	14/20 (34)	38	52	52	67/26 (93)	67/27 (94)	81/30 (111)	70/39 (109)	19/8 (27)	19/8 (27)	19/22 (41)	19/23 (42)	84/51	135	222	210
B2a Phase I	202/63	15	17	37	39	82	9/20 (29)	33	47	47	45/19 (64)	45/20 (65)	59/13 (72)	48/32 (80)	13/6 (19)	13/16 (19)	13/20 (33)	13/21 (34)	51/35	74	161	149
B2a Phase II (I+II)	94/20 (296/83)	7 (22)	7 (24)	7 (44)	7 (46)	83 (165)	5/0 (34)	5/0 (38*)	5/0 (52*)	5/0 (52*)	23/7 (30)	23/7 (95)	23/7 (102)	23/7 (110)	6/1 (7)	6/1 (26)	6/1 (40)	6/1 (41)	33/15 (84/51)	62 (136)	62 (223)	62 (211)
B2b Phase I	192/62	17	19	39	41	132	14/19 (33)	37	51	51	43/17 (60)	43/18 (61)	57/21 (78)	46/30 (76)	12/6 (18)	12/6 (18)	12/20 (32)	12/21 (33)	48/29	21	108	96
B2b Phase II (I+II)	103/21 (296/83)	5 (22)	5 (24)	5 (44)	5 (46)	36 (168)	0/1 (34)	0/1 (38*)	0/1 (52*)	0/1 (52*)	24/9 (33)	24/9 (94)	24/9 (111)	24/9 (109)	8/2 (10)	8/2 (28)	8/16 (42)	8/17 (43)	36/21 (84/51)	114 (135)	114 (222)	114 (210)
B2c Phase I	233/70	16	18	38	40	102	13/19 (32)	36	50	50	43/21 (63)	44/21 (65)	57/24 (81)	46/33 (79)	13/7 (20)	13/7 (20)	13/21 (34)	13/22 (35)	50/30	135	222	210
B2c Phase II (I+II)	60/13 (296/83)	6 (22)	6 (24)	6 (44)	6 (46)	67 (169)	1/1 (34)	1/1 (38*)	1/1 (52*)	1/1 (52*)	24/9 (33)	24/9 (98)	24/9 (114)	24/9 (112)	6/1 (7)	6/1 (27)	6/1 (41)	6/1 (42)	35/21 (85/51)	0 (135)	0 (222)	0 (210)
C	280/80	18	20	40	42	163	13/20 (33)	37	51	51	61/25 (86)	61/26 (87)	75/29 (104)	64/38 (102)	19/7 (26)	19/7 (26)	19/21 (40)	19/22 (41)	72/44	135	222	210
D	240/72	18	20	40	42	160	13/20 (33)	37	51	51	50/21 (71)	50/22 (72)	64/25 (89)	53/34 (87)	15/7 (22)	15/7 (22)	15/21 (36)	15/22 (37)	59/36	86	173	161
E	259/76	17	19	39	41	148	13/18 (31)	35	49	49	48/21 (69)	48/22 (70)	62/25 (87)	51/34 (85)	15/7 (22)	15/7 (22)	15/21 (36)	15/22 (37)	71/42	131	218	206
F	214/66	17	19	39	41	152	13/20 (33)	37	51	51	39/18 (57)	39/19 (58)	53/22 (75)	42/31 (73)	10/6 (16)	10/6 (16)	10/20 (30)	10/21 (31)	41/26	74	161	149

Note: All numbers have been rounded.

[1] Includes the total number of acres of disturbance within RHCAs.

[2] Includes the total number of acres of disturbance within 300 feet of a known snowfield (as defined in the 2010 Results of Hydrology Assessment for Proposed China Mountain Wind Energy Project). Note: snowfields have not been identified for the haul routes, so impacts could not be assessed.

[3] Stream crossings: proposed for reconstruction/new roads (Total road crossings). *Phase I + Phase II + haul route

[4] Project disturbance occurring on slopes from 12-20 percent and on slopes greater than 20 percent: short-term/long-term (total).

[5] PA = total acres of surface disturbance within RHCAs within the project area.

[6] NHR = total acres of surface disturbance within RHCAs within the project area plus the northern inbound haul route.

[7] SHR1 or SHR2 = total acres of surface disturbance within RHCAs within the project area plus either option 1 or option 2 of southern inbound haul route.

The phased alternatives would result in the most acres of permanent surface disturbance within RHCAs and Alternative F would have the least. The phased alternatives when combined with southern inbound haul route option 1 would result in the most acres of permanent surface disturbance within RHCAs; 7 acres more than when combined with southern inbound haul route option 2. Alternative F when combined with the northern inbound haul route would have the least acres of permanent surface disturbance within RHCAs. Phase B2b would have the most acres of disturbance in snowfields and Alternative E would have the least. The number of streams crossings varies between alternatives by one stream crossing and when combined with the northern inbound haul route would have the most stream crossings; 58 more than combined with southern inbound haul route option 1 and 64 more than combined with southern inbound haul route option 2. Alternative B1 would have the most acres of surface disturbance on slopes from 12-20 percent and Alternative F would have the least. Alternative B1 when combined with southern inbound haul route option 1 would have the most acres of surface disturbance on slopes from 12-20 percent. Alternative F when combined with the northern inbound haul route would have the least surface disturbance on slopes from 12-20 percent. Alternative B1 would have the most acres of surface disturbance on slopes from greater than 20 percent and Alternative F would have the least. Alternative B1 when combined with southern inbound haul route option 2 would have the most acres of surface disturbance on slopes greater than 20 percent. Alternative F when combined with the northern inbound haul route would have the least surface disturbance on slopes greater than 20 percent. Alternative B1 and the phased alternatives have the most acres and miles of trenching and Alternative F has the least. Alternative B2a has the most acres of surface disturbance in areas of the 2007 Murphy Complex Fires and Alternative F has the least. Alternative B1 when combined with southern inbound haul route option 1 would have the most acres of surface disturbance in areas of the 2007 Murphy Complex Fires and Alternative F in combination with southern inbound haul route option 2 has the least.

4.1.4.5 Cumulative Impacts

Cumulative impacts on riparian and wetland vegetation, water quality, and hydrology consist of incremental effects of the alternatives when added to other past, present, and reasonably foreseeable future actions. These effects can occur over a long period of time, resulting in gradual changes in wetland and riparian vegetation communities by removing existing wetland and riparian vegetation and increasing the extent of early seral vegetation. Water quality due to sedimentation and hydrological function would also experience gradual changes. The cumulative effects analysis area for the proposed alternatives and both options of the southern inbound haul route for riparian and wetland vegetation, water quality, and hydrology is the Salmon Falls Subbasin.

The cumulative effects analysis area for the northern inbound haul route is the C.J. Strike Reservoir Subbasin and is considered with the proposed Gateway West 500 kV transmission line project (which would occur in the C.J. Strike Reservoir subbasin). The Gateway West 500 kV transmission line project when considered with the northern inbound haul route would have slight short-term and long-term adverse impacts on water quality and minor impacts on hydrology in those subbasins.

Alternative A (No Action Alternative)

The No Action Alternative in combination with the past and present actions listed in Table 4.0.2-1 and past and ongoing motorized vehicle use, livestock grazing, and wildfires can result in incremental increases of sedimentation to the headwaters of intermittent and perennial streams within the subbasins. Motorized vehicle use is expected to continue at current or increased levels. This is expected to maintain, or increase, existing levels of sedimentation into water bodies. Livestock grazing is expected to remain at current levels and the frequency and scale of wildfire are expected to continue at current or increased levels. Adverse impacts on water quality associated with livestock use and wildfire would also be expected to continue at current or increased levels.

Surface disturbance from these actions could result in moderate long-term effects on wetland and riparian vegetation communities by removing existing wetland and riparian vegetation and increasing the extent of early seral vegetation if these areas are revegetated. Existing hydrologic processes including erosion and sedimentation would continue to occur. With the trend of increased use of public lands, stream segments that are already suffering degradation are likely to get worse. These impacts, when added to future surface disturbing activities, would result in hydrological alteration and minor adverse impacts on the subbasins due to increased sedimentation.

All Action Alternatives

Past and ongoing surface disturbance has occurred in localized areas throughout the Salmon Falls Creek, Bruneau, C.J. Strike Reservoir, and Upper Snake Rock Subbasins from projects listed in Table 4.0.2-1. This localized site disturbance when added to past and ongoing motorized vehicle use, livestock grazing and wildfires can result in incremental increases of nutrient and sediment delivery to the headwaters of intermittent and perennial streams within the four subbasins. These impacts when added to future surface disturbing activities, including this project would result in moderate long-term effects on wetland and riparian vegetation communities by removing existing wetland and riparian vegetation and increasing the extent of early seral vegetation, if these areas are revegetated. Hydrological alteration and adverse impacts on water quality in the subbasin due to increased nutrient and sediment delivery would also occur.

4.1.5 NOISE

The following section describes the assessment of temporary and long-term predicted noise impacts due to project construction, O&M, and decommission. For explanation of acoustical terminology that is used in this analysis, the reader should refer to the Noise Technical Report prepared for the project file and summarized in Appendix 3B.

4.1.5.1 Analysis Methods

Indicators

The indicators for noise impact assessment are typically absolute or relative threshold criteria, established by applicable laws, ordinances, and regulations. In the absence of these enforceable

standards, relevant guidance can be used to develop reasonable indicators as described in the following paragraphs.

Noise Levels

While the Nevada Revised Statutes (NRS) include NRS 244.363, which empowers counties to create and enforce noise ordinances (State of Nevada, 2010), Elko County does not currently have a noise ordinance (Elko County Planning Department, 2009). Similarly, while the 2008 Comprehensive Plan for Twin Falls County indicates that development of a noise ordinance is a desired policy (Twin Falls County Comprehensive Plan, 2008); there is currently no enforceable noise ordinance for Twin Falls County at this time.

Due to this lack of applicable state and county criteria for defining an absolute or relative threshold for acceptable operational noise from the project, one could consider an exterior day-night noise level (L_{dn}) of 55 A-weighted decibel (dBA) from the United States (U.S.) EPA "levels document" on community noise (Environmental Protection Agency, 1974). The U.S. Department of Housing and Urban Development Noise Guidebook Chapter 2 (24 CFR Section 51.101(a) (8)) also recommends that exterior areas of frequent human use follow this EPA guideline of 55 dBA L_{dn}.

However, in remote rural settings such as those that represent the project area, a lower guidance threshold based on probability of causing human listener annoyance might be more appropriate when assessing potential noise impact. For instance, a doubling of perceived outdoor sound level (i.e., a rise of 10 dBA) could be considered capable of generating public reaction characterized as "from sporadic and widespread complaints to threats of community action" (Bies & Hansen, 2003). As Section 3.1.5.4 indicates the predicted existing outdoor sound level is 35 dBA L_{dn}, then 45 dBA L_{dn} might thus be a better guidance threshold of potential noise impact than the higher EPA-based 55 dBA L_{dn} value.

The usage of "potential" here is important, because actual ambient noise levels vary with location and contribution of sound sources and thus creates both a variable ambient level and a correspondingly 10 dBA higher guidance threshold to determine possible impact. For example, where localized existing ambient noise levels might already be 45 dBA L_{dn}, due to the proximity of a roadway or other noise source(s), the corresponding guidance threshold would be 10 dBA higher or 55 dBA L_{dn} —the same as the EPA guidance criterion. Should pre-project ambient noise levels already be higher than 45 dBA L_{dn} at some locations, it would be conservative and reasonable to apply the 55 dBA L_{dn} EPA-based guidance criterion.

Therefore, for noise impact analysis in this section, the appropriate indicator for outdoor locations associated with human receivers would be (again, in the absence of laws, ordinances, regulations, and standards-based criteria) the lower of two values: pre-project ambient plus 10 dBA, represented conservatively as 45 dBA L_{dn}, and the EPA-based 55 dBA L_{dn}.

Consistent with the Noise Technical Report analysis prepared for the project record, potential noise impact on human receivers is assessed at six representative landmarks that are primarily associated with recreational activities (e.g., hunting and dispersed camping) and are not known to have permanent occupants. These landmarks are located east of the project area and include, from north to south, Rock House Place, Harrell Place, China Creek Ranch, Duncan Place, Player Place, and Brown's Bench Ranch. All but Brown's Bench Ranch are in Idaho. Rock House Place is the closest to the project area, about 0.5 miles from the northern tip of the ROW preference area. Brown's Bench Ranch is about 2.5 miles east of the Nevada portion of the ROW preference area.

There are no known construction noise thresholds established in Federal, state, or local laws, ordinances, regulations, and standards. Thus, potential construction noise levels have been estimated hypothetically for the project and compared with the already stated guidance thresholds. Note that construction activities would take place over a period lasting up to 24 months (although this time frame could be spread over up to 4 years, depending on the alternative and for the phased alternatives construction activities could happen in two separate periods up to 10 years apart) and the locations of construction would move within the project boundary. Thus, potential noise impacts from such construction activities would be considered temporary.

Noise Levels for Wildlife

As described in the Noise Technical Report prepared for the project record, there are no Federal guidelines for determining acceptable sound or vibration levels for terrestrial wildlife. Thresholds for noise impacts on wildlife vary based on the species and their sensitivity to noise disturbance, and research to identify and support these thresholds is ongoing. For instance, Larkin's literature review of wildlife noise impacts (Larkin, 1997) presents the following finding for ungulates such as pronghorn antelope:

> "Pronghorn antelope subject to the approach of an OH-58 helicopter exhibited no reaction and strong reaction at 60 dBA and 77 dBA, respectively. The animals typically experience 36 to 40 dBA wind noise."

As a more current example, the University of California, Davis has been conducting multi-year research relating to potential environmental effects on sage-grouse—including noise from natural gas extraction facilities. To summarize one of its studies, when exposed to reproductions of man-made sound sources (such as drilling operations and truck pass-bys) at a sound pressure level (SPL) magnitude of 55 dBA (when measured 52.5 feet [16 meters] from a concealed amplified outdoor speaker assembly), sage-grouse lek attendance has been observed to decline over a three-year period by at least 38 percent (Blickley, 2010) when contrasted with an otherwise comparable but unexposed control lek. While the reproduced noise sources utilized in the experimental study might be considered similar to construction noise for the project, it is not clear (based on study progress and availability of data as of the date of this Draft EIS) that 55 dBA L_{eq} should be considered the appropriate threshold for assessing construction noise impact on this or other avian species in the project area. This uncertainty could be expressed by the following sample questions:

- While the 55 dBA at 52.5 feet (16 meters) tells us something about the noise source used in the experiment, what sound level caused sage-grouse to not attend the lek? In other words, was there adverse effect when the sage-grouse was closer to the noise source, where the measured level would be higher?
- What observations of sage-grouse behavior would be considered adequate to substantiate this threshold sound level or corresponding distance between the avian and the outdoor speaker?

Additional research may help provide defensible answers to these kinds of questions, but they are not available at this time and are beyond the scope of this EIS.

Without a defined numerical threshold as an indicator, potential noise impacts on wildlife from construction, O&M, and decommissioning activities shall (for purposes of this analysis) qualitatively be considered more likely and/or more intense when the project-related sources of noise are relatively close to the known wildlife habitat and cause predicted sound levels that substantially exceed what would otherwise be the masking level of the ambient sound environment. In other words, potential noise impacts would be less likely and/or less intense when the project noise and the ambient sound environment are relatively close in magnitude. In the absence of a numerical threshold, noise impacts to wildlife are not addressed separately by alternative.

Methods and Assumptions

The analysis area for noise includes the project area and additional area bounded by a perimeter approximately 2 miles from the furthest extent of wind turbine layout positions as contemplated in the alternatives under consideration, and 2 miles from each side of the haul routes under consideration.

Construction

The construction schedule of any project alternative, or either of the defined phases within applicable alternatives, would take place over a period of up to 24 months, although this time frame could be spread over up to 4 years, depending on the alternative. The project would utilize conventional construction techniques and equipment including excavators, bulldozers, heavy trucks (e.g., water truck, dump truck), cranes, and similar heavy construction equipment. The amount of construction equipment and the number of workers in any given area of the project area would vary, but activity would tend to be concentrated in certain areas and then move as the wind turbines would be erected sequentially from one foundation location to an adjacent one and so on. These variations would also result in varying levels of construction-related noise. Blasting may be necessary for roadway and foundation construction activities.

Conventional construction activities at the project site would result in a temporary increase in the ambient noise level resulting from the operation of construction equipment. The increase in noise level would primarily be experienced close to the noise source. The estimated magnitude of the noise effects would depend on the type of construction activity, noise level generated by construction equipment, duration of the construction, and the distance between the noise source and receiver as

described in Appendix 4A. Appendix 2A includes suggested design features that should help reduce construction and blasting activity noise or reduce the intensity of predicted impact.

Estimating potential noise impact from haul truck traffic includes the following assumptions:

- The estimated maximum 1,654 total truck loads (Section 2.4.2.5) is on average evenly spread over 200 business days, and transport is limited to eight daytime hours of a normal work shift (e.g., 9 AM to 5 PM). This results in an average occurrence of approximately one truck pass-by per hour.
- A truck travels 25 miles per hour (40 kilometers/hour) on the road.
- Ambient sound levels are estimated as 35 dBA L_{eq} during the day (i.e., the 8-hour work shift), 30 dBA L_{eq} in the evening (non-daytime and non-nighttime hours), and 25 dBA L_{eq} at night (10 PM to 7 AM) (Section 3.1.5).
- Per data from Table 6 of the Federal Highway Administration *Traffic Noise Model Look-Up Tables* (Federal Highway Administration, 1998), a single heavy truck would be expected to exhibit an hourly L_{eq} of 48 dBA at a distance of 33 feet over "soft" (i.e., acoustically absorptive) ground. Potential noise-sensitive receivers are no closer than this 33 feet distance from the road.

Quarrying, Rock Crushing, and Concrete Batch Plant Operations

While noise produced from these construction-related activities would likely include sound from specialized equipment, for purposes of this assessment it is assumed that the dominant noise producers would be a pair of simultaneously operating diesel-powered trucks. Since this assumption essentially produces the same expression for estimating SPL_{CN} as detailed in Appendix 4A, the locations corresponding with these activities should therefore be added to the consideration where heavy equipment noise might occur during project construction.

Operation and Maintenance

As also used to predict aggregate wind turbine operation noise in the Noise Technical Report prepared for the project record, the Cadna/A® Noise Prediction Model (Version 4.0.135) was used to estimate the project-generated operation sound levels over the project area, with specific attention at each of six identified representative landmarks (associated with recreational land uses), for the Proposed Action (Alternative B1) and seven action alternatives under consideration.

Decommissioning

For purposes of this predictive impact assessment and on the basis of anticipated heavy construction equipment used and intensity of expected activity over a period of time, it is assumed that project decommissioning would involve the same potential for noise impacts as project construction. It is also assumed that no measurable rise in the ambient environmental noise would occur between construction and decommissioning due to non-project activities or other noise-producing phenomena.

Estimating potential noise impact from haul truck traffic would include the same assumptions as described for construction.

4.1.5.2 Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

The No Action Alternative involves no construction, operation or decommissioning of the project; thus, no noise impacts are anticipated. Existing background noise levels in the project area and vicinity would continue including noise from: general recreational uses, occasional aircraft, traffic on area roads and highways, and other noise already present in the project area.

Impacts Common to All Action Alternatives

Since determination of a noise impact is based on exceeding a particular decibel level, and only when there is a receiver present, this analysis considers impact intensity as a measure of how far the decibel threshold is exceeded. In other words, the impact intensity would be defined by the difference between the predicted noise level and the impact indicator as follows:

- **Minor** – Less than 3 dBA, considered slight but detectable by the average healthy human ear.
- **Moderate** – A difference of 3 to 5 dBA, considered readily apparent and a noticeable change.
- **Major** – Greater than 5 dBA, considered highly noticeable.

Due to the nature of sound propagation, in which noise level decreases with increasing distance from a source, the difference between a predicted project noise level and the applicable indicator (and thus expected impact intensity as proposed above) can vary with distance between a noise-sensitive receiver and the dominant noise source(s).

Construction

Over the duration of project construction, activities and equipment associated with construction, which might include blasting events, would temporarily raise outdoor noise levels above current ambient environmental sound levels. As the distance between construction activity noise source(s) and noise-sensitive receivers may vary with alternative, potential construction noise impacts at each of six identified representative recreational land use landmarks are considered per alternative. Note that any such impacts are considered temporary.

Additionally, an impact is considered temporary due to the limited duration of listener exposure to the noise, which would depend on the duration of recreational activity or land use in the immediate vicinity of an identified representative location. For instance, the hunting season for sage-grouse is only 7 days in September (Idaho Department of Fish and Game [IDFG], 2010), during which time the immediate vicinity of an identified representative location might be used as a camping area.

Noise from construction activities would temporarily impact wildlife using the project area. The degree of impact would depend on the noise level, the species, and the proximity of the animal to the

activity. Human-generated noise is known to affect animals in a range of ways, from annoyance, to chronic stress, to hearing loss. Noise may directly affect reproductive physiology or energetic consumption as individuals incur energetic costs or lose mating or foraging opportunities by repeatedly reacting to or avoiding noise. Animals may also be forced to retreat from favorable habitat to avoid aversive anthropogenic noise levels.

Though the direct effects of noise on wildlife may be the most obvious, noise may also have indirect effects on population dynamics through changes in habitat use, foraging, predator avoidance, courtship and mating, reproduction and parental care, and possibly local patterns of wildlife movement. Excessive or persistent noise may also affect mortality rates of adults by causing hearing loss, a serious hazard in predator-prey interactions. Other effects of noise on wildlife are likely to be subtler, such as those affecting intra-specific and inter-specific communication. In species that rely on acoustic communication, anthropogenic noise may adversely affect individual behavior by making signal detection difficult and thus altering the dynamic interaction between the producers and perceivers of communicative signals (Larkin, 1997). However, it cannot always be assumed that human-generated noise will necessarily have a negative effect. One reason is that, although natural environments can be quiet, natural noise (e.g., high winds, rainfall, thunderclaps) is part of the natural world and adaptations to a noisy environment predate modern-day noises generated by humans.

Operation and Maintenance

Operation of project wind turbines, the expected dominant noise producers, would raise outdoor noise levels above current ambient environmental sound levels within a range or distance from specific wind turbine locations. As the distance between the operating wind turbines and noise-sensitive receivers may vary with alternative, potential operation noise impacts and their intensities at each of six identified representative recreational land use landmark locations are considered per alternative. Predictions of project operation noise at these sample locations appear in Appendix 4A and resemble what was presented in the Noise Technical Report prepared for the project record. Note that although the expected project operation period is not temporary, the transient and/or short-duration presence of human receivers in the project area associated with recreational land use is considered temporary in nature. Therefore, in this context and due to the lack of known permanent human occupants (i.e., typical of an occupied residential dwelling or residential community) in the project noise analysis area, operational noise impacts are considered temporary.

While the pad-mounted electrical transformer at the base of each wind turbine creates noise and is at ground level, its sound power is likely to be much less than that of the sum of aerodynamic noise sources associated with the moving wind turbine rotor blades.

Anticipated noise from regular project maintenance would include infrequent vehicle travel on project area roads that interconnect the wind turbine locations. Some human activity is also expected at the project operations administrative and support buildings or structures. However, compared to the aggregate of project wind turbines, these are not considered dominant or continuous sources of significant project noise.

Research on the potential effects of noise and vibration on wildlife continues to develop, showing that these effects can vary with species, settings, seasons, and other parameters that remain undiscovered or require better understanding. As discussed in Section 4.1.5.1, without a defined numerical threshold as an indicator, potential noise impacts on wildlife from O&M are qualitatively considered more likely and/or more intense when the project-related sources of noise are relatively close to the known wildlife habitat and cause predicted sound levels that substantially exceed what would otherwise be the masking level of the ambient sound environment. Therefore, the closer an animal is to the noise source (such as a turbine), the greater the likelihood of an adverse impact.

Recent studies suggest that certain species either adapt when their environment becomes noisier, or the masking of normal acoustical cues seems to challenge both prey and predator in what one might call with relatively equal measure. Examples of each of these findings, in like order, are as follows:

> "Our study suggests that ground squirrels may be able to cope with turbines and their associated acoustic noise through behavioral modifications in a predatory context… The fact that California ground squirrels appear to be able to adjust their behavior appropriately to cope with the presence of turbines is not surprising since *Spermophilus beecheyi* has demonstrated its ability to live in a variety of habitats under a variety of anthropogenic modifications." (Rabin et al., 2006)

> "A 5 dB increase in background sound level (in the frequency band of the acoustic signal) means prey species could experience a 45 percent reduction in the distance at which they can hear a predator approaching, and predators that hunt using acoustic cues might experience a 70 percent reduction in search area. Similar calculations apply to animal communication." (Barber et al., 2009)

Decommissioning

During the period of project decommissioning, activities and equipment associated with demolition, dismantling wind turbines and ancillary systems, and reclaiming and/or restoring project lands to some level of pre-project effect, would temporarily raise outdoor noise levels above ambient environmental sound levels within a range or distance from a specific activity. As the distance between decommissioning activity noise source(s) and noise-sensitive receivers may vary with alternative, potential noise impacts and their intensities at each of six identified representative recreational land use landmarks are considered per alternative. Note that any such impacts are considered temporary. Further, an impact would be considered temporary due to the limited duration of listener exposure to the noise, which would depend on the duration of recreational activity or land use in the immediate vicinity of this location.

Noise from decommissioning activities would temporarily impact wildlife using the project area, as discussed for Construction.

Alternative B1 (Proposed Action)

Construction

Of the six representative recreation land use locations shown in the Noise Technical Report, only Rock House Place, which is approximately 2,600 feet (793 meters) from the closest wind turbine location, is within a distance range where project construction sound would exceed 45 dBA L_{dn} by more than 5 dBA and would thus be expected to experience a major temporary noise impact.

Should blasting be required, a temporary major impact would be anticipated at Rock House Place during a blast event.

Operation and Maintenance

With respect to the 45 dBA L_{dn} indicator, the 52 dBA L_{dn} future ambient predicted for a listener at Rock House Place as shown in Appendix 4A would result in expectations of a major temporary noise impact, while a listener at Browns Bench Ranch would hear a predicted 46 dBA L_{dn} future ambient and thus only be expected to experience a minor temporary noise impact.

Decommissioning

As predicted for construction activity, temporary impacts are expected from decommissioning. After decommissioning, ambient environmental noise would (assuming no measurable rise in the ambient due to non-project activities or other noise-producing phenomena) likely return to pre-project levels.

Alternative B2a

Construction

Of the six representative recreation land use locations shown in the Noise Technical Report, only Rock House Place is within a distance range where project construction sound would exceed 45 dBA L_{dn} by more than 5 dBA and would thus be expected to experience a major temporary noise impact occurring with Phase I. During Phase II, construction noise sources would be too distant to cause impacts at any of the six representative locations.

Given the impact avoidance distance for blasting activities, a temporary major impact is anticipated at Rock House Place during a Phase I blast event.

Operation and Maintenance

With respect to the 45 dBA L_{dn} indicator, the 52 dBA L_{dn} future ambient predicted for a listener at Rock House Place as shown in Appendix 4A would result in expectations of a major temporary noise impact, while a listener at Browns Bench Ranch would hear a predicted 46 dBA L_{dn} future ambient and thus only be expected to experience a minor temporary noise impact during operation of Phase I. Upon completion of Phase II, the project wind turbine layout would resemble that of Alternative B1, have the same predicted SPL values, and thereby have the same expected temporary noise impacts.

Decommissioning

As predicted for construction activity, temporary impacts are expected from decommissioning. After decommissioning, ambient environmental noise would likely return to pre-project levels.

Alternative B2b

Construction

Of the six representative recreation land use locations shown in the Noise Technical Report, only Rock House Place is within a distance range where project construction sound would exceed 45 dBA L_{dn} by more than 5 dBA and would thus be expected to experience a major temporary noise impact occurring with Phase I. During Phase II, construction noise sources would be too distant to cause impacts at any of the six representative locations.

Given the impact avoidance distance for blasting activities, a temporary major impact is anticipated at Rock House Place during a Phase I blast event.

Operation and Maintenance

With respect to the 45 dBA L_{dn} indicator, the 52 dBA L_{dn} predicted for a listener at Rock House Place as shown in Appendix 4A would result in expectations of a major temporary noise impact during operation of Phase I.

Upon completion of Phase II, the project wind turbine layout would resemble that of Alternative B1, have the same predicted SPL values, and thereby have the same expected temporary noise impacts.

Decommissioning

As predicted for construction activity, temporary impacts are expected from decommissioning. After decommissioning, ambient environmental noise would (assuming no measurable rise in the ambient due to non-project activities or other noise-producing phenomena) likely return to pre-project levels.

Alternative B2c

Construction

During Phase I, construction noise sources would be too distant to cause impacts at any of the six representative recreation land use locations shown in the Noise Technical Report. During Phase II, only Rock House Place is within a distance range where project construction sound would exceed 45 dBA L_{dn} by more than 5 dBA and would thus be expected to experience a major temporary noise impact.

Based on the impact avoidance distances, a temporary major impact is anticipated at Rock House Place during a Phase II blast event.

Operation and Maintenance

After conclusion of Phase I construction, and with respect to the 45 dBA L_{dn} indicator, the 46 dBA L_{dn} future ambient predicted for a listener at Browns Bench Ranch as shown in Appendix 4A would result in expectations of a minor temporary noise impact.

Upon completion of Phase II, the project wind turbine layout would resemble that of Alternative B1, have the same predicted SPL values, and thereby have the same expected temporary noise impacts.

Decommissioning

As predicted for construction activity, temporary impacts are expected from decommissioning. After decommissioning, ambient environmental noise would (assuming no measurable rise in the ambient due to non-project activities or other noise-producing phenomena) likely return to pre-project levels.

Alternative C

Construction

Construction noise sources would be too distant to cause impacts at any of the six representative recreation land use locations shown in the Noise Technical Report.

None of the six identified representative recreation land use locations would be within the blasting impact avoidance distance range and would not be expected to experience an impact.

Operation and Maintenance

With respect to the 45 dBA L_{dn} indicator, the 46 dBA L_{dn} future ambient predicted for a listener at Browns Bench Ranch as shown in Appendix 4A would result in expectations of a minor temporary noise impact.

Decommissioning

As predicted for construction activity, temporary impacts are expected from decommissioning. After decommissioning, ambient environmental noise would (assuming no measurable rise in the ambient due to non-project activities or other noise-producing phenomena) likely return to pre-project levels.

Alternative D

Construction

Construction noise sources would be too distant to cause impacts at any of the six representative recreation land use locations shown in the Noise Technical Report.

None of the six identified representative recreation land use locations would be within the blasting impact avoidance distance range and would not be expected to experience an impact.

Operation and Maintenance

As predicted in Appendix 4A for listeners at the six representative recreation land use locations shown in the Noise Technical Report, no noise impacts are expected.

Decommissioning

As predicted for construction activity, temporary impacts are expected from decommissioning. After decommissioning, ambient environmental noise would (assuming no measurable rise in the ambient due to non-project activities or other noise-producing phenomena) likely return to pre-project levels.

Alternative E

Construction

Construction noise sources would be too distant to cause impacts at any of the six representative recreation land use locations shown in the Noise Technical Report.

None of the six identified representative recreation land use locations would be within the blasting impact avoidance distance range and would not be expected to experience an impact.

Operation and Maintenance

As predicted in Appendix 4A for listeners at the six representative recreation land use locations shown in the Noise Technical Report, no noise impacts are expected.

Decommissioning

As predicted for construction activity, temporary impacts are expected from decommissioning. After decommissioning, ambient environmental noise would (assuming no measurable rise in the ambient due to non-project activities or other noise-producing phenomena) likely return to pre-project levels.

Alternative F

Construction

Construction noise sources would be too distant to cause impacts at any of the six representative recreation land use locations shown in the Noise Technical Report.

None of the six identified representative recreation land use locations would be within the blasting impact avoidance distance range and would not be expected to experience an impact.

Operation and Maintenance

As predicted in Appendix 4A for listeners at the six representative recreation land use locations shown in the Noise Technical Report, no noise impacts are expected.

Decommissioning

As predicted for construction activity, temporary impacts are expected from decommissioning. After decommissioning, ambient environmental noise would (assuming no measurable rise in the ambient due to non-project activities or other noise-producing phenomena) likely return to pre-project levels.

4.1.5.3 Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Populated or potentially populated places along this route include Bruneau, Hot Springs, Winter Camp, and Three Creek. Using the assumptions for estimating potential noise impact from haul truck traffic described above in Section 4.1.5.1, the resulting day-night sound level (L_{dn}) is calculated to be less than either of the 45 dBA L_{dn} or 55 dBA L_{dn} guidance indicators. Therefore, no noise impacts would be expected due to haul truck traffic. Wildlife noise impact likelihood would increase with decreasing perpendicular distance between the route traffic noise (e.g., a truck or OHV pass-by) and the wildlife location.

Southern Inbound Haul Route Option 1

There are no known populated or potentially populated places along this proposed haul route; thus, there are no noise-sensitive receivers to impact. Based on assumptions in the previous subsection for the northern inbound haul route, wildlife noise impact likelihood would increase with decreasing perpendicular distance between the route traffic noise (e.g., a truck or OHV pass-by) and the wildlife location.

Southern Inbound Haul Route Option 2

Impacts would be the same as described for the southern inbound haul route option 1.

Outbound Haul Route

The proposed route for haul trucks exiting the project area would use House Creek Road and Lilly Grade, passing through (or near) the populated or potentially populated places of Roseworth and Castleford prior to joining Idaho Route 30. Therefore, noise impacts would be expected in these areas due to haul truck traffic. Per the assumptions for haul truck traffic described in Section 4.1.5.1, wildlife noise impact likelihood would increase with decreasing perpendicular distance between the route traffic noise (e.g., a truck or OHV pass-by) and the wildlife location.

4.1.5.4 Project as a Whole

Aside from potential wildlife noise impacts (Section 4.1.5.1 *Noise Levels for Wildlife*); Table 4.1.5-1 presents a summary of impacts for the considered alternatives. For applicable alternatives, it is understood that decommissioning would occur only after completion of both Phases. No noise impacts are expected from any of the haul routes, so only impacts from the wind facility are considered in the summary comparison. Alternatives D – F would have the fewest noise impacts, while implementation of Alternative B1 or any of the phased alternatives would result in the greatest impacts from noise.

Table 4.1.5-1. Impact Summary Table – Noise.

Alternative	Wind Facility with any of the Inbound Haul Routes
Alternative A: No Action	• No anticipated construction noise impacts. • No anticipated long-term operation noise impacts. • No anticipated decommissioning noise impacts. • No haul route noise impact expected.
Alternative B1	• Temporary major anticipated construction noise impact at Rock House Place. • Temporary major anticipated operation noise impact at Rock House Place and temporary minor anticipated operation noise impact at Brown Bench Ranch. • Decommissioning: anticipated temporary major noise impact at Rock House Place. • No haul route noise impact expected.
Alternative B2a – Phase I	• Temporary major anticipated construction noise impact at Rock House Place. • Temporary major anticipated operation noise impact at Rock House Place and temporary minor anticipated operation noise impact at Brown Bench Ranch. • No haul route noise impact expected.
Alternative B2a – Phase II	• No anticipated construction noise impact. • Temporary major anticipated operation noise impact at Rock House Place and temporary minor anticipated operation noise impact at Brown Bench Ranch. • Decommissioning: anticipated temporary major noise impact at Rock House Place. • No haul route noise impact expected.
Alternative B2b – Phase I	• Temporary anticipated major construction noise impact at Rock House Place. • Temporary anticipated major operation noise impact at Rock House Place. • No haul route noise impact expected.
Alternative B2b – Phase II	• No anticipated construction noise impact. • Temporary major anticipated operation noise impact at Rock House Place and temporary minor anticipated operation noise impact at Brown Bench Ranch. • Decommissioning: anticipated temporary major noise impact at Rock House Place. • No haul route noise impact expected.
Alternative B2c – Phase I	• No anticipated construction noise impact. • Temporary minor anticipated operation noise impact at Brown Bench Ranch. • No haul route noise impact expected.
Alternative B2c – Phase II	• Temporary anticipated major construction noise impact at Rock House Place. • Temporary anticipated major operation noise impact at Rock House Place and temporary minor anticipated operation noise impact at Brown Bench Ranch. • Decommissioning: anticipated temporary major noise impact at Rock House Place. • No haul route noise impact expected.

Table 4.1.5-1. Impact Summary Table – Noise (continued).

Alternative	Wind Facility with any of the Inbound Haul Routes
Alternative C	• No anticipated construction noise impacts. • Temporary minor anticipated operation noise impact at Brown Bench Ranch. • No anticipated decommissioning noise impacts. • No haul route noise impact expected.
Alternative D	• No anticipated construction noise impacts. • No anticipated operation noise impacts. • No anticipated decommissioning noise impacts. • No haul route noise impact expected.
Alternative E	• No anticipated construction noise impacts. • No anticipated operation noise impacts. • No anticipated decommissioning noise impacts. • No haul route noise impact expected.
Alternative F	• No anticipated construction noise impacts. • No anticipated operation noise impacts. • No anticipated decommissioning noise impacts. • No haul route noise impact expected.

4.1.5.5 Cumulative Impacts

Alternative A (No Action Alternative)

The No Action Alternative involves no construction or operation of the project; thus, no noise would add to the ambient sound environment and would result in no anticipated cumulative impact on the analysis area.

All Action Alternatives

Noise is a form of energy dissipation that, like light, has intensity that reduces with distance due to a variety of factors that include as follows:

- Geometrical divergence. This is the reason a light bulb looks less and less bright as you step back further away. Likewise, a sound source is louder when heard at close distances, but quieter when heard far away.
- Ground absorption. Loose soils and dense vegetation, or even fresh-fallen snow, creates a very porous ground surface that helps absorb traversing sound much in the same way that porous acoustical ceiling tile above an interior office or conference room helps reduce echoes.
- Air absorption. Warm temperatures and high humidity (i.e., more moisture in the air composition) make it easier for sound to travel outdoors than do drier, colder climate conditions.

Thus, at sufficient distance from the project, construction or operation noise would dissipate to a magnitude where it is effectively masked by the ambient sound environment. Other known and future

development in the vicinity of the project would be sufficiently distant to reasonably expect no cumulative noise impact resulting from any project alternative under consideration.

4.2 BIOLOGICAL RESOURCES

4.2.1 VEGETATION

This section discusses potential impacts on upland vegetation, special status plant (SSP) species and their occupied and potential habitat, and the introduction and spread of noxious weeds and invasive plants that could result from implementing the project. The analysis area for vegetation includes the project disturbance area and haul route disturbance area.

4.2.1.1 Analysis Methods

Indicators

The indicators for impacts on vegetation include the following:

- Number of acres of disturbance to upland vegetation groups found within the analysis area.
- Number of acres of disturbance to occupied and potential habitat for special status plant species.

Additional qualitative indicators include the potential for change in vegetation composition, dust deposition on vegetation, and introduction and spread of noxious weeds and invasive plants based on the extent of ground disturbance.

Methods and Assumptions

Impacts on vegetation are assessed by determining the number of acres of total, short-term, long-term, and permanent disturbance to upland vegetation groups and total acres of disturbance to occupied and potential SSP habitat for each alternative. In addition, the potential for changes to vegetation composition and the potential for establishment of noxious weeds and invasive plants from construction, O&M, and decommissioning project features and roads are assessed. For analysis purposes, potential habitat for each SSP species that is known or has the potential to occur within the project area or haul routes was modeled in Geographic Information System (GIS) using known elevation range, slope, and known upland plant group, where applicable (BLM, 2006; BLM, 2000; Flora of North America Editorial Committee, 1993; Hickman, 1993; and NatureServe, 2010). For slickspot peppergrass, mapped potential habitat was used (BLM, 2003).

Short-term disturbance would include the removal of existing vegetation, which would be revegetated with BLM-approved seed mix and cuttings and shrubs, where appropriate, after construction activities. Long-term disturbance would be the removal of vegetation from the analysis area for project facilities and roads that would remain through the anticipated 30-year project time span. Permanent impacts on vegetation and SSP occupied and potential habitat would result from project

features that would not be decommissioned, such as reconstructed of existing roads and haul routes. Total disturbance is the sum of short-term, long-term, and permanent disturbance.

The intensity of the impact on vegetation is defined as minor, moderate, or major. The intensity of the potential impacts means the degree to which the proposed project would affect vegetation. The definitions of intensity used in the analyses are based off the definitions provided in Section 4.0.2, but include specification related to vegetation. The definitions for intensity used in the analyses are provided below:

Minor: The effect on the vegetation is detectable but does not change the extent of vegetation coverage, seral stage, fire regime, or composition of the vegetation.

Moderate: The effect on vegetation is apparent. Project activities that result in moderate effects on vegetation could change the extent of vegetation coverage, seral stage, fire regime, or composition of the vegetation.

Major: The effect on vegetation is large and highly noticeable. Project activities that result in major effects on vegetation would change the extent of vegetation coverage, seral stage, fire regime, or composition of the vegetation.

The following assumptions were used when analyzing effects of the project on vegetation:

- Vegetation would be removed in all areas that are disturbed. Some areas would be revegetated (short-term disturbance).
- Adequate ground cover for site stabilization would occur within 2 to 5 years following seeding (Stevens & Monsen, 2004).
- Changes to the seral stage of vegetation groups would be influenced by the seeding method used (Allen, 1995; Downs, Rickard, & Cadwell, 1995).
- Noxious weeds and invasive plants would continue to be introduced and spread because of ongoing vehicle traffic in and out of the analysis area, recreational activities, wildlife and livestock grazing and movements, and wind.
- Increasing surface disturbance increases the potential for the establishment and spread of noxious weeds and invasive plant species.
- Newberry's milkvetch occupied habitat includes all incidental observation points (URS, 2010; buffered by 82 feet [25 meters]), to be consistent with Idaho Fish and Wildlife Information System (IFWIS) mapping standards (Idaho Fish and Wildlife Information System [IFWIS], 2010). Analyses for all other SSPs are based on disturbance to potential SSP habitat. Within potential habitat, SSPs may not occur, may be widespread, or may be very limited to isolated or localized areas within the potential habitat areas.
- Loss of individual SSPs, occupied habitat, or potential habitat could occur from natural or human-induced disturbances, including project disturbance or primary influences of existing conditions such as wildfire and fire rehabilitation, livestock grazing, motorized vehicles, invasive plant introduction and spread, or weather (BLM, 2010).

- Construction of Phase II of the three phased alternatives (B2a, B2b, B2c) would occur at year 9, approximately 7 years after completion of Phase I construction. Separation of impacts between phased alternatives would be between 7 to 10 years due to the 2-year construction period of Phase I, 7 years of monitoring post Phase I construction, and 1-year construction period of Phase II.

4.2.1.2 Direct and Indirect Impacts of the Wind Energy Facility

Alternative A: (No Action Alternative)

Uplands

Upland vegetation would continue to be managed by BLM, private landowners, and IDL. Vegetation would not be impacted from project construction, O&M, or decommissioning activities under the No Action Alternative. Vegetation would be maintained in the analysis area and would continue to be influenced by wildfires and fire rehabilitation, livestock grazing, motorized vehicle use, noxious weed and invasive plant introduction and spread, and weather, as described in Section 3.2.1. Dust deposition from existing vehicle use on roads in the analysis area could alter the composition of vegetation adjacent to roads.

Noxious Weeds and Invasive Plants

BLM management actions for noxious weeds and invasive plants would continue to focus on control (BLM, 2007a; BLM, 2007b). Wildlife, livestock, humans, OHV, and/or wind could continue to spread noxious weeds and invasive plants by transporting weed seed into open areas (Zouhar, 2003). Current BLM management could reduce the potential for introduction or spread of noxious weeds and invasive plants (Harrison et al., 1994).

Special Status Plants

SSPs and their habitat in the analysis area would continue to be managed by the BLM, private landowners, and IDL under the No Action Alternative. Current disturbances to SSPs and their habitat include roads and trails, livestock grazing and associated infrastructure, cross-country motorized vehicle use, habitat modification from introduction and establishment of noxious weeds and invasive plants, and altered fire regime (BLM, 2010). Management guidance for SSPs in the Jarbidge Field Office and Wells Field Office would continue to be proactive in protecting SSPs.

Impacts Common to All Action Alternatives

The project and associated infrastructure would impact vegetation through direct mortality, injury, or removal of vegetation; fugitive dust deposition; exposure to contaminants; the introduction and establishment of noxious weeds and invasive plants; and increased wildland fire risk. This section describes the types of impacts that could occur from any of the action alternatives during construction, O&M, and decommissioning of the wind energy facility and haul routes on upland vegetation and SSPs, and discusses the potential for establishment of noxious weeds and invasive plants. Design features listed in Appendix 2A and implemented during construction, O&M, and

decommissioning would reduce impacts on vegetation and SSPs and their occupied habitat and would reduce the potential establishment of noxious weeds and invasive plants.

Uplands

Construction

Vegetation removal and surface disturbance associated with construction of project features would be a major direct long-term impact on vegetation. Construction of new roads, reconstruction of existing roads, and construction of wind turbines would remove the most vegetation of all project features. Excavation, trampling, and accidental spills could indirectly change the composition of shrub-dominated vegetation communities (Prater & DeLucia, 2006; Byler, Harvey, Hessburg, Hann, & Long, 1994) to early seral grasslands. Removal of vegetation, change in vegetation composition, and soil disturbance would indirectly impact soil erosion (Section 4.1.3), air quality (Section 4.1.1), water quality (Section 4.1.4), fish and wildlife habitat and forage (Section 4.2.2), and forage available to livestock (Section 4.4.2). Overall, construction of the wind energy facility would have a major long-term impact on vegetation and vegetation composition in the analysis area. In areas where vegetation would be removed and not reclaimed (reconstructed roads and haul routes), vegetation loss would be permanent.

Soil compaction from heavy equipment used during construction of project roads, turbine foundations, and other project features, and in the laydown areas used to store equipment, could alter soil structure and function (Lei, 2007; Landsberg, Miller, Anderson, & Tepp, 2003). Indirectly this could reduce water infiltration, restrict deep root growth, and limit seed germination (Cline, 2008). The loss of topsoil and native seed bank during excavation and blasting for project roads, foundations, and underground utilities could lead to a short-term increase in soil erosion and decreased stability of vegetation communities (Brockway, Gatewood, & Paris, 2002); however, design features such as salvaging topsoil for reapplication during revegetation would reduce these impacts (Appendix 2A).

Revegetation after construction activities would change the composition of vegetation and would increase the amount of early seral vegetation groups in the analysis area. Early seral grassland communities would likely return in the short term; however, composition is dependent on the BLM-approved seed mix, cuttings, and shrubs planted during revegetation activities. Over the long term, revegetated areas would return to mid to late seral groups; however, reestablishing mid to late seral vegetation could take 30 years or more, depending on the vegetation group (Lesica, Cooper, & Kudray, 2007). Shrubland, dwarf shrubland, and shrubland/woodland vegetation classes (Section 3.2.1.1) would have greatest long-term impacts because of the long period of time it takes shrubs to reestablish after revegetation activities, and would be dependent on their inclusion in the revegetation management plan or adjacent vegetation. Design features such as keeping livestock off of revegetated areas until revegetation is deemed successful would help the success of revegetation efforts (Appendix 2A).

Increasing the number of roads would increase user access and use compared to Alternative A. The increased access would indirectly result in increased user-created roads and trails, which would

increase soil compaction (Lei, 2007) and indirect impacts on vegetation as described above. Crushing, shearing, and removal of vegetation could also result from user-created roads and trails.

Dust deposition on vegetation in areas adjacent to project roads could affect photosynthesis, respiration, transpiration, and reproduction (Farmer, 1993; Trombulak & Frissell, 2000). This could result in long-term changes to vegetation composition adjacent to roads. Design features and dust abatement techniques such as gravelling the roads, reducing travel speed to 20 miles per hour (mph), and application of dust suppressants (water) would help reduce these impacts (Appendix 2A).

Changes in the composition of vegetation and an increase in traffic and use could indirectly increase fire frequency and severity (Chambers et al., 2005; Ripplinger, 2010; Fire and Fuel Management Section 4.3.10). Implementation of wildland fire prevention and suppression measures could indirectly help retain existing vegetation resources. Prevention and suppression measures include the preparation and implementation of a fire prevention and suppression plan, use of equipment with spark arresters, and the maintenance of a fire watch and fire-fighting equipment during construction (Appendix 2A).

Operation and Maintenance

Vehicle traffic on the project roads during the O&M activities may result in continued disturbance of adjacent vegetation. Regular snow removal or road maintenance could remove, crush, or shear vegetation along roads. Road maintenance and use would result in a minor dust deposition on vegetation in adjacent areas and increased risk of wildland fire starts. Over the long term, road maintenance and snow removal could indirectly alter vegetation composition or limit the establishment of vegetation in localized areas. Implementing design features would reduce impacts on vegetation during O&M activities (Appendix 2A).

Decommissioning

Decommissioning would have similar impacts as those described for project construction. Areas that had project features, including new roads, would be redisturbed and then reclaimed for a second time. Areas where vegetation was previously removed during construction of project features, including new roads, would be reclaimed. The removal of the underground collection system would remove vegetation that was revegetated after construction. This area would be reclaimed during decommissioning. Reclamation would follow the Vegetation Management/Revegetation Plan (Appendix 2A) and would result in a major increase in early seral vegetation within the analysis area. Impacts from increased road use would be the same as that from construction. Over the long term, areas reclaimed could result in reduced fragmentation of vegetation groups that resulted from construction of the wind energy facility and restore the long-term productivity to the area; however it could take 30 years or more for the vegetation be restored to their existing vegetation groups and seral condition. Implementing design features would reduce adverse impacts on vegetation during decommissioning activities (Appendix 2A). Reconstructed existing roads and haul routes would not be reclaimed.

Noxious Weeds and Invasive Plants

Construction

Surface disturbance, increasing the miles of roads in the analysis area, and increasing vehicle traffic would indirectly increase the opportunity for the introduction and establishment of noxious weeds and invasive plant species in the analysis area relative to Alternative A (Clifford, 1959). Because most of the project area is within the mountain big sagebrush, low sagebrush, and black sagebrush zone, there would be less risk of conversion to an annual community type from disturbance than if it were in a low elevation Wyoming big sagebrush zone.

Revegetation after construction would reduce the amount of disturbed soil and the potential for establishment of noxious weeds and invasive plants. Design features used during project construction would reduce the potential for establishment of noxious weeds or invasive plants (Appendix 2A). Design features such as preparation and implementation of a weed management plan, completion of pre-construction weed inventories, pre-construction weed treatment, keeping construction equipment free of weeds prior to entering the analysis area, removing the minimum amount of vegetation necessary for the siting of structures and facilities, and seeding and mulching all disturbed areas using weed free hay and straw would reduce the potential for establishment of noxious weeds or invasive plants (Appendix 2A).

Operation and Maintenance

Vehicle traffic and surface disturbance associated with O&M activities, particularly along new, reconstructed, and existing roads, would indirectly increase opportunities for the establishment of noxious weeds and invasive plants. Implementing design features, as described in construction above, would reduce the potential for establishment of noxious weeds and invasive plants during O&M activities (Appendix 2A).

Decommissioning

Decommissioning the project would have similar impacts as described for construction. Decommissioning newly constructed project roads and other infrastructure would disturb the soil. Disturbed areas would have an increased opportunity for noxious weeds and invasive plants to become established; however, the extent would depend on the vegetation conditions and season when decommissioning occurred (Young & Clements, 2005). Implementing design features during decommissioning, as described under construction above, would reduce the potential for establishment of noxious weeds and invasive plants in these disturbed areas and the analysis area (Appendix 2A). Over the long term, decommissioning and associated reclamation would reduce the risk of noxious weed and invasive plant establishment.

Special Status Plants

Current guidance from conservation measures in biological opinions or letters of concurrence from the U.S. Fish and Wildlife Service (USFWS) provides consistent and current management for populations of slickspot peppergrass and its habitat (United States Fish and Wildlife Service

[USFWS], 2009a). Impacts on slickspot peppergrass would be addressed through consultation with USFWS.

Construction

Construction of the project would remove minor amounts of potential slickspot peppergrass habitat and known occupied Newberry's milkvetch habitat. In addition, minor to moderate amounts of potential SSP habitat, depending on the species, would be removed. Direct impacts could include removal of individual plants, the seed bank, SSP habitat, and/or habitat for pollinators. Indirect impacts would include habitat degradation, potential for establishment of noxious weeds and invasive plants, and potential for wildland fire starts. Revegetating impacted areas upon completion of construction activities would help reduce impacts on adjacent SSP potential habitat by reducing the potential for introduction and spread of noxious weeds and invasive plants. In areas where SSP habitat would be removed and not reclaimed (reconstructed roads and haul routes), loss of potential SSP habitat would be permanent.

Dust deposition on plants during construction could affect photosynthesis, respiration, transpiration, and reproduction (Farmer, 1993; Trombulak & Frissell, 2000), which could minimally reduce the longevity of SSP populations in the long-term. Dust could also result in minor long-term changes in occupied and potential SSP habitat relative to Alternative A. Dust abatement techniques described in Appendix 2A would reduce the amount of fugitive dust. Impacts described in uplands and noxious weeds and invasive plants would apply to SSPs and their occupied or potential habitat because all potential SSPs within the project area are found in upland plant groups and noxious weeds and invasive plants could impact occupied and potential SSP habitat.

Full SSP surveys have yet to be conducted; however, pre-construction surveys would be performed. If SSPs are encountered during pre-construction surveys, impacts would be avoided, minimized, or mitigated (relocation of project features or lay-down areas), if possible (Appendix 2A). These actions would reduce the likelihood of potential impacts on individual plants; however, removal of potential habitat and fragmentation would still occur within SSP habitat (Spellerberg, 1998; Hann, Wisdom, & Rowland, 2003). Minor to moderate impacts on SSPs, depending on the species, could result from the removal of occupied and potential habitat. SSPs may eventually recolonize reseeded areas, but impacts on SSPs are expected to be long-term.

Operation and Maintenance

Increased vehicle traffic during O&M activities could result in disturbance of occupied and potential SSP habitat through dust deposition (Farmer, 1993; Trombulak & Frissell, 2000) and the possible introduction and spread of noxious weeds and invasive plant species (Clifford, 1959). Increased wildland fire risk and potential wildland fire starts could result from increased traffic (Young & Clements, 2005), which could alter occupied and potential SSP habitat. Dust, noxious weed and invasive plant, and wildfire design features would reduce the impacts on SSPs and their potential habitat (Appendix 2A).

Decommissioning

Decommissioning the project would have similar impacts as described for construction. Areas where SSP occupied or potential habitat was removed during construction of project features and new roads would be reclaimed. The removal of the underground collection system would remove SSP occupied and potential habitat that was revegetated after construction. This area would then be reclaimed. Reconstructed existing roads and haul routes would not be reclaimed. Over the long term, areas reclaimed could result in reduced fragmentation of habitat, restoration of long-term productivity, and possible recolonization by SSPs. Implementing design features would reduce impacts on SSPs and their occupied and potential habitat during decommissioning activities (Appendix 2A).

Alternative B1 (Proposed Action)

Design features listed in Appendix 2A and implemented during construction, O&M, and decommissioning would be the same as those described in *Impacts Common to All Action Alternatives* and would reduce impacts on vegetation and SSPs and their occupied and potential habitat and would reduce the potential establishment of noxious weeds and invasive plants. In addition, design features listed in the Applicants' Plan of Development (Appendix 2B) also apply; however, those listed in Appendix 2A would do more to reduce impacts.

Uplands

Construction

Project construction would remove a total of 810 acres of vegetation, spread out across the project ROW, and would include acreage removed on public, private, and IDL land (Table 4.2.1-1, total construction impact). Mountain big sagebrush would have the greatest total acreage removed, with a total of 305 acres removed across all land ownerships. Other vegetation groups affected would include low sagebrush, black sagebrush, grassland-native perennial, mountain brush or woodland, Wyoming big sagebrush, recently burned, and breaks. Approximately 201 acres of vegetation would be removed for the life of the project (long-term impact), resulting in a major long-term impact on vegetation. Approximately 583 acres would be revegetated after construction activities (short-term impact), resulting in a major change in vegetation composition and structure. Reconstructed existing roads and haul routes would not be reclaimed, resulting in approximately 25 acres of permanent vegetation loss. Dust deposition from construction activities and increased traffic during project construction could result in minor impacts on vegetation adjacent to project roads.

Operation and Maintenance

O&M along 83 miles of project roads could result in surface disturbance and dust deposition on adjacent vegetation. Over the long term, this could result in minor changes to the composition of vegetation.

Table 4.2.1-1. Total, Short-term, Long-term, and Permanent Impacts[1] on Vegetation (in acres) from each Action Alternative across all Land Ownerships for the Wind Energy Facility.

Vegetation Group	B1				B2a[2]				B2b[2]				B2c[2]				C				D				E				F			
	T	S	L	P	T	S	L	P	T	S	L	P	T	S	L	P	T	S	L	P	T	S	L	P	T	S	L	P	T	S	L	P
Mountain Big Sagebrush	305	217	77	10	312	217	85	10	312	217	85	10	312	217	85	10	298	211	77	9	288	205	74	9	292	207	75	10	271	190	72	9
Wyoming Big Sagebrush	12	7	2	3	13	8	2	3	12	7	2	3	12	7	2	3	12	7	2	3	12	7	2	3	12	7	2	3	12	7	2	3
Grassland-Native Perennial	104	71	31	2	104	71	31	2	104	71	31	2	104	71	31	2	104	71	31	2	79	51	25	2	92	61	29	2	70	45	24	2
Mountain Brush or Woodland	68	51	16	0	68	51	17	0	68	51	17	0	68	51	17	0	68	51	16	0	52	39	13	0	33	24	9	0	36	26	9	0
Low Sagebrush	177	126	46	5	177	126	46	5	177	126	46	5	177	126	46	5	177	126	46	5	158	112	41	5	142	98	39	5	128	89	34	5
Black Sagebrush	143	109	29	5	143	109	29	5	143	109	29	5	143	109	29	5	84	62	17	5	39	28	6	5	83	62	16	5	24	16	3	5
Breaks	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
Recent Burn	1	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
Revegetated[3]	0	0	0	0	17	17	0	0	17	17	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total[4]	**810**	**583**	**201**	**25**	**836**	**601**	**209**	**25**	**835**	**601**	**209**	**25**	**828**	**593**	**209**	**25**	**744**	**530**	**189**	**25**	**629**	**442**	**162**	**25**	**655**	**459**	**170**	**25**	**542**	**374**	**144**	**25**

[1] T = total construction impact (short-term + long-term + permanent), S = short-term impact, L = long-term impact, P = permanent impact. Acreage is rounded to the nearest acre.

[2] Impacts presented are for full build out Phase I & II. Impacts broken out by phase are presented under each phased alternative.

[3] Vegetation that is disturbed and revegetated after construction of Phase I and redisturbed during construction of Phase II. These acreages would be revegetated again after Phase II construction.

[4] Totals may not appear to add up due to rounding of acres in table.

Decommissioning

Decommissioning the project would have similar impacts as described for construction. Areas that had project features, including new roads, would be redisturbed and then reclaimed for a second time. Approximately 201 acres of land that contained project features and roads constructed for the project would be reclaimed. In addition, the removal of the underground collection system would remove 84 acres of vegetation that was revegetated after construction. A total of 284 acres would be reclaimed during decommissioning, resulting in early seral vegetation. Over the long term, reclamation would result in reduced fragmentation of vegetation groups and restoration of long-term productivity.

Noxious Weeds and Invasive Plants

Construction

Construction and reconstruction of 83 miles of roads, 170 turbines, and other infrastructure would remove a total of 810 acres of vegetation (Table 4.2.1-1). Surface disturbance would result in a major short-term increase in opportunities for noxious weed and invasive plant establishment. Over the long term, revegetation activities after construction on approximately 583 acres would decrease the potential for noxious weed and invasive plant establishment (Table 4.2.1-1) by reducing the amount of disturbed soil.

Operation and Maintenance

Vehicle traffic and surface disturbance associated with O&M activities, particularly along the 83 miles of reconstructed and constructed roads, would indirectly increase opportunities for the establishment of noxious weeds and invasive plants.

Decommissioning

Approximately 284 total acres would be disturbed during decommissioning, resulting in a major increased opportunity for noxious weeds and invasive plants to become established. Over the long term, decommissioning and associated reclamation would reduce the risk of noxious weed and invasive plant establishment.

Special Status Plants

Construction

The construction of the wind energy facility would have similar impacts as described in uplands for Alternative B1, including the direct removal of SSP occupied and potential habitat. A total of 11 acres of potential slickspot peppergrass habitat would be removed during project construction, which would have minor short- and long-term impacts on slickspot peppergrass and its habitat. Six acres of potential habitat would be removed along existing roads and the remaining 5 acres would be at the northern O&M facility, underground distribution line, and site compound. Over the long term, this would have minor additional impacts on slickspot peppergrass and its habitat because the existing road has already increased the risk of invasive annual plants, which shorten the fire return interval (Pellent, 1996). Habitat degradation through conversion to annual grasslands and shortened fire regime are the main threats to slickspot peppergrass (USFWS, 2009b). Vehicular traffic along the

existing road increases the risk of fire starts (Clifford, 1959). Increased traffic due to construction would increase this risk.

A total of 1 acre of known occupied Newberry's milkvetch habitat would be removed from two separate locations; from construction of a proposed new road and adjacent underground collection system adjacent to a wind turbine at one location and construction of a wind turbine in another location. Indirectly, adjacent occupied habitat could be degraded. Other known occupied Newberry's milkvetch habitat exists further south in the project area. Construction of the roads, wind turbines, and underground collection system would fragment known occupied and potential habitat.

Newberry's milkvetch, tufted Townsend daisy, and dimeresia would have the most potential habitat removed with up to 665 total acres removed, depending on the species, across all landownership (Table 4.2.1-2). Most of the habitat loss would be on public land, followed by private, then IDL. For Newberry's milkvetch, dimeresia, and tufted Townsend daisy, the construction of the wind turbines would remove the most potential habitat, followed by construction of the new roads, reconstruction of existing roads, and then installation of the underground collection system. Other project features would have less direct impact. Due to the amount of potential habitat loss and fragmentation, impacts on Newberry's milkvetch, dimeresia, and tufted Townsend daisy could be moderate over the short- and long-term. Revegetation of up to 479 acres of potential habitat, depending on the species and predominately on public land, could result in recolonization by these SSPs over the long term. Up to156 acres of Newberry's milkvetch, dimeresia, and tufted Townsend daisy potential habitat, depending on the species, would remain unvegetated during the life of the project.

Table 4.2.1-2. Total Impacts[1] on Special Status Plant Potential Habitat (in acres) from each Action Alternative across all Land Ownerships from the Wind Energy Facility.

Special Status Plant	B1	B2a[2]	B2b[2]	B2c[2]	C	D	E	F
Two-headed onion	11	12	12	12	11	11	11	11
Newberry's milkvetch	422	428	428	425	397	341	371	296
Four-wing milkvetch	73	71	71	71	26	26	25	26
Dimeresia	665	671	671	668	599	520	557	457
Davis' peppergrass	11	13	13	13	11	11	11	11
Slickspot peppergrass	11	14	14	14	11	11	11	11
Tufted Townsend daisy	665	671	671	668	599	520	557	457

[1] Total = total construction impact (short-term + long-term + permanent).
[2] Impacts presented are for full build out Phase I & II. Impacts broken out by phase are presented under each phased alternative.

Four-wing milkvetch, Davis' peppergrass, and two-headed onion would have much less potential habitat directly removed due to construction, 73, 11, and 11 acres respectively, all on public land (Table 4.2.1-2). Because these species have specialized habitats and would not be widespread within potential habitat areas, impacts on these species are expected to be minor over the short- and long-term.

Operation and Maintenance

O&M along 83 miles of project roads would result in increased dust deposition, potential introduction and spread of noxious weeds and invasive plants, and increased fire risk in comparison to Alternative A. Of the 83 miles of project roads, up to 54 miles would go through potential SSP habitat, depending on the species (Table 4.2.1-3). Dimeresia, tufted Townsend daisy, and Newberry's milkvetch have the greatest potential for adverse impacts from O&M actions because there would be more roads and increased traffic through their potential habitat.

Table 4.2.1-3. Project Roads through Special Status Plant Potential Habitat (in miles[1]) by Action Alternative.

Special Status Plant	B1	B2a Phase I	B2a Phase II	B2a Phase I & II	B2b Phase I	B2b Phase II	B2b Phase I & II	B2c Phase I	B2c Phase II	B2c Phase I & II	C	D	E	F
Two-headed onion	1	1	0	1	1	0	1	1	0	1	1	1	1	1
Newberry's milkvetch	33	24	9	33	24	10	33	27	6	33	32	29	31	26
Four-wing milkvetch	7	7	0	7	7	0	7	5	2	7	5	5	5	5
Dimeresia	54	40	15	54	41	14	54	43	11	54	51	46	49	42
Davis' peppergrass	1	1	0	1	1	0	1	1	0	1	1	1	1	1
Slickspot peppergrass	2	2	0	2	2	0	2	2	0	2	2	2	2	2
Tufted Townsend daisy	54	40	15	54	41	14	54	43	11	54	51	46	49	42

[1] Mileage is rounded to the nearest mile. Totals in Phase I & II may not appear to add up due to rounding in table.

Decommissioning

Reclamation of project features, including newly constructed project roads, would result in an increase in early seral vegetation within the analysis area. Over the long term, areas reclaimed could result in reduced fragmentation of habitat, restoration of long-term productivity, and possible recolonization by SSPs.

Alternative B2a

Uplands

Construction

Impacts on upland vegetation groups would be similar to Alternative B1; however, construction of the project would occur in two phases. Construction from Phase I would remove 536 acres of vegetation across public, private, and IDL land (Table 4.2.1-4, total disturbance). Approximately 149 acres of vegetation would be removed for the life of the project (long-term impact). Low sagebrush would have the greatest total acreage removed, with a total of 172 acres removed across all land ownerships. Other vegetation groups affected would include black sagebrush, mountain big sagebrush, mountain brush or woodland, grassland-native perennial, Wyoming big sagebrush, breaks, and recent burn.

Table 4.2.1-4. Total, Short-term, Long-term, and Permanent Impacts[1] on Vegetation (in acres) from each Phase of Alternative B2a across all Land Ownerships for the Wind Energy Facility.

Vegetation Group	B2a Phase I				B2a Phase II				B2a Phase I & II			
	Total[2]	Short	Long	Perm	Total[2]	Short	Long	Perm	Total[2]	Short	Long	Perm
Mountain Big Sagebrush	105	63	39	3	207	154	47	6	312	217	85	10
Wyoming Big Sagebrush	13	8	2	3	1	1	0	0	14	9	2	3
Grassland-Native Perennial	51	31	21	0	53	41	10	2	104	71	31	2
Mountain Brush or Woodland	57	43	15	0	11	8	2	0	68	51	17	0
Low Sagebrush	172	122	45	5	5	4	1	0	177	126	46	5
Black Sagebrush	135	102	28	5	8	7	1	0	143	109	29	5
Breaks	1	0	1	0	0	0	0	0	1	0	1	0
Recent Burn	1	1	0	0	0	0	0	0	1	1	0	0
Revegetated Areas[3]	0	0	0	0	17	17	0	0	17	17	0	0
Total[2]	**536**	**370**	**149**	**17**	**300**	**232**	**60**	**9**	**836**	**601**	**209**	**25**

[1] Total = total construction impact (short-term + long-term + permanent), Short = short-term impact, Long = long-term impact, Perm = permanent impact. Acreage is rounded to the nearest acre.

[2] Totals may not appear to add up due to rounding of acres in table.

[3] Vegetation that is removed and revegetated after construction of Phase I and removed again during construction of Phase II includes what was 7 acres of low sagebrush, 5 acres of grassland-native perennial, 4 acres of mountain big sagebrush, and 1 acre of Wyoming big sagebrush. These acreages would be revegetated again after Phase II construction.

Approximately 7 years after construction of Phase I, the construction of Phase II would remove 300 acres of vegetation across public, private, and IDL land. Mountain big sagebrush would have the greatest total acreage removed, with a total of 207 acres removed across all land ownerships (Table 4.2.1-4). Other vegetation groups affected would include grassland-native perennial, mountain brush or woodland, black sagebrush, low sagebrush, and Wyoming big sagebrush. In addition, 17 acres of vegetation that was removed and revegetated after construction of Phase I (revegetated areas) would be removed again during construction of Phase II. These areas include the batching plant, crushing plant, the site compound, and two of the four laydown areas.

Impacts on vegetation from the construction of Phase I and Phase II include removal of a total of 836 acres of vegetation, which is more than Alternative B1 (Table 4.2.1-1).

Operation and Maintenance

O&M along 63 miles of project roads during Phase I and an additional 20 miles during Phase II could result in surface disturbance and dust deposition on adjacent vegetation. Full build out of Phase I and Phase II would have the same O&M impacts as described for Alternative B1.

Decommissioning

Impacts from decommissioning the full build out of Phase I and Phase II would be the same as for Alternative B1.

Noxious Weeds and Invasive Plants

Construction

Impacts from noxious weeds and invasive plants would be slightly higher than Alternative B1 because phasing the project would increase the acreage of total surface disturbance and would spread the disturbance out temporally. Increased surface disturbance would increase the potential for establishment of noxious weeds and invasive plants.

Operation and Maintenance

O&M along 63 miles of project roads during Phase I and an additional 20 miles during Phase II could result in surface disturbance and an increase in the potential for establishment of noxious weeds and invasive plants. Full build out of Phase I and Phase II would have the same O&M impacts as described for Alternative B1.

Decommissioning

Impacts from decommissioning the full build out of Phase I and Phase II would be the same as for Alternative B1.

Special Status Plants

Construction

Impacts on SSPs and their occupied and potential habitat would be similar to Alternative B1; however, impacts would occur in two phases separated by 7 to 10 years. Construction of Phase I would have the same impacts on potential slickspot peppergrass habitat (11 acres) and known occupied Newberry's milkvetch habitat (1 acre) as Alternative B1. Phase I construction would remove 439 acres of dimeresia and tufted Townsend daisy potential habitat and 269 acres of Newberry's milkvetch potential habitat (Table 4.2.1-5), which is less than Alternative B1. Two-headed onion, four-wing milkvetch, and Davis' peppergrass would have 9, 71, and 10 acres of potential habitat removed.

Approximately 7 years after construction of Phase I, the construction of Phase II would remove up to 232 acres of SSP potential habitat, depending on the species (Table 4.2.1-5). Total impacts from full build of both phases would remove up to 671 acres of potential SSP habitat, depending on the species. This is slightly more than Alternative B1, due removing up to 12 acres of previously removed potential habitat during construction of Phase I.

Table 4.2.1-5. Total Impacts[1] on Special Status Plant Potential Habitat (in acres) from each Phase of Alternative B2a across all Land Ownerships for the Wind Energy Facility.

Special Status Plant	Phase I	Phase II	Phase I & II
Two-headed onion	9	3	12
Newberry's milkvetch	269	159	428
Four-wing milkvetch	71	0	71
Dimeresia	439	232	671
Davis' peppergrass	10	3	13
Slickspot peppergrass	11	3	14
Tufted Townsend daisy	439	232	671

[1] Total = total construction impact (short-term + long-term + permanent).

Operation and Maintenance

O&M for Phase I would occur on up to 40 miles of project roads through potential SSP habitat, depending on the species, up to an additional 15 miles during Phase II, and a total of up to 54 miles for the full build out of Phase I and Phase II (Table 4.2.1-3).

Decommissioning

Impacts from decommissioning the full build out of Phase I and Phase II would be the same as for Alternative B1.

Alternative B2b

Uplands

Construction

Impacts on upland vegetation would be similar to Alternative B1; however, construction of the project would occur in two phases. Construction from Phase I would remove 523 acres of vegetation across public, private, and IDL land (Table 4.2.1-6, total disturbance). Approximately 131 acres of vegetation would be removed for the life of the project (Table 4.2.1-6, long-term impact). Mountain big sagebrush would have the greatest total acreage removed, with a total of 214 acres removed across all land ownerships. Other vegetation groups affected would include low sagebrush, black sagebrush, mountain brush or woodland, grassland-native perennial, Wyoming big sagebrush, breaks, and recent burn (Table 4.2.1-6).

Approximately 7 years after construction of Phase I, the construction of Phase II would remove 313 acres of vegetation across public, private, and IDL land (Table 4.2.1-6, total disturbance). Mountain big sagebrush would have the greatest total acreage removed, with a total of 99 acres across all land ownerships. Other vegetation groups affected would include grassland-native perennial, black sagebrush, low sagebrush, and mountain brush or woodland. In addition, 17 acres of vegetation that was removed and revegetated after construction of Phase I would be removed again during construction of Phase II. These areas include the batching plant, crushing plant, the site compound, and two of the four laydown areas.

Impacts on vegetation from the construction of Phase I and Phase II include removal of a total of 835 acres of vegetation, which is more than Alternative B1 (Table 4.2.1-1).

Table 4.2.1-6. Total, Short-term, Long-term, and Permanent Impacts[1] on Vegetation (in acres) from each Phase of Alternative B2b across all Land Ownerships for the Wind Energy Facility.

Vegetation Group	B2b Phase I				B2b Phase II				B2b Phase I & II			
	Total[2]	Short	Long	Perm	Total[2]	Short	Long	Perm	Total[2]	Short	Long	Perm
Mountain Big Sagebrush	214	151	53	10	99	67	32	0	312	217	85	10
Wyoming Big Sagebrush	12	7	2	3	0	0	0	0	12	7	2	3
Grassland-Native Perennial	31	15	14	2	73	56	17	0	104	71	31	2
Mountain Brush or Woodland	34	25	8	0	34	26	8	0	68	51	17	0
Low Sagebrush	134	93	35	5	43	33	10	0	177	126	46	5
Black Sagebrush	97	74	17	5	46	35	11	0	143	109	29	5
Breaks	1	0	1	0	0	0	0	0	1	0	1	0
Recent Burn	1	0	0	0	0	0	0	0	1	0	0	0
Revegetated Areas[3]	0	0	0	0	17	17	0	0	17	17	0	0
Total[2]	**523**	**366**	**131**	**25**	**313**	**234**	**78**	**0**	**835**	**601**	**209**	**25**

[1] Total = total construction impact (short-term + long-term + permanent), Short = short-term impact, Long = long-term impact, Perm = permanent impact. Acreage is rounded to the nearest acre.

[2] Totals may not appear to add up due to rounding of acres in table.

[3] Vegetation that is removed and revegetated after construction of Phase I and removed during construction of Phase II includes what was 7 acres of low sagebrush, 5 acres of grassland-native perennial, 4 acres of mountain big sagebrush, and 1 acre of Wyoming big sagebrush. These acreages would be revegetated again after Phase II construction.

Operation and Maintenance

O&M along 62 miles of project roads during Phase I and an additional 21 miles during Phase II could result in surface disturbance and dust deposition on adjacent vegetation. Full build out of Phase I and Phase II would have the same O&M impacts as described for Alternative B1.

Decommissioning

Impacts from decommissioning the full build out of Phase I and Phase II would be the same as for Alternative B1.

Noxious Weeds and Invasive Plants

Construction

Impacts from noxious weeds and invasive plants would be slightly higher than Alternative B1 because phasing the project would increase the acreage of total surface disturbance and would spread

out the disturbance temporally. Increased surface disturbance would increase the potential for establishment of noxious weeds and invasive plants.

Operation and Maintenance

O&M along 62 miles of project roads during Phase I and an additional 21 miles during Phase II could result in surface disturbance and an increase in the potential for establishment of noxious weeds and invasive plants. Full build out of Phase I and Phase II would have the same O&M impacts as described for Alternative B1.

Decommissioning

Impacts from decommissioning the full build out of Phase I and Phase II would be the same as for Alternative B1.

Special Status Plants

Construction

Impacts on SSPs and their potential habitat would be similar to Alternative B1; however, impacts would occur in two phases separated by approximately 7 to 10 years. Construction of Phase I would have the same impacts on potential slickspot peppergrass habitat as Alternative B1 (11 acres). Less than 0.5 acres of known occupied Newberry's milkvetch habitat would be removed during Phase I. Up to 468 acres of dimeresia and tufted Townsend daisy potential habitat and 274 acres of Newberry's milkvetch potential habitat would be removed (Table 4.2.1-7), which is less than Alternative B1. Two-headed onion, four-wing milkvetch, and Davis' peppergrass would have 9, 71, and 10 acres of potential habitat removed, the same as Phase I of Alternative B2a.

Approximately 7 years after construction of Phase I, the construction of Phase II would remove 3 acres of potential slickspot peppergrass habitat, less than 0.5 acres of known occupied Newberry's milkvetch habitat, and up to 203 acres of SSP potential habitat, depending on the species (Table 4.2.1-7). Total impacts from full build of both phases would be the same as full build of both phases of Alternative B2a.

Table 4.2.1-7. Total Impacts[1] on Special Status Plant Potential Habitat (in acres) from each Phase of Alternative B2b across all Land Ownerships for the Wind Energy Facility.

Special Status Plant	Phase I	Phase II	Phase I & II
Two-headed onion	9	3	12
Newberry's milkvetch	274	155	428
Four-wing milkvetch	71	0	71
Dimeresia	468	203	671
Davis' peppergrass	10	3	13
Slickspot peppergrass	11	3	14
Tufted Townsend daisy	468	203	671

[1] Total = total construction impact (short-term + long-term + permanent).

Operation and Maintenance

O&M for Phase I would occur on up to 41 miles of project roads through potential SSP habitat, depending on the species, up to an additional 14 during Phase II, and a total of up to 54 miles for the full build out of Phase I and Phase II (Table 4.2.1-3).

Decommissioning

Impacts from decommissioning the full build out of Phase I and Phase II would be the same as for Alternative B1.

Alternative B2c

Uplands

Construction

Impacts on upland vegetation would be similar to Alternative B1; however, construction of the project would occur in two phases. Construction from Phase I would remove 562 acres of vegetation across public, private, and IDL land (Table 4.2.1-8). Approximately 152 acres of vegetation would be removed for the life of the project (long-term impact). Mountain big sagebrush would have the greatest total acreage removed, with a total of 221 acres removed across all land ownerships. Other vegetation groups affected would include low sagebrush, grassland-native perennial, black sagebrush, mountain brush or woodland, Wyoming big sagebrush, and breaks (Table 4.2.1-8).

Approximately 7 years after construction of Phase I, the construction of Phase II would remove 267 acres of vegetation across public, private, and IDL land. Mountain big sagebrush would have the greatest total acreage removed, with a total of 91 acres across all land ownerships (Table 4.2.1-8, total disturbance). Other vegetation groups affected would include black sagebrush, low sagebrush, mountain brush or woodland, and grassland-native perennial. In addition, 10 acres of vegetation that was removed and revegetated after construction of Phase I would be removed again during construction of Phase II. These areas include the batching plant, crushing plant, and the site compound.

Impacts on vegetation from the construction of Phase I and Phase II include removal of 828 acres of vegetation groups, which is more than Alternative B1.

Table 4.2.1-8. Total, Short-term, Long-term, and Permanent Impacts[1] on Vegetation (in acres) from each Phase of Alternative B2c across all Land Ownerships for the Wind Energy Facility.

Vegetation Group	B2c Phase I				B2c Phase II				B2c Phase I & II			
	Total[2]	Short	Long	Perm	Total[2]	Short	Long	Perm	Total[2]	Short	Long	Perm
Mountain Big Sagebrush	221	152	60	9	91	66	25	1	312	217	85	10
Wyoming Big Sagebrush	12	7	2	3	0	0	0	0	12	7	2	3
Grassland-Native Perennial	98	67	29	2	6	5	1	0	104	71	31	2
Mountain Brush or Woodland	41	30	11	0	27	21	6	0	68	51	17	0
Low Sagebrush	112	73	34	5	65	53	12	0	177	126	46	5
Black Sagebrush	77	56	16	5	66	53	13	0	143	109	29	5
Breaks	1	0	1	0	0	0	0	0	1	0	1	0
Recent Burn	0	0	0	0	1	0	0	0	1	0	0	0
Revegetated Areas[3]	0	0	0	0	10	10	0	0	10	10	0	0
Total[2]	**562**	**384**	**152**	**25**	**267**	**209**	**57**	**1**	**828**	**593**	**209**	**25**

[1] Total = total construction impact (short-term + long-term + permanent), Short = short-term impact, Long = long-term impact, Perm =permanent impact. Acreage is rounded to the nearest acre.

[2] Totals may not appear to add up due to rounding of acres in table.

[3] Vegetation that is removed and revegetated after construction of Phase I and removed during construction of Phase II includes what was 7 acres of low sagebrush, 2 acres of grassland-native perennial, and 1 acre of Wyoming big sagebrush. These acreages would be revegetated again after Phase II construction.

Operation and Maintenance

O&M along 70 miles of project roads during Phase I and an additional 13 miles during Phase II could result in surface disturbance and dust deposition on adjacent vegetation. Full build out of Phase I and Phase II would have the same O&M impacts as described for Alternative B1.

Decommissioning

Impacts from decommissioning the full build out of Phase I and Phase II would be the same as for Alternative B1.

Noxious Weeds and Invasive Plants

Construction

Impacts from noxious weeds and invasive plants would be slightly higher than Alternative B1 because phasing the project would increase the acreage of total surface disturbance and would spread the disturbance out temporally. Increased surface disturbance would increase the potential for establishment of noxious weeds and invasive plants.

Operation and Maintenance

O&M along 70 miles of project roads during Phase I and an additional 13 miles during Phase II could result in surface disturbance and an increase in the potential for establishment of noxious weeds and invasive plants. Full build out of Phase I and Phase II would have the same O&M impacts as described for Alternative B1.

Decommissioning

Impacts of decommissioning the full build out of Phase I and Phase II would be the same as for Alternative B1.

Special Status Plants

Construction

Impacts on SSPs and their potential habitat would be similar to Alternative B1; however, impacts would occur in two phases separated by approximately 7 to 10 years. Construction of Phase I would have the same impacts on potential slickspot peppergrass (11 acres) and known occupied Newberry's milkvetch habitat (1 acre) as Alternative B1. Phase I construction would remove up to 436 acres of dimeresia and tufted Townsend daisy potential habitat and 304 acres of Newberry's milkvetch potential habitat (Table 4.2.1-9), which is less than Alternative B1. Two-headed onion, four-wing milkvetch, and Davis' peppergrass would have 9, 23, and 10 acres of potential habitat removed.

Approximately 7 years after construction of Phase I, the construction of Phase II would remove up to 231 acres of SSP potential habitat, depending on the species (Table 4.2.1-9). Total impacts from full build of both phases would remove up to 668 acres of potential SSP habitat, depending on the species. This is slightly more than Alternative B1, due to removal of up to 9 acres of previously removed then revegetated potential habitat during construction of Phase I.

Table 4.2.1-9. Total Impacts[1] on Special Status Plant Potential Habitat (in acres) from each Phase of Alternative B2c across all Land Ownerships for the Wind Energy Facility.

Special Status Plant	Phase I	Phase II	Phase I & II
Two-headed onion	9	3	12
Newberry's milkvetch	304	121	425
Four-wing milkvetch	23	48	71
Dimeresia	436	231	668
Davis' peppergrass	10	3	13
Slickspot peppergrass	11	3	14
Tufted Townsend daisy	436	231	668

[1] Total = total construction impact (short-term + long-term + permanent).

Operation and Maintenance

O&M for Phase I would occur on up to 43 miles of project roads through potential SSP habitat, depending on the species, up to an additional 11 miles during Phase II, and up to a total of 54 miles for the full build out of Phase I and Phase II (Table 4.2.1-3).

Decommissioning

Impacts of decommissioning the full build out of Phase I and Phase II would be the same as for Alternative B1.

Alternative C

Uplands

Construction

Impacts would be similar to Alternative B1, except construction would remove a total of 744 acres of vegetation across public, private, and IDL land. Mountain big sagebrush would have the greatest total acreage removed, with 298 acres removed across all land ownerships (Table 4.2.1-1). Other vegetation groups affected would include low sagebrush, grassland-native perennial, black sagebrush, mountain brush or woodland, Wyoming big sagebrush, breaks, and recent burn. Approximately 189 acres of vegetation would be removed for the life of the project, resulting in a major long-term impact on vegetation. Approximately 530 acres would be revegetated after construction activities (Table 4.2.1-1, short-term impact), resulting in a major change in vegetation composition and structure. Reconstructed existing roads would not be reclaimed, resulting in approximately 25 acres of permanent vegetation loss. Dust deposition from construction activities and increased traffic during project construction could result in minor impacts on vegetation adjacent to project roads.

Operation and Maintenance

Impacts would be similar to Alternative B1. O&M along 80 miles of project roads could result in surface disturbance and dust deposition on adjacent vegetation. Over the long term, this could result in minor changes to the vegetation composition.

Decommissioning

Decommissioning the wind energy facility would have similar impacts on vegetation as described for Alternative B1. Approximately 189 acres of land that contained project features, including roads constructed for the project, would be reclaimed. In addition, the removal of the underground collection system would remove 72 acres of vegetation that was revegetated after construction. A total of 262 acres would be reclaimed during decommissioning, resulting in early seral vegetation. Over the long term, reclamation could result in reduced fragmentation of vegetation and restoration of long-term productivity.

Noxious Weeds and Invasive Plants

Construction

Impacts from noxious weeds and invasive plants would be similar as those described for Alternative B1. Construction of the project under Alternative C would remove 744 acres of vegetation. Surface disturbance of these areas would increase opportunities for noxious weed and invasive plant establishment. Over the long term, revegetation activities on approximately 530 acres would decrease the potential for noxious weed and invasive plant establishment by reducing the amount of disturbed soil.

Operation and Maintenance

Impacts would be similar to Alternative B1. Vehicle traffic and surface disturbance associated with O&M activities, particularly along the 80 miles of reconstructed and constructed roads, would indirectly increase opportunities for the establishment of noxious weeds and invasive plants.

Decommissioning

Decommissioning impacts would be similar as those described for Alternative B1. Approximately 284 total acres would be disturbed during decommissioning, resulting in a major increased opportunity for noxious weeds and invasive plants to become established. Over the long term, decommissioning and associated reclamation would reduce the risk of noxious weed and invasive plant establishment.

Special Status Plants

Construction

Impacts on slickspot peppergrass, two-headed onion, and Davis' peppergrass potential habitat (11 acres) and known occupied Newberry's milkvetch habitat (1 acre) would be the same as Alternative B1. Impacts on Newberry's milkvetch, dimeresia, tufted Townsend daisy, and four-wing milkvetch potential habitat would be similar to Alternative B1; however, less potential habitat would be removed, due to fewer turbines and associated underground collection system and fewer associated roads (Table 4.2.1-2). A total of up 599 acres of dimeresia and tufted Townsend daisy, 397 acres of Newberry's milkvetch, and 26 acres of four-wing milkvetch potential habitat would be removed. Due to the amount of potential habitat loss and fragmentation, impacts on Newberry's milkvetch, dimeresia, and tufted Townsend daisy could be moderate over the short- and long-term. Revegetation of up to 426 acres of potential habitat, depending on the species and predominately on public land, could result in recolonization by these SSPs over the long term. Approximately 143 acres of dimeresia and tufted Townsend daisy and 98 acres of Newberry's milkvetch potential habitat would remain unvegetated over the life of the project.

Operation and Maintenance

Impacts would be similar to Alternative B1. O&M would occur on up to 51 miles of project roads through potential SSP habitat, depending on the species (Table 4.2.1-3).

Decommissioning

Decommissioning impacts would be similar to Alternative B1. Reclamation of project features including newly constructed project roads, would result in increased early seral vegetation within the analysis area. Over the long term, areas reclaimed could result in reduced fragmentation of habitat, restoration of long-term productivity, and possible recolonization by SSPs.

Alternative D

Uplands

Construction

Impacts would be similar to Alternative B1, except construction would remove a total of 629 acres of vegetation across public, private, and IDL land. Mountain big sagebrush would have the greatest total acreage removed, with 288 acres removed across all land ownerships (Table 4.2.1-1). Other vegetation groups affected would include low sagebrush, grassland-native perennial, mountain brush or woodland, black sagebrush, Wyoming big sagebrush, breaks, and recent burn. Approximately 162 acres of vegetation would be removed for the life of the project, resulting in a major long-term impact on vegetation. Approximately 442 acres would be revegetated after construction activities (Table 4.2.1-1, short-term impact), resulting in a major change in vegetation composition and structure. Reconstructed existing roads would not be reclaimed, resulting in approximately 25 acres of permanent vegetation loss. Dust deposition from construction activities and increased traffic during project construction could result in minor impacts on vegetation adjacent to project roads.

Operation and Maintenance

Impacts on vegetation communities from O&M of the project would be similar to Alternative B1. The O&M of 72 miles of project roads could result in surface disturbance and dust deposition on adjacent vegetation communities.

Decommissioning

Decommissioning the wind energy facility would have similar impacts on vegetation as described for Alternative B1. Approximately 162 acres of land that contained project features, including roads constructed for the project, would be reclaimed. In addition, the removal of the underground collection system would remove 59 acres of vegetation that was revegetated after construction. A total of 221 acres would be reclaimed during decommissioning, resulting in early seral vegetation. Over the long term, reclamation could result in reduced fragmentation of vegetation groups that resulted from construction of the wind energy facility.

Noxious Weeds and Invasive Plants

Construction

Impacts from noxious weeds and invasive plants would be similar as those described for Alternative B1. Construction of the project under Alternative D would remove 629 acres of vegetation. Surface disturbance of these areas would increase opportunities for noxious weed and invasive plant establishment. Over the long term, revegetation activities on approximately 442 acres would decrease the potential for noxious weed and invasive plant establishment by reducing the amount of disturbed soil.

Operation and Maintenance

Impacts would be similar to Alternative B1. Vehicle traffic and surface disturbance associated with O&M activities, particularly along the 72 miles of reconstructed and constructed roads, would indirectly increase opportunities for the establishment of noxious weeds and invasive plants.

Decommissioning

Decommissioning impacts would be similar to those described for Alternative B1. Approximately 284 total acres would be disturbed during decommissioning, resulting in a major increased opportunity for noxious weeds and invasive plants to become established. Over the long term, decommissioning and associated reclamation would reduce the risk of noxious weed and invasive plant establishment.

Special Status Plants

Construction

Impacts on slickspot peppergrass, two-headed onion, and Davis' peppergrass potential habitat (11 acres) and known occupied Newberry's milkvetch (1 acre) would be the same as Alternative B1. Impacts on Newberry's milkvetch, dimeresia, tufted Townsend daisy, and four-wing milkvetch potential habitat would be similar to Alternative B1; however, less potential habitat would be removed, due to fewer turbines and associated underground collection system and fewer associated roads (Table 4.2.1-2). A total of up 520 acres of dimeresia and tufted Townsend daisy, 341 acres of Newberry's milkvetch, and 26 acres of four-wing milkvetch potential habitat would be removed. Due to the amount of potential habitat loss and fragmentation, impacts on Newberry's milkvetch, dimeresia, and tufted Townsend daisy could be moderate over the short- and long-term.

Revegetation of up to 366 acres of potential habitat, depending on the species and predominately on public land, could result in recolonization by these SSPs over the long term. Approximately 124 acres of dimeresia and tufted Townsend daisy and 84 acres of Newberry's milkvetch potential habitat would remain unvegetated during the life of the project.

Operation and Maintenance

Impacts would be similar to Alternative B1. O&M would occur on up to 46 miles of project roads through potential SSP habitat, depending on the species (Table 4.2.1-3).

Decommissioning

Decommissioning the wind energy facility would have similar impacts on SSPs as described for Alternative B1. Reclamation of project features and newly constructed project roads would result in an increase in early seral vegetation within the analysis area. Over the long term, areas reclaimed could result in reduced fragmentation of habitat that occurred during the construction of the wind energy facility, and possible recolonization by SSPs.

Alternative E

Uplands

Construction

Impacts would be similar to Alternative B1, except construction would remove a total of 655 acres of vegetation across public, private, and IDL land. Mountain big sagebrush would have the greatest total acreage removed, with 292 acres removed across all land ownerships (Table 4.2.1-1). Other vegetation groups affected include low sagebrush, grassland-native perennial, black sagebrush, mountain brush or woodland, Wyoming big sagebrush, and breaks. Approximately 170 acres of vegetation would be removed for the life of the project, resulting in a major long-term impact on vegetation. Approximately 459 acres would be revegetated after construction activities (Table 4.2.1-1, short-term impact), resulting in a major change in vegetation composition and structure. Reconstructed existing roads would not be reclaimed, resulting in approximately 25 acres of permanent vegetation loss. Dust deposition from construction activities and increased traffic during project construction could result in minor impacts on vegetation adjacent to project roads.

Operation and Maintenance

O&M along 76 miles of project roads could result in surface disturbance and dust deposition on adjacent vegetation. Over the long term, this could result in minor changes to the vegetation composition.

Decommissioning

Decommissioning the wind energy facility would have similar impacts on vegetation as described for Alternative B1. Approximately 170 acres of land that contained project features, including roads constructed for the project, would be reclaimed. In addition, the removal of the underground collection system would remove 71 acres of vegetation that was revegetated after construction. A total of 241 acres would be reclaimed during decommissioning, resulting in early seral vegetation. Over the long term, reclamation could result in reduced fragmentation of vegetation and restoration of long-term productivity.

Noxious Weeds and Invasive Plants

Construction

Impacts from noxious weeds and invasive plants would be similar as those described for Alternative B1. Construction of the project under Alternative E would remove 655 acres of vegetation. Surface disturbance of these areas would increase opportunities for noxious weed and invasive plant establishment. Over the long term, revegetation activities on approximately 459 acres would decrease the potential for noxious weed and invasive plant establishment by reducing the amount of disturbed soil.

Operation and Maintenance

Impacts would be similar to Alternative B1. Vehicle traffic and surface disturbance associated with O&M activities, particularly along the 76 miles of reconstructed and constructed roads, would indirectly increase opportunities for the establishment of noxious weeds and invasive plants.

Decommissioning

Decommissioning impacts would be similar to those described for Alternative B1. Approximately 241 acres would be disturbed during decommissioning, resulting in a major increased opportunity for noxious weeds and invasive plants to become established. Over the long term, decommissioning and associated reclamation would reduce the risk of noxious weed and invasive plant establishment.

Special Status Plants

Construction

Impacts on slickspot peppergrass, two-headed onion, and Davis' peppergrass potential habitat (11 acres) would be the same as Alternative B1. Newberry's milkvetch occupied habitat would be removed in only one location, instead of two locations under Alternative B1, for less than 0.5 acres removed. Impacts on Newberry's milkvetch, dimeresia, tufted Townsend daisy, and four-wing milkvetch potential habitat would be similar to Alternative B1; however, less potential habitat would be removed due to fewer turbines and associated underground collection system and fewer associated roads (Table 4.2.1-2). A total of up 557 acres of dimeresia and tufted Townsend daisy, 371 acres of Newberry's milkvetch, and 25 acres of four-wing milkvetch potential habitat would be removed. Due to the amount of potential habitat loss and fragmentation, impacts on Newberry's milkvetch, dimeresia, and tufted Townsend daisy could be moderate over the short-term.

Revegetation of up to 393 acres of potential habitat, depending on the species and predominately on public land, could result in recolonization by these SSPs over the long term. Approximately 134 acres of dimeresia and tufted Townsend daisy and 92 acres of Newberry's milkvetch potential habitat would remain unvegetated during the life of the project.

Operation and Maintenance

Impacts would be similar to Alternative B1. O&M would occur on up to 49 miles of project roads through potential SSP habitat, depending on the species (Table 4.2.1-3).

Decommissioning

Decommissioning the wind energy facility would have similar impacts on SSPs as described for Alternative B1. Reclamation of project features, including newly constructed project roads, would result in increased early seral vegetation within the analysis area. Over the long term, areas reclaimed could result in reduced fragmentation of habitat, restoration of long-term productivity, and possible recolonization by SSPs.

Alternative F

Uplands

Construction

Impacts would be similar to Alternative B1, except construction would remove a total of 542 acres of vegetation across public, private, and IDL land. Mountain big sagebrush would have the greatest total acreage removed, with 271 acres removed across all land ownerships (Table 4.2.1-1). Other vegetation groups affected would include low sagebrush, grassland-native perennial, mountain brush or woodland, black sagebrush, Wyoming big sagebrush, breaks, and recent burn. Approximately 144 acres of vegetation would be removed for the life of the project, resulting in a major long-term impact on vegetation. Approximately 374 acres would be revegetated after construction activities (Table 4.2.1-1, short-term impact), resulting in a major change in vegetation composition and structure. Reconstructed existing roads would not be reclaimed, resulting in approximately 25 acres of permanent vegetation loss. Dust deposition from construction activities and increased traffic during project construction could result in minor impacts on vegetation adjacent to project roads.

Operation and Maintenance

Impacts would be similar to Alternative B1. O&M along 66 miles of project roads could result in surface disturbance and dust deposition on adjacent vegetation. Over the long term, this could result in minor changes to the vegetation composition.

Decommissioning

Decommissioning the wind energy facility would have similar impacts on vegetation as described for Alternative B1. Approximately 144 acres of land that contained project features, including roads constructed for the project, would be reclaimed. In addition, the removal of the underground collection system would remove 41 acres of vegetation that was revegetated after construction. A total of 185 acres would be reclaimed during decommissioning, resulting in early seral vegetation. Over the long term, reclamation could result in reduced fragmentation of vegetation and restoration of long-term productivity.

Noxious Weeds and Invasive Plants

Construction

Impacts from noxious weeds and invasive plants would be similar to those described for Alternative B1. Construction of the project under Alternative F would remove 542 acres of vegetation. Surface disturbance of these areas would increase opportunities for noxious weed and invasive plant establishment. Over the long term, revegetation activities on approximately 374 acres would decrease the potential for noxious weed and invasive plant establishment by reducing the amount of disturbed soil.

Operation and Maintenance

Impacts would be similar to Alternative B1. Vehicle traffic and surface disturbance associated with O&M activities, particularly along the 66 miles of reconstructed and constructed roads, would indirectly increase opportunities for the establishment of noxious weeds and invasive plants.

Decommissioning

Decommissioning impacts would be similar as those described for Alternative B1. Approximately 185 acres would be disturbed during decommissioning, resulting in a major increased opportunity for noxious weeds and invasive plants to become established. Over the long term, decommissioning and associated reclamation would reduce the risk of noxious weed and invasive plant establishment.

Special Status Plants

Construction

Impacts on slickspot peppergrass, two-headed onion, and Davis' peppergrass potential habitat (11 acres) would be the same as Alternative B1. No known occupied Newberry's milkvetch would be removed. Impacts on Newberry's milkvetch, dimeresia, tufted Townsend daisy, and four-wing milkvetch and their potential habitat would be similar to Alternative B1; however, less habitat would be removed due to fewer turbines and associated underground collection system and fewer associated roads (Table 4.2.1-2). A total of up 457 acres of dimeresia and tufted Townsend daisy, 296 acres of Newberry's milkvetch, and 26 acres of four-wing milkvetch potential habitat would be removed. Due to the amount of potential habitat loss and fragmentation, impacts on Newberry's milkvetch, dimeresia, and tufted Townsend daisy could be moderate over the short-term.

Revegetation of up to 317 acres of potential habitat, depending on the species and predominately on public land, could result in recolonization by these SSPs over the long term. Approximately 111 acres of dimeresia and tufted Townsend daisy and 75 acres of Newberry's milkvetch potential habitat would remain unvegetated during the life of the project.

Operation and Maintenance

Impacts would be similar to Alternative B1. O&M would occur on up to 42 miles of project roads through potential SSP habitat, depending on the species (Table 4.2.1-3).

Decommissioning

Decommissioning the wind energy facility would have similar impacts on SSPs as described for Alternative B1. Reclamation of project features, including newly constructed project roads, would result in increased early seral vegetation within the analysis area. Over the long term, areas reclaimed eould result in reduced fragmentation of habitat that occurred during the construction of the wind energy facility, and possible recolonization by SSPs.

4.2.1.3 Direct and Indirect Impacts of the Haul Routes

Design features would help reduce the impacts on vegetation and SSPs and their occupied and potential habitat and would reduce the potential for the establishment of noxious weeds and invasive plants from construction, O&M, and decommissioning activities, as described in *Impacts Common to All Action Alternatives* (Appendix 2A).

Northern Inbound Haul Route

Uplands

Construction

Reconstruction of 10 miles of the 96-mile gravel portion of the northern inbound haul route would result in 39 acres of permanent removal of vegetation spread out along the existing road. Wyoming big sagebrush would have the greatest acreage removed, with a total of 18 acres, followed by agricultural land, and annual vegetation (Table 4.2.1-10). Indirect impacts would include increased dust deposition on vegetation adjacent to the road and increased risk of wildfire starts due to increased traffic along the road.

Table 4.2.1-10. Permanent Disturbance of Vegetation (in acres) from the Northern Inbound Haul Route.

Vegetation Group	Permanent[1]
Wyoming Big Sagebrush	18
Annual	8
Agricultural Land	12
TOTALS[2]	**39**

[1] Acreages are rounded to the nearest acre.
[2] Totals may not appear to add up due to rounding of acres in table.

Operation and Maintenance

The northern inbound haul route would be used approximately once per year for major maintenance of the wind energy facility. O&M activities would result in a minor short-term increase in dust deposition on vegetation adjacent to the 96-mile gravel portion of road, removal of vegetation in localized areas of the road, and greater risk of wildland fire starts, resulting in a minor long-term impact relative to Alternative A.

Decommissioning

This haul route is an established roadway and would not be decommissioned. Use of this haul route during decommissioning of the wind energy facility could result in increased dust deposition on vegetation adjacent to the graveled portions of road and increased risk of wildfire starts.

Noxious Weeds and Invasive Plants

Construction

Use of this route would increase during the anticipated 2 years of project construction (3 years for the phased alternatives). Increased vehicle traffic would result in increased potential for the establishment of noxious weeds and invasive plants (Mortensen, Rauschert, Nord, & Jones, 2009; Davies, 2008; and Clifford, 1959). As the northern inbound haul route is adjacent to known noxious weeds and invasive plants, annual vegetation communities, and agricultural areas which could contain noxious weeds and invasive plants, vehicles transporting equipment to the analysis area could disperse noxious weeds and invasive plants.

Operation and Maintenance

Use of the haul route would be infrequent but could result in surface disturbance in localized areas and a minor increased potential for the establishment of noxious weeds or invasive plants.

Decommissioning

During the removal of project components, increased vehicle traffic along the haul route could increase opportunities for noxious weed and invasive plant establishment relative to Alternative A.

Special Status Plants

Construction

Reconstruction of the northern inbound haul route would not remove any known occupied slickspot peppergrass habitat. It would permanently remove 24 acres of potential slickspot peppergrass habitat adjacent to the existing road. The 24 acres removed would be dispersed along the 52 miles of the northern inbound haul route that travels through potential slickspot peppergrass habitat. Full SSP surveys would be performed prior to reconstruction of the northern inbound haul route. If slickspot peppergrass or other SSP species were encountered during surveys, the location of road widening or pullouts would be moved or micro-sited, if possible. In addition to potential slickspot peppergrass habitat, approximately 6 acres of Greeley's wavewing and Packard's cowpie buckwheat and 1 acre of Davis' peppergrass potential habitat would be permanently removed. Since the northern inbound haul route is an existing route, potential SSP habitat is already fragmented and no new fragmentation would occur.

Direct impacts could include removal of individual plants, the seed bank, SSP potential habitat, and/or important pollinators and their habitat. Invasive plants are one of the primary factors degrading slickspot peppergrass habitat (USFWS, 2009b). Increased potential for establishment of noxious weeds and invasive plants, greater opportunities for dust deposition, habitat alteration and removal, and increased risk of wildfire starts could occur by increasing the use of the northern inbound haul route through approximately 5,700 acres of occupied slickspot peppergrass habitat and 33,048 acres of potential habitat within a 0.5-mile buffer of the current road. These impacts could result in minor to moderate adverse impacts on slickspot peppergrass occupied and potential habitat.

Operation and Maintenance

The northern inbound haul route goes through approximately 9 miles of occupied slickspot peppergrass habitat and 52 miles of potential slickspot peppergrass habitat, 2 miles of potential Greeley's wavewing, 2 miles through potential Packard's cowpie buckwheat, and 38 miles through potential Davis' peppergrass habitat. The northern inbound haul route goes through less than 1 mile of occupied Greeley's wavewing, Packard's cowpie buckwheat, and Davis' peppergrass habitat. Use of the northern inbound haul route approximately once per year for major maintenance of the wind energy facility would result in minor increased dust deposition, potential establishment of noxious weeds and invasive plants, and increased wildfire risk in occupied and potential SSP habitat relative to existing conditions.

Decommissioning

Increased use of the haul route during project decommissioning would result in increased traffic and associated indirect impacts as described above.

Southern Inbound Haul Route Option 1

Uplands

Construction

The reconstruction of existing roads and construction of new roads for the 11-mile southern inbound haul route option 1 would remove approximately 86 acres of existing vegetation, resulting in a moderate impact. Approximately 63 acres of vegetation would be permanently removed because the road would not be decommissioned (Table 4.2.1-11). The 23-acre staging area for the helper trucks would be revegetated once the project construction was completed. During the construction of Phase II for Alternatives B2a, B2b, and B2c, vegetation from this 23-acre staging area that was revegetated after construction of Phase I would be removed again for use during Phase II construction. Low sagebrush would have the largest acreage removed, with 36 acres removed. Approximately 23 of those acres would be revegetated, after construction. Other vegetation groups impacted would include grassland-native perennial, black sagebrush, mountain big sagebrush, and Wyoming big sagebrush (Table 4.2.1-11).

Table 4.2.1-11. Total, Short-term, and Permanent Disturbance of Vegetation (in acres) from the Southern Inbound Haul Route Option 1.

Vegetation Group	Disturbance Type[1]		
	Total	Short	Permanent
Mountain Big Sagebrush	2	0	2
Wyoming Big Sagebrush	1	0	1
Grassland-Native Perennial	30	0	30
Low Sagebrush	36	23	13
Black sagebrush	16	0	16
TOTALS[2]	**86**	**23**	**63**

[1] Total = total construction impact (short-term + permanent), Short =short-term impact, Permanent = permanent impact. Acreages are rounded to the nearest acre.

[2] Totals may not appear to add up due to rounding of acres in table.

Operation and Maintenance

Option 1 of the southern inbound haul route would be used approximately once per year for major maintenance of the wind energy facility. O&M activities could result in a minor short-term increase in dust deposition on vegetation adjacent to the road, removal of vegetation in localized areas, and greater risk of wildland fire starts, resulting in a minor long-term impact relative to existing conditions.

Decommissioning

Use of this haul route during decommissioning of the wind energy facility could result in dust deposition on vegetation adjacent to the road and increased risk of wildfire starts.

Noxious Weeds and Invasive Plants

Construction

Increasing vehicle traffic, constructing 5 miles of new road, and reconstructing 6 miles of existing road would result in opportunities for noxious weed and invasive plant establishment.

Operation and Maintenance

Use of option 1 of the southern inbound haul route would indirectly increase potential for establishment of noxious weeds or invasive plants.

Decommissioning

During the removal of project components, increased vehicle traffic along the haul route could increase opportunities for noxious weed and invasive plant establishment relative to existing conditions.

Special Status Plants

Construction

There is no occupied or potential slickspot peppergrass habitat in Nevada, so the construction of option 1 of the southern inbound haul route would not have any impacts on slickspot peppergrass. Construction of the haul route would remove between 1 and 56 acres of SSP potential habitat, depending on the species (Table 4.2.1-12), resulting in minor to moderate adverse impacts on SSP potential habitat. One acre of two-headed onion potential habitat would be removed along an existing road, which would be a minor permanent impact. One acre of potential Davis' peppergrass potential habitat would be permanently removed; however, due to its highly specialized habitat requirements (BLM, 2006), occurrence of Davis' peppergrass is unlikely.

Impacts on tufted Townsend daisy, dimeresia, Newberry's milkvetch, and four-wing milkvetch potential habitat would include removal of 56, 56, 48, and 47 acres of potential habitat, respectively (Table 4.2.1-12). Direct impacts could include removal of individual plants, the seed bank, SSP potential habitat, and/or important pollinators and their habitat. Increased dust deposition on plants during construction could impact SSP potential habitat. Minor to moderate permanent impacts on

SSPs and their potential habitat could result from the construction of option 1 of the southern inbound haul route. Approximately 23 acres would be revegetated after construction. Those 23 acres are potential habitat for Newberry's milkvetch, four-wing milkvetch, dimeresia, and tufted Townsend daisy. Up to 62 acres of SSP potential habitat, depending on the species, would be permanently removed.

Table 4.2.1-12. Total, Short-term, and Permanent Impacts on Special Status Plant Potential Habitat (in acres) from the Southern Inbound Haul Route Option 1.

Special Status Plant	Disturbance Type[1]		
	Total[2]	Short	Permanent
Two-headed onion	1	0	1
Newberry's milkvetch	48	23	25
Four-wing milkvetch	47	23	24
Dimeresia	56	23	33
Davis' peppergrass	1	0	1
Tufted Townsend daisy	56	23	33

[1] Total = total construction impact (short-term + permanent), Short = short-term impact, Permanent = permanent impact. Acreages are rounded to the nearest acre.

[2] Totals may not appear to add up due to rounding of acres in table.

Operation and Maintenance

O&M along 11 miles of the southern inbound haul route option 1 would result in increased dust deposition, potential introduction and spread of noxious weeds and invasive plants, and increased fire risk relative to existing conditions. Approximately 8 miles of option 1 of the southern inbound haul route would go through dimeresia and tufted Townsend daisy potential habitat and 7 miles would go through Newberry's milkvetch potential habitat. Four of the 11 miles would go through four-wing milkvetch potential habitat. Less than 0.5 miles of option 1 of the southern inbound haul route would go through two-headed onion and Davis' peppergrass potential habitat. Impacts on SSPs and their potential habitat during O&M would be minor indirect impacts.

Decommissioning

Increased use of the haul route during project decommissioning could result in dust deposition, increased risk of wildfire starts, and increased potential for establishment of noxious weeds and invasive plants in SSP potential habitat.

Southern Inbound Haul Route Option 2

Uplands

Construction

The reconstruction of existing roads and construction of new roads for the 13-mile southern inbound haul route option 2 would remove approximately 90 acres of existing vegetation, resulting in a moderate impact. Approximately 67 acres would be a permanent removal of vegetation because the road would not be decommissioned (Table 4.2.1-13). The 23-acre staging area for the helper trucks

would be revegetated once the project construction was completed. During the construction of Phase II for Alternatives B2a, B2b, and B2c, vegetation from this 23-acre staging area that was revegetated after construction of Phase I would be removed again for use during Phase II construction. Low sagebrush would have the largest acreage removed (36 acres). Approximately 23 of those acres would be revegetated after construction. Other vegetation groups permanently impacted would include grassland-native perennial, black sagebrush, breaks, mountain big sagebrush, and Wyoming big sagebrush (Table 4.2.1-13).

Table 4.2.1-13. Total, Short-term, and Permanent Disturbance of Vegetation (in acres) from the Southern Inbound Haul Route Option 2.

Vegetation Group	Disturbance Type[1]		
	Total	Short	Permanent
Mountain Big Sagebrush	2	0	2
Wyoming Big Sagebrush	1	0	1
Grassland-Native Perennial	26	0	26
Low Sagebrush	36	23	13
Black sagebrush	20	0	20
Breaks	4	0	4
TOTALS[2]	**90**	**23**	**67**

[1] Total = total construction impact (short-term + permanent), Short = short-term impact, Permanent = permanent impact. Acreages are rounded to the nearest acre.

[2] Totals may not appear to add up due to rounding of acres in table.

Operation and Maintenance

Option 2 of the southern inbound haul route would be used approximately once per year for major maintenance of the wind energy facility. O&M activities could result in a minor short-term increase in dust deposition on vegetation adjacent to the road, removal of vegetation in localized areas, and greater risk of wildland fire starts, resulting in a minor long-term impact relative to existing conditions.

Decommissioning

Use of this haul route during decommissioning of the wind energy facility could result in dust deposition on vegetation adjacent to the road and increased risk of wildfire starts.

Noxious Weeds and Invasive Plants

Construction

Increasing vehicle traffic, constructing 7 miles of new road, and reconstructing 6 miles of existing road could result in opportunities for noxious weed and invasive plant establishment.

Operation and Maintenance

Use of option 2 of the southern inbound haul route would indirectly increase opportunities for noxious weed or invasive plant establishment.

Decommissioning

During the removal of project components, increased vehicle traffic along the haul route could increase opportunities for noxious weed and invasive plant establishment relative to existing conditions.

Special Status Plants

Construction

There is no occupied or potential slickspot peppergrass habitat in Nevada, so the construction of option 1 of the southern inbound haul route would not have any impacts on slickspot peppergrass. Construction of the haul route would remove between 1 and 59 acres of SSP potential habitat, depending on the species (Table 4.2.1-14), resulting in minor to moderate adverse impacts on SSP potential habitat. Impacts on two-headed onion and Davis' peppergrass potential habitat would be the same as option 1 of the southern inbound haul route. Approximately 3 more acres would be removed from option 2 of the southern inbound haul route than option 1 of four-wing milkvetch, dimeresia, and tufted Townsend daisy potential habitat, resulting in similar impacts (Table 4.2.1-14). Approximately 7 more acres of Newberry's milkvetch potential habitat would be removed from construction of option 2 than option 1 of the southern inbound haul route, for a total of 55 acres removed. The same 23 acres would be revegetated as described in option 1 of the southern inbound haul route. Up to 65 acres of SSP potential habitat, depending on the species, would be permanently removed.

Table 4.2.1-14. Total, Short-term, and Permanent Impacts on Special Status Plant Potential Habitat (in acres) from the Southern Inbound Haul Route Option 2.

Special Status Plant	Disturbance Type[1]		
	Total[2]	Short	Permanent
Two-headed onion	1	0	1
Newberry's milkvetch	55	23	33
Four-wing milkvetch	50	23	27
Dimeresia	59	23	36
Davis' peppergrass	1	0	1
Tufted Townsend daisy	59	23	36

[1] Total = total construction impact (short-term + permanent), Short = short-term impact, Permanent = permanent impact. Acreages are rounded to the nearest acre.
[2] Totals may not appear to add up due to rounding of acres in table.

Operation and Maintenance

O&M along 13 miles of the southern inbound haul route option 2 would result in increased dust deposition, potential introduction and spread of noxious weeds and invasive plants, and increased fire risk relative to existing conditions. Approximately 9 miles of option 2 of the southern inbound haul route would go through Newberry's milkvetch, dimeresia, and tufted Townsend daisy potential habitat. Approximately 6 of the 11 miles would go through four-wing milkvetch potential habitat. Less than 0.5 miles of option 2 of the southern inbound haul route would go through two-headed

onion and Davis' peppergrass potential habitat. Impacts on SSPs and their potential habitat during O&M would be minor indirect impacts.

Decommissioning

Increased use of the haul route during project decommissioning could result in impacts on SSP potential habitat, as described for option 1 of the southern inbound haul route.

Outbound Haul Route

Uplands and Noxious Weeds and Invasive Plants

Construction

No construction would take place along the outbound haul route; therefore, no surface disturbing activities would impact vegetation. The increase in vehicle traffic would indirectly increase opportunities for noxious weed and invasive plant establishment and potential wildfire starts in areas adjacent to the outbound route. In addition, there would be a minor increase in dust deposition on adjacent vegetation relative to existing conditions.

Operation and Maintenance

The outbound haul route would be used for maintenance of the wind energy facility. Increasing vehicle traffic on the outbound haul route would increase opportunities for noxious weed and invasive plant establishment, increase dust deposition on adjacent vegetation, and increase wildfire risk. O&M activities would have minor impacts on vegetation adjacent to the road relative to existing conditions.

Decommissioning

During the removal of project components, increased vehicle traffic along the haul route would increase opportunities for noxious weed and invasive plant establishment and wildfire starts, relative to existing conditions.

Special Status Plants

Construction

Slickspot peppergrass is the only known SSP that would be impacted from use of the outbound haul route, and this would occur predominantly during construction of the wind energy facility. There are 12,802 acres of slickspot peppergrass habitat that exists within 0.5 miles of the outbound haul route, but to date no slickspot peppergrass plants have been observed (BLM, 2003; Western EcoSystems Technology, Inc. [WEST], 2010).

No construction would take place along the outbound haul route, therefore surface disturbance or removal of slickspot peppergrass habitat would not occur. Increased dust could have a minor impact on slickspot peppergrass habitat in the long-term.

Indirect impacts would be from increased use of the road through 20 miles of slickspot peppergrass habitat, potential for the establishment of invasive plants and noxious weeds, increased wildfire risk, and potential degradation of slickspot peppergrass and pollinator habitat.

Operation and Maintenance

Minor impacts would occur during O&M. Increased dust deposition could impact slickspot peppergrass habitat. Increased opportunities for noxious weed and invasive plant establishment, habitat alteration, and wildfire risk could result in minor long-term impacts on slickspot peppergrass habitat.

Decommissioning

Increased use of this route during project decommissioning would result in increased traffic and associated indirect impacts as described above.

4.2.1.4 Project as a Whole

Uplands and Noxious Weeds and Invasive Plants

The project as a whole includes the project disturbance area and the haul routes. The primary impacts on vegetation from the proposed project are tied to the area of total vegetation removal and surface disturbance from the construction, O&M, and eventual decommissioning of the wind energy facility. The acres of total disturbance are summarized below for each alternative for the project area plus both options of the southern inbound haul route and the project area plus the northern inbound haul route (Table 4.2.1-15). No construction disturbance would occur along the outbound haul route, except for additional use of the road, so it is not included in the table. Disturbance of vegetation and use of roads and haul routes during construction, O&M, and decommissioning would result in the subsequent potential for establishment of noxious weeds and invasive plants under all alternatives.

Construction of the wind energy facility under all action alternatives would result in major short- and long-term impacts on vegetation groups (Table 4.2.1-15). Several project features would remain unchanged under all alternatives and cause the same amount of disturbance to vegetation groups, such as the batching and crushing plants, interconnection compound, quarry, site compound, substation, and transmission line road. The major difference between the alternatives is the difference in the number of turbines and associated underground collection system and miles of roads (existing roads that need reconstruction and new roads). Alternatives B2a and B2b would remove the most acres of vegetation and removed would be spread out over a 7 to 10 year period. Alternative F would remove the least amount of vegetation of all the fully built alternatives (Table 4.2.1-15).

Additional impacts on vegetation would occur from the construction and reconstruction of the haul routes. With the northern inbound haul route, an additional 39 acres of vegetation would be removed from reconstruction. Option 1 of the southern inbound haul route would remove an additional 86 acres of vegetation and option 2 of the southern inbound haul route would remove an additional 90 acres of vegetation. Minor impacts would occur during O&M approximately once a year during the

life of the project. None of the haul routes would be decommissioned, thus the loss of vegetation would be permanent.

Table 4.2.1-15. Number of Acres of Total Vegetation Disturbance by Alternative and Haul Route.

Alternative	Wind Energy Facility with Northern Inbound Haul Route	Wind Energy Facility with Southern Inbound Haul Route Option 1	Wind Energy Facility with Southern Inbound Haul Route Option 2
A	0	0	0
B1	849	896	900
B2a	Phase I – 575 Phase II – 300 Phase I & II – 875	Phase I – 622 Phase II – 323 Phase I & II – 945	Phase I – 626 Phase II – 323 Phase I & II – 949
B2b	Phase I – 562 Phase II – 313 Phase I & II – 874	Phase I – 609 Phase II – 336 Phase I & II – 944	Phase I – 613 Phase II – 336 Phase I & II – 948
B2c	Phase I – 601 Phase II – 267 Phase I & II – 867	Phase I – 648 Phase II – 290 Phase I & II – 937	Phase I – 652 Phase II – 290 Phase I & II – 941
C	783	830	834
D	668	715	719
E	694	741	745
F	581	628	632

Special Status Plants

The project as a whole includes the project disturbance area and the haul routes. The primary impacts on SSPs from the proposed project are tied to the area of total surface disturbance from the construction, O&M, and eventual decommissioning of the wind energy facility within occupied and potential SSP habitat. The acres of total disturbance are summarized below for each alternative for the project area plus the northern inbound haul route and the project area plus both options of the southern inbound haul route (Table 4.2.1-16). No construction disturbance would occur along the outbound haul route, except for additional use of the road, so it is not included in the table.

Construction of the wind energy facility under all action alternatives would result in long-term impacts on SSPs and their potential habitat (Table 4.2.1-16). Several project features would remain unchanged under all alternatives and cause the same amount of disturbance to each SSP and their potential habitat, such as the batching and crushing plant, interconnection compound, quarry, site compound, substation, and transmission line road. The major difference between the alternatives is the difference in the number of wind turbines and associated underground collection system and roads (existing roads that need reconstruction and new roads). Alternatives B2a and B2b would remove the most acres of SSP potential habitat. Alternative F would remove the least amount of known potential SSP habitat of all the fully built alternatives (Table 4.2.1-16).

Impacts on potential slickspot peppergrass habitat would be essentially the same across all action alternatives; however, the phased alternatives (Alternatives B2a, B2b, and B2c) would have slightly

more impacts. Each phased alternative would remove 3 acres of potential slickspot peppergrass habitat that was revegetated after construction of Phase I. Impacts on known occupied Newberry's milkvetch is essentially the same for most action alternatives, with 1 acre of known occupied habitat removed from two different locations. Alternative E would remove less than 0.5 acres from one location and Alternative F would not remove any known occupied Newberry's milkvetch habitat.

With the northern inbound haul route, an additional 24 acres of potential slickspot peppergrass habitat would be impacted during road reconstruction. Localized disturbance from 9 miles of the northern inbound haul route through occupied slickspot peppergrass habitat and 52 miles through potential slickspot peppergrass habitat would occur during construction activities and during O&M approximately once a year during the life of the project. In addition to potential slickspot peppergrass habitat, reconstruction of the northern inbound haul route would remove up to 6 acres of potential habitat for three other SSPs.

No additional impacts on slickspot peppergrass would result from either option of the southern inbound haul route because there is no occupied or potential habitat in Nevada. Option 1 of the southern inbound haul route would remove between 1 and 56 acres of potential habitat for 6 different SSPs, depending on the species. Option 2 of the southern inbound haul route would remove between 1 and 88 acres of potential habitat for 6 different SSPs, depending on the species. For both options of the southern inbound haul route, 23 acres would be revegetated after construction. Those 23 acres are potential habitat for Newberry's milkvetch, four-wing milkvetch, and tufted Townsend daisy. Minor impacts would occur during O&M approximately once a year during the life of the project. None of the inbound haul routes would be decommissioned, thus a permanent loss of SSP potential habitat would result. Up to 62 acres of SSP potential habitat would be permanently lost from option 1 of the southern inbound haul route, depending on the species, up to 65 acres would be lost from option 2 of the southern inbound haul route, and up to 24 acres of would be lost from road reconstruction to the northern inbound haul route.

Use of the outbound haul route during construction, O&M, and decommissioning would indirectly increase dust, introduction of noxious weeds and invasive plants, and fire risk along 20 miles through slickspot peppergrass habitat.

Table 4.2.1-16. Acres of Total Disturbance[1] by Alternative (Including Phases) on Special Status Plant Potential Habitat from the Project as a Whole.

Special Status Plant		B1	B2a Phase I	B2a Phase II	B2a Phase I&II	B2b Phase I	B2b Phase II	B2b Phase I&II	B2c Phase I	B2c Phase II	B2c Phase I&II	C	D	E	F
Two-headed onion	PA + NHR[2]	11	9	3	12	9	3	12	9	3	12	11	11	11	11
	PA + SHR1[3]	12	10	3	13	10	3	13	10	3	13	12	12	12	12
	PA + SHR2[4]	12	10	3	13	10	3	13	10	3	13	12	12	12	12
Newberry's milkvetch	PA + NHR	422	269	159	428	274	155	428	304	121	425	397	341	371	296
	PA + SHR1	470	317	182	476	322	178	476	352	144	473	445	389	419	344
	PA + SHR2	477	324	182	483	329	178	483	359	144	480	452	396	426	351
Four-wing milkvetch	PA + NHR	73	70	0	71	71	0	71	23	48	71	26	26	25	26
	PA + SHR1	120	117	23	118	118	23	118	70	71	118	73	73	72	73
	PA + SHR2	123	120	23	121	121	23	121	73	71	121	76	76	75	76
Dimeresia	PA + NHR	665	439	232	671	468	203	671	436	231	668	599	520	557	457
	PA + SHR1	721	495	255	727	524	226	727	492	254	724	655	576	613	513
	PA + SHR2	724	498	255	730	527	226	730	495	254	727	658	579	616	516
Davis' peppergrass	PA + NHR	12	11	3	14	11	3	14	11	3	14	12	12	12	12
	PA + SHR1	12	11	3	14	11	3	14	11	3	14	12	12	12	12
	PA + SHR2	12	11	3	14	11	3	14	11	3	14	12	12	12	12
Slickspot peppergrass	PA + NHR	35	35	3	38	35	3	38	35	3	38	35	35	35	35
	PA + SHR1	11	11	3	14	11	3	14	11	3	14	11	11	11	11
	PA + SHR2	11	11	3	14	11	3	14	11	3	14	11	11	11	11
Tufted Townsend daisy	PA + NHR	665	439	232	671	468	203	671	436	231	668	599	520	557	457
	PA + SHR1	721	495	255	727	524	226	727	492	254	724	655	576	613	513
	PA + SHR2	724	498	255	730	527	226	730	495	254	727	658	579	616	516

Table 4.2.1-16. Acres of Total Disturbance[1] by Alternative (Including Phases) on Special Status Plant Potential Habitat from the Project as a Whole (continued).

Special Status Plant		B1	B2a Phase I	B2a Phase II	B2a Phase I&II	B2b Phase I	B2b Phase II	B2b Phase I&II	B2c Phase I	B2c Phase II	B2c Phase I&II	C	D	E	F
Greeley's wavewing	PA + NHR	6	6	0	6	6	0	6	6	0	6	6	6	6	6
	PA + SHR1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	PA + SHR2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Packard's cowpie buckwheat	PA + NHR	6	6	0	6	6	0	6	6	0	6	6	6	6	6
	PA + SHR1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	PA + SHR2	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] Total = total construction impact (short-term + long-term + permanent).
[2] PA + NHR = Wind Energy facility + northern inbound haul route.
[3] PA + SHR1 = Wind Energy facility + southern inbound haul route option 1.
[4] PA + SHR2 = Wind Energy facility + southern inbound haul route option 2.

4.2.1.5 Cumulative Impacts

The cumulative effects analysis area for vegetation and SSPs includes the vegetation and SSP analysis area and the following subbasins: Salmon Falls; Bruneau; C.J. Strike Reservoir; and Upper Snake-Rock (HUC Level 4 watersheds; Figure 3.1.4-8; United States Geological Survey, 2010). This area was selected because it considers potential impacts on vegetation and SSP populations that could occur throughout the entire region of influence from the proposed project and haul routes. All action alternatives would have similar impacts on vegetation and SSP and when added to other past, current, and reasonably foreseeable future actions, they would have the same cumulative impacts.

Alternative A (No Action Alternative)

Uplands

Vegetation is primarily influenced by wildfires and fire rehabilitation, livestock grazing, motorized vehicles, cross-country use in particular, invasive plant introduction and spread, and weather (BLM, 2010, p. 3-13; BLM, 2007c, p. 85). These influences would continue to occur and would impact vegetation, in addition to past, current, and reasonably foreseeable future projects in the cumulative effects analysis area. Cumulative impacts on vegetation have or would result from the removal of vegetation for the construction of other wind energy projects, project roads and infrastructure for transmission lines, communication, meteorological towers, and mine operations (Table 4.0.2-1). Within these 4 subbasins, these projects have or would remove existing upland vegetation from surface disturbance during construction and O&M activities. Surface disturbance from these actions could result in moderate long-term effects on upland vegetation by increasing the extent of early seral vegetation. Indirectly, this could change the fire regime and the composition and structure of upland vegetation. All cumulative projects that are on public land would be required to revegetate disturbed areas and implement design features, which would reduce impacts on vegetation.

Noxious Weeds and Invasive Plants

Current impacts and actions in the cumulative effects analysis area, such as recreation and motorized vehicle use, livestock grazing, and wildfires create disturbance. Disturbance acts as a vector for the establishment of noxious weeds and invasive plants, particularly in the lower elevations where Wyoming big sagebrush exists. These impacts and actions would continue to occur and would impact vegetation, in addition to disturbance from projects in the cumulative effects analysis area. Cumulative impacts on noxious weed and invasive plant establishment have or would result from the removal of existing vegetation for the construction of other wind energy projects, access roads and infrastructure for transmission lines, communication, meteorological towers, and mine operations (Table 4.0.2-1). Within the four subbasins in the analysis area, these projects have or would increase opportunities for noxious weed and invasive plant establishment due to surface disturbance. All cumulative projects that are on public land would be required to have a weed management plan, which would reduce impact from noxious weeds and invasive plants.

Special Status Plants

The primary actions that affect SSPs and their potential habitats within the analysis area include, but are not limited to, construction and maintenance of access infrastructure such as roads and trails, cross-country motorized vehicle use, habitat modification from introduction and establishment of noxious weeds and invasive plants, altered fire regime, and livestock grazing and associated infrastructure.

Motorized vehicle use is expected to continue at current or increased levels. This is expected to maintain, or increase, existing levels of habitat alteration. Livestock grazing is expected to remain at current levels and the frequency and scale of wildfire are expected to continue at current levels. Adverse impacts on SSPs and their potential habitat associated with livestock use would be expected to continue at current levels and wildfire impacts would be expected to continue at current levels.

Within the four subbasins of the analysis area, existing roads, transmission lines, communication towers, mines, and additional miscellaneous meteorological and communication towers are sited and have resulted in past and ongoing surface disturbance in those localized areas (Table 4.0.2-1). These surface disturbances can directly remove SSPs, their potential habitat, the seed bank, and important pollinators and their habitat.

Project site disturbance (Table 4.0.2-1), when added to past and ongoing motorized vehicle use, livestock grazing, and wildfires, can result in incremental increases in opportunities for dust deposition, noxious weed and invasive plant establishment, habitat alteration and removal, and wildfire risk. When added to future surface disturbing activities, cumulative project site disturbance can result in overall changes in potential SSP habitat composition and distribution of SSPs within these subbasins. Current, generally proactive, management for the consideration of SSPs on public lands would help reduce adverse impacts on SSPs in localized areas. Current guidance from conservation measures in biological opinions or letters of concurrence from the USFWS provides consistent and current management for populations of slickspot peppergrass and its habitat on public lands.

All Action Alternatives

Uplands

Cumulative impacts on upland vegetation communities would be similar to those described under Alternative A. However, increasing short- and long-term surface disturbance from the construction or reconstruction of project roads, transmission lines, and wind turbines associated with the action alternatives would increase the extent of early seral vegetation in the cumulative effects analysis areas. Within these four subbasins, proposed wind energy projects and transmission lines would remove existing upland vegetation from surface disturbance during construction and O&M activities over a greater area than Alternative A.

Noxious Weeds and Invasive Plants

Cumulative impacts on noxious weed and invasive plant establishment would be similar to those described under Alternative A. However, increasing the traffic and short- and long-term surface disturbance from the construction or reconstruction of project roads, transmission lines, and wind turbines associated with the action alternatives would increase opportunities for noxious weed and invasive plant establishment relative to Alternative A.

Special Status Plants

Increased opportunities for dust deposition, noxious weed and invasive plant establishment, habitat alteration and removal, and shortened wildfire regime could increase throughout the cumulative impact area due to existing roads, continued motorized vehicle use, livestock grazing, wildfire and other surface disturbing activities. When added to any of the action alternatives, including the haul routes, adverse impacts could be minor to moderate to SSPs and their potential habitats. Greatest potential impacts expected would be for Newberry's milkvetch because it is most likely to be the most widespread SSP within the analysis area and could have the most adverse impact from the project. Its known distribution is rather limited within the cumulative impact area, making a potentially large removal of its habitat more adverse. Dimeresia and tufted Townsend daisy could also have moderate adverse impacts; however, due to their more limited habitat distribution within areas mapped as potential habitat, impacts would likely be minor. Two-headed onion, four-wing milkvetch, and Davis' peppergrass would have less amounts of potential habitat removed and the likelihood of occurrence within these mapped areas is relatively low.

When considering current actions, adverse impacts of the proposed project, including the haul routes, could be minor to moderate on slickspot peppergrass and its habitat. Direct impacts on slickspot peppergrass include potential habitat removal within the project area and northern inbound haul route. The area adjacent to the northern inbound haul route is the population center of slickspot peppergrass within the Jarbidge Field Office. Direct impacts from road reconstruction and indirect impacts from increased use of the northern inbound haul route, where 5,700 acres of occupied habitat and 33,048 acres of potential habitat exists within a 0.5-mile buffer of the route, include possible habitat modification due to introduction of noxious weeds and invasive plants, increased wildfire risk, potential changes in species composition and structure, and possible disruption, reduction, or elimination of pollinator populations. These minor direct and indirect impacts, when added incrementally to other past, present, and reasonably foreseeable future actions, would likely result in minor to moderate adverse impacts on slickspot peppergrass over the long term.

4.2.2 FISH AND WILDLIFE

This section presents potential effects of implementing the Proposed Action or alternatives on fish and wildlife, including migratory birds, special status species, and big game. The analysis area varies by species or species group, and is described for each resource. Section 3.2.2 describes existing conditions for fish and wildlife based on the indicators used in the analysis of impacts.

General impacts of wind energy facilities on fish and wildlife are described in the *Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States* (BLM, 2005). This document is incorporated by reference. Detailed analyses for specific groups of species identified as issues during scoping are addressed in the following sections. General wildlife is not discussed; however, impacts can be inferred as being similar to the types of impacts discussed in the following sections.

The Applicants would be required to prepare an Avian Protection Plan; approval of this plan by USFWS would be required prior to BLM authorizing a Notice to Proceed. This plan could include additional mitigation designed to reduce impacts on avian species. Since the plan is not yet prepared, it is not known what the effectiveness of this plan would be in reducing impacts on avian species.

4.2.2.1 Analysis Methods

Indicators

The indicators for impacts on fish and wildlife are specific to individual species or groups of species and are defined in Section 4.2.2.2, Section 4.2.2.3, and Section 4.2.2.4 under the subsection where species or groups of species are assessed.

Methods and Assumptions

Impacts on fish and wildlife are assessed by: determining the number of acres of disturbance and removal of wildlife habitat; the potential for displacement from the construction, O&M, and decommissioning of the wind energy facility; and the potential for direct mortality from operation of the facility. Adverse impacts on fish and wildlife species from physiological stress and habitat fragmentation would occur during the life of this project. Quantifying impacts from stress and fragmentation is not possible at this time, but an assumption is made that both would increase with an increase in acres of disturbance. The impacts on wildlife habitat are directly related to the impacts described to vegetation groups in Section 4.2.1, and therefore, the assumptions described for vegetation apply to wildlife. The impacts on amphibian and fish habitat are related to the impacts on RHCAs and water quality as described in Section 4.1.4, and therefore, the assumptions described for water resources apply to amphibians and fish.

Where peer-reviewed literature exists describing the impacts of wind energy facilities on fish and wildlife species, these are cited to substantiate the impact analysis. Where no such data exists, as is the case for sage-grouse, impacts are extrapolated from research from oil and gas development or for similar species.

Impacts on all birds, including BLM special status species, are addressed under Migratory Birds (Section 4.2.2.2). Migratory birds of conservation concern and BLM special status bird species likely occurring in or near the project area are identified in Section 3.2.2.2, Section 3.3.3.3, and Appendix 3E. These lists provide habitat associations that can be used to identify impacts on each species when presented with acres of habitat impacted. For example, removal of shrublands would impact Brewer's sparrow, sage thrasher, and other birds identified in Appendix 3E as using sagebrush or shrub species.

Noise from construction, operation, and decommissioning of the wind facility is expected to adversely affect some wildlife species. It could result in temporary to long-term behavioral modifications and could result in displacement from otherwise suitable habitat. Section 4.1.5.2 describes how noise impacts some species of wildlife and qualitatively portrays the increasing likelihood of potential impact relative to decreasing distance between wildlife and sources of man-made project noise.

Under all of the phased alternatives, impacts on fish and wildlife species from Phase I would occur during construction and then through O&M for the life of the project. Construction of Phase II would occur in year 9 of the ROW grant and would result in impacts on fish and wildlife related to construction of Phase II (1 year), and then impacts from O&M of both Phase I and Phase II over a 20 year period (until year 30 of the ROW grant). Impacts from full build out of all the phased alternatives would be similar to Alternative B1, but would occur over 20 years compared to 30 years for Alternative B1. Construction of Phase II would result in the same type of construction impacts as Phase I, but would have fewer acres of surface disturbance than Phase I and the duration of construction related impacts would be less than Phase I, (1 year versus 2 years). For analysis purposes, it is assumed that Phase II would be permitted as proposed. Phase II would result in a second major disturbance from construction within a 30-year period compared to Alternative B1, where all construction disturbances would occur in the first 2 years of the ROW grant.

Proposed amendments to the 1987 Jarbidge RMP (Section 2.5.3; Section 2.7.3) and their potential impacts on fish and wildlife are discussed for each action alternative. Impacts on fish and wildlife within and adjacent to the haul routes that would result from the proposed RMP amendments would be similar to those described for each alternative. Therefore, these impacts are not discussed specifically in the analysis of impacts of the haul routes.

The following assumptions were used when analyzing effects of the proposed project on fish and wildlife:

- Areas replanted with sagebrush would not attain current wildlife cover function for more than 20 years (Stevens & Monsen, 2004) and could take as much as 100 years for full recovery in Wyoming big sagebrush habitats (Cooper et al., 2007).
- Physiological stress to wildlife would increase with an increase in acres of disturbance.
- Response to habitat fragmentation varies by species. In general, habitat fragmentation would increase with an increase in acres of disturbance.
- Sage-grouse would avoid habitat within a 4-mile radius from construction disturbance areas and locations of project infrastructure (Walker, Naugle & Doherty, 2007).
- Key sage-grouse habitat, where removed, would be reclassified as R1 habitat once revegetation seedings are deemed successful and as key habitat once sagebrush canopy cover reaches at least 15 percent.

- Responses of sage-grouse to wind energy development would be similar to those of oil and gas development, given the similarities in infrastructure between these two types of energy development (roads, transmission, and human disturbance).
- Water quality and quantity in tributaries to redband trout-bearing streams could affect downstream trout-bearing reaches.
- Water use by the project would be from off-site private sources.
- Bat fatalities during O&M would be similar to those reported post-construction for wind facilities in the Columbia Plateau Ecoregion.
- The rate of bat fatality would be the same across the entire project area.
- Impacts on insect prey base populations would be associated with the impacts on vegetation communities described in Section 4.2.1.2.
- The risk of collision of bats and birds with turbines would increase with numbers of turbines.
- Mobile species of wildlife, such as deer and adult birds, may avoid the initial construction disturbance/vegetation removal by moving into habitats in adjacent areas. It is conservatively assumed that adjacent habitats are at carrying capacity for the species that live there and cannot support additional biota from the construction areas (BLM, 2005). The subsequent competition for resources in adjacent habitats would likely preclude the incorporation of the displaced individuals into the resident populations (BLM, 2005).
- It is assumed that the entire avoidance area described for big game, greater sage-grouse, sharp-tailed grouse, raptors, and other wildlife would be avoided during project disturbances. However, this may not always be the case as landforms may create barriers that diminish or eliminate impacts within an analysis area and certain species or individuals within the same species may react differently to disturbance. This level of analysis is not currently available, but disturbances would likely impact the majority of an analysis area given the open sagebrush-steppe and grassland setting within and adjacent to the project area.

4.2.2.2 Migratory Birds

Raptors

The analysis area for impacts on raptor habitat is the area within a 1-mile buffer of the project disturbance area and haul routes (raptor avoidance area). This buffer is based on research that identifies, by species, how sensitive a nesting raptor is to disturbance from activities such as construction, mining, and timber harvest (Romin & Muck, 2002). Because nesting habitat is specialized for individual species, the avoidance areas over-represent the actual acres of nesting habitat potentially avoided. However, it does portray avoidance of areas around potential nest sites which would provide important cover and foraging habitats for raptors.

Of the species identified during surveys and expected to occur within the project area, a 1-mile nest buffer is the greatest seasonal spatial restriction recommended under BLM guidance (ferruginous hawk; Appendix 2A). Therefore, a 1-mile buffer is used to portray potential avoidance of habitat for all raptor species, with the exception of golden eagles (raptor avoidance area). The analysis area for

golden eagle habitat is extended to be within 6 miles of the project disturbance area based on current research and consultation with the USFWS (USFWS, 2010a). The 6-mile buffer corresponds to the area around a nest where more than 85 percent of activities occur (USFWS, 2010a). Potential avoidance of habitat by golden eagles is therefore assumed to occur within 6 miles of project features (golden eagle avoidance area).

The analysis area for impacts on raptor nests is based on the seasonal restriction buffers identified in Chapter 2, Section 2. 11.2, and through consultation with the USFWS. For example, impacts on red-tailed hawk nests are described as the number of nests within 0.33 miles of project disturbance areas and impacts on golden eagle nests are described as the number of nests within 1 mile. Disturbances near raptor nest sites have resulted in nest abandonment and high nestling mortality (Romin & Muck, 2002).

The indicators for impacts on raptors are:

- Acres of habitat avoided;
- Number of raptor nests within the analysis area; and
- Estimated mortality of raptors.

Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

There would be no raptor mortalities associated with wind turbines in the China Mountain area since a ROW would not be granted for development of a wind energy facility. No raptor nests would be disturbed. Since no vegetation removal would occur, there would be no reduction in foraging and/or nesting habitats of raptors.

Impacts Common to All Action Alternatives

The 1985 Wells RMP seasonal stipulations (Appendix 2A) would apply to raptors under all alternatives and would reduce the risk of disturbance from construction, maintenance, and decommissioning activities during sensitive periods for those raptors nesting in Nevada. Exceptions could be granted on a case-by-case basis.

Construction

Direct impacts from construction include habitat loss, modification, and fragmentation which could create an unsuitable landscape for birds and would result in adverse impacts to the interspecific relationships within bird communities (Kuvlesky et al., 2007). Surface disturbing activities would create minor short- and long-term reductions in foraging habitat through removal of vegetation which supports the prey base for many raptor species in the project area. Long-term adverse impacts on raptors from construction of the project would result from the combined footprint of the turbine towers, roads, power lines, and supporting infrastructure that removes or alters habitat. Loss of foraging and nesting habitat is addressed in Section 4.2.1 as loss of vegetation groups. A mitigation

measure is recommended that would require avoidance of rocky breaks when building the transmission line road (Section 2.4.6). If this mitigation were applied, then approximately 0.5 acres of breaks and potential raptor nesting habitat would not be removed or disturbed during construction along the road corridor under the transmission line.

Studies have shown that raptors compensate for the loss of foraging and nesting habitat by abandoning established territories or moving to less productive or already occupied territories (Romin & Muck, 2002). Impacts from construction would also include short-term avoidance of otherwise suitable habitats because of increased noise and visual disturbances. Construction of the project could displace birds from preferred habitat, shift birds to less desirable habitat, and cause birds to avoid impacted areas (Wyoming Game and Fish Department [WGFD], 2010).

Impacts from construction would also include potential collision injuries or mortalities. Collisions with vehicles, construction equipment, and partially constructed turbines could result in minor short-term adverse impacts to raptors from injury or mortality.

Operation and Maintenance

Operation of the wind facility would result in fatalities associated with collisions with project features, of which the most likely cause would be rotating turbine blades. An estimated 33,000 birds are killed annually in the U.S. by wind turbines (WGFD, 2010). This estimate may be biased low (Smallwood, 2007), and one report estimates anywhere from 88,000 to 320,000 avian mortalities due to collisions with wind turbines (American Bird Conservancy, 2010). Regardless, birds using the project area would be adversely impacted by the proposed wind facility. Direct impacts could include injuries or fatalities from collisions with turbine rotor blades, monopoles, power lines, and other related structures (Kunz et al., 2007; Winegrad, 2004). If the proposed mitigation altering the cut-in speed of turbine rotors from dusk to dawn between late summer and early fall were implemented for either action alternative (Section 2.4.6), the risk of bird fatalities could potentially be reduced for species that migrate at low altitudes at night.

Within modern wind-energy facilities in the Pacific Northwest, raptors compromised 8.6 percent of avian mortalities (Johnson & Erickson, 2008). Approximately 27 percent of raptors recorded in the project area flew at altitudes within the zone of turbine rotation, indicating risk of collision with wind turbine blades (Section 3.2.2.2; Young et al., 2009). Raptor use within the project area is ranked near the middle when compared to other similar projects at other locations (Young, Hallingstad, Poulton, & Bay, 2009), indicating that the project area receives moderate use. Raptor use estimates directly correlate to mortality rate estimations. Predicted raptor collision mortality within the project area is estimated at 0.07/MW/year, or seven raptors per year for each 100 MW of wind energy development (Young et al., 2009). This estimation would result in moderate long-term adverse impacts on raptors when compared to other similar projects. Mortality rate is used to predict raptor fatalities for each alternative. Based on baseline studies, the majority of the raptors expected to be impacted by collisions with turbine blades are red-tailed hawks, American kestrels, and northern harriers (Young et al., 2009). Appendix 3D shows flight-height within the project area for several bird groups and

provides an idea of the exposure to rotating turbines that these bird groups may be exposed to. Appendix 3D identifies accipiters (American kestrel, etc.), buteos (red-tailed hawk, etc.), and eagles (golden eagle, etc.) as the raptor groups with the highest percentage of observations occurring in the zone of turbine rotation.

Raptors are also at risk of electrocution while using transmission line poles and structures at substations as perching areas. While electrocution hazards would be minimized through design features (Appendix 2A) that discourage perching near areas of concern, the potential for minor adverse impacts would still exist. Transmission lines also pose a potential collision risk, especially during pursuit of prey, and would result in minor adverse impacts on raptors. If flight diverters are required on power lines as a result of the stipulations for sage-grouse (Appendix 2A), a reduction in collision risk could occur. Fatalities associated with these features cannot be estimated but would not vary by alternative; therefore, they are not analyzed further. Alternatively, transmission lines and other project structures would provide a minor beneficial long-term impact on raptors through an increased number of perching sites.

Raptor avoidance of wind energy facilities is not well studied, but a marked difference was identified for raptor nesting density between a wind energy facility (0 nests/39 square miles [100 km^2]) and adjacent lands within similar habitat (5.94 nests/39 square miles [100 km^2]) (Higgins, Osborn, & Naugle, 2007). Active raptor nests within species-specific seasonal nest buffers of project disturbance areas could be impacted by visual disturbances from turbines and human activity during maintenance as well as noise associated with operating turbines and maintenance activities. These impacts could result in major adverse impacts from nest failure and/or nest abandonment of raptors nesting within these buffers. Visual disturbances and human activity could diminish the quality of foraging and nesting habitat and would result in moderate long-term adverse impacts on raptor species through habitat avoidance.

Decommissioning

Decommissioning activities would result in the same adverse impacts on raptors as the construction process in terms of increased vehicle traffic, noise, visual disturbances, and short-term surface disturbance; decommissioning activities would lead to short-term avoidance of otherwise suitable habitats. Decommissioning of the wind facility, once complete, would result in moderate long-term beneficial impacts on raptors by removing a source of raptor mortality, decreasing disturbances associated with human activities in the area, removing visual disturbances, and increasing habitat for prey items through revegetation.

Alternative B1 (Proposed Action)

Table 4.2.2-1 displays acres of potential long-term avoidance of habitat by raptors and golden eagles during construction, O&M, and decommissioning. Habitat avoidance could result in reduced nesting density, failure of nests, abandonment of nests, and movement into lower quality habitat, as described in *Impacts Common to All Action Alternatives*. Refer to Section 3.2.2 and Appendix 3E for descriptions of habitat associations for individual raptor species. Habitat associations correspond to

the vegetation groups presented in Table 4.2.2-1 and provide insight into the impacts on raptor species as a result of habitat avoidance. For example, Appendix 3E states that prairie falcons nest on cliffs within grassland and shrub-steppe environments, and their habitat associations include grasslands, shrublands, and breaks. Therefore, Alternative B1 would result in long-term adverse impacts to prairie falcons by causing avoidance within 36,440 acres of shrublands, 15,860 acres of grasslands, and 3,125 acres of breaks.

Table 4.2.2-1. Acres of Raptor Habitat Avoided Under Alternative B1.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks
Raptor Avoidance Area	36,440	15,860	7,940	3,125
Golden Eagle Avoidance Area	222,770	62,890	24,120	6,850

Four red-tailed hawk nests occur within 0.33 miles of proposed project infrastructure project activities and two golden eagle nests occur within 1.0 mile of activities. Disturbance to nests during the nesting season could result in major short-term adverse impacts on raptors occupying these nests during construction, maintenance, and/or decommissioning by causing nest abandonment and/or failure.

Through an amendment to the 1987 Jarbidge RMP (Section 2.5.3.2), this alternative would allow construction, maintenance, and decommissioning to take place within raptor nest seasonal restriction buffers. This could result in moderate long-term adverse impacts from avoidance of the analysis area by potential breeding pairs. If mitigation presented in Appendix 2B regarding golden eagles is required, project features would not be sited within a 0.25- mile buffer of active golden eagle nests. Further, application of this mitigation would exclude O&M activities whenever possible within this buffer. This mitigation would provide some protection to nesting golden eagles during the breeding season, but less than the spatial buffers required in the 1987 Jarbidge RMP.

Estimated raptor fatalities associated with operation of the wind facility would be approximately 24 raptors a year. Over the 30 year period of operation, this could result in up to 720 raptor fatalities.

Alternative B2a

Table 4.2.2-2 displays potential long-term avoidance of habitat by raptors and golden eagles during construction, O&M, and decommissioning by project phase. Refer to Section 3.2.2 and Appendix 3E for descriptions of habitat associations for individual raptor species. Habitat associations correspond to the vegetation groups presented in Table 4.2.2-2 and provide insight into the impacts on raptor species as a result of habitat avoidance, as described for Alternative B1. Long-term adverse impacts on raptors associated with habitat avoidance would be the same as Alternative B1. However, the phased alternative would not reach the same level of disturbance until year 10 of the ROW grant, after Phase II is constructed.

Table 4.2.2-2. Acres of Raptor Habitat Avoided Under Alternative B2a.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks
Raptor Avoidance Area Phase I	31,180	12,630	5,400	3,080
Raptor Avoidance Area Phase II	5,260	3,230	2,540	45
Raptor Avoidance Area Phase I + Phase II	36,440	15,860	7,940	3,125
Golden Eagle Avoidance Area Phase I	210,330	59,160	18,270	6,850
Golden Eagle Avoidance Area Phase II	12,440	3,730	5,850	0
Golden Eagle Avoidance Area Phase I + Phase II	222,770	62,890	24,120	6,850

Project activities within 0.33 miles of three red-tailed hawk nests and within 1.0 mile of two golden eagle nests during the nesting season could adversely impact raptors occupying these nests during Phase I construction and maintenance by causing nest abandonment and/or failure. Impacts on raptors from the construction of Phase II would be the same as Alternative B1, impacting a total of four red-tailed hawk nests and two golden eagle nests. Types of impacts from RMP amendments would be the same as described for Alternative B1. Mitigation in Appendix 2B would result in impacts on nesting golden eagles as described for Alternative B1.

Estimated raptor fatalities associated with operation of the wind facility would be approximately 14 raptors a year for 10 years under Phase I. Construction of Phase II would add an estimated 10 raptor fatalities a year. Phase I and Phase II would result in an estimated 24 raptor fatalities a year over 20 years. Total estimated raptor fatalities over the life of the project would be less than Alternative B1, totaling 620 raptors.

Alternative B2b

Table 4.2.2-3 displays potential long-term avoidance of habitat by raptors and golden eagles during construction, O&M, and decommissioning by project phase. Refer to Section 3.2.2 and Appendix 3E for descriptions of habitat associations for individual raptor species. Habitat associations correspond to the vegetation groups presented in Table 4.2.2-3 and provide insight into the impacts on raptor species as a result of habitat avoidance, as described for Alternative B1. Long-term adverse impacts on raptor species associated with habitat avoidance under the phased alternative would be the same as described for Alternative B2a.

Table 4.2.2-3. Acres of Raptor Habitat Avoided Under Alternative B2b.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks
Raptor Avoidance Area Phase I	34,640	13,650	6,620	2,685
Raptor Avoidance Area Phase II	1,800	2,210	1,320	440
Raptor Avoidance Area Phase I + Phase II	36,440	15,860	7,940	3,125
Golden Eagle Avoidance Area Phase I	222,480	62,890	24,110	6,840
Golden Eagle Avoidance Area Phase II	290	0	10	10
Golden Eagle Avoidance Area Phase I + Phase II	222,770	62,890	24,120	6,850

Number of raptor nests impacted, including golden eagles, would be the same as Alternative B2a. An amendment to the 1987 Jarbidge RMP (Section 2.7.3.2) would allow construction and decommissioning to take place within seasonal nest buffers if certain exception criteria are met. Adherence to these criteria would minimize impacts on nesting raptors from construction and decommissioning. Seasonal restrictions for major maintenance would be retained throughout O&M of the project, which could provide a minor beneficial impact by avoiding disturbance within raptor nest buffers.

Estimated raptor fatalities associated with the operation of the wind facility would be the same as described for Alternative B2a.

Alternative B2c

Table 4.2.2-4 displays potential long-term avoidance of habitat by raptors and golden eagles during construction, O&M, and decommissioning by project phase. Refer to Section 3.2.2 and Appendix 3E for descriptions of habitat associations for individual raptor species. Habitat associations correspond to the vegetation groups presented in Table 4.2.2-4 and provide insight into the impacts on raptor species as a result of habitat avoidance, as described for Alternative B1. Long-term adverse impacts on raptors associated with habitat avoidance under the phased alternative would be the same as described for Alternative B2a.

Table 4.2.2-4. Acres of Raptor Habitat Avoided Under Alternative B2c.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks
Raptor Avoidance Area Phase I	34,430	15,100	7,570	2,010
Raptor Avoidance Area Phase II	2,010	760	370	1,115
Raptor Avoidance Area Phase I + Phase II	36,440	15,860	7,940	3,125
Golden Eagle Avoidance Area Phase I	219,340	62,890	24,120	6,840
Golden Eagle Avoidance Area Phase II	3,430	0	0	10
Golden Eagle Avoidance Area Phase I + Phase II	222,770	62,890	24,120	6,850

Project activities within 0.33 miles of three red-tailed hawk nests and within 1.0 mile of one golden eagle nest during the nesting season could adversely impact raptors occupying these nests during Phase I by causing nest abandonment and/or failure. Impacts on raptors from the construction of Phase II would be the same as Alternative B1, impacting a total of four red-tailed hawk nests and two golden eagle nests. The effect of the proposed amendments to the 1987 Jarbidge RMP on nesting raptors would be the same as Alternative B2b.

Estimated raptor fatalities associated with the operation of the wind facility would be the same as described for Alternative B2a.

Alternative C

Table 4.2.2-5 displays potential long-term avoidance of habitat by raptors and golden eagles during construction, O&M, and decommissioning. Types of impacts would be the same as those described for Alternative B1. Refer to Section 3.2.2 and Appendix 3E for descriptions of habitat associations for individual raptor species. Habitat associations correspond to the vegetation groups presented in Table 4.2.2-5 and provide insight into the impacts on raptors as a result of habitat avoidance, as described for Alternative B1. Alternative C would result in a negligible decrease in acres of habitat avoided by raptors compared to Alternative B1.

Table 4.2.2-5. Acres of Raptor Habitat Avoided Under Alternative C.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks
Raptor Avoidance Area	35,930	15,840	7,940	3,125
Golden Eagle Avoidance Area	222,570	62,890	24,120	6,850

Disturbance to four red-tailed hawk nests and two golden eagle nests could occur during construction, major maintenance, and decommissioning. This could cause nest abandonment and/or failure. The effect of the proposed amendments to the 1987 Jarbidge RMP on nesting raptors would be the same as Alternative B2b.

Estimated raptor fatalities associated with the operation of the wind facility would be 21 per year and 630 over the life of the project, which would be less than Alternative B1.

Alternative D

Table 4.2.2-6 displays potential long-term avoidance of habitat by raptors and golden eagles during construction, O&M, and decommissioning. Types of impacts would be the same as those described for Alternative B1. Refer to Section 3.2.2 and Appendix 3E for descriptions of habitat associations for individual raptor species. Habitat associations correspond to the vegetation groups presented in Table 4.2.2-6 and provide insight into the impacts on raptors as a result of habitat avoidance, as described for Alternative B1. Alternative D would result in a negligible decrease in acres of habitat avoided by raptors compared to Alternative B1.

Table 4.2.2-6. Acres of Raptor Habitat Avoided Under Alternative D.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks
Raptor Avoidance Area	34,880	15,260	7,850	3,060
Golden Eagle Avoidance Area	222,570	62,890	24,120	6,850

Project activities within 0.33 miles of three red-tailed hawk nests and within 1.0 mile of two golden eagle nests during the nesting season could adversely impact raptors occupying these nests by causing nest abandonment and/or failure during construction, O&M, and/or decommissioning. Compared to Alternative B1, one less red-tailed hawk nest would be impacted. The effect of the proposed amendments to the 1987 Jarbidge RMP on nesting raptors would be the same as Alternative B2b, and could help to minimize impacts over Alternative B1.

Estimated raptor fatalities from collision with wind turbines and potentially other project infrastructure during O&M would be 17 per year and 510 over the life of the project, which would be fewer than Alternative B1.

Alternative E

Table 4.2.2-7 displays potential long-term avoidance of habitat by raptors and golden eagles during construction, O&M, and decommissioning. Types of impacts would be the same as those described for Alternative B1. Refer to Section 3.2.2 and Appendix 3E for descriptions of habitat associations for individual raptor species. Habitat associations correspond to the vegetation groups presented in Table 4.2.2-7 and provide insight into the impacts on raptors as a result of habitat avoidance, as described for Alternative B1. Alternative E would result in a negligible decrease in acres of habitat avoided by raptors compared to Alternative B1.

Table 4.2.2-7. Acres of Raptor Habitat Avoided Under Alternative E.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks
Raptor Avoidance Area	35,250	15,350	7,900	2,810
Golden Eagle Avoidance Area	221,760	62,890	24,120	6,840

All seasonal raptor nest restrictions identified in the 1987 Jarbidge RMP and any recent BLM updates to these restrictions would be followed. Therefore, project activities (construction, major maintenance, and decommissioning) would not be allowed within 0.33 miles of four red-tailed hawk nests and within 1.0 mile of two golden eagle nests during the nesting season. Because there would be no amendment to the seasonal and spatial restrictions in the 1987 Jarbidge RMP, this alternative would provide the greatest level of protection to nesting raptors from disturbances associated with all construction, O&M, and decommissioning activities.

Estimated raptor fatalities during O&M would be the same as Alternative D.

Alternative F

Table 4.2.2-8 displays potential long-term avoidance of habitat by raptors and golden eagles during construction, O&M, and decommissioning. Types of impacts would be the same as those described for Alternative B1. Refer to Section 3.2.2 and Appendix 3E for descriptions of habitat associations for individual raptor species. Habitat associations correspond to the vegetation groups presented in Table 4.2.2-8 and provide insight into the impacts on raptors as a result of habitat avoidance, as described for Alternative B1. Alternative F would result in a negligible decrease in acres of habitat avoided by raptors, and a negligible to minor decrease in acres of habitat avoided by golden eagles, compared to Alternative B1.

Table 4.2.2-8. Acres of Raptor Habitat Avoided Under Alternative F.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks
Raptor Avoidance Area	34,620	14,940	7,670	2,650
Golden Eagle Avoidance Area	222,480	62,890	24,120	6,840

Project activities within 0.33 miles of three red-tailed hawk nests and within 1.0 mile of one golden eagle nest during the nesting season could adversely impact raptors occupying these nests by causing nest abandonment and/or failure. Compared to Alternative B1, one less golden eagle nest would be impacted. The effect of the proposed amendments to the 1987 Jarbidge RMP on nesting raptors would be the same as Alternative B2b. An estimated 15 raptor fatalities per year and 450 over the life of the project would be associated with the operation of the wind facility, the fewest of all the alternatives.

Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Short-term adverse impacts on raptor and golden eagle habitats could occur within the analysis area associated with the reconstruction and use of the northern inbound haul route. Increased vehicle traffic and noise could cause avoidance of potential nesting habitats and could lead to abandonment or failure of established nests. Acres of habitat avoided by raptors and golden eagles are not quantified, as vegetation data within the extent of the analysis area were not available at the time the document was prepared. Nest surveys were not performed along the northern inbound haul route. However, raptors are known to nest within 1 mile of the northern inbound haul route, including Swainson's hawk, ferruginous hawk, and prairie falcon (Section 3.2.2.3). Raptors perching along roadside fences and transmission lines would be at a greater risk from adverse impacts associated with vehicle collisions.

Southern Inbound Haul Route Option 1

Table 4.2.2-9 displays potential avoidance of habitat during use of the southern inbound haul route option 1 by raptors and golden eagles. Types of impacts would the same as those described for the northern inbound haul route. Refer to Section 3.2.2 and Appendix 3E for descriptions of habitat associations for individual raptor species. Habitat associations correspond to the vegetation groups presented in Table 4.2.2-9 and provide insight into the impacts on raptors as a result of habitat avoidance, as described for Alternative B1.

Table 4.2.2-9. Acres of Raptor Habitat Avoided for the Southern Inbound Haul Route Option 1.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks
Raptor Avoidance Area	9,015	5,460	250	0
Golden Eagle Avoidance Area	90,600	39,430	4,570	840

There are no known raptor nests within the seasonal restriction buffers as defined in Appendix 2A. Therefore, reconstruction, construction, and use of the southern inbound haul route would not directly disturb nesting raptors. There are three golden eagle nests (two active nests) within 6 miles of the southern inbound haul route option 1 and at least one prairie falcon nest within 1 mile of the haul route. Although nesting would not be directly impacted, foraging and other behavior of raptors using these nest sites could be adversely impacted if they were disturbed by construction and hauling activities.

Southern Inbound Haul Route Option 2

Table 4.2.2-10 displays potential avoidance of habitat during use of the southern inbound haul route option 2 by raptors and golden eagles. Types of impacts would be the same as those described for the northern inbound haul route. Refer to Section 3.2.2 and Appendix 3E for descriptions of habitat associations for individual raptor species. Habitat associations correspond to the vegetation groups presented in Table 4.2.2-10 and provide insight into the impacts on raptors as a result of habitat

avoidance, as described for Alternative B1. The southern inbound haul route option 2 would have a negligible increase in acres of habitat avoided by raptors compared to the southern inbound haul route option 1.

Table 4.2.2-10. Acres of Raptor Habitat Avoided for the Southern Inbound Haul Route Option 2.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks
Raptor Avoidance Area	10,500	5,525	250	0
Golden Eagle Avoidance Area	93,390	39,430	4,590	900

There is one golden eagle nest within 1 mile of the southern inbound haul route option 2. Construction and use of the southern inbound haul route could cause nest failure or nest abandonment to the golden eagle nest. One additional active and one inactive but intact golden eagle nest is within 6 miles of the southern inbound haul route option 2 and at least one prairie falcon nest is within 1 mile. Although nesting would not be directly impacted, foraging and other behavior of raptors using these nest sites could be adversely impacted if they were disturbed by construction and hauling activities. The southern inbound haul route option 2 could result in major adverse impacts on a golden eagle nest that occurs within 1 mile. This option would have greater adverse impacts on nesting golden eagles than the southern inbound haul route option 1.

Outbound Haul Route

Minor short-term adverse impacts on raptor and golden eagle habitats could occur within the analysis area associated with the use of the outbound haul route. Increased vehicle traffic and noise could cause avoidance of potential nesting habitats and could lead to abandonment or failure of established nests. Raptors perching along roadside fences and transmission lines would be at a greater risk from adverse impacts associated with vehicle collisions during use of this road for the project.

Project as a Whole

Direct and indirect impacts on raptors and their habitat would result from development of this project. Long-term adverse impacts associated with the avoidance of habitats described provides insight into the potential impacts a wind energy facility may have on raptors in the area. Large avoidance areas described for raptors and golden eagles varied by less than 6 percent among alternatives. Table 4.2.2-11 compares fatality estimations and raptor nests impacted between alternatives with the haul routes included. Since raptor avoidance areas cannot be quantified for the northern haul route, acres of habitat avoided are not included in Table 4.2.2-11.

Table 4.2.2-11. Impact Summary Table for Project as a Whole – Raptor Nests and Estimated Fatalities.

	Alt A	Alt B1	Alt B2a PI/PII[1] (I + II)[2]	Alt B2b PI/PII[1] (I + II)[2]	Alt B2c PI/PII[1] (I + II)[2]	Alt C	Alt D	Alt E	Alt F
Project Area									
Raptor Nests[3] Within Seasonal Buffer	0	4	3/1 (4)	3/1 (4)	3/1 (4)	4	3	4	3
Golden Eagle Nests Within Seasonal Buffer	0	2	2/0 (2)	2/0 (2)	1/1 (2)	2	2	2	2
Estimated Raptor Fatalities[4]	0	720	620	620	620	630	510	510	450
Project with Northern Inbound Haul Route									
Raptor Nests Within Seasonal Buffer	0	4	3/1 (4)	3/1 (4)	3/1 (4)	4	3	4	3
Golden Eagle Nests Within Seasonal Buffer	0	2	2/0 (2)	2/0 (2)	1/1 (2)	2	2	2	2
Estimated Raptor Fatalities	0	720	620	620	620	630	510	510	450
Project with Southern Inbound Haul Route Option 1									
Raptor Nests Within Seasonal Buffer	0	4	3/1 (4)	3/1 (4)	3/1 (4)	4	3	4	3
Golden Eagle Nests Within Seasonal Buffer	0	2	2/0 (2)	2/0 (2)	1/1 (2)	2	2	2	2
Estimated Raptor Fatalities	0	720	620	620	620	630	510	510	450
Project with Southern Inbound Haul Route Option 2									
Raptor Nests Within Seasonal Buffer	0	4	3/1 (4)	3/1 (4)	3/1 (4)	4	3	4	3
Golden Eagle Nests Within Seasonal Buffer	0	3	3/0 (3)	3/0 (3)	2/1 (3)	3	3	3	3
Estimated Raptor Fatalities	0	720	620	620	620	630	510	510	450

[1] Impact on a nest common to both Phase I + Phase II presented only once under Phase I.
[2] Impacts presented for Phase I + Phase II combined.
[3] Raptor nests, excluding golden eagle nests.
[4] Estimated raptor fatalities over the 30 year ROW grant.

Impacts on raptor and golden eagle nests within their seasonal restriction buffers are similar between alternatives. The southern inbound haul route option 2 would impact one additional golden eagle nest not within the seasonal buffer of any of the alternatives or other haul routes. RMP amendments for Alternatives B1 and B2a would reduce seasonal protection of nesting raptors by allowing construction, O&M, and decommissioning to occur within seasonal nest buffers. RMP amendments for Alternatives B2b, B2c, C, D, and F, would maintain seasonal protection of nesting raptors since

construction and decommissioning could only occur within nest buffers if certain exception criteria were met. Alternative E would provide the greatest protection to nesting raptors by following current BLM guidance at all times.

Fatality estimates were not determined for golden eagles specifically, they are reported for all raptor species. However, when observed in the project area during bird surveys, golden eagles flew at a height that was within the zone of turbine rotation 47 percent of the time they were observed (Appendix 3D). This would correlate to a collision risk for the golden eagles that use the project area. Further, given that the majority of raptors observed in the project area during migration, were golden eagles (Section 3.2.2.3), risk of mortality to golden eagles would be greater. Alternative B1 is estimated to cause the greatest number of fatalities to raptors and Alternative F is estimated to cause the fewest.

Alternative B1 in conjunction with the southern inbound haul route option 2 would have the greatest impact on raptors and golden eagles in terms of estimated fatalities and impacts on nesting pairs. Alternative F alone and with the northern inbound haul route or option 1 of the southern inbound haul route would have the fewest estimated fatalities and impact the fewest nests while still protecting nesting raptors during construction and decommissioning if certain exception criteria are met.

Cumulative Impacts

Cumulative impacts on raptor species, including golden eagles, consist of incremental effects of the alternatives when added to other past, present, and reasonably foreseeable future actions. These effects would occur over the duration of the 30-year ROW grant, resulting in incremental increases in habitat degradation, habitat avoidance, mortality, and potential population impacts. The cumulative effects analysis area is an approximately 35-mile radius from the turbine footprints, which represents guidance provided by the BLM.

Past and present impacts on raptors include habitat degradation that lessens the quality of nesting and foraging habitat such as wildfire, invasive plant species, livestock grazing, and recreational activities. Of the past, present, and reasonably foreseeable actions described in Table 4.0.2-1, the Salmon Falls Dam to Wells 138 kV, Midpoint to Humboldt 345 kV, the proposed SWIP 500 kV, other smaller overhead transmission lines and telephone lines, along with various other aboveground facilities are within the cumulative effects analysis area for raptors. Future operation of the wind project, when added to the impacts of these existing and proposed actions, would contribute to habitat degradation. Raptor fatalities predicted from operation of the project would add cumulatively to those sources existing within the analysis area. Other sources of fatalities could include electrocution and collisions with vehicles or transmission line, meteorological towers, and communication tower structures, and illegal take. No fatality estimates are available for any of the other potential sources.

Alternative A (No Action Alternative)

The No Action Alternative would not add cumulatively to existing impacts on raptors because the wind facility would not be built. Raptors and their habitats would continue to be managed by the

USFWS and BLM under existing conditions, as described in Section 3.2.2.2. No adverse impacts associated with a wind energy facility would be added to declining population of golden eagles. Habitat degradation, habitat avoidance, and fatalities from existing influences on raptors would continue.

Alternative B1 (Proposed Action)

Operation of the project would have long-term adverse impacts on raptors, which would add cumulatively to impacts associated with habitat avoidance and degradation to the past and future impacts within the analysis area. Fatalities associated with the operation of the project would have a moderate impact on raptors within the cumulative effects analysis area. Operation of the wind energy facility would likely be the largest source of raptor fatalities within the analysis area. The project would result in moderate additions to the adverse impacts acting cumulatively on declining golden eagle populations.

Alternatives B2a, B2b, and B2c

Cumulative impacts would be similar to Alternative B1. The phased alternatives would result in a moderate decrease in raptor fatalities compared to Alternative B1, which would have a minor effect on cumulative impacts.

Alternative C

Cumulative impacts would be similar to the phased alternatives.

Alternatives D and E

Operation of the project would have long-term adverse impacts on raptors, which would add cumulatively to impacts associated with habitat avoidance and degradation to the past and future impacts within the analysis area. Fatalities associated with the operation of the project would have a moderate impact on raptors within the cumulative effects analysis area. However, Alternative D and E would result in a moderate decrease in fatalities as compared to Alternative B1, which would reduce the adverse cumulative impacts from the project. Operation of the wind energy facility would likely be the largest source of raptor fatalities within the analysis area. The project would result in moderate additions to the adverse impacts acting cumulatively on declining golden eagle populations.

Alternative F

Cumulative impacts would be similar to Alternatives D and E. Estimated raptor fatalities would be the fewest of the alternatives and result in a moderate reduction in the adverse cumulative impacts as compared to Alternative B1. However, operation of the wind energy facility would likely be the largest source of raptor fatalities within the analysis area, and would result in moderate additions to the adverse impacts acting cumulatively on declining golden eagle populations.

Passerines and Other Birds

The analysis area for passerines and other birds is the area within 328 feet of project roads and haul routes and 590 feet of all other project disturbance areas. These distances were identified through research on the effects of roads on passerines within sagebrush habitats (Ingelfinger & Anderson, 2004), and the effects of wind turbines on the densities of nesting grassland passerines (Leddy, Higgins, & Naugle, 1999). Both studies showed a decline in attendance within those buffer areas. For the purpose of this analysis, the analysis area is also referred to as an avoidance area to clearly identify indirect impacts on habitats of passerines and other birds. The acres of habitat directly removed by surface disturbance and acres of habitat within the avoidance area are presented for each alternative. Impacts on all passerines and other birds, including BLM special status species, are addressed in this section.

The indicators for impacts on passerines and other non-raptor bird species are:

- Acres of habitat removed and avoided.
- Estimated mortality of birds.

Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

There would be no passerine or other bird mortalities associated with wind turbines in the China Mountain area since a ROW would not be granted for development of a wind energy facility. Since no vegetation removal would occur, there would be no reduction in foraging and/or nesting habitats of passerines and other birds. Passerines and their habitats would continue to be managed by the USFWS and BLM under existing conditions, as described in Section 3.2.2.2.

Impacts Common to All Action Alternatives

Passerines and other non-raptor bird species that use the project area would be adversely impacted by the proposed wind facility. Direct and indirect impacts presented for raptors in *Impacts Common to All Action Alternatives* would be similar for passerines and other birds.

Construction

Surface disturbing activities could impact ground and shrub nesting species by removing established breeding territories and/or direct removal of an established nest. Migratory birds in surrounding habitats could be impacted by construction activities through modifications to foraging and reproductive behaviors because of increased noise (Section 4.1.5.2) and visual disturbances resulting in flushing and/or avoidance of these areas. Increased perching opportunities for predatory birds would be available among the construction equipment and turbine pieces in staging areas.

Operation and Maintenance

Passerines make up the majority of bird fatalities from modern wind energy facilities, often comprising more than 80 percent (Johnson & Erickson, 2008). Brewer's sparrow, horned lark,

mountain bluebird, rock wren, vesper sparrow, and violet-green swallow made up the majority of passerine use in the project area (Young et al., 2009). Provided that relative abundance is related to exposure and risk of collision, these species would be the most likely affected through direct impacts (Young et al., 2009). It is expected that the proposed wind facility would result in fatality rates between 1 and 3 birds/MW/year or 100 to 300 bird fatalities per year for every 100MW produced (Young et al., 2009). Of the most abundant passerines identified within the project area, the horned lark is the most commonly found passerine fatality at wind-energy sites in the west (Johnson & Erickson, 2008).

Potential avoidance of the area within 328 feet of roads and 590 feet of turbines by passerines and other birds could create long-term impacts by displacing birds to adjacent habitats, which would result in increased resource competition. Increased perching opportunities for raptors and corvids along the 19-mile transmission line in the project area and other project features, such as the lattice meteorological towers, could result in long-term impacts on passerines and other birds through an increase in mortalities from predation and decreased nest success through nest depredations. If the mitigation measure recommending use of monopole meteorological towers were required (Section 2.4.6.1) perching opportunities and associated risk of predation would be reduced.

Decommissioning

Decommissioning would result in the same adverse impacts on passerines and other birds as the construction process in terms of surface disturbance, noise, and visual disturbances. Decommissioning would result in moderate long-term beneficial impacts on passerines and other birds by removing a source of passerine mortality associated with collisions with turbine blades, decreasing disturbances associated with human activities in the area, removing auditory and visual disturbances, decreasing raptor perches, and increasing habitat through revegetation.

Alternative B1 (Proposed Action)

Table 4.2.2-12 displays acres of impacts on habitat of passerines and other birds within the project area. These impacts would be for the life of the project from construction, through operation and decommissioning and would be considered minor to moderate long-term adverse impacts on passerines and other birds. These acres of impacts would include some permanent disturbance that is not called out, but is described in Section 4.2.1. Refer to habitat associations described in Section 3.2.2.2, Section 3.2.2.3, and Appendix 3E to associate the impacts in Table 4.2.2-12 with specific species of passerines and other birds.

Table 4.2.2-12. Acres of Habitat Impacted for Passerines and Other Birds Under Alternative B1.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks	RHCAs
Acres Removed	637	104	68	1	20
Acres Avoided	6,000	1,910	1,325	26	400

Estimated fatality rates for passerines during operation would range from 340 to 1,020 birds each year. Over the life of the project, more than 30,000 passerine fatalities could occur.

Alternative B2a

Table 4.2.2-13 displays impacts on habitat of passerines and other birds within the project area from construction, O&M, and decommissioning of Phase I, Phase II, and Phase I and Phase II together.

Long-term adverse impacts on passerines and other birds associated with habitat removal and avoidance would be the same as Alternative B1. However, the phased alternative would not reach the same level of disturbance until year 10 of the ROW grant, after Phase II is constructed. Estimated fatality rates for passerines during operation of Phase I would range from 200 to 600 fatalities a year for 10 years. Phase II would add an additional 140 to 420 fatalities a year for a total of 340 to 1,020 fatalities a year over 20 years. Over the life of the project, more than 26,000 passerine fatalities could occur. Total passerine fatalities would be less than Alternative B1.

Table 4.2.2-13. Acres of Habitat Impacted for Passerines and Other Birds Under Alternative B2a.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks	RHCAs
Acres Removed Phase I	425	51	57	1	15
Acres Removed Phase II	212	53	11	0	5
Acres Removed Phase I + II	637	104	68	1	20
Acres Avoided Phase I	4,945	1,430	1,170	26	325
Acres Avoided Phase II	1,055	480	155	0	75
Acres Avoided Phase I + II	6,000	1,910	1,325	26	400

Alternative B2b

Table 4.2.2-14 displays impacts on habitat of passerines and other birds within the project area from construction, O&M, and decommissioning of Phase I, Phase II, and Phase I and Phase II together.

Table 4.2.2-14. Acres of Habitat Impacted for Passerines and Other Birds Under Alternative B2b.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks	RHCAs
Acres Removed Phase I	457	31	34	1	17
Acres Removed Phase II	180	73	34	0	3
Acres Removed Phase I + II	637	104	68	1	20
Acres Avoided Phase I	4,935	1,320	840	26	370
Acres Avoided Phase II	1,065	590	485	0	30
Acres Avoided Phase I + II	6,000	1,910	1,325	26	400

Long-term adverse impacts on passerines and other birds associated with habitat removal and avoidance would be the same as described for Alternative B2a.

Estimated fatality rates for passerines during O&M would be the same as described for Alternative B2a.

Alternative B2c

Table 4.2.2-15 displays impacts on habitat of passerines and other birds within the project area from construction, O&M, and decommissioning of Phase I, Phase II, and Phase I and Phase II together.

Table 4.2.2-15. Acres of Habitat Impacted for Passerines and Other Birds Under Alternative B2c.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks	RHCAs
Acres Removed Phase I	422	98	41	1	16
Acres Removed Phase II	215	6	27	0	4
Acres Removed Phase I + II	637	104	68	1	20
Acres Avoided Phase I	4,440	1,885	870	0	340
Acres Avoided Phase II	1,560	25	455	26	60
Acres Avoided Phase I + II	6,000	1,910	1,325	26	400

Long-term adverse impacts on passerines and other birds associated with habitat removal and avoidance would be the same as described for Alternative B2a.

Estimated fatality rates for passerines during O&M would be the same as described for Alternative B2a.

Alternative C

Table 4.2.2-16 displays impacts on habitat of passerines and other birds within the project disturbance area from construction, O&M, and decommissioning.

Table 4.2.2-16. Acres of Habitat Impacted for Passerines and Other Birds Under Alternative C.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks	RHCAs
Acres Removed	571	104	68	1	18
Acres Avoided	5,490	1,910	1,325	14	390

The acres of habitat removed and avoided for grasslands, mountain brush or woodland, and RHCAs would be the same as Alternative B1 and impacts would be the same as described for Alternative B1 to passerines and other birds using these vegetation groups. Fewer impacts on shrublands and breaks would result in a minor decrease in adverse impacts on passerines and other birds that utilize these vegetation groups compared to Alternative B1. Therefore, adverse long-term impacts on passerines and other birds would be slightly less than Alternative B1. However, differences are minor and the overall impact would be similar.

Estimated fatality rates for passerines during O&M would range from 300 to 900 birds each year. Over the life of the project, as many as 27,000 passerine fatalities could occur during O&M. This would be a minor decrease in fatalities compared to Alternative B1.

Alternative D

Table 4.2.2-17 displays impacts on habitat of passerines and other birds within the project disturbance area from construction, O&M, and decommissioning.

Table 4.2.2-17. Acres of Habitat Impacted for Passerines and Other Birds Under Alternative D.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks	RHCAs
Acres Removed	497	79	52	1	18
Acres Avoided	5,235	1,740	1,080	14	380

Both the acres removed and acres potentially avoided for all habitats would be less than Alternative B1. Therefore, adverse long-term impacts on passerines and other birds would be less than Alternative B1. However, differences would be minor and the overall impact would be similar to Alternative B1.

Estimated fatality rates for passerines during O&M would range from 248 to 744 birds each year. Over the life of the project, as many as 22,320 passerine fatalities could occur. This would be a minor decrease in fatalities compared to Alternative B1.

Alternative E

Table 4.2.2-18 displays impacts on habitat of passerines and other birds within the project disturbance area from construction, O&M, and decommissioning.

Table 4.2.2-18. Acres of Habitat Impacted for Passerines and Other Birds Under Alternative E.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks	RHCAs
Acres Removed	529	92	33	1	18
Acres Avoided	5,200	1,820	925	1	365

Both the acres removed and acres potentially avoided for all habitats would be less than Alternative B1. Therefore, adverse long-term impacts on passerines and other birds would be less than Alternative B1. However, differences would be minor and the overall impact would be similar to Alternative B1.

Estimated fatality rates for passerines during O&M would range from 240 to 720 birds each year. Over the life of the project, more than 22,000 passerine fatalities could occur. This would result in a minor to moderate decrease in estimated fatalities when compared to Alternative B1.

Alternative F

Table 4.2.2-19 displays impacts on habitat of passerines and other birds within the project disturbance area from construction, O&M, and decommissioning.

Table 4.2.2-19. Acres of Habitat Impacted for Passerines and Other Birds Under Alternative F.

	Shrublands[1]	Grasslands	Mountain Brush or Woodland	Breaks	RHCAs
Acres Removed	435	70	36	1	3
Acres Avoided	4,860	1,660	920	14	375

Both the acres removed and acres potentially avoided for all habitats would be less than Alternative B1. Therefore, adverse long-term impacts on passerines and other birds would be less than Alternative B1.

Alternative F would have the fewest long-term adverse impacts on passerine and other bird habitats compared to Alternative B1.

Estimated fatality rates for passerines from O&M would range from 210 to 630 birds each year. Over the life of the project, as many as 19,000 passerine fatalities could occur. Alternative F is estimated to have the fewest passerine fatalities compared to Alternative B1.

Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Short-term adverse impacts on passerine and other birds could occur within the analysis area associated with the reconstruction and use of the northern inbound haul route. Surface disturbance to 39 acres would occur in sagebrush, annual grasslands, and agricultural areas. These would result in negligible long-term adverse impacts on passerines and other birds along the northern inbound haul route. Avoidance of these impact areas would result in minor long-term adverse impacts (Table 4.2.2-20). Avoidance of the haul route during road reconstruction, and construction and decommissioning of the project would have minor short-term adverse impacts from increased vehicle traffic and noise. Vehicle traffic could also increase the risk of adverse impacts from fire, exposure to toxins, and introduction of noxious weeds.

Table 4.2.2-20. Acres of Passerine and Other Bird Habitat Removed or Avoided for the Northern Inbound Haul Route.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks	RHCAs
Acres Removed[1]	18	8	0	0	5
Acres Avoided	275	75	0	0	30

[1] Does not include 12 acres of agricultural land.

Southern Inbound Haul Route Option 1

Table 4.2.2-21 displays impacts on passerines and other bird habitats from the southern inbound haul route option 1. Most of these impacts would be considered permanent, as reclamation is not planned for this route. Shrublands totaling 23 acres would be revegetated after construction of the project is complete. If a phased alternative is chosen, these 23 acres would be redisturbed in Phase II. Composition of the redisturbed vegetation group would depend on the choice made by a BLM authorized officer for reseeding after Phase I. Refer to habitat descriptions found in Section 3.2.2.2, Section 3.2.2.3, and Appendix 3E to associate the impacts in Table 4.2.2-21 with passerine and other bird species.

Table 4.2.2-21. Acres of Passerine and Other Bird Habitat Removed or Avoided for the Southern Inbound Haul Route Option 1.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks	RHCAs
Acres Removed	55	30	0	0	22
Acres Avoided	635	355	6	0	130

Compared to the northern inbound haul route, the southern inbound haul route option 1 would remove more acres of passerine and other bird habitat. Acres of habitat avoided would be greater than the northern inbound haul route because more acres of habitat would be impacted for the southern inbound haul route option 1. Considering that construction and reconstruction of the southern inbound haul route option 1 would widen and improve the condition of this road, the expected increase in vehicle traffic from project vehicles and the public would cause or greatly increase behavioral avoidance.

Southern Inbound Haul Route Option 2

Table 4.2.2-22 displays impacts on passerines and other bird habitats from the southern inbound haul route option 2. Types of impacts would be similar to those described for southern inbound haul route option 1.

Table 4.2.2-22. Acres of Passerine and Other Bird Habitat Removed or Avoided for the Southern Inbound Haul Route Option 2.

	Shrublands	Grasslands	Mountain Brush or Woodland	Breaks	RHCAs
Acres Removed	59	26	0	4	24
Acres Avoided	772	346	6	15	130

The southern inbound haul route option 2 would result in a minor increase in total habitats removed and avoided compared to southern inbound haul route option 1. The difference in minor long-term adverse impacts on passerines and other birds would be negligible between the two southern inbound haul route options.

Outbound Haul Route

Short-term adverse impacts on passerine and other birds could occur from the use of the outbound haul route. Increased vehicle traffic and noise during construction and decommissioning of the project could cause avoidance of potential nesting and foraging habitats. If this were to occur, it would lead to abandonment or failure of established nests. Vehicle traffic could also increase the risk of adverse impacts from fire, exposure to toxins, and introduction of noxious weeds.

Project as a Whole

Table 4.2.2-23 displays the impacts of the project as a whole on passerines, by alternative, based on impacts on habitat. Adverse impacts on passerine habitat would be the greatest as a result of Alternative B1 or any of the phased alternatives in conjunction with the southern inbound haul route option 2. The fewest adverse impacts would occur under Alternative F in conjunction with the northern inbound haul route.

Table 4.2.2-23. Impact Summary Table for Project as a Whole – Passerine Habitat.

	Alt A	Alt B1	Alt B2a PI/PII (I + II)	Alt B2b PI/PII (I + II)	Alt B2c PI/PII (I + II)	Alt C	Alt D	Alt E	Alt F
Project Area									
Shrublands Removed	0	637	425/212 (637)	457/180 (637)	422/215 (637)	571	497	529	435
Shrublands Avoided	0	6,000	4,945/1,055 (6,000)	4,935/1,065 (6,000)	4,440/1,560 (6,000)	5,490	5,235	5,200	4,860
Grasslands Removed	0	104	51/53 (104)	31/73 (104)	98/6 (104)	104	79	92	70
Grasslands Avoided	0	1,910	1,430/480 (1,910)	1,320/590 (1,910)	1,885/25 (1,910)	1,910	1,740	1,820	1,660
Mt. Brush or Woodland Removed	0	68	57/11 (68)	34/34 (68)	41/27 (68)	68	52	33	36
Mt. Brush or Woodland Avoided	0	1,325	1,170/155 (1,325)	840/485 (1,325)	870/455 (1,325)	1,325	1,080	925	920
Breaks Removed	0	1	1/0 (1)	1/0 (1)	1/0 (1)	1	1	1	1
Breaks Avoided	0	26	26/0 (26)	26/0 (26)	0/26 (26)	14	14	1	14
RHCAs Removed	0	20	15/5 (20)	17/3 (20)	16/4 (20)	18	18	18	3
RHCAs Avoided	0	400	325/75 (400)	370/30 (400)	340/60 (400)	390	380	365	375
Project with Northern Inbound Haul Route									
Shrublands Removed	0	655	443/212 (655)	475/180 (655)	440/215 (655)	589	515	547	453
Shrublands Avoided	0	6,275	5,220/1,055 (6,275)	5,210/1,065 (6,275)	4,715/1,560 (6,275)	5,765	5,510	5,475	5,135
Grasslands Removed	0	112	59/53 (112)	39/73 (112)	106/6 (112)	112	87	100	78
Grasslands Avoided	0	1,985	1,505/480 (1,985)	1,395/590 (1,985)	1,960/25 (1,985)	1,985	1,815	1,895	1,735

Table 4.2.2-23. Impact Summary Table for Project as a Whole – Passerine Habitat (continued).

	Alt A	Alt B1	Alt B2a PI/PII (I + II)	Alt B2b PI/PII (I + II)	Alt B2c PI/PII (I + II)	Alt C	Alt D	Alt E	Alt F
Mt. Brush or Woodland Removed	0	68	57/11 (68)	34/34 (68)	41/27 (68)	68	52	33	36
Mt. Brush or Woodland Avoided	0	1,325	1,170/155 (1,325)	840/485 (1,325)	870/455 (1,325)	1,325	1,080	925	920
Breaks Removed	0	1	1/0 (1)	1/0 (1)	1/0 (1)	1	1	1	1
Breaks Avoided	0	26	26/0 (26)	26/0 (26)	0/26 (26)	14	14	1	14
RHCAs Removed	0	25	20/5 (25)	22/3 (25)	21/4 (25)	23	23	23	8
RHCAs Avoided	0	430	355/75 (430)	400/30 (430)	370/60 (430)	420	410	395	405
Project with Southern Inbound Haul Route Option 1									
Shrublands Removed	0	692	480/212 (692)	512/180 (692)	477/215 (692)	626	552	584	490
Shrublands Avoided	0	6,635	5,717/1,055 (6,635)	5,707/1,065 (6,635)	5,212/1,560 (6,635)	6,125	5,870	5,835	5,495
Grasslands Removed	0	134	81/53 (134)	61/73 (134)	128/6 (134)	134	109	122	100
Grasslands Avoided	0	2,265	1,785/480 (2,265)	1,675/590 (2,265)	2,240/25 (2,265)	2,265	2,095	2,175	2,015
Mt. Brush or Woodland Removed	0	68	57/11 (68)	34/34 (68)	41/27 (68)	68	52	33	36
Mt. Brush or Woodland Avoided	0	1,331	1,176/155 (1,331)	846/485 (1,331)	876/455 (1,331)	1,331	1,086	931	926
Breaks Removed	0	1	1/0 (1)	1/0 (1)	1/0 (1)	1	1	1	1
Breaks Avoided	0	26	26/0 (26)	26/0 (26)	0/26 (26)	14	14	1	14
RHCAs Removed	0	42	37/5 (42)	39/3 (42)	38/4 (42)	40	40	40	25
RHCAs Avoided	0	530	455/75 (530)	500/30 (530)	470/60 (530)	520	510	495	505
Project with Southern Inbound Haul Route Option 2									
Shrublands Removed	0	696	484/212 (696)	516/180 (696)	481/215 (696)	630	556	588	494
Shrublands Avoided	0	6,772	5,717/1,055 (6,772)	5,707/1,065 (6,772)	5,212/1,560 (6,772)	6,262	6,007	5,972	5,632
Grasslands Removed	0	130	77/53 (130)	57/73 (130)	124/6 (130)	130	105	118	96
Grasslands Avoided	0	2,256	1,776/480 (2,256)	1,666/590 (2,256)	2,231/25 (2,256)	2,266	2,086	2,166	2,006
Mt. Brush or Woodland Removed	0	68	57/11 (68)	34/34 (68)	41/27 (68)	68	52	33	36

Table 4.2.2-23. Impact Summary Table for Project as a Whole – Passerine Habitat (continued).

	Alt A	Alt B1	Alt B2a PI/PII (I + II)	Alt B2b PI/PII (I + II)	Alt B2c PI/PII (I + II)	Alt C	Alt D	Alt E	Alt F
Mt. Brush or Woodland Avoided	0	1,331	1,176/155 (1,331)	846/485 (1,331)	876/455 (1,331)	1,331	1,086	931	926
Breaks Removed	0	5	5/0 (5)	5/0 (5)	5/0 (5)	5	5	5	5
Breaks Avoided	0	41	41/0 (41)	41/0 (41)	15/26 (41)	29	29	16	29
RHCAs Removed	0	44	39/5 (44)	41/3 (44)	40/4 (44)	42	42	42	27
RHCAs Avoided	0	530	455/75 (530)	500/30 (530)	470/60 (530)	520	510	495	505

Table 4.2.2-24 shows estimated fatality rates for passerines between alternatives. A range of fatalities was estimated and presented as a rate of fatalities per megawatt per year of production (1 – 3/MW/year) (Young et al., 2009). For comparison purposes, the maximum rate estimated (3/MW/year) was used. Fatality estimations are not calculated for haul routes. Therefore only the project area totals are displayed. Regardless of inbound haul route, Alternative B1 would result in the largest number of passerine and other bird fatalities over the life of the project, while Alternative F would have the fewest.

Table 4.2.2-24. Impact Summary Table for Project as a Whole – Passerine Estimated Fatalities.

	Alt A	Alt B1	Alt B2a	Alt B2b	Alt B2c	Alt C	Alt D	Alt E	Alt F
Project Area with All Inbound Haul Routes									
Estimated Fatalities	0	30,600	26,400	26,400	26,400	27,000	22,320	21,600	18,900

Cumulative Impacts

Cumulative impacts on passerine and other bird species consists of incremental effects of the alternatives when added to other past, present, and reasonably foreseeable future actions. These effects would occur over the duration of the 30-year ROW grant, resulting in incremental increases to habitat degradation, habitat avoidance, and mortality. The cumulative effects analysis area is the project disturbance area and haul routes, plus a 590-foot buffer of these features. This analysis area corresponds to known avoidance of wind turbines by passerine birds (Leddy et al., 1999). Migratory birds travel throughout North and South America to occupy important seasonal habitats, and wind facilities exist and would be built in the future within the range of many migratory bird species; this wind facility would add cumulatively to those impacts.

Past, present, and foreseeable impacts on passerines and other birds include habitat degradation from wildfire, invasive plant species, livestock grazing, and recreational activities as well as fatalities from predation and collisions with vehicles and fences. Future operation of the wind project, when added to the impacts of these existing cumulative actions, would contribute to habitat degradation, avoidance,

and mortality. Passerine fatalities predicted from operation of the China Mountain project would add cumulatively to those sources existing within the analysis area. No fatality estimates are available for other sources.

Alternative A (No Action Alternative)

The No Action Alternative would not add cumulatively to existing impacts on passerines and other birds because the facility would not be built. Habitat degradation, habitat avoidance, and fatalities from existing influences on passerines and other birds would continue.

Alternative B1 (Proposed Action)

The project would add cumulatively to habitat avoidance and degradation that has occurred and is expected to occur within the analysis area. Fatalities associated with the operation of the China Mountain wind energy facility would add an estimated 340 to 1,020 passerine fatalities each year to existing sources within the analysis area. Additional fatalities are expected because of increased predation that could occur with increased perching opportunities from transmission lines and other project structures. These passerine fatalities would add cumulatively to the existing impacts in the analysis area and result in moderate impacts on passerine and other birds.

Alternatives B2a, B2b, and B2c

The phased alternatives would contribute cumulative impacts from habitat degradation the same as described for Alternative B1. Fatality estimates for the phased alternatives would be less than Alternative B1, and the differences would result in a negligible decrease in the cumulative impacts on passerines and other birds that would result from this project.

Alternatives C, D, E, and F

Alternatives C through F would all contribute fewer cumulative impacts than Alternative B1 in terms of habitat degradation and passerine and other bird fatalities. Alternative F would contribute the fewest adverse impacts on passerines and other birds from habitat degradation and fatalities.

All action alternatives would represent the largest contributing factor of cumulative impacts on passerines and other birds within the analysis areas.

4.2.2.3 Special Status Species

Sage-grouse

The analysis area for sage-grouse includes the project area (direct habitat removal), a 4-mile radius of the project area (project avoidance buffer), an approximately 11-mile radius of the project (mid-scale), and a 34-mile radius of the project (regional, cumulative analysis scale) as described in Section 3.2.2.3 (Figure 3.2.2-2), and a 4-mile radius of the haul routes. Refer to the tables in the Project as a Whole section for a side-by-side comparison of impacts by alternative.

The indicators for impacts on sage-grouse are:

- Acres of sage-grouse key and R1 habitat removed and avoided;
- Acres of nesting, spring, summer, fall, and winter sage-grouse habitat removed and avoided; and
- Number of occupied leks within 4 miles of the project features disturbed. (Occupied leks analyzed in this EIS include those occupied as of 2010).

In addition to the quantitative indicators above, the risk of nest predation associated with the transmission line, impacts on movement, and how road use and noise could impact sage-grouse are evaluated qualitatively.

Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

Since a ROW would not be granted for development, impacts on sage-grouse associated with development of the wind facility would not occur. Movements of sage-grouse to and through the ROW preference area from Browns Bench would continue. Use of seasonal habitats in the project area and vicinity would continue. Current sources of management at the project site that can impact sage-grouse habitat or disturb sage-grouse would continue, including livestock grazing, fencing, and recreation. Other threats to sage-grouse that would continue regardless of the proposed project include wildfire, invasive plant species, and climate change (USFWS, 2008).

Impacts Common to All Action Alternatives

Wind energy development may affect sage-grouse by construction of roads, powerlines, turbines, and other infrastructure, by O&M of the wind facility, and during decommissioning. The construction and O&M may result in direct loss of habitat, habitat fragmentation, indirect loss of habitat (including habitat degradation and behavioral avoidance), collision with wind energy facilities (turbines and power lines), increased predation, reduced reproduction, increased human disturbance, and increased noise. Sage-grouse populations have been in decline for decades, with infrastructure development ranked as one of the top threats (USFWS, 2005; Idaho Sage-grouse Advisory Committee [ISAC], 2006). Another primary cause of the decline of sage-grouse populations is fragmentation of sagebrush habitats (USFWS, 2010b). Impacts of each stage of the project (construction, O&M, and decommissioning) that are common to all action alternatives are described below.

Currently, there are no completed studies examining the potential impacts of wind energy on sage-grouse. However, there are several peer-reviewed papers documenting the impacts of oil and gas development on sage-grouse (Walker et al., 2007; Holloran, 2005; Harju et al., 2010; Lyon & Anderson, 2003). Oil and gas development typically results in a greater surface disturbance footprint and a greater level of human activity during operations when compared to wind energy facilities. However, both types of developments result in direct habitat loss, have an associated network of roads and transmission lines, and experience heavy traffic and human activity during construction. It can therefore be predicted that sage-grouse would respond to commercial-scale wind development in

a manner similar to oil and gas development (Walker et al. 2007; Naugle et al., in press). Impacts of development on sage-grouse can also be inferred from studies of another upland grouse species, the greater and lesser prairie chicken (Pruett et al., 2009; Hagen, 2003).

In the Wells Field Office, stipulations would be in place during construction, major maintenance, and decommissioning that would restrict disturbance in sage-grouse brood-rearing areas from May 15 to August 15, would restrict disturbance in crucial winter habitat from November 1 to March 15, and would apply timing restrictions to construction, decommissioning, and major maintenance within 0.3 miles (0.5 km) of sage-grouse leks March 1 through May 15 between 7:00 PM and 10:00 AM (Appendix 2A). Exceptions to these Nevada stipulations could be granted based on pre-construction surveys and site-specific conditions. Application of the stipulations in Nevada would reduce the potential disturbance and behavioral avoidance of sage-grouse during construction, major maintenance, and decommissioning. Some impacts during routine operation and minor maintenance would still be expected. However, in the Jarbidge and Wells field offices, minor maintenance operations would be restricted during the lekking season between 6:00 PM and 9:00 AM within 0.6 mile of lek sites, with no exceptions (Appendix 2A). This would reduce the potential of disturbance to leks from these smaller scale human disturbances. Stipulations for Idaho are described under each action alternative, as they would differ given the proposed amendments to the 1987 Jarbidge RMP.

Construction

Construction of the wind facility would lead to direct loss of habitat and fragmentation of habitat, along with the potential degradation of habitat through the spread of non-native and invasive plants. Construction would disturb sage-grouse by the increases in human presence, noise, and vehicles on roads, leading to changes in behavior and potential avoidance of otherwise suitable habitat. Use of roads by sage-grouse would also pose a risk of collision with vehicles.

Construction of the proposed wind energy facility would result in direct habitat loss, primarily from building new roads and reconstructing existing roads and haul routes, and secondarily from the construction footprint of wind turbines and other project infrastructure (project features). Note that habitat removed would primarily occur in small patches throughout the project area. Loss of habitat would fragment available habitat and reduce cover and food necessary for sage-grouse during the spring, summer, and fall, and to a lesser extent during the winter, when project area sage-grouse use is low. Following construction, approximately 70 percent of the disturbed sage-grouse key habitat would be revegetated for all alternatives. Revegetated habitat would be converted to grasses and forbs, but would not function as under current conditions until a sufficient shrub cover is developed (at least 20 years; Stevens & Monsen, 2004; over 100 years for full recovery for Wyoming big sagebrush; Cooper et al., 2007). Depending upon proximity to sagebrush cover and availability of forbs, these revegetated areas could be used during the summer or fall, but would have limited use during the winter and spring due to lack of cover. Once sufficient shrub cover is established in disturbed areas, its capacity to function as sage-grouse habitat may be compromised by the presence of turbines and other project infrastructure.

Disturbance and removal of native vegetation could lead to the spread of non-native invasive plant species, as described in Section 4.2.1.2. The spread of invasive plant species is considered a threat to sage-grouse (Connelly et al., 2004). The spread of non-native and invasive plants into the project area would reduce the suitability of the plant communities for sage-grouse and would increase the risk of fire, which would result in another threat to sage-grouse habitat.

Construction noise would affect sage-grouse. Noise produced by road use and other construction activities under all alternatives would disturb grouse using the project area, and could result in avoidance behavior, physiological stress, disruption of breeding activities, and interference with auditory cues and communication (USFWS, 2008). Low-frequency vibrations would be produced from blasting during construction, but whether this would cause changes in behavior or avoidance of areas by sage-grouse is not known.

Construction and use of roads in the project area would impact sage-grouse. Roads can adversely affect habitats important to sage-grouse by causing fragmentation, spreading invasive species, reducing habitat value, and/or reducing the amount of habitat available (Braun, 1998). Roads associated with oil and gas development were interpreted to be the primary impact on sage-grouse due to their persistence and continued use even after development ceased (Lyon & Anderson, 2003). Roads have been reported to pose a risk of collision with vehicles (Holloran, 2005); this risk would be greatest during construction of the wind energy facility when road use (haul routes and project roads) would be the greatest. However, speed limits of 20 miles per hour along the haul routes during construction and in the project area would reduce this risk.

The increased human activity in sage-grouse habitat during construction of the wind facility has the potential to adversely impact sage-grouse and lead to behavioral avoidance of otherwise suitable habitat. Johnson et al. (in press) reported that "...the cumulative effects of increased human activity appear to relate negatively to sage-grouse population trends across the species' range."

Operation and Maintenance

Operation and maintenance of the wind energy facility would adversely affect sage-grouse through fragmentation of habitat, noise, avoidance behavior, and mortality. Fragmentation would result from direct removal of habitat and through functional habitat loss. Based on the assumptions listed in Section 4.2.2.1, sage-grouse would avoid maintenance activities, turbines, power lines, roads, and other infrastructure (project features). This would lead to reduced lek attendance, reduced lek persistence, and reduced nest initiation and success rates. Sage-grouse mortality would result from avian predation associated with infrastructure that provides increased raptor perching opportunities. Sage-grouse mortality also would result if sage-grouse collided with vehicles, transmission lines, and turbines. These impacts are predicted to lead to further declines in sage-grouse populations in the Browns Bench/Shoshone Basin area.

Fragmentation

Fragmentation of sagebrush habitats by various mechanisms has been cited as a primary cause of the decline of sage-grouse populations (USFWS, 2010b). Documented negative effects of fragmentation include reduction of lek persistence, lek attendance, population recruitment, yearling and adult annual survival, female nest site selection, nest initiation, and loss of leks and winter habitat (Holloran, 2005; Aldridge & Boyce, 2007; Walker et al., 2007; Doherty et al., 2008). Habitat fragmentation from a variety of human developments, including roads, energy development, and other factors has even contributed to or been associated with sage-grouse extirpation in their range (Wisdom, Meinke, Knick, & Schroeder, in press). Development of the proposed wind energy facility would result in habitat fragmentation, primarily through the construction of roads, transmission lines, turbines, and other project infrastructure. Habitat fragmentation resulting from wind development infrastructure would lead to effects on sage-grouse greater than the associated direct habitat losses from construction. Habitat fragmentation would also occur by functional habitat loss caused by sage-grouse avoidance of human activities, increased noise, and presence of wind turbines. Disturbance near active leks would lead to abandonment, and leks separated by distances greater than 8 to 11 miles (13 to 18 km) could be isolated due to decreased probability of dispersal from neighboring leks (Knick and Hanser, in press). Wisdom et al. (in press) suggest that maintenance of desired conditions in areas identified as strongholds for greater sage-grouse appears critical to the species' future persistence. Given that the project area is within a sage-grouse population stronghold, as described in Section 3.2.2.3, fragmentation of sage-grouse habitat in this stronghold would move this area away from desired conditions and could have adverse implications to the populations in this region.

Noise

Noise and presence of humans and vehicles during routine and major maintenance would disturb sage-grouse activities. However, these impacts would be infrequent and temporary. Sage-grouse behavior may be affected by the noise from wind turbine rotor blades (Connelly et al., 2004). For birds in the immediate vicinity of the turbines, and depending on their respective acoustic spectra and amplitudes, the sound of the rotating blades could mask bird vocalizations, which are important during breeding and other activities. Based on the noise analysis (Section 4.1.5.2), it is qualitatively predicted that wildlife are generally more likely to experience an impact, or experience one of higher intensity, the closer they are to sound sources.

Avoidance

In the analysis area, the presence of wind turbines would cause avoidance behavior, and create a barrier to sage-grouse movement. Sage-grouse are accustomed to a low shrub canopy, and may have a negative response to numerous wind turbines up to 427 feet tall (including blade height). Since grouse did not evolve with tall vertical structures present, the addition of wind turbines may reduce the suitability of habitat and result in avoidance of otherwise suitable habitat (Manville, 2004). Avoidance behavior may also be created by the turbine blades. Turbine blade movement creates moving shadows that cause a flickering effect producing a phenomenon called "shadow flicker" (USFWS, 2008). The shadow flicker could be perceived by grouse as a shadow of a predator and elicit an avoidance response. The shadow from the turbine blades would vary by the direction of the

sun, weather, and season, thus would not be consistent temporally. While documentation in the literature is currently lacking, another factor that may contribute to avoidance of the project area by night-roosting sage-grouse is the presence of red, flashing aircraft warning lights on the turbine towers that would be continuously active at night.

Oil and gas development negatively affected sage-grouse in seven studies (Naugle, Doherty, Walker, Holloran, & Copeland, in press). Negative responses of sage-grouse to oil and gas development were consistent among these studies, regardless of whether they examined lek dynamics or population demographic parameters. Impacts on sage-grouse at gas fields based on lek counts were apparent out to 4 miles (6.4 kilometers; Walker et al., 2007). Within this distance, lek counts decreased with distance to nearest drilling rig, producing well, or main haul road, and in many cases resulted in the extirpation of leks within gas fields. The probability of lek persistence was also reported to decrease from 87 to 5 percent within approximately 2 miles of leks for fully developed gas fields. Impacts on leks were not detected for 3 to 4 years by Walker et al. (2007) and Holloran (2005) and up to 10 years by Harju et al. (2010). This delay in onset of impact is thought to occur because of high lek site fidelity of sage-grouse (Naugle et al, in press).

Impacts on sage-grouse demographics from oil and gas development demonstrated that populations declined when birds behaviorally avoided infrastructure in one or more seasons and when cumulative impacts of development negatively affected reproduction, or both (Doherty, Naugle, Walker, & Graham, 2008). Sage-grouse hens remained in traditional nesting areas regardless of increased development, but nest initiation rate for females from disturbed leks was reduced (Naugle et al., in press). Yearling females avoided infrastructure when selecting nest sites, and yearling males avoided leks inside of the development (Naugle et al., in press). The fidelity of sage-grouse to seasonal habitat may exacerbate the adverse effect of oil and gas development since birds may return to areas disturbed, but may no longer reproduce (Lyon & Anderson, 2003). Holloran (2005) reported for fully developed gas fields, that populations of breeding males on leks declined by an average of 51 percent compared to only a 3 percent decline at undisturbed leks. A similar population decline was reported for the lesser prairie chicken in Kansas at an oil and gas development (Hagen, 2003).

Based on the research on the effect of oil and gas development on sage-grouse, it is predicted that sage-grouse would avoid the proposed wind facility (Walker et al., 2007; Naugle et al., in press). It is expected that the majority of avoidance of suitable habitat would occur during construction, major maintenance, and decommissioning. However, given the unknown response of sage-grouse to the presence of wind turbines and operation of the wind facility, it is assumed that avoidance of suitable habitat within 4 miles of project infrastructure also would occur during O&M. Given the population declines reported for sage-grouse after multiple seasons of avoidance of oil and gas infrastructure (Doherty, Naugle, Walker, & Graham, 2008), avoidance of habitat near the wind facility is predicted to result in further declines in sage-grouse populations in the Browns Bench/Shoshone Basin area. Sage-grouse leks within 4 miles of the project area would be adversely impacted by the proposed project, through reduction of lek attendance or avoidance of leks. Since most sage-grouse nests occur within 4 miles of leks (Doherty, Naugle, Copeland, Pocewicz, & Kiesecke, in press), nesting birds

could also be impacted within this area through reduced nest initiation rates. Impacts could occur immediately during construction or could take up to 10 years to be realized (Harju et al., 2010).

In addition to the predicted avoidance of wind turbines, sage-grouse may restrict or avoid use near power lines because of the presence of tall structures and associated project roads, and because of the resulting fragmentation of habitat (Braun, 2008). Response to power lines by sage-grouse has been found to vary widely, and no consistent relationship between lek attendance and distance to power line has been reported (Johnson et al., in press). However, data reported by Walker et al. (2007) suggested that power lines had an adverse effect on lek persistence and Manville (2004) reported impacts on grouse within 3.7 miles of overhead transmission lines. Braun (1998) found that use of otherwise suitable habitat by sage-grouse near powerlines increased as distance from the powerline increased for up to 0.38 miles (0.6 km) and, based on that unpublished data, reported that the presence of powerlines may limit sage-grouse use within 0.6 mile (1 km) in otherwise suitable habitat. A study on greater and lesser prairie chickens indicated that individuals avoided power lines by at least 328 feet (100 meters) and that they crossed power lines less often than expected if birds were to have moved randomly (Pruett et al., 2009). A study assessing environmental variables between former ranges of sage-grouse and areas still occupied by sage-grouse reported that the mean distance to electric transmission lines was greater than two times farther in occupied sage-grouse range than in extirpated range, indicating avoidance of transmission lines by this species (Wisdom et al., in press). Therefore it can be inferred that the proposed transmission line would fragment habitats used by sage-grouse in the project area and create a barrier to sage-grouse movement.

Mortality

Sage-grouse could be killed by flying into turbine rotor blades, turbine towers, power lines, or meteorological towers. Few sage-grouse deaths are attributed to flying into turbine rotors or hitting towers (Erickson et al., 2001; USFWS, 2008). In a recent review of sage-grouse deaths from 10 wind facilities in the Columbia Plateau in eastern Oregon and Washington, no mortalities occurred (Johnson & Erickson, 2010). The lack of fatalities could be because of low sage-grouse densities, or because the average tower height and lowest point of the blade at these wind facilities are above the average height of sage-grouse flights. In contrast, the project area study reported 12 sage-grouse (92% of observations) flying at heights between 115 and 427 feet (Appendix 3D; Young et al., 2009), indicating susceptibility to collision with the wind turbine, blades or other project facilities. Due to the unknown risk and lack of data reporting fatality estimates for sage-grouse, this potential impact is not further addressed for individual alternatives. Fatalities of migratory birds at wind energy facilities are discussed in Section 4.2.2.2.

Sage-grouse mortalities could also result from grouse flying into the proposed transmission lines. Sage-grouse and other grouse species are considered poor flyers due to their heavy body, small wings, and rapid flight, which make them particularly vulnerable to collision with overhead wires (Bevanger, 1994). The height of the three wires of the transmission line would be at 40 feet, 60 feet, and 82 feet; the bottom wire could sag down to approximately 30 feet when in operation. Of the 13 grouse individuals observed flying during fixed point bird surveys in 2008, one grouse was observed flying

between 0 and 114 feet, within the zone of the transmission wires, indicating some susceptibility to collision with the wires (Appendix 3D). To reduce the risk of collision, design features (Appendix 2A) would require flight diverters on any fences or power lines within 0.6 mile (1 km) of sage-grouse seasonal habitats. Since the meteorological towers proposed for this project would not have guy wires, and since the fences around substations would be chain link, collisions with meteorological towers or substation fences are not expected.

The project would also increase sage-grouse deaths from predators. Construction of 19 miles of transmission lines in the project area with between 125 and 167 monopole steel structures and construction of three lattice meteorological towers would increase predation rates of sage-grouse nests and individuals in the project area, which would lead to reduced nest success and productivity and reduced survival. Power lines, power line towers, and meteorological towers create elevated nesting and perching structures for avian predators, such as common ravens and raptors. Ravens commonly prey on sage-grouse eggs, and several species of raptors are common predators of juvenile and adult sage-grouse (Steenhof, Kochert, & Roppe, 1993; Hagen, in press). A study by Coates (2007) in northeastern Nevada reported common ravens as the most common sage-grouse nest predator in his study area, with raven presence being associated with power lines and roads. A study by Coates and Delehanty (2010) reported increases in the odds of nest failure associated with increases in presence of ravens. Results from year 7 of a 10-year study on sage-grouse post-construction of a 345 kV transmission line indicated a decline in the sage-grouse population in central Nevada, with overall lek attendance of males decreasing by 25 percent from 2003 to 2009 (Bloomberg & Sedinger, 2009). Bloomberg and Sedinger (2009) also reported an increase in counts of common ravens along the transmission line corridor and an increase in raven-associated disturbances at leks for the first 5 years after construction; however, on the 6th year, raven counts declined to preconstruction levels and remained low during the 7th year of the study.

Predation may influence the population dynamics of sage-grouse by reducing nest success, survival of juveniles (especially during the first few weeks after hatch), and annual survival of breeding-aged birds (Connelly et al., 2004). The perceived threat of predation associated with utility lines could also cause sage-grouse to avoid utility lines, effectively causing sage-grouse to abandon leks, nest sites, and brood-rearing areas near utility lines (Ellis, 1984; Braun, 1998). In general, average predation on sage-grouse is not limiting; however, in fragmented landscapes or in areas with higher than expected predator populations due to artificial landscape features, predation may limit populations (Hagen, in press). Design features for powerlines and meteorological towers (Appendix 2A) would require placement of perch deterrents on components that would allow perching or nest building. This would minimize the potential for raptors and ravens perching or nesting on tower components and subsequently would reduce avian predation. If mitigation recommending that permanent meteorological towers near greater sage-grouse seasonal habitats be of self-supporting solid steel construction instead of lattice (Section 2.4.6.1) were required, then the potential for raptors and ravens perching or nesting on meteorological towers would be minimized and subsequently avian predation would be reduced.

Decommissioning

Decommissioning the project would have similar impacts as those described for project construction as they relate to disturbance. Human presence, noise, and use of the roads by vehicles during decommissioning of the wind facility would disturb grouse still present in the area, leading to changes in behavior and potential avoidance of habitat. The entire project area would be reclaimed, with the exception of the reconstructed project roads and haul routes. Once reclaimed, and vegetation communities have become reestablished and suitable sagebrush cover has developed, the project area would once again be suitable for sage-grouse. The movement of sage-grouse back into the project area at this time would depend on the condition of the local population.

Alternative B1 (Proposed Action)

Sage-grouse Habitat

Table 4.2.2-25 displays the total acres of key, R1, R2, and unclassified habitat that would be removed during construction and the acres of habitat that would presumably be avoided by sage-grouse during all project stages (construction, O&M, and decommissioning). Avoidance of habitat within a 4-mile radius from construction and decommissioning disturbance and locations of project infrastructure is assumed based on the assumption that sage-grouse respond to disturbance associated with commercial-scale wind development in a manner similar to energy development (Walker et al., 2007; Naugle et al., in press). Table 4.2.2-26 displays the total acres of seasonal sage-grouse habitat removed during construction and the percent of total available seasonal habitat acres presumably avoided (in a 4-mile project feature buffer) during all project stages. Refer to the tables in *Project as a Whole* for a side-by-side comparison by alternative. The acres removed include areas that would be revegetated after construction, and those which would remain unvegetated for the duration of the ROW grant. The dominant sage-grouse habitat removed would be key habitat. The greatest amount of seasonal habitat removed would be that used by female grouse during the summer and fall and male grouse in the spring and summer, and also fall. The least amount of habitat removed would be that used by male and female grouse during the winter. Removal of sage-grouse habitat during construction would lead to long-term effects on sage-grouse through the reduction of food and cover.

Table 4.2.2-25. Acres of Sage-grouse Habitat[1] Removed and Potentially Avoided – Alternative B1.

	Key	R1	R2	UC
Acres of Habitat Removed	586	194	0	31
Acres of Habitat Avoided	125,056	70,276	2,083	17,284

[1] Sage-grouse habitat classification based on categories defined in BLM, 2008 (key habitat, Restoration Type I, Restoration Type II, and Restoration Type III). No impacts on R3 habitat.

Table 4.2.2-26. Acres of Seasonal Sage-grouse Habitat[1] Removed and Percent of Total Seasonal Habitat Potentially Avoided – Alternative B1.

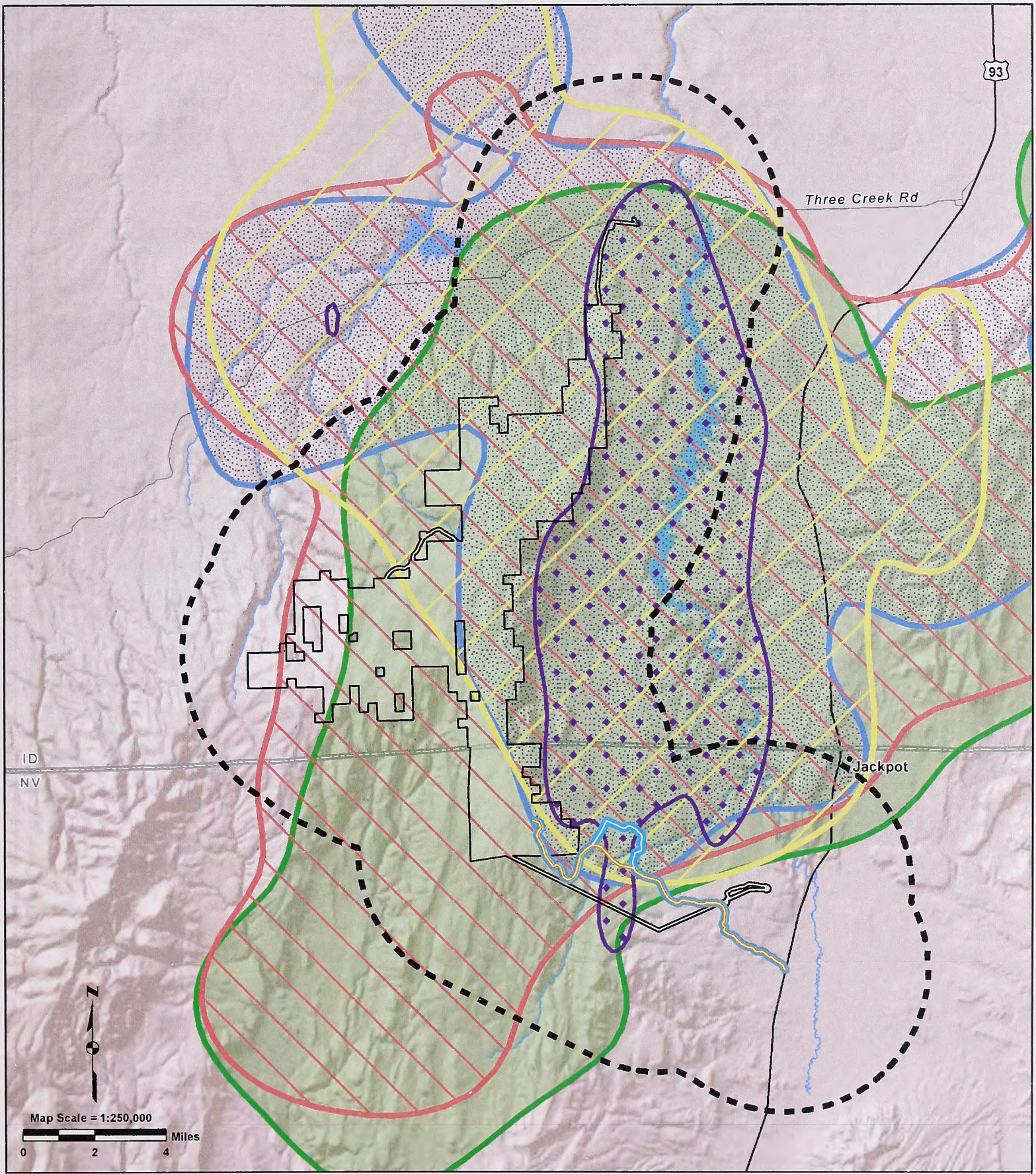
	Female Nesting	Female Spring	Female Summer	Female Fall	Female Winter	Male Spring	Male Summer	Male Fall	Male Winter
Acres Removed	533	467	783	750	59	770	793	697	98
Percent Avoided	54%	41%	38%	43%	79%	44%	39%	55%	76%

[1] Habitat Based on 95% Fixed Kernel Use Areas from telemetry data of sage-grouse captured in Idaho. Acres of seasonal habitat are not additive. Acres of female grouse habitat are not additive to males due to overlapping use.

Avoidance of sage-grouse habitat during construction and decommissioning would likely be temporary whereas avoidance during O&M would be long-term, occurring throughout the 30-year ROW grant, and would effectively fragment the habitat. Causes of avoidance and implications to sage-grouse populations are described under *Impacts Common to All Action Alternatives.* The acres of key habitat avoided (Table 4.2.2-25) represent approximately 26 percent of that available in the mid-scale analysis area and 9 percent of the habitat available at the regional analysis area. Refer to the analysis areas presented in Figure 3.2.2-2 for context; the avoidance area would be essentially the same as that shown in the 4-mile buffer (yellow dashed boundary).

Figures 4.2.2-1 and 4.2.2-2 display seasonal habitat avoided by female and male sage-grouse, respectively, for Alternative B1. The avoidance areas are based on a 4-mile avoidance buffer of all construction activities (temporary) and project infrastructure (long-term). Review of these figures indicates that the presence of turbines and other infrastructure, particularly that along the eastern ridgeline, would fragment habitat, effectively creating a barrier to sage-grouse movement and preventing seasonal movement into and through the project area.

Of the seasonal habitats, use of winter habitat would be the most affected. Based on an evaluation of existing telemetry data and the assumption of full avoidance of habitat within 4 miles of project features, female and male sage-grouse would avoid about 79 and 76 percent of their predicted winter habitat area, respectively (Table 4.2.2-26). However, since the winter telemetry dataset is much smaller in comparison to data for other seasons, this figure may actually under-estimate winter habitat as well as the potential avoidance area. Avoidance of winter habitat would lead to reduction in survival, given the importance and restricted availability of this habitat. Avoidance of other seasonal habitat would also occur. Avoidance of spring habitat by males would reduce attendance at or persistence of leks which would adversely affect nest initiation and reproduction. Avoidance of nesting habitat by females would reduce reproduction. Avoidance of summer habitat by females would reduce the survival of broods, if sufficient habitat was not found elsewhere. Given the importance and quality of the habitat in and in the vicinity of the project area to sage-grouse, particularly winter and breeding habitat, avoidance of habitat would have a major long-term adverse effect on the sage-grouse population, contributing to further population declines, with implications beyond the regional analysis area.



LEGEND

- Project Area Boundary
- Avoidance Area (4-Mile Buffer)
- Southern Haul Route Option 1
- Southern Haul Route Option 2

95% Fixed Kernal Estimates

(Based on telemetry data of Sage-grouse captured in Idaho.)

- Spring (March 1- June 30)
- Summer (July 1- August 31)
- Nesting (April 1- June 15)
- Fall (September 1- November 30)
- Winter (December 1- February 28)

Figure 4.2.2-1. Female Seasonal Sage-grouse Habitat - Alternative B1

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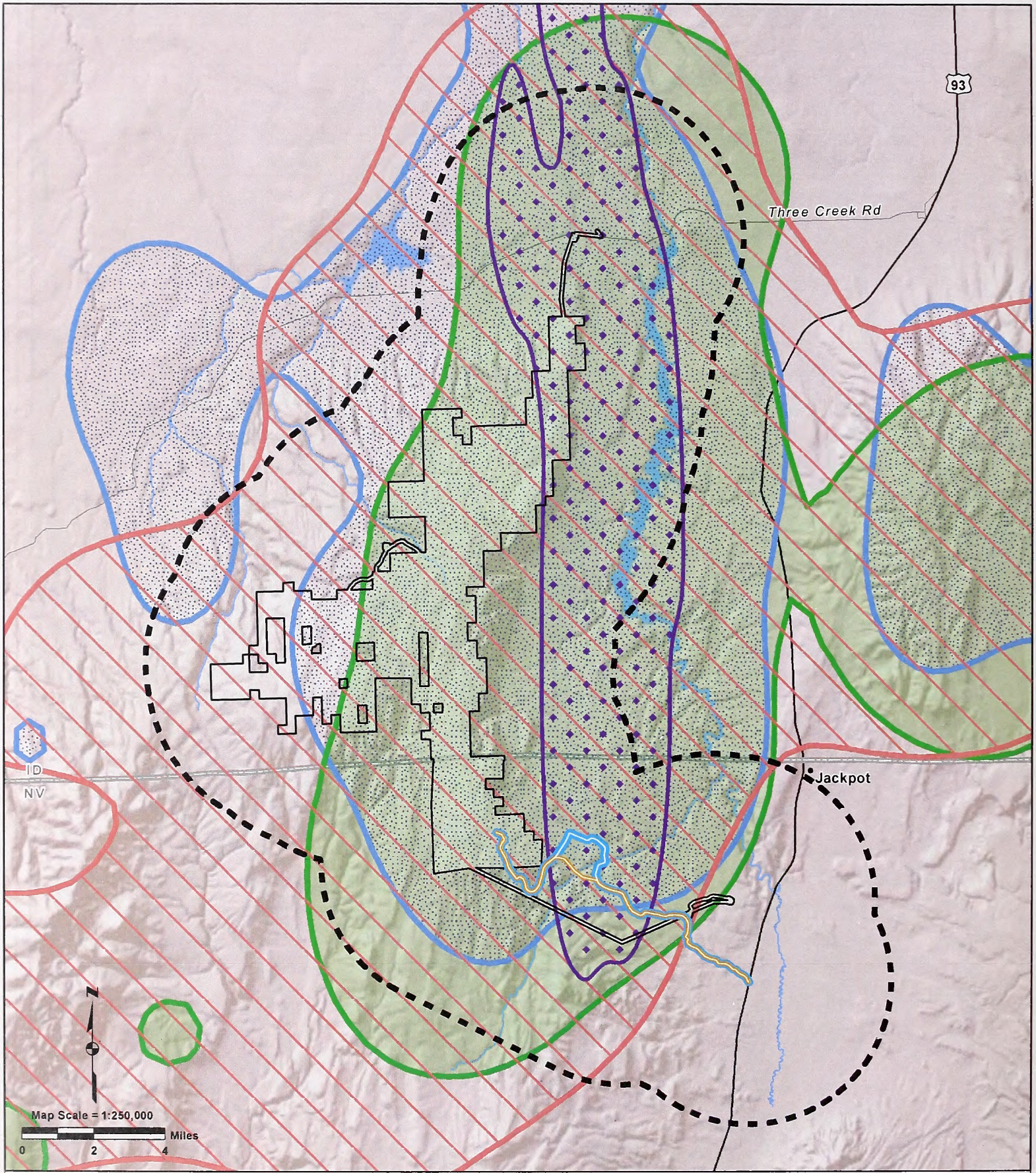

L Project Area Boundary

E Avoidance Area (4-Mile Buffer)

G Southern Haul Route Option 1 — Southern Haul Route Option 2

E **95% Fixed Kernal Estimates**
(Based on telemetry data of Sage-grouse captured in Idaho.)

N Spring (March 1- June 30) — Fall (September 1- November 30)

D Summer (July 1- August 31) — Winter (December 1- February 28)

Figure 4.2.2-2. Male Seasonal Sage-grouse Habitat - Alternative B1

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Avoidance of habitat during decommissioning activities, if grouse are present, would be temporary. Once habitat is reclaimed and appropriate sagebrush cover established for use by sage-grouse, the project area would once again be suitable for sage-grouse. The movement of sage-grouse back into the project area at this time would depend on the condition of the local population.

Leks

Within 4 miles of project features there are 24 occupied leks. Construction, operation, and decommissioning of the wind facility would therefore result in immediate or delayed behavioral changes to grouse attending these leks including avoidance, reduced attendance, reduced lek persistence, and/or lek abandonment or displacement. These impacts would have long-term effects on sage-grouse populations. Given that sage-grouse populations in the Northern Great Basin, including the project analysis area, have been steadily declining for at least 20 years (Section 3.2.2.3), impacts of the wind project would further contribute to the downward trend in populations.

Jarbidge RMP Amendments

The 1987 Jarbidge RMP amendment proposed for special status animals and crucial wildlife habitat for Alternative B1 (Section 2.5.3.2) would lift the seasonal restrictions applicable to sage-grouse breeding grounds, nesting/brood-rearing habitat, and winter range and the seasonal restrictions and spatial buffers around sage-grouse leks. This amendment would allow for the siting, construction, operation, maintenance, and decommissioning of the wind energy facility within sage-grouse habitats, which would result in direct and indirect impacts on sage-grouse and their habitat during all stages of the project as described in *Impacts Common to All Action Alternatives*.

Mitigation

The Draft Greater Sage-Grouse Conservation Plan for the China Mountain Wind Energy Project (TetraTech, 2010; summarized in Section 2.5.4) would be applied as mitigation as part of the Proposed Action. This would result in reclamation and revegetation of areas temporarily disturbed on-site during construction and compensatory mitigation of off-site areas. The latter would be designed to improve habitat quality outside of the project footprint area. Three basic types of compensatory mitigation have been proposed: enhancement, creation, and restoration. Habitat directly and indirectly impacted would be converted into habitat units lost based on habitat quality, as described in the plan, and would be mitigated at a level that would exceed the number of computed habitat units lost. Mitigation would be achieved with the use of a conservation fund capped at $16 million over the 30-year ROW grant.

On-site mitigation would result in the revegetation of disturbed areas. These areas would not be usable by sage-grouse in their current capacity for at least 20 years and as long as 100 years, depending on the rate of recovery of shrub cover and habitat function (Stevens & Monsen, 2004; Cooper et al., 2007). Further vegetation would not mitigate for on-site impacts on sage-grouse given the assumption that sage-grouse would avoid the area within 4 miles of project infrastructure. Compensatory mitigation would attempt to enhance, restore, and/or create nesting, late brood-rearing, and/or wintering habitats off-site. Application of off-site mitigation, depending on its location, may

require future environmental analysis under the National Environmental Policy Act. Until the location, size, and type of off-site mitigation is known, it is not possible to address the implications to sage-grouse populations in the project area and vicinity. Further, the effectiveness of this form of mitigation on sage-grouse populations is not known or supported in the literature.

As part of the mitigation proposed by the Applicants in Appendix 2B, maintenance timing restrictions would be required between March 15 and May 15 that would delay all routine maintenance until after 9:00 A.M. within 1 mile of active leks unless an emergency requires immediate access to an area. Application of this spatial and seasonal buffer would reduce the potential disturbance impacts on sage-grouse during operation and maintenance, and provides some protection to grouse at leks in Idaho given the lifting of the seasonal restrictions and spatial buffers in breeding grounds afforded by the 1987 Jarbidge RMP amendment (Section 2.5.3.2). However, it does not provide protection to grouse at lek sites during construction. Further, since lek persistence reportedly decreases out to 2 miles or greater from leks (Naugle et al., in press), impacts on grouse further away would still be realized despite application of this restriction. If emergency access is required within 1 mile of a lek site during the lekking period, attending grouse would be adversely impacted.

Alternative B2a

Sage-grouse Habitat

Table 4.2.2-27 displays the total acres of key, R1, R2, and unclassified habitat that would be removed during construction and acres that would presumably be avoided (in a 4-mile project feature buffer) by sage-grouse during each phase of development for all project stages (construction, O&M, and decommissioning). Table 4.2.2-28 displays the acres of seasonal sage-grouse habitat removed during construction and the percent of total available seasonal habitat acres presumably avoided during each phase for all project stages. The acres removed would lead to long-term effects to sage-grouse through the reduction of food and cover.

Table 4.2.2-27. Acres of Sage-grouse Habitat[1] Removed and Potentially Avoided by Phase – Alternative B2a.

	Key	R1	R2	UC (unclassified)
Phase I				
Acres Removed	389	118	0	28
Acres Avoided	109,268	66,956	2,083	15,036
Phase II				
Acres Removed	208	87	0	2
Additional Acres Avoided[2]	15,788	3,320	0	2,248
Phase I + II				
Acres Removed	597	205	0	30
Acres Avoided	125,056	70,276	2,083	17,284

[1] Sage-grouse habitat classification based on categories defined in BLM, 2008. No R3 habitat impacts.

[2] Additional acres avoided during Phase II over those avoided for Phase I.

Table 4.2.2-28. Acres of Seasonal Sage-grouse Habitat[1] Removed and Percent of Total Seasonal Habitat Potentially Avoided – Alternative B2a.

	Female Nesting	Female Spring	Female Summer	Female Fall	Female Winter	Male Spring	Male Summer	Male Fall	Male Winter
Phase I									
Acres Removed	423	367	495	461	58	482	505	455	97
Percent Avoided	52%	40%	36%	42%	78%	43%	34%	54%	75%
Phase II Acres									
Acres Removed	131	110	313	313	3	313	313	266	3
Additional Percent Avoided[2]	1%	1%	2%	1%	<1%	1%	5%	1%	<1%
Phase I + II									
Acres Removed	554	477	808	774	61	795	818	721	100
Percent Avoided	54%	41%	38%	43%	79%	44%	39%	55%	76%

[1] Habitat Based on 95 percent Fixed Kernel Use Areas from sage-grouse captured in Idaho. Acres of seasonal habitat are not additive. Acres of female sage-grouse habitat are not additive to males due to overlapping use.
[2] Additional acres avoided during Phase II over those avoided for Phase I.

The dominant habitat impacted would be key sage-grouse habitat for each phase and for both phases combined. The amount of key and R1 sage-grouse habitat removed during construction of only Phase I would be less than that removed under Alternative B1. Total habitat removed at full build out (Phase I + Phase II; Table 4.2.2-27) would be slightly more than Alternative B1 due to revegetated areas being disturbed during construction of Phase II. The amount of seasonal habitat removed during construction of Phase I (Table 4.2.2-28) would be less than under Alternative B1, with the exception of winter habitat, which would be similar. The greatest amount of seasonal habitat removed would be that used by female grouse during the summer and fall and male grouse in the spring, summer, and also fall. The least amount of habitat removed would be that used by male and female grouse during the winter. More key, R1, and seasonal habitat would be removed during Phase I, than during Phase II.

The effect of avoidance of otherwise suitable habitat on sage-grouse populations would be the same as that described for Alternative B1 when both phases are fully constructed and operational. The acres of key habitat avoided (Table 4.2.2-27) during operation of only Phase I would represent approximately 22 percent of that available in the mid-scale analysis area and 8 percent of the habitat available at the regional analysis area, which is similar to the impacts of development of Alternative B1. Refer to the analysis areas presented in Figure 3.2.2-2 for context; the avoidance area would be essentially the same as that shown in the 4-mile buffer. A second pulse of disturbance would occur during construction of Phase II at year 9 of the ROW grant. This would result in additional disturbance and stress to grouse, if still present in the area. The amount of key, R1, R2, and unclassified sage-grouse habitat avoided after both phases are built would be the same as Alternative B1, since the amount of infrastructure built would be the same.

Figures 4.2.2-3 and 4.2.2-4 display seasonal habitat avoided by female and male sage-grouse, respectively, for Alternative B2a which are based on a 4-mile avoidance buffer of all construction activities (temporary) and project infrastructure (long-term). The avoidance areas are presented as if

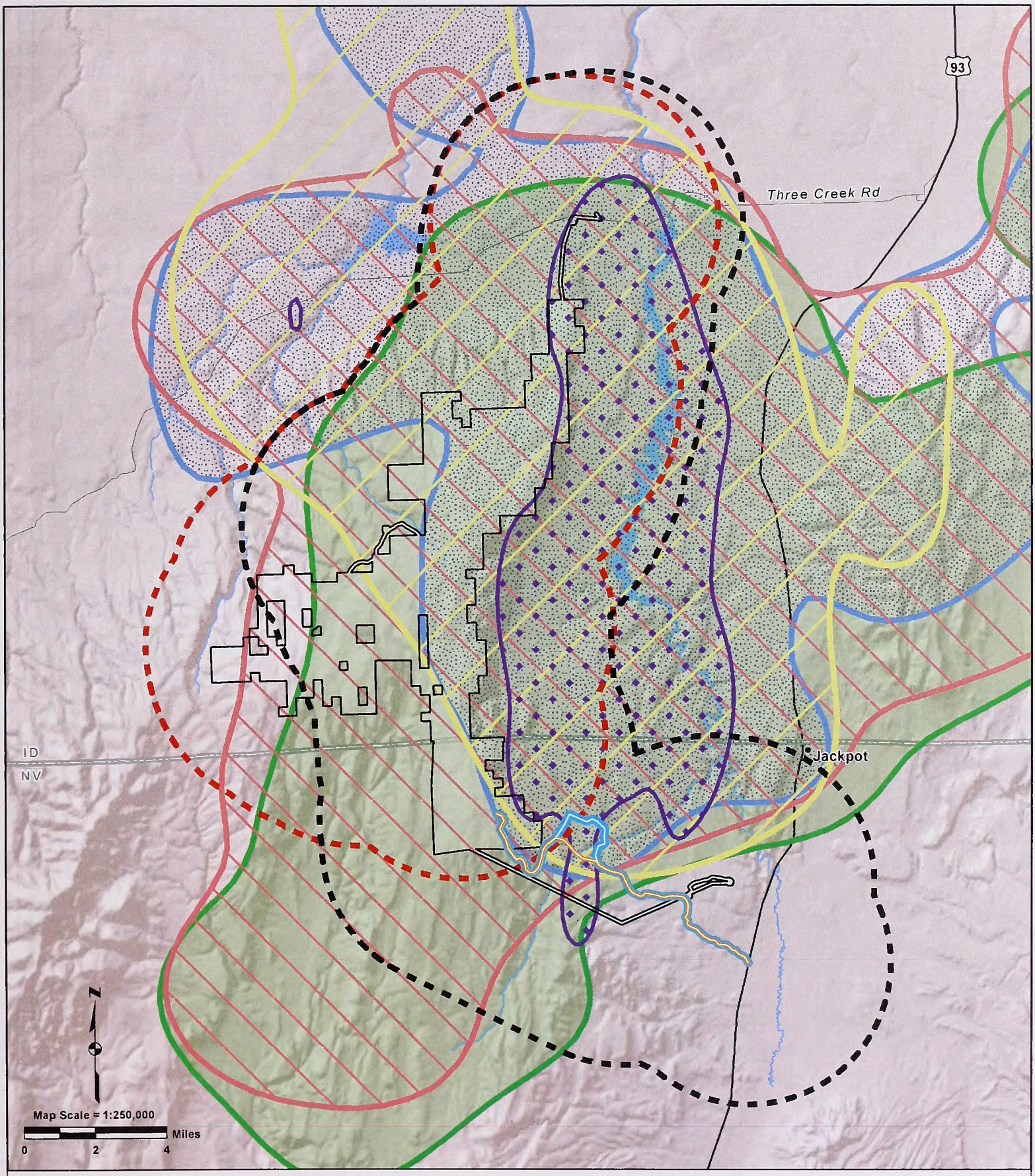
each phase were a stand-alone project. Each phase includes the site compound and northern O&M facilities since there would be major increases in activity at these locations during construction of each phase. Review of the Phase II boundary depicts where the second pulse of construction disturbance would occur at year 9 of the ROW grant. Only a small amount of the Phase II avoidance area would be new areas not avoided from construction of Phase I. It is assumed that the entire area within the Phase I avoidance area and Phase II avoidance area combined would be avoided after implementation of Phase II and through the life of the ROW grant.

Review of Figures 4.2.2-3 and 4.2.2-4 indicates that the presence of turbines and other infrastructure during Phase I and both phases combined would fragment habitat and prevent seasonal movement into and through the project area. Given that all turbines in Phase I would occur on the eastern ridgeline in the project area, they would create a barrier to sage-grouse movement. Based on the assumption of full avoidance of all project infrastructure, the impact of building Phase I, as it relates to habitat avoidance, would be the about the same as building the entire project. Of the seasonal habitats, use of winter habitat would be the most affected, as under Alternative B1. Female and male sage-grouse would avoid about 78 and 75 percent of their predicted winter habitat area, respectively during construction and operation of Phase I (Table 4.2.2-28); avoidance of winter habitat after construction and operation of both phases would be 79 and 76 percent, as under Alternative B1. Avoidance of other seasonal habitat would also occur. Avoidance of habitat by female and male sage-grouse would affect survival, attendance, and persistence at leks, nest initiation, and reproduction, as discussed for Alternative B1. Given the importance and quality of the habitat in and in the vicinity of the project area to sage-grouse, avoidance of otherwise suitable habitat would have a major long-term adverse effect on the sage-grouse population, as described for Alternative B1.

Avoidance of habitat during decommissioning activities would be the same as described for Alternative B1.

Leks

Construction, operation, and decommissioning of the wind facility would result in immediate or delayed behavioral changes to grouse attending leks, as described for Alternative B1. There would be 23 occupied leks within 4 miles of project features during Phase I of construction and operation. For Phase II, there would be 16 occupied leks within 4 miles of project features, of which 15 overlap those for Phase I, for a total of 24 leks in this area during operation of Phase I and Phase II combined. Therefore, grouse at 15 leks would be subject to construction disturbance once during construction of Phase I and a second time during construction of Phase II, if still occupied. As proposed, monitoring of grouse would occur for 7 years after construction (Section 2.6.5). Not all impacts on leks may be detectable at 7 years (Harju et al., 2010), as discussed in *Impacts Common to All Action Alternatives.* Therefore, it is possible that Phase II would be implemented as proposed before the full potential for adverse impacts from operation of Phase I could be determined, which could result in adverse long-term population impacts. At the time of decommissioning, 24 leks currently occupied would be within 4 miles of project features for Phase I and Phase II combined.



L Project Area Boundary

E Phase I Avoidance Area (4-Mile Buffer)

Phase II Avoidance Area (4-Mile Buffer)

Southern Haul Route Option 1

Southern Haul Route Option 2

G **95% Fixed Kernal Estimates**
(Based on telemetry data of Sage-grouse captured in Idaho.)

E Spring (March 1- June 30)

Fall (September 1- November 30)

N Summer (July 1- August 31)

Winter (December 1- February 28)

D Nesting (April 1- June 15)

Figure 4.2.2-3. Female Seasonal Sage-grouse Habitat - Alternative B2a

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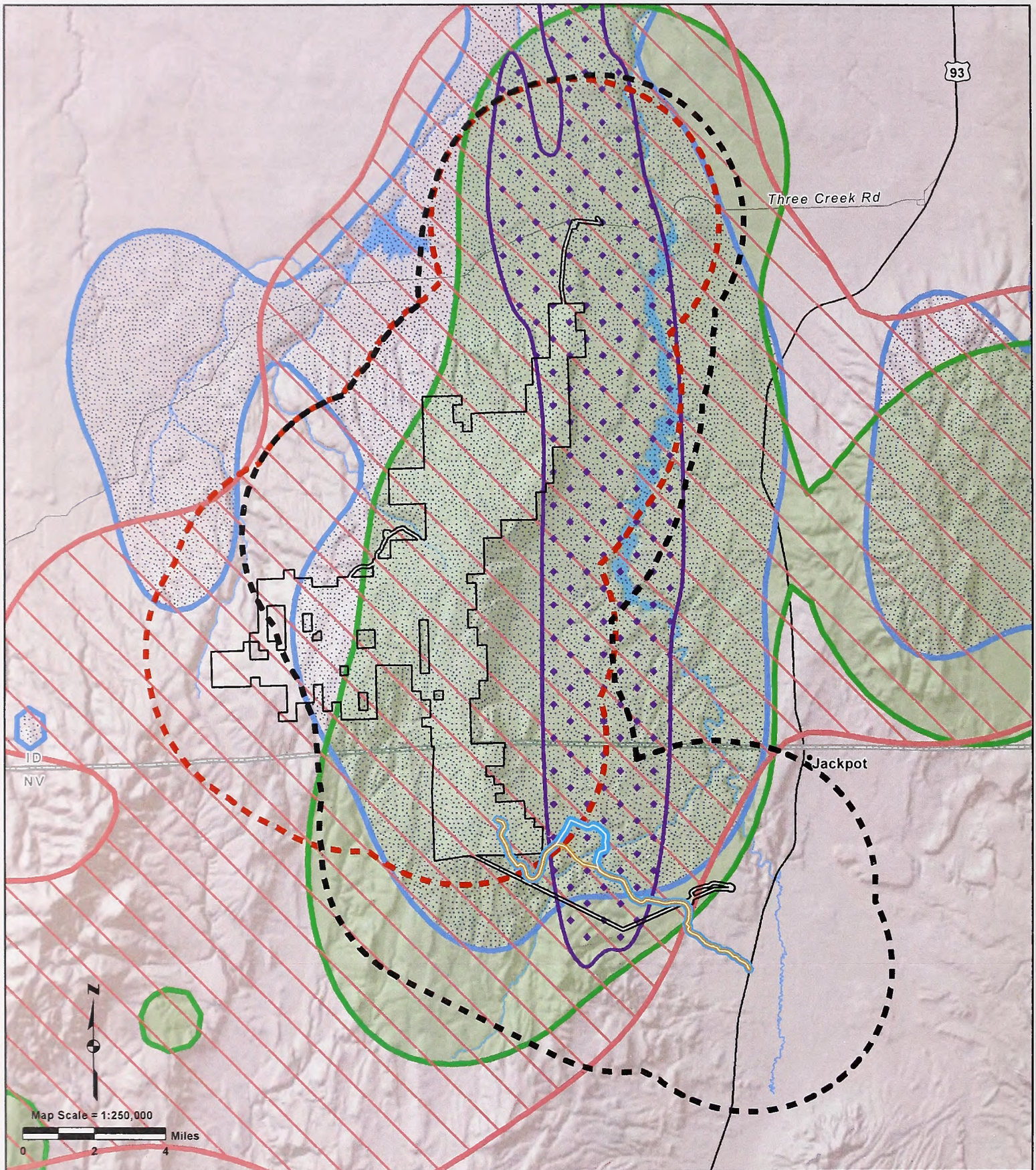

L Project Area Boundary

E Phase I Avoidance Area (4-Mile Buffer)

Phase II Avoidance Area (4-Mile Buffer)

G Southern Haul Route Option 1

Southern Haul Route Option 2

E **95% Fixed Kernal Estimates**
(Based on telemetry data of Sage-grouse captured in Idaho.)

N Spring (March 1- June 30)

Fall (September 1- November 30)

D Summer (July 1- August 31)

Winter (December 1- February 28)

Figure 4.2.2-4. Male Seasonal Sage-grouse Habitat - Alternative B2a

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Jarbidge RMP Amendments

The effect of the 1987 Jarbidge RMP amendments would be the same as described for Alternative B1.

Mitigation

The effect of mitigation would be the same as described for Alternative B1.

Alternative B2b

Sage-grouse Habitat

Table 4.2.2-29 displays the total acres of key, R1, R2, and unclassified habitat that would be removed during construction and acres that would presumably be avoided by sage-grouse during each phase of development for all project stages (construction, O&M, and decommissioning). Table 4.2.2-30 displays the acres of seasonal sage-grouse habitat removed during construction and the percent of total available seasonal habitat acres presumably avoided during each phase for all project stages. The acres removed would lead to long-term effects to sage-grouse through the reduction of food and cover.

The dominant habitat impacted would be key sage-grouse habitat for each phase and for both phases combined. The amount of key and R1 habitat removed during construction of only Phase I would be less than that removed under Alternative B1. More sage-grouse key habitat would be removed during Phase I than during Phase II, whereas more R1 habitat would be removed during Phase II. Total habitat removed at full build out (Phase I + Phase II; Table 4.2.2-29) would be slightly more than Alternative B1 due to revegetated areas being disturbed during construction of Phase II.

The amount of seasonal habitat removed during construction of Phase I (Table 4.2.2-30) would be less than under Alternative B1. The greatest amount of seasonal habitat removed during Phase I would be that used by female grouse during the summer and fall and male grouse in the spring, summer, and also fall. The least amount of habitat removed would be that used by male and female grouse during the winter. More seasonal habitat would be removed during Phase I than Phase II, with the exception of female spring, and female and male winter, where more habitat would be removed in Phase II.

The effect of avoidance of otherwise suitable habitat on sage-grouse populations and the amount of habitat avoided would be the same as that described for Alternative B1 when both phases are fully constructed and operational. The acres of key sage-grouse habitat avoided during operation of only Phase I (Table 4.2.2-29) would represent approximately 25 percent of that available in the mid-scale analysis area and 9 percent of the habitat available at the regional analysis area, similar to development of Alternative B1. Refer to the analysis areas presented in Figure 3.2.2-2 for context; the avoidance area would be essentially the same as that shown in the 4-mile buffer. A second pulse of disturbance would occur during construction of Phase II, which would result in additional disturbance and stress to grouse, if still present in the area.

Table 4.2.2-29. Acres of Sage-grouse Habitat[1] Removed and Potentially Avoided by Phase – Alternative B2b.

	Key	R1	R2	UC (unclassified)
Phase I				
Acres Removed	466	49	0	8
Acres Avoided	123,050	69,250	2,083	15,306
Phase II				
Acres Removed	131	156	0	22
Additional Acres Avoided[2]	2,006	1,026	0	1,978
Phase I + II				
Acres Removed	597	205	0	30
Acres Avoided	125,056	70,276	2,083	17,284

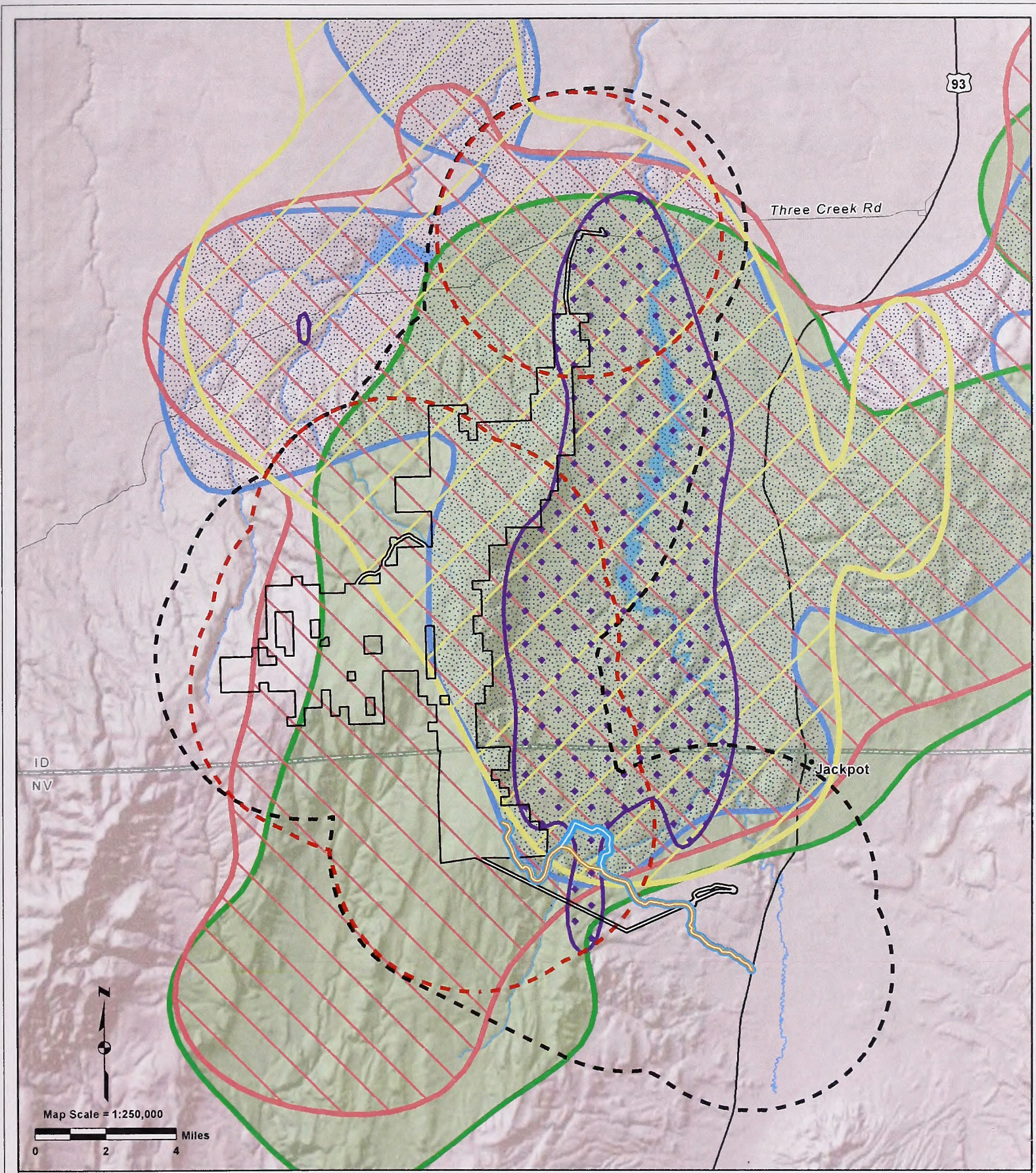
[1] Sage-grouse habitat classification based on categories defined in BLM, 2008. No R3 habitat impacts.
[2] Additional acres avoided during Phase II over those avoided for Phase I.

Table 4.2.2-30. Acres of Seasonal Sage-grouse Habitat[1] Removed and Percent of Total Seasonal Habitat Potentially Avoided – Alternative B2b.

	Female Nesting	Female Spring	Female Summer	Female Fall	Female Winter	Male Spring	Male Summer	Male Fall	Male Winter
Phase I Acres									
Acres Removed	284	218	534	500	22	521	544	448	29
Percent Avoided	51%	40%	37%	42%	76%	44%	38%	53%	73%
Phase II Acres									
Acres Removed	267	259	267	267	40	267	267	267	70
Additional Percent Avoided[2]	1%	1%	1%	1%	3%	1%	1%	2%	2%
Phase I + II									
Acres Removed	551	477	801	767	62	788	811	715	99
Percent Avoided	54%	41%	38%	43%	79%	44%	39%	55%	76%

[1] Habitat Based on 95 percent Fixed Kernel Use Areas from sage-grouse captured in Idaho. Acres of seasonal habitat are not additive. Acres of female sage-grouse habitat are not additive to males due to overlapping use.
[2] Additional acres avoided during Phase II over those avoided for Phase I.

Figures 4.2.2-5 and 4.2.2-6 display seasonal habitat avoided by female and male sage-grouse, respectively, for Alternative B2b which are based on a 4-mile avoidance buffer of all construction activities (temporary) and project infrastructure (long-term). The avoidance areas are presented as if each phase were a stand-alone project. Each phase includes the site compound and northern O&M facility since there would be major increases in activity at these locations during construction of each phase. Review of the Phase II boundary depicts where the second pulse of construction disturbance would occur at year 9 of the ROW grant. Only a minimal amount of the Phase II avoidance area would be new areas not avoided from construction of Phase I. It is assumed that the entire area within the Phase I avoidance area and Phase II avoidance area combined would be avoided after implementation of Phase II and through the life of the ROW grant.



L Project Area Boundary

E Phase I Avoidance Area (4-Mile Buffer)

Phase II Avoidance Area (4-Mile Buffer)

Southern Haul Route Option 1

Southern Haul Route Option 2

G **95% Fixed Kernal Estimates**
(Based on telemetry data of Sage-grouse captured in Idaho.)

E Spring (March 1- June 30)

Fall (September 1- November 30)

N Summer (July 1- August 31)

Winter (December 1- February 28)

D Nesting (April 1- June 15)

Figure 4.2.2-5. Female Seasonal Sage-grouse Habitat - Alternative B2b

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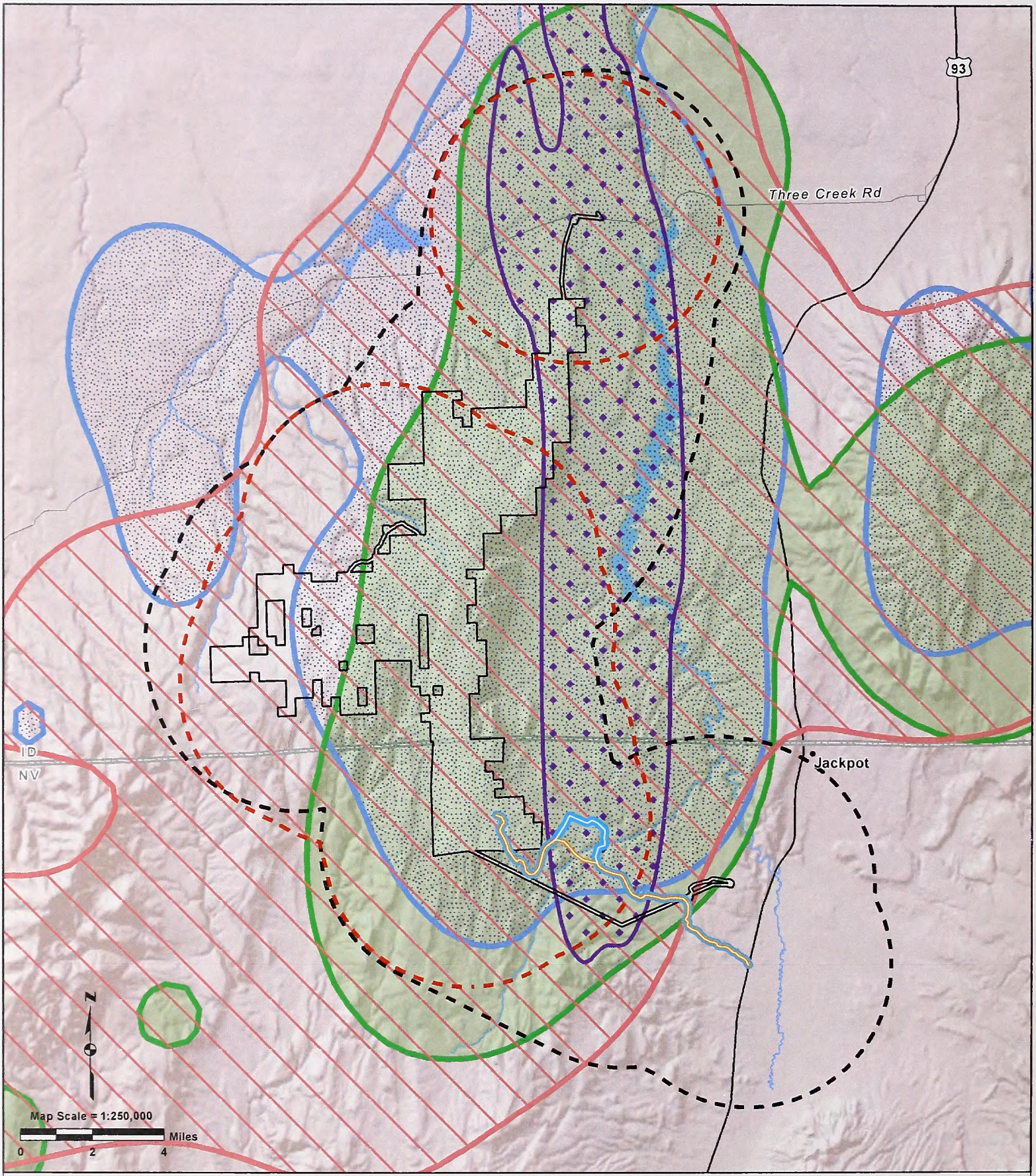

L Project Area Boundary

E Phase I Avoidance Area (4-Mile Buffer)

Phase II Avoidance Area (4-Mile Buffer)

G Southern Haul Route Option 1

Southern Haul Route Option 2

E **95% Fixed Kernal Estimates**
(Based on telemetry data of Sage-grouse captured in Idaho.)

N Spring (March 1- June 30)

Fall (September 1- November 30)

D Summer (July 1- August 31)

Winter (December 1- February 28)

Figure 4.2.2-6. Male Seasonal Sage-grouse Habitat - Alternative B2b

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Review of Figures 4.2.2-5 and 4.2.2-6 indicates that the presence of turbines, transmission line, and other infrastructure during Phase I and both phases combined would fragment habitat and prevent seasonal movement into and through the project area. The turbines in Phase I would not occur on the eastern ridgeline in the southern portion of the project area as under Alternative B2a. However, since the transmission line would still span this area, sage-grouse movement could be inhibited along the entire eastern ridgeline during operation of Phase I. Based on the assumption of full avoidance of all project infrastructure, the impact of building Phase I, as it relates to habitat avoidance, would be similar to building the entire project. Of the seasonal habitats, use of winter habitat would be the most affected, as under Alternative B1. During construction and operation of Phase I, female and male sage-grouse would avoid about 76 and 73 percent of their predicted winter habitat area, respectively (Table 4.2.2-30); avoidance of winter habitat after construction and operation of both phases would be 79 and 76 percent, same as Alternative B1. Avoidance of other seasonal habitat would also occur. Avoidance of habitat by female and male sage-grouse would affect survival, attendance and persistence at leks, nest initiation, and reproduction, as discussed for Alternative B1. Given the importance and quality of the habitat in and in the vicinity of the project area to sage-grouse, avoidance of otherwise suitable habitat would have a major long-term adverse effect on the sage-grouse population, as described for Alternative B1.

Avoidance of habitat during decommissioning activities would be the same as described for Alternative B1.

Leks

Construction, operation, and decommissioning of the wind facility would result in immediate or delayed behavioral changes to grouse attending leks, as described for Alternative B1. There would be 22 occupied leks within 4 miles of project features during Phase I of construction and operation. Under Phase II, there would be 14 currently occupied leks within 4 miles of project features, of which 12 overlap those for Phase I, for a total of 24 leks in this area during operation of both phases combined. Therefore, grouse at 12 leks would be subject to construction disturbance once during construction of Phase I and a second time during construction of Phase II, if still occupied. Long-term impacts on sage-grouse populations would result from implementation of Phase II prior to impacts being detected for Phase I, as described for Alternative B2b. At the time of decommissioning, 24 leks currently occupied would be within 4 miles of project features for Phase I and Phase II combined.

Jarbidge RMP Amendments

The seasonal restrictions applicable to sage-grouse breeding grounds, nesting/brood-rearing habitat, and winter range and the seasonal restrictions and spatial buffers around sage-grouse leks would be retained under Alternative B2b for construction and decommissioning. However, an amendment to the 1987 Jarbidge RMP is proposed that would allow exceptions to these restrictions and buffers during construction and decommissioning if certain exception criteria are met (Section 2.7.3.2). The effect of this amendment would be most pronounced for leks and associated nest sites. Exceptions would only be granted for construction activities involving infrequent short-term disturbance (less than 1 hour per day), if the lek is naturally screened from the disturbance, or if nesting hens are

unlikely to be present within 4 miles of a proposed activity. If no exceptions were granted, construction and major maintenance activities would not be permitted until after June 30. This would greatly reduce the potential for disturbance to nesting and lekking grouse during construction compared to Alternative B1, and could prevent the behavioral avoidance of the project area expected from construction and decommissioning activities in the absence of such restrictions. Emergency (major) maintenance activities would still be subject to the seasonal and spatial restrictions in the 1987 Jarbidge RMP, which would reduce the potential for direct and indirect impacts on sage-grouse during such activities compared to Alternative B1.

Mitigation

No sage-grouse mitigation is proposed specifically for Alternative B2b.

Alternative B2c

Sage-grouse Habitat

Table 4.2.2-31 displays the total acres of key, R1, R2, and unclassified habitat that would be removed during construction and acres of habitat potentially avoided by sage-grouse during each phase of development for all project stages (construction, O&M, and decommissioning). Table 4.2.2-32 displays the acres of seasonal sage-grouse habitat removed during construction and the percent of total available seasonal habitat acres presumably avoided during each phase for all project stages. The acres removed would lead to long-term effects to sage-grouse through the reduction of food and cover.

The dominant habitat impacted would be key sage-grouse habitat for each phase and for both phases combined. The amount of key habitat removed during construction of only Phase I would be less than that removed under Alternative B1, whereas the amount of R1 and unclassified habitat would be similar. More sage-grouse key and R1 habitat would be removed during Phase I than during Phase II. Total habitat removed at full build out (Phase I + Phase II; Table 4.2.2-31) would be slightly more than Alternative B1 due to revegetated areas being disturbed during construction of Phase II.

Table 4.2.2-31. Acres of Sage-grouse Habitat[1] Removed and Potentially Avoided by Phase – Alternative B2c.

	Key	R1	R2	UC (unclassified)
Phase I				
Acres Removed	350	189	0	23
Acres Avoided	121,539	69,345	2,083	14,803
Phase II				
Acres Removed	244	16	0	7
Additional Acres Avoided[2]	3,517	931	0	2,481
Phase I + II				
Acres Removed	597	205	0	30
Acres Avoided	125,056	70,276	2,083	17,284

[1] Sage-grouse habitat classification based on categories defined in BLM, 2008. No R3 habitat impacts.
[2] Additional acres avoided during Phase II over those avoided for Phase I.

Table 4.2.2-32. Acres of Seasonal Sage-grouse Habitat[1] Removed and Percent of Total Seasonal Habitat Potentially Avoided – Alternative B2c.

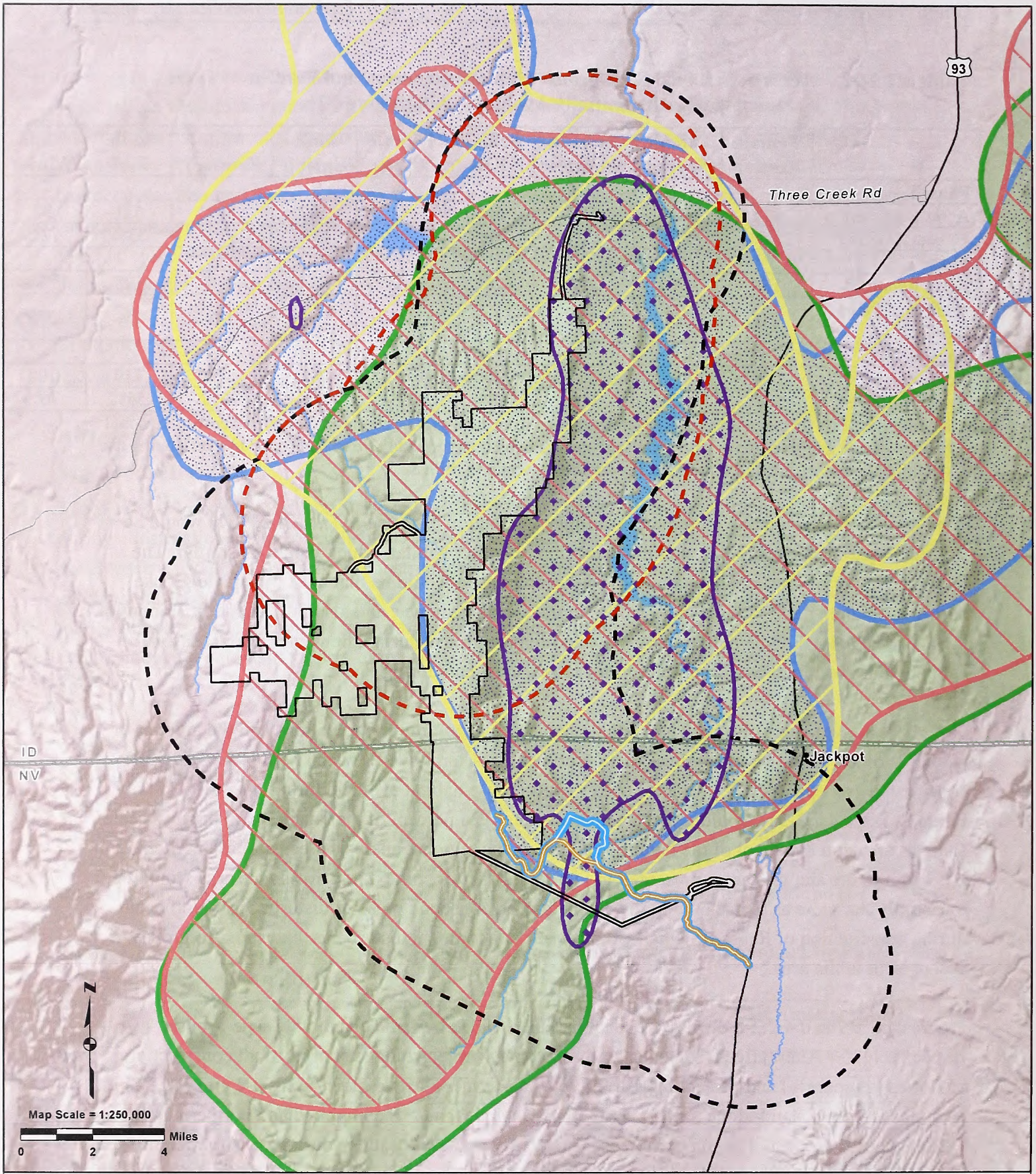
	Female Nesting	Female Spring	Female Summer	Female Fall	Female Winter	Male Spring	Male Summer	Male Fall	Male Winter
Phase I									
Acres Removed	415	406	507	508	58	507	517	521	97
Percent Avoided	50%	39%	37%	41%	74%	43%	37%	53%	72%
Phase II									
Acres Removed	139	70	298	262	3	284	298	198	3
Additional Percent Avoided[2]	2%	2%	1%	1%	5%	2%	1%	2%	3%
Phase I + II									
Acres Removed	554	476	805	770	61	791	815	719	100
Percent Avoided	54%	41%	38%	43%	79%	44%	39%	55%	76%

[1] Habitat Based on 95 percent Fixed Kernel Use Areas from sage-grouse captured in Idaho. Acres of seasonal habitat are not additive. Acres of female sage-grouse habitat are not additive to males due to overlapping use.
[2] Additional acres avoided during Phase II over those avoided for Phase I.

The amount of seasonal habitat removed during construction of Phase I (Table 4.2.2-32) would be less than under Alternative B1, with the exception of winter habitat, which would be similar. The greatest amount of seasonal habitat removed during Phase I would be that used by female grouse during the summer and fall and male grouse in the spring, summer, and also fall. The least amount of habitat removed would be that used by male and female grouse during the winter. More seasonal habitat would be removed during Phase I for all seasons than during Phase II.

The effect of avoidance of otherwise suitable habitat on sage-grouse populations and the amount of habitat avoided would be the same as that described for Alternative B1 when both phases are fully constructed and operational. The acres of key sage-grouse habitat avoided during operation of only Phase I (Table 4.2.2-31) would represent approximately 25 percent of that available in the mid-scale analysis area and 8 percent of the habitat available at the regional analysis area, similar to Alternative B1. Refer to the analysis areas presented in Figure 3.2.2-2 for context; the avoidance area would be essentially the same as that shown in the 4-mile buffer. A second pulse of disturbance would occur during construction of Phase II, which would result in additional disturbance and stress to grouse, if still present in the area.

Figures 4.2.2-7 and 4.2.2-8 display seasonal habitat avoided by female and male sage-grouse, respectively, for Alternative B2c which are based on a 4-mile avoidance buffer of all construction activities (temporary) and project infrastructure (long-term). The avoidance areas are presented as if each phase were a stand-alone project. Each phase includes the site compound and northern O&M facility since there would be major increases in activity at these locations during construction of each phase. Review of the Phase II boundary depicts where the second pulse of construction disturbance would occur at year 9 of the ROW grant. Only a minimal amount of the Phase II avoidance area would be new areas not avoided from construction of Phase I. It is assumed that the entire area within the Phase I avoidance area and Phase II avoidance area combined would be avoided after implementation of Phase II and through the life of the ROW grant.



L Project Area Boundary

E Phase I Avoidance Area (4-Mile Buffer)

Phase II Avoidance Area (4-Mile Buffer)

Southern Haul Route Option 1

Southern Haul Route Option 2

G **95% Fixed Kernal Estimates**

(Based on telemetry data of Sage-grouse captured in Idaho.)

E Spring (March 1- June 30)

Fall (September 1- November 30)

N Summer (July 1- August 31)

Winter (December 1- February 28)

D Nesting (April 1- June 15)

Figure 4.2.2-7. Female Seasonal Sage-grouse Habitat - Alternative B2c

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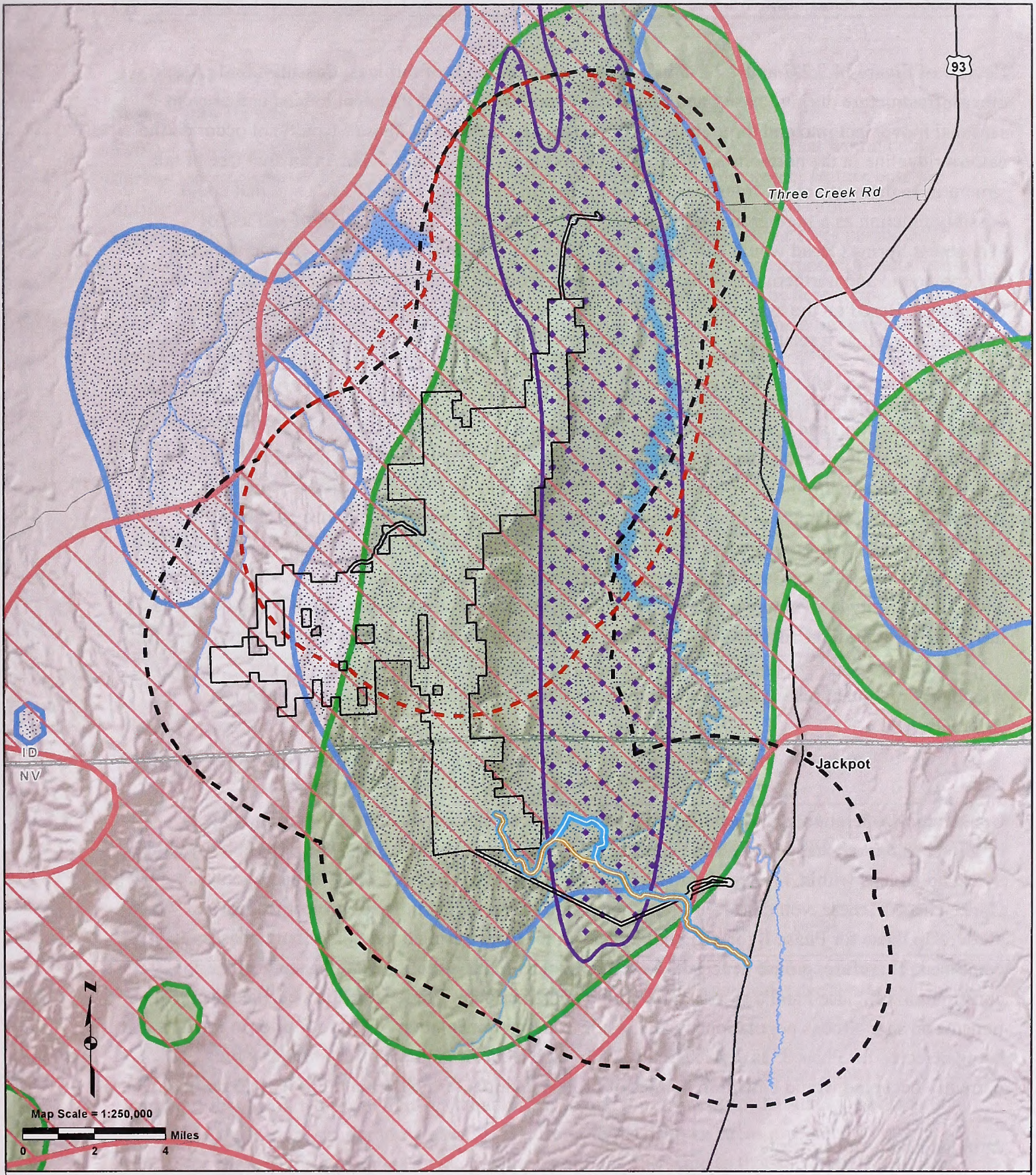

L Project Area Boundary

E Phase I Avoidance Area (4-Mile Buffer)

Phase II Avoidance Area (4-Mile Buffer)

G Southern Haul Route Option 1

Southern Haul Route Option 2

E **95% Fixed Kernal Estimates**
(Based on telemetry data of Sage-grouse captured in Idaho.)

N Spring (March 1- June 30)

Fall (September 1- November 30)

D Summer (July 1- August 31)

Winter (December 1- February 28)

Figure 4.2.2-8. Male Seasonal Sage-grouse Habitat - Alternative B2c

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Review of Figures 4.2.2-7 and 4.2.2-8 indicates that the presence of turbines, transmission line, and other infrastructure during Phase I and both phases combined would fragment habitat and prevent seasonal movement into and through the project area. The turbines in Phase I would not occur on the eastern ridgeline in the northern portion of the project area. This would maintain an area free of tall structures to the north of the transmission line for the first 10 years of the ROW grant that could possibly function as a sage-grouse movement corridor. However, reconstruction of and use of Monument Springs Road would still occur during Phase I as would the construction and use of the site compound and northern O&M facility; thus sage-grouse movement could still be inhibited in these areas. Based on the assumption of full avoidance of all project infrastructure, the impact of building Phase I, as it relates to habitat avoidance, would be similar to building the entire project.

Of the seasonal habitats, use of winter habitat would be the most affected, as under Alternative B1. During construction and operation of Phase I, female and male sage-grouse would avoid about 74 and 72 percent of their predicted winter habitat area, respectively (Table 4.2.2-32); avoidance of winter habitat after construction and operation of both phases would be 79 and 76 percent, same as Alternative B1. Avoidance of other seasonal habitat would also occur. Avoidance of habitat by female and male sage-grouse would affect survival, attendance and persistence at leks, nest initiation, and reproduction, as discussed for Alternative B1. Given the importance and quality of the habitat in and in the vicinity of the project area to sage-grouse, avoidance of otherwise suitable habitat would have a major long-term adverse effect on the sage-grouse population, as described for Alternative B1.

Avoidance of habitat during decommissioning activities would be the same as described for Alternative B1.

Leks

Construction, operation, and decommissioning of the wind facility would result in immediate or delayed behavioral changes to grouse attending leks, as described for Alternative B1. There would be 24 occupied leks within 4 miles of project features during Phase I of construction and operation. Under Phase II, there would be 15 currently occupied leks within 4 miles of project features, of which all overlap those for Phase I, for a total of 24 leks in this area during operation of both phases combined. Therefore, grouse at 15 leks would be subject to construction disturbance once during construction of Phase I and a second time during construction of Phase II, if still occupied. Long-term impacts on sage-grouse populations would result from implementation of Phase II prior to impacts being detected for Phase I, as described for Alternative B2b. At the time of decommissioning, 24 leks currently occupied would be within 4 miles of project features for Phase I and Phase II combined.

Jarbidge RMP Amendments

The effect of the 1987 Jarbidge RMP amendments would be the same as for Alternative B2b.

Mitigation

No sage-grouse mitigation is proposed specifically for Alternative B2c.

Alternative C

Sage-grouse Habitat

Table 4.2.2-33 displays the total acres of key, R1, R2, and unclassified habitat that would be removed during construction and acres of habitat presumably avoided (in a 4-mile project feature buffer) during all project stages. Table 4.2.2-34 displays the total acres of seasonal sage-grouse habitat removed during construction and the percent of total available seasonal habitat acres presumably avoided during all project stages. Removal of sage-grouse habitat during construction would lead to long-term effects on sage-grouse through the reduction of food and cover. The acres removed include areas that would be revegetated after construction and those which would remain unvegetated for the duration of the ROW grant. The dominant habitat removed would be key sage-grouse habitat. The greatest amount of habitat removed would be that used by female grouse during the summer and fall and male grouse in the spring, summer, and also fall. The least amount of habitat removed would be that used by male and female grouse during the winter. The amount of key habitat and seasonal sage-grouse habitat removed for Alternative C would be less than Alternative B1.

Table 4.2.2-33. Acres of Sage-grouse Habitat[1] Removed and Potentially Avoided – Alternative C.

	Key	R1	R2	UC (unclassified)
Acres Removed	519	194	0	31
Acres Avoided	124,444	69,580	2,083	15,360

[1] Sage-grouse habitat classification based on categories defined in BLM, 2008. No impacts on R3 habitat.

Table 4.2.2-34. Acres of Seasonal Sage-grouse Habitat[1] Removed and Percent of Total Seasonal Habitat Potentially Avoided – Alternative C.

	Female Nesting	Female Spring	Female Summer	Female Fall	Female Winter	Male Spring	Male Summer	Male Fall	Male Winter
Acres Removed	465	400	716	682	22	702	726	630	50
Percent Avoided	52%	40%	37%	42%	78%	44%	38%	54%	76%

[1] Habitat Based on 95 percent Fixed Kernel Use Areas from sage-grouse captured in Idaho. Acres of seasonal habitat are not additive. Acres of female sage-grouse habitat are not additive to males due to overlapping use.

Construction and operation of Alternative C would result in avoidance of otherwise suitable sage-grouse habitat. The acres of key habitat avoided (Table 4.2.2-33) would represent approximately 25 percent of that available in the mid-scale analysis area and 9 percent of the habitat available at the regional analysis area, similar to Alternative B1. Refer to the analysis areas presented in Figure 3.2.2-2 for context; the avoidance area would be essentially the same as that shown in the 4-mile buffer.

The avoidance areas of seasonal sage-grouse habitat under Alternative C would only differ by 2 percent or less compared to Alternative B1, and are therefore not presented graphically. The presence of turbines and other infrastructure, especially on the eastern ridgeline, would fragment otherwise

suitable habitat and prevent seasonal movement into and through the project area. Even though the 18 turbines proposed for Alternative B1 in the northern part of the project area would not be constructed for Alternative C, the reconstruction of Monument Springs Road and construction and use of the site compound and northern O&M facilities would occur. Based on the project assumptions, this would result in behavioral avoidance by sage-grouse. Therefore, the avoidance areas reported for Alternative C would be very similar to those for Alternative B1.

Of the seasonal habitats, use of winter habitat would be the most affected. Female and male sage-grouse would avoid about 78 and 76 percent of their predicted winter habitat area, respectively (Table 4.2.2-34), which is within 1 percent of that for Alternative B1. However, winter habitat and avoidance of mapped winter habitat areas may be underestimated, as described for Alternative B1. Avoidance of other seasonal habitat would also occur. Avoidance of habitat by female and male sage-grouse would affect survival, attendance and persistence at leks, nest initiation, and reproduction, as discussed for Alternative B1. Given the importance and quality of the habitat in and in the vicinity of the project area to sage-grouse, avoidance of otherwise suitable habitat would have a major long-term adverse effect on the sage-grouse population, similar to that of Alternative B1.

Avoidance of habitat during decommissioning activities would be the same as described for Alternative B1.

Leks

The number of occupied leks within 4 miles of project features (24) and the potential changes in sage-grouse behavior and impacts on populations would be the same as those reported for Alternative B.

Jarbidge RMP Amendments

The effect of the 1987 Jarbidge RMP amendments would be the same as for Alternative B2b.

Mitigation

No sage-grouse mitigation is proposed specifically for Alternative C.

Alternative D

Sage-grouse Habitat

Table 4.2.2-35 displays the total acres of key, R1, R2, and unclassified habitat that would be removed during construction and acres of habitat presumably avoided during all project stages. Table 4.2.2-36 displays the total acres of seasonal sage-grouse habitat removed during construction and the percent of total available seasonal habitat acres presumably avoided during all project stages. Removal of sage-grouse habitat during construction would lead to long-term effects on sage-grouse through the reduction of food and cover. The dominant habitat removed would be key sage-grouse habitat. The greatest amount of habitat removed would be that used by female grouse during the summer and fall and male grouse in the spring, summer, and also fall. The least amount of habitat removed would be

that used by male and female grouse during the winter. The amount of key habitat and seasonal sage-grouse habitat removed for Alternative D would be less than Alternative B1.

Table 4.2.2-35. Acres of Sage-grouse Habitat[1] Removed and Potentially Avoided – Alternative D.

	Key	R1	R2	UC (unclassified)
Acres Removed	482	136	0	11
Acres Potentially Avoided	123,690	69,579	2,083	15,360

[1] Sage-grouse habitat classification based on categories defined in BLM, 2008. No impacts on R3 habitat.

Table 4.2.2-36. Acres of Seasonal Sage-grouse Habitat[1] Removed and Percent of Total Seasonal Habitat Potentially Avoided – Alternative D.

	Female Nesting	Female Spring	Female Summer	Female Fall	Female Winter	Male Spring	Male Summer	Male Fall	Male Winter
Acres Removed	433	355	602	568	22	588	612	515	50
Percent Avoided	51%	40%	37%	42%	77%	44%	38%	54%	74%

[1] Habitat Based on 95 percent Fixed Kernel Use Areas from sage-grouse captured in Idaho. Acres of seasonal habitat are not additive. Acres of female sage-grouse habitat are not additive to males due to overlapping use.

Construction and operation of Alternative D would result in avoidance of otherwise suitable sage-grouse habitat. The acres of key habitat avoided (Table 4.2.2-35) would represent approximately 25 percent of that available in the mid-scale analysis area and 9 percent of the habitat available at the regional analysis area, similar to Alternative B1. Refer to the analysis areas presented in Figure 3.2.2-2 for context; the avoidance area would be essentially the same as that shown in the 4-mile buffer.

The avoidance areas of seasonal sage-grouse habitat under Alternative D would only differ by 3 percent or less compared to Alternative B1, and therefore are not presented graphically. The presence of turbines and other infrastructure would fragment otherwise suitable habitat and prevent seasonal movement into and through the project area. Even though the 18 turbines proposed in the northern part of the project area and the 28 proposed in the southern portion for Alternative B1 would not be constructed for Alternative D, the reconstruction of Monument Springs Road, construction and use of the site compound and northern O&M facilities, and construction and operation of the transmission line would occur. Based on the project assumptions, this would result in behavioral avoidance by sage-grouse. Therefore, the avoidance areas reported for Alternative D would be very similar to those for Alternative B1.

Of the seasonal habitats, use of winter habitat would be the most affected. Female and male sage-grouse would avoid about 77 and 74 percent of their predicted winter habitat area, respectively (Table 4.2.2-36), which is within 2 percent of that for Alternative B1. However, winter habitat and avoidance of mapped winter habitat areas may be underestimated, as described for Alternative B1. Avoidance of

other seasonal habitat would also occur. Avoidance of habitat by female and male sage-grouse would affect survival, attendance and persistence at leks, nest initiation, and reproduction, as discussed for Alternative B1. Given the importance and quality of the habitat in and in the vicinity of the project area to sage-grouse, avoidance of otherwise suitable habitat would have a major long-term adverse effect on the sage-grouse population, similar to that of Alternative B1.

Avoidance of habitat during decommissioning activities would be the same as described for Alternative B1.

Leks

There would be 23 occupied leks within 4 miles of project features. Behavioral impacts on grouse attending leks would be the same as discussed for Alternative B1; projected population impacts would be similar.

Jarbidge RMP Amendments

The effect of the 1987 Jarbidge RMP amendments would be the same as for Alternative B2b.

Mitigation

No sage-grouse mitigation is proposed specifically for Alternative D.

Alternative E

Sage-grouse Habitat

Table 4.2.2-37 displays the total acres of key, R1, R2, and unclassified habitat that would be removed during construction and acres of habitat presumably avoided during all project stages. Table 4.2.2-38 displays the total acres of seasonal sage-grouse habitat removed during construction and the percent of total available seasonal habitat acres presumably avoided during all project stages. Removal of sage-grouse habitat during construction would lead to long-term effects on sage-grouse through the reduction of food and cover. The dominant habitat removed would be key sage-grouse habitat. The greatest amount of habitat removed would be that used by female grouse during the summer and fall and male grouse in the spring, summer, and also fall. The least amount of habitat removed would be that used by male and female grouse during the winter. The amount of key habitat and seasonal sage-grouse habitat removed for Alternative E would be less than Alternative B1.

Table 4.2.2-37. Acres of Sage-grouse Habitat[1] Removed and Potentially Avoided – Alternative E.

	Key	R1	R2	UC (unclassified)
Acres Removed	463	175	0	17
Acres Potentially Avoided	123,240	69,488	2,083	15,257

[1] Sage-grouse habitat classification based on categories defined in BLM, 2008. No impacts on R3 habitat.

Table 4.2.2-38. Acres of Seasonal Sage-grouse Habitat[1] Removed and Percent of Total Seasonal Habitat Potentially Avoided – Alternative E.

	Female Nesting	Female Spring	Female Summer	Female Fall	Female Winter	Male Spring	Male Summer	Male Fall	Male Winter
Acres Removed	384	322	627	593	22	613	637	541	29
Percent Avoided	51%	40%	37%	42%	76%	43%	38%	53%	74%

[1] Habitat Based on 95 percent Fixed Kernel Use Areas from sage-grouse captured in Idaho. Acres of seasonal habitat are not additive. Acres of female sage-grouse habitat are not additive to males due to overlapping use.

Construction and operation of Alternative E would result in avoidance of otherwise suitable sage-grouse habitat. The acres of key habitat avoided (Table 4.2.2-37) would represent approximately 25 percent of that available in the mid-scale analysis area and 9 percent of the habitat available at the regional analysis area, as under Alternative B1. Refer to the analysis areas presented in Figure 3.2.2-2 for context; the avoidance area would be essentially the same as that shown in the 4-mile buffer.

The avoidance areas of seasonal sage-grouse habitat under Alternative E would only differ by 3 percent or less compared to Alternative B1, and are therefore not presented graphically. The presence of turbines and other infrastructure would fragment otherwise suitable habitat and prevent seasonal movement into and through the project area. Even though the 18 turbines proposed in the northern part of the project area for Alternative B1 and other scattered turbine locations would not be constructed for Alternative E, the reconstruction of Monument Springs Road and construction and use of the site compound and northern O&M facility would still occur, and many turbines would still be sited along the eastern ridgeline of the project area. Based on the project assumptions, this would result in behavioral avoidance by sage-grouse. Therefore, the avoidance areas reported for Alternative E would be very similar to those for Alternative B1.

Of the seasonal habitats, use of winter habitat would be the most affected. Female and male sage-grouse would avoid about 76 and 74 percent of their predicted winter habitat area, respectively (Table 4.2.2-38), which is within 3 percent of that for Alternative B1. However, winter habitat and avoidance of mapped winter habitat areas may be underestimated, as described for Alternative B1. Avoidance of other seasonal habitat would also occur. Avoidance of habitat by female and male sage-grouse would affect survival, attendance and persistence at leks, nest initiation, and reproduction, as discussed for Alternative B1. Given the importance and quality of the habitat in and in the vicinity of the project area to sage-grouse, avoidance of otherwise suitable habitat would have a major long-term adverse effect on the sage-grouse population, similar to that of Alternative B1.

Avoidance of habitat during decommissioning activities would be the same as described for Alternative B1.

Leks

There would be 22 occupied leks within 4 miles of project features. Behavioral impacts on grouse attending leks would be the same as discussed for Alternative B1; projected population impacts would be similar.

Jarbidge RMP Amendments

There would be no amendments to the 1987 Jarbidge RMP. Therefore, all seasonal restrictions and/or spatial buffers applicable to sage-grouse breeding grounds, nesting/brood-rearing habitat, winter range, and sage-grouse leks in the 1987 Jarbidge RMP would apply during construction, decommissioning, and major (emergency) maintenance activities (Section 2.11.2). As a result, this is the most restrictive alternative regarding timing of construction, decommissioning, and major maintenance activities, and provides the most protection to sage-grouse seasonal habitats during these activities. Application of these restrictions would result in less avoidance of otherwise suitable habitats by sage-grouse during construction, decommissioning, and major maintenance than under Alternative B1. Major construction, decommissioning, and maintenance activities within 4 miles of sage-grouse leks would only be allowed during the period between June 31 and February 14, unless it is determined by the BLM through the exception process (Information Bulletin No ID-2010-039) that these activities would have no adverse impacts on the species. No facilities would be sited in habitat classified as winter use areas by sage-grouse in the Idaho portion of the project area, thus the no occupancy restriction for winter range would not be applicable. If major use of the northern portion of Monument Springs Road were to occur between December 1 and February 15, then impacts on wintering grouse, if present in the area, would occur.

Mitigation

No sage-grouse mitigation is proposed specifically for Alternative E.

Alternative F

Sage-grouse Habitat

Table 4.2.2-39 displays the total acres of key, R1, R2, and unclassified habitat that would be removed during construction and acres of habitat presumably avoided during all project stages. Table 4.2.2-40 displays the total acres of seasonal sage-grouse habitat removed during construction and the percent of total available seasonal habitat acres presumably avoided during all project stages. Removal of sage-grouse habitat during construction would lead to long-term effects on sage-grouse through the reduction of food and cover. The dominant habitat removed would be key sage-grouse habitat. The greatest amount of habitat removed would be that used by female grouse during the summer and fall and male grouse in the spring, summer, and also fall. The least amount of habitat removed would be that used by male and female grouse during the winter. The amount of key habitat and seasonal sage-grouse habitat removed for Alternative F would be less than Alternative B1.

Table 4.2.2-39. Acres of Sage-grouse Habitat1 Removed and Potentially Avoided – Alternative F.

	Key	R1	R2	UC (unclassified)
Acres Removed	425	110	0	8
Acres Potentially Avoided	123,075	69,340	2,083	15,360

[1] Sage-grouse habitat classification based on categories defined in BLM, 2008. No impacts on R3 habitat.

Table 4.2.2-40. Acres of Seasonal Sage-grouse Habitat[1] Removed and Percent of Total Seasonal Habitat Potentially Avoided – Alternative F.

	Female Nesting	Female Spring	Female Summer	Female Fall	Female Winter	Male Spring	Male Summer	Male Fall	Male Winter
Acres Removed	352	278	515	481	22	501	525	430	50
Percent Avoided	51%	40%	37%	42%	76%	43%	38%	53%	73%

[1] Habitat Based on 95 percent Fixed Kernel Use Areas from sage-grouse captured in Idaho. Acres of seasonal habitat are not additive. Acres of female sage-grouse habitat are not additive to males due to overlapping use.

Construction and operation of Alternative E would result in avoidance of otherwise suitable sage-grouse habitat. The acres of key habitat avoided (Table 4.2.2-39) would represent approximately 25 percent of that available in the mid-scale analysis area and 9 percent of the habitat available at the regional analysis area, similar to Alternative B1. Refer to the analysis areas presented in Figure 3.2.2-2 for context; the avoidance area would be essentially the same as that shown in the 4-mile buffer.

The avoidance areas of seasonal sage-grouse habitat under Alternative F would only differ by 3 percent or less compared to Alternative B1, and therefore are not presented graphically. The presence of project infrastructure would fragment otherwise suitable habitat and prevent seasonal movement into and through the project area. Even though the turbines proposed in the southern half of the project area and the 18 turbines proposed in the northern part of the project area for Alternative B1 would not be constructed for Alternative F, the construction and operation of the transmission line, reconstruction of Monument Springs Road, and construction and use of the site compound and northern O&M facility and would still occur, which would lead to avoidance of the entire project area. Therefore, the avoidance areas reported for Alternative F would be very similar to those for Alternative B1.

Of the seasonal habitats, use of winter habitat would be the most affected. Female and male sage-grouse would avoid about 76 and 73 percent of their predicted winter habitat area, respectively (Table 4.2.2-40), which is within 3 pereent of that for Alternative B1. However, winter habitat and avoidance of mapped winter habitat areas may be underestimated, as described for Alternative B1. Avoidance of other seasonal habitat would also occur. Avoidance of habitat by female and male sage-grouse would affect survival, attendance and persistence at leks, nest initiation, and reproduction, as discussed for Alternative B1. Given the importance and quality of the habitat in and in the vicinity of the project

area to sage-grouse, avoidance of otherwise suitable habitat would have a major long-term adverse effect on the sage-grouse population, similar to that of Alternative B1.

Avoidance of habitat during decommissioning activities would be the same as described for Alternative B1.

Leks

There would be 22 occupied leks within 4 miles of project features. Behavioral impacts on grouse attending leks would be the same as discussed for Alternative B1; projected population impacts would be similar.

Jarbidge RMP Amendments

The effect of the 1987 Jarbidge RMP amendments would be the same as for Alternative B2b.

Mitigation

No sage-grouse mitigation is proposed specifically for Alternative F.

Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Sage-grouse Habitat

Sage-grouse habitat (Wyoming big sagebrush) is present along portions of the northern inbound haul route and is interspersed with rabbitbrush and native and non-native perennial grasslands. Table 4.2.2-41 displays the total acres of key, R1, R2, and unclassified habitat that would be removed during reconstruction of the haul route and acres of habitat presumably avoided during construction and decommissioning. Table 4.2.2-42 displays the total acres of seasonal sage-grouse habitat removed during reconstruction of the haul route and the percent of total available seasonal habitat acres presumably avoided during construction and decommissioning. Note that seasonal sage-grouse habitat is based on grouse captured on Browns Bench in Idaho and does not reflect seasonal use that would occur on more northern portions of the haul route.

Table 4.2.2-41. Acres of Sage-grouse Habitat Removed and Potentially Avoided – Northern Inbound Haul Route.

	Key[1]	R1	R2	R3	UC (unclassified)
Acres Removed	3	7	0	0	29
Acres Avoided	161,412	254,357	3,123	0	197,256

[1] Sage-grouse habitat classification based on categories defined in BLM, 2008b.

Table 4.2.2-42. Acres of Seasonal Sage-grouse Habitat[1] Removed and Percent of Total Seasonal Habitat Potentially Avoided – Northern Inbound Haul Route.

	Female Nesting	Female Spring	Female Summer	Female Fall	Female Winter	Male Spring	Male Summer	Male Fall	Male Winter
Acres Removed	0	0	0	0	0	1	0	0	0
Percent Avoided	34%	28%	17%	9%	16%	26%	16%	14%	29%

[1] Habitat Based on 95 percent Fixed Kernel Use Areas from sage-grouse captured in Idaho. Acres of seasonal habitat are not additive. Acres of female sage-grouse habitat are not additive to males due to overlapping use.

Negligible amounts of habitat would be removed from reconstruction of the existing road proposed for the northern inbound haul route. Where vegetation would be removed, direct impacts on sage-grouse habitat would be expected as described under *Impacts Common to All Action Alternatives*. The heavy use of the haul route that would occur during the construction and decommissioning periods would likely result in temporary behavioral avoidance of seasonal sage-grouse habitat out to 4 miles from the location of road noise. Once construction activities are complete, avoidance of this haul route beyond that which may currently occur because of the existing road is not expected until the road is used again for decommissioning of the project.

Leks

Thirty-two occupied leks occur within 4 miles of the northern inbound haul route; five of these occur less than 0.7 miles from Monument Springs Road just north of the ROW boundary, with the closest only 158 feet away (Figures 3.2.2-19). Twelve of these leks also occur within the 4-mile buffer of the project area and of the northern outbound haul route and would also be impacted from operation of the wind facility. Vehicles hauling project materials on the northern inbound haul route would pass by these leks during construction and decommissioning. Although grouse at these leks could be accustomed to the current level of traffic on this route, the number of vehicles that would use this route would increase during the construction and decommissioning periods and the type of vehicles would also be different and larger. Noise from vehicle use would likely disturb grouse attending these lek sites during the breeding season and would lead to behavioral changes including avoidance, reduced attendance, reduced lek persistence, and/or lek abandonment. Noise would likely also affect grouse nesting in the vicinity of these leks. Depending on which alternative is chosen and whether an RMP amendment lifting seasonal restrictions would result, timing and seasonal restrictions around sage-grouse leks would reduce the potential behavioral avoidance of leks and nest sites that would likely occur during reconstruction of the northern inbound haul route during the lekking and nesting seasons.

Southern Inbound Haul Route Option 1 and Option 2

Sage-grouse Habitat

Construction and reconstruction of the southern inbound haul route options would remove habitat used by sage-grouse. The heavy use of the haul route that would occur during the construction and decommissioning periods would likely result in temporary behavioral avoidance of seasonal sage-

grouse habitat out to 4 miles from the location of road noise. Once construction activities are complete, this route would no longer be used for project O&M. However, this road would be open to the general public and use is expected to increase over current conditions due to road reconstruction. Therefore, additional indirect disturbance to sage-grouse over existing conditions from future use of this road throughout the ROW grant period is expected. The reconstruction and maintenance of this road would facilitate access to the project area from the south and increase hunting pressure in Nevada (hunting of sage-grouse in the Idaho portion of the project area in not permitted).

Table 4.2.2-43 displays the total acres of key, R1, R2, and unclassified habitat that would be removed during construction of the two southern inbound haul route options and acres of habitat presumably avoided during construction and decommissioning. Table 4.2.2-44 displays the acres of sage-grouse seasonal habitat removed during construction of the southern inbound haul route options and percent of total available seasonal habitat presumably avoided during construction and decommissioning. Note that most of the habitat avoidance areas of the haul routes overlap the avoidance areas of the project area (from the wind facility and associated infrastructure), and are therefore not additive. These overlapping areas are not included in the *Project as a Whole* table where a side-by-side comparison of impacts of the southern inbound haul route options when combined with the action alternatives is presented.

The dominant sage-grouse habitat removed would be R1 sage-grouse habitat, as the location of the haul route burned in the Scott Creek Fire of 2007. With the exception of the approximately 23-acre staging area associated with the southern inbound haul route options, no additional acres disturbed would be revegetated or reclaimed. The amount of habitat removed for either of the haul route options would make up a minor amount of sage-grouse habitat in the analysis areas. However, the amount of sage-grouse habitat potentially avoided during the construction of and use of either of the southern inbound haul route options during turbine construction, major maintenance, and decommissioning, would be much greater.

Table 4.2.2-43. Acres of Sage-grouse Habitat Removed and Potentially Avoided – Southern Inbound Haul Routes.

	Key[1]	R1	R2	R3	UC (unclassified)
Southern Inbound Haul Route Option 1					
Acres Removed	7	77	0	0	2
Acres Avoided	35,425	39,770	1,372	0	3,455
Southern Inbound Haul Route Option 2					
Acres Removed	15	73	0	0	2
Acres Avoided	37,317	39,315	0	0	3,455

[1] Sage-grouse habitat classification based on categories defined in BLM, 2008b.

Table 4.2.2-44. Acres of Seasonal Sage-grouse Habitat[1] Removed During Construction and Percent of Total Seasonal Habitat Potentially Avoided – Southern Inbound Haul Routes.

	Female Nesting	Female Spring	Female Summer	Female Fall	Female Winter	Male Spring	Male Summer	Male Fall	Male Winter
Southern Inbound Haul Route Option 1									
Acres Removed	25	48	75	77	15	77	81	81	26
Percent Avoided	10%	8%	10%	14%	22%	12%	11%	20%	19%
Southern Inbound Haul Route Option 2									
Acres Removed	31	53	80	84	8	84	93	93	34
Percent Avoided	11%	9%	10%	15%	26%	12%	11%	20%	21%

[1] Habitat Based on 95 percent Fixed Kernel Use Areas from sage-grouse captured in Idaho. Acres of seasonal habitat are not additive. Acres of female sage-grouse habitat are not additive to males due to overlapping use.

Of the seasonal sage-grouse habitats, the greatest amount of habitat removed would be that used by female grouse during the summer and fall and male grouse in the spring, summer, and fall. The least amount of habitat removed would be that used by male and female grouse during the winter. The majority of the impact would be permanent, as only 27 percent of the habitat removed would be revegetated. The revegetated areas would not function as under current conditions until a sufficient shrub cover developed. Female and male sage-grouse would avoid about 26 and 21 percent of their predicted winter habitat area, respectively (Table 4.2.2-44). Less than 20 percent of other available seasonal sage-grouse habitats would be avoided. The effect of avoidance of otherwise suitable habitat on sage-grouse populations would be the same as that described for Alternative B1. Although the eastern portion of both routes of the southern inbound haul route are not currently mapped as seasonal sage-grouse habitat, it is predicted, based on the preliminary telemetry data from grouse captured in Nevada, that these areas function as seasonal habitat. Therefore, the avoidance areas represented for seasonal habitat are likely underestimated.

Leks

There are seven occupied leks within 4 miles of option 1 of the southern inbound haul route, with the closest only 106 feet from the route. There are nine occupied leks within 4 miles of option 2 of the southern inbound haul route, with the closest only 106 feet from the route (Figure 3.2.2-18). Construction of and use during construction and decommissioning of the southern inbound haul route options would therefore result in behavioral changes to grouse attending these leks. All leks within 4 miles of option 1 of the southern inbound haul route and all but one within 4 miles of option 2 are within 4 miles of the project area and would also be impacted from operation of the wind facility. Seasonal protection stipulations restricting construction, decommissioning, and major maintenance activities would apply to leks within 0.3 mile (Appendix 2A, Wildlife), which would afford protection to one of the leks discussed for both haul route options (all other leks are greater than 0.3 mile away).

Outbound Haul Route

Sage-grouse Habitat

Sage-grouse habitat (Wyoming sagebrush) is present along portions of the outbound haul route and is interspersed with native and non-native perennial grasslands. No roadway construction or reconstruction is proposed for this haul route and therefore no removal of sage-grouse habitat would occur. The acres of key, R1, and unclassified habitat potentially avoided and the percent of known seasonal use areas avoided during the construction and decommissioning periods are displayed in Tables 4.2.2-45 and 4.2.2-46, respectively. Seasonal sage-grouse habitat is based on grouse captured on Browns Bench in Idaho and does not reflect seasonal use that would occur on more northern portions of the haul route. Note that some of the avoidance areas of the outbound haul route would overlap the avoidance areas of the wind facility and associated infrastructure. The amount of overlap would vary by alternative.

Table 4.2.2-45. Acres of Sage-grouse Habitat Potentially Avoided During Construction of the Wind Energy Facility – Outbound Haul Route.

	Key[1]	R1	R2	R3	UC (unclassified)
Acres Avoided	94,372	85,108	0	0	210,778

[1] Sage-grouse habitat classification based on categories defined in BLM, 2008b.

Table 4.2.2-46. Percent of Total Seasonal Sage-grouse Habitat[1] Potentially Avoided During Construction of the Wind Energy Facility – Outbound Haul Route.

	Female Nesting	Female Spring	Female Summer	Female Fall	Female Winter	Male Spring	Male Summer	Male Fall	Male Winter
Percent Avoided	41%	32%	17%	9%	16%	27%	14%	14%	30%

[1] Habitat Based on 95 percent Fixed Kernel Use Areas from sage-grouse captured in Idaho. Acres of seasonal habitat are not additive. Acres of female sage-grouse habitat are not additive to males due to overlapping use.

The increased use of the outbound haul route that would occur during the construction and decommissioning periods would likely result in temporary behavioral avoidance of sage-grouse habitat out to 4 miles from the location of road noise. Once construction activities are complete, avoidance of this haul route by sage-grouse beyond any that may currently occur because of existing use is not expected. Once construction activities are complete, avoidance of this haul route beyond that which may currently occur because of the existing road is not expected until the road is used again for decommissioning of the project.

Leks

Twenty-one occupied leks occur within 4 miles of the northern outbound haul route; five of these occur less than 0.7 miles from Monument Springs Road just north of the ROW boundary, with the closest only 158 feet away (Figures 3.2.2-19). Twelve of these leks also occur within the 4-mile buffer of the project area and of the northern inbound haul route and would also be impacted from operation of the wind facility. Vehicles exiting the project site during the construction period and

using this route during decommissioning would pass by these leks. Although grouse at these leks are likely accustomed to the current level of traffic on this route, the number of vehicles that would use the outbound haul route would increase during construction and decommissioning and the type of vehicles would also be different and larger. Noise from vehicle use would likely disturb grouse attending these lek sites and nearby nests during the breeding season. Indirectly, this disturbance would result in behavioral changes including avoidance, reduced attendance, reduced lek persistence, and/or lek abandonment.

Project as a Whole

Long-term, adverse, direct and indirect impacts on sage-grouse and their habitat would result with development of the wind project. The primary analysis indicators for sage-grouse are summarized in Tables 4.2.2-47, 4.2.2-48, and 4.2.2-49 for each alternative alone, and for each alternative combined with the three inbound haul route options. The numbers presented for the phased alternatives are those for full build out (Phase I and Phase II). Refer to the text and tables under Alternative B2a, B2b, and B2c for more detail regarding impact during individual phases.

RMP amendments for Alternatives B1 and B2a would reduce protection to sage-grouse, as construction, major maintenance, and decommissioning could occur at any time of the year near sage-grouse leks and in sage-grouse habitat. RMP amendments for Alternatives B2b, B2c, C, D, and F, would reduce some of the protection to sage-grouse, but not to the extent of Alternative B1 and B2a, as exceptions to seasonal and spatial restrictions would only be granted if it is determined that there is little risk of impact on sage-grouse. Further, seasonal restrictions would still be imposed for major maintenance activities. Since Alternative E would have no RMP amendments, construction, maintenance, and decommissioning activities would be restricted near leks, brood-rearing habitat, and winter habitat during critical life history periods. Therefore, this alternative would be the most protective for sage-grouse during critical life history periods. However, based on the assumption of full avoidance of habitat within 4 miles of project features, operation of Alternative E would still result in long-term adverse impacts on sage-grouse.

Table 4.2.2-47. Impact Summary Table for Project as a Whole – Sage-grouse Habitat Removal (acres) – Wind Facility Alone and Combined with Haul Routes.

	Alt A	Alt B1	Alt B2a[1]	Alt B2b[1]	Alt B2c[1]	Alt C	Alt D	Alt E	Alt F
Wind Facility Only									
Key	0	586	597	598	598	519	482	463	425
R1	0	194	205	206	204	194	136	175	110
Female Nesting	0	533	554	551	554	465	433	384	352
Female Spring	0	467	477	477	476	400	355	322	278
Female Summer	0	783	808	801	805	716	602	627	515
Female Fall	0	750	774	767	770	682	568	593	481
Female Winter	0	59	61	62	61	22	22	22	22
Male Spring	0	770	795	788	791	702	588	613	501
Male Summer	0	793	818	811	815	726	612	637	525
Male Fall	0	697	721	715	719	630	515	541	430
Male Winter	0	98	100	99	100	50	50	29	50
Wind Facility with use of Northern Inbound Haul Route									
Key	0	589	600	601	601	522	485	466	428
R1	0	201	212	213	211	201	143	182	117
Female Nesting	0	533	154	551	554	465	433	384	352
Female Spring	0	467	477	477	476	400	355	322	278
Female Summer	0	783	808	801	805	716	602	627	515
Female Fall	0	750	774	767	770	682	568	593	481
Female Winter	0	59	61	62	61	22	22	22	22
Male Spring	0	771	796	789	792	703	589	614	502
Male Summer	0	793	818	811	815	726	612	637	525
Male Fall	0	697	721	715	719	630	515	541	430
Male Winter	0	98	100	99	100	50	50	29	50
Wind Facility with use of Southern Inbound Haul Route Option 1									
Key	0	593	604	605	605	526	489	470	432
R1	0	271	282	283	281	271	213	252	187
Female Nesting	0	558	579	576	579	490	458	409	377
Female Spring	0	515	525	525	524	448	403	370	326
Female Summer	0	858	883	876	880	791	677	702	590
Female Fall	0	827	851	844	847	759	645	670	558
Female Winter	0	74	76	77	76	37	37	37	37
Male Spring	0	847	872	865	868	779	665	690	578
Male Summer	0	874	899	892	896	807	693	718	606
Male Fall	0	778	802	796	800	711	596	622	511
Male Winter	0	124	126	125	126	76	76	55	76
Wind Facility with use of Southern Inbound Haul Route Option 2									
Key	0	601	612	613	613	534	497	478	440
R1	0	267	278	279	277	267	209	248	183
Female Nesting	0	564	585	582	585	496	464	415	383
Female Spring	0	520	530	530	529	453	408	375	331
Female Summer	0	863	888	881	885	796	682	707	595
Female Fall	0	834	858	851	854	766	652	677	565
Female Winter	0	67	69	70	69	30	30	30	30
Male Spring	0	854	879	873	875	786	672	697	585
Male Summer	0	886	911	904	908	819	705	730	618
Male Fall	0	790	814	808	812	723	608	634	523
Male Winter	0	132	134	133	134	84	84	63	84

Alternative B1 would result in the greatest removal of key and R1 sage-grouse habitat of all alternatives and Alternative F would result in the least (Table 4.2.2-47). Likewise, the greatest amount of habitat removed from seasonal use areas would be under Alternative B1, and the least under Alternative E (Table 4.2.2-47). For the phased alternatives, fewer acres of sage-grouse habitat would be removed during construction of Phase I than under Alternative B1. However, total habitat removed at full build out (Phase I + Phase II) would be slightly more than Alternative B1 due to revegetated areas being disturbed during construction of Phase II. When combined with the northern inbound haul route, very few additional acres of key (3 acres) and R1 (7 acres) sage-grouse habitat and mapped seasonal habitat (0 to 1 acres) would be removed for each alternative. When combined with the southern inbound haul route options, a minor amount of additional acres of key sage-grouse habitat would be removed (7 to 15 acres); but a moderate amount of additional R1 habitat would be removed (73 to 77 acres). The difference between the two southern inbound haul route options for the increased removal of habitat is negligible. There would also be an increase in removal of sage-grouse seasonal habitat for both female and males when the disturbance of either of the two southern inbound haul routes is added to disturbance from the wind facility under any action alternative (15 to 81 acres for option 1 and 8 to 93 acres for option 2); the difference between the two haul route options is minor. The greatest increase in habitat removed would be to the mapped winter ranges.

Due to the assumption of full avoidance of habitat within 4 miles of project features, there would be less than 3 percent difference between avoidance areas between alternatives for key habitat and seasonal habitat for female and male sage-grouse (Table 4.2.2-48). In other words, the data presented in Table 4.2.2-48 shows no discernable difference between alternatives when it comes to habitat avoidance. Use of available winter habitat would be affected more than use of the other seasonal habitats, with between 73 and 79 percent of available habitat avoided during construction, O&M, and decommissioning. During operation of Phase I of any of the phased alternatives, the difference in avoidance acres of key habitat at the mid-scale analysis area and regional analysis area when compared to Alternative B1 would be 4 percent or less and 1 percent or less, respectively. Behavioral avoidance of seasonal sage-grouse habitats for Phase I of the phased alternatives would be 3 percent or less than that of Alternative B1.

When combined with the northern inbound haul route, the acres of key sage-grouse habitat avoided more than doubles. This major increase is due to the length of the northern inbound haul route and the assumption of full habitat avoidance. For the seasonal habitats, there would also be an increase in avoidance with the addition of the northern inbound haul route, but not nearly as pronounced as that for key sage-grouse habitat given that the seasonal habitat does not extend as far north as the full length of this haul route. The greatest increase in seasonal habitat avoided would be for female nesting habitat (12%), female spring habitat (10%), and male spring habitat (12%).

Table 4.2.2-48. Impact Summary Table for Project as a Whole – Sage-grouse Habitat Avoidance Areas[1] – Wind Energy Facility Alone and Combined with Haul Routes.

	Alt A	Alt B1	Alt B2a[2]	Alt B2b[2]	Alt B2c[2]	Alt C	Alt D	Alt E	Alt F
Wind Energy Facility Only									
Key	0	125,056	125,056	125,056	125,056	124,444	123,690	123,240	123,075
Female Nesting	0	54	54	54	54	52	51	51	51
Female Spring	0	41	41	41	41	40	40	40	40
Female Summer	0	38	38	38	38	37	37	37	37
Female Fall	0	43	43	43	43	42	42	42	42
Female Winter	0	79	79	79	79	78	77	76	76
Male Spring	0	44	44	44	44	44	44	43	43
Male Summer	0	39	39	39	39	38	38	38	38
Male Fall	0	55	55	55	55	54	54	53	53
Male Winter	0	76	76	76	76	76	74	74	73
Wind Energy Facility with use of Northern Inbound Haul Route									
Key	0	253,193	253,193	253,193	253,193	252,827	251,827	251,378	251,212
Female Nesting	0	66	66	66	66	66	65	65	65
Female Spring	0	53	53	53	53	52	52	52	52
Female Summer	0	45	45	45	45	45	45	44	44
Female Fall	0	43	43	43	43	42	42	42	42
Female Winter	0	79	79	79	79	79	77	76	76
Male Spring	0	56	56	56	56	55	55	55	55
Male Summer	0	44	44	44	44	44	44	43	43
Male Fall	0	55	55	55	55	54	54	53	53
Male Winter	0	76	76	76	76	76	75	74	73
Wind Energy Facility with use of Southern Inbound Haul Route Option 1									
Key	0	125,762	125,762	125,762	125,762	125,150	125,035	124,221	124,529
Female Nesting	0	52	52	52	52	52	52	51	51
Female Spring	0	41	41	41	41	40	40	40	40
Female Summer	0	38	38	38	38	38	38	37	37
Female Fall	0	43	43	43	43	42	42	42	42
Female Winter	0	79	79	79	79	79	79	77	78
Male Spring	0	45	45	45	45	44	44	44	44
Male Summer	0	39	39	39	39	38	38	38	38
Male Fall	0	55	55	55	55	54	54	54	54
Male Winter	0	76	76	76	76	76	76	75	75
Wind Energy Facility with use of Southern Inbound Haul Route Option 2									
Key	0	125,762	125,762	125,762	125,762	125,150	225,035	124,221	124,529
Female Nesting	0	53	53	53	53	52	52	52	52
Female Spring	0	42	42	42	42	41	41	41	41
Female Summer	0	38	38	38	38	38	38	38	38
Female Fall	0	43	43	43	43	43	43	43	43
Female Winter	0	82	82	82	82	81	81	80	80
Male Spring	0	45	45	45	45	44	44	44	44
Male Summer	0	39	39	39	39	38	38	38	38
Male Fall	0	56	56	56	56	55	55	54	54
Male Winter	0	78	78	78	78	77	77	77	77

[1] Sage-grouse habitat avoidance areas are presented as acres for key habitat and percentage of available habitat for seasonal habitats. Percent of seasonal sage-grouse habitat avoided is based on the total available seasonal habitat estimated by 95% Fixed Kernel Use Areas from telemetry data of sage-grouse captured in Idaho.

[2] Impacts presented for Phase I + Phase II combined.

When combined with the southern inbound haul route, there would be a minor increase in key habitat avoided. The increase would vary by alternative and haul route option and range between 706 and 1,455 acres (<2% increase) for option 1 and 1,746 and 2,793 for option 2 (<3% increase). The small increase in avoidance is due to the majority of the haul route avoidance areas overlapping that of the project. There would also be an increase in seasonal habitat avoided when the project is combined with the southern inbound haul route options. The increase would be less than 3 percent due to the overlap of avoidance with the project.

Given the importance and quality of the habitat in and in the vicinity of the project area to sage-grouse, particularly winter and breeding habitat, avoidance of habitat throughout the 30-year duration of the ROW grant could have a major long-term adverse effect on the sage-grouse populations, regardless of the action alternative chosen or the haul route selected. These impacts could contribute to further population declines, with implications beyond the regional analysis area.

Between 22 and 24 leks would occur within 4 miles of the project area for all alternatives (Table 4.2.2-49). Under the phased alternatives, 12 to 15 leks would be subject to disturbance twice, once during each phase of development. When combined with the northern inbound haul route, there would be between 42 and 44 total leks within 4 miles of the project area (an increase in 20 leks), depending on the alternative. When the project is combined with the southern inbound haul route option 1, there would be between 22 and 24 total leks within 4 miles of the project area (no increase in leks), and when combined with the southern inbound haul route option 2, there would be between 23 and 25 total leks within 4 miles of the project area (an increase in one lek), depending on the alternative. Use of the northern inbound haul route would therefore result in an increase in disturbance to an additional 20 or 19 leks when compared to option 1 and option 2 of the southern inbound haul route, respectively. However, when combined with construction and operation of the wind facility, it is expected that impacts on sage-grouse would be greater with use of either option of the southern inbound haul route verses the northern inbound haul route. This is because of the current low level of use of the existing road proposed for the southern inbound haul route options, the amount of construction disturbance required, and the expected increase in use of the reconstructed road by the general public over the life of the project and beyond.

Table 4.2.2-49. Impact Summary Table for Project as a Whole – Number of Leks within a 4-mile Radius – Wind Facility Alone and Combined with Haul Routes[1].

	Alt A	Alt B1	Alt B2a[2]	Alt B2b[2]	Alt B2c[2]	Alt C	Alt D	Alt E	Alt F
Wind Facility	0	24	24	24	24	24	23	22	22
Wind Facility + NHR	0	44	44	44	44	44	43	42	42
Wind Facility + SHR1	0	24	24	24	24	24	23	22	22
Wind Facility + SHR2	0	25	25	25	25	25	24	23	23

[1] NHR = northern inbound haul route; SHR1 = southern inbound haul route options 1 and 2.
[2] Impacts presented for Phase I + Phase II combined.

Cumulative Impacts

Cumulative impacts on sage-grouse consist of incremental effects of the alternatives when added to other past, present, and reasonably foreseeable future actions. These effects would occur over the

duration of the 30-year ROW grant, resulting in incremental increases to habitat degradation, habitat avoidance, mortality, and potential population impacts. The cumulative effects analysis area for sage-grouse is the regional analysis area described in Section 3.2.2.3 (an approximately 34-mile radius around the project site; Figure 3.2.2-2). This area was chosen based on the premise that landscape characteristics at a 34-mile (54-km) radius may influence sage-grouse seasonal movements and incorporate habitats outside the breeding season (Knick & Hanser, in press; Swenson, Simmons, & Eistace, 1987; Leonard, Reese, & Connelly, 2000). This area encompasses sage-grouse in the Jarbidge and Shoshone Basin sage-grouse working group boundaries and northern Nevada; sage-grouse in these areas are known to travel through the project area. Portions of key, R1, R2, R3, and unclassified sage-grouse habitat in the cumulative impact analysis area would be impacted by past, present, and future projects in the analysis area.

Based on a review of the literature, the primary threats to sage-grouse include habitat loss, with fire, invasive plant species, urban, and agricultural expansion being major sources of habitat loss; habitat fragmentation, especially as it relates to energy development; improperly managed livestock grazing; West Nile virus; and climate change (USFWS, 2008). Other threats, as they relate to the proposed project, include increased predation (based on increased perching opportunities from construction of transmission lines and meteorological towers), collision with wind energy facilities (turbines and power lines), increased human disturbance, and increased noise (USFWS, 2008). The *Conservation Plan for the Greater Sage-grouse in Idaho* (ISAC, 2006) listed infrastructure development as second only to wildfire, in threats to sage-grouse in Idaho. Of the past, present, and reasonably foreseeable actions described in Section 4.0.2.5 and Table 4.0.2-1, wildfire, livestock grazing, recreation, spread of invasive species, development and operation of wind facilities, meteorological and communication towers, and transmission lines (infrastructure) all have the potential to add cumulatively to the direct and indirect impacts of the proposed project on sage-grouse.

Wildfire

The largest contributing factor to the loss of suitable sagebrush-steppe habitat has been wildfire and infrastructure (Connelly et al., 2004; ISAC, 2006), and recovery rate of sagebrush after wildfire is very slow, taking over 100 years for full recovery for the Wyoming subspecies of big sagebrush (Cooper et al., 2007). Habitat modification or removal is often followed by cheatgrass or other invasive or noxious weed species that outcompete native vegetation and thrive on ground disturbance. Adverse impacts on sage-grouse habitat from the proposed project would add cumulatively to the impacts of wildfire in the analysis area.

Wildfire is an increasingly significant disturbance throughout sagebrush ecosystems, resulting in increased burned areas and decreased total sagebrush cover, which can further accelerate the trajectory of habitat loss for sage-grouse (Connelly et al., 2004). Fire is a natural part of the sagebrush system, but there has been departure from historic fire regimes as a result of changes to native vegetation community structure and current fire management practices (Section 3.3.10). In the analysis area, 1,283,643 acres have burned in wildfires between 1991 and 2010 (104,093 acres between 1991 and 1995, 201,680 acres between 1996 and 2000, 103,904 acres between 2001 and

2005, and 873,965 acres between 2006 and 2010; Figure 3.2.2-2). This equates to 40 percent of the analysis area. Approximately 46 percent of the acreage in the Jarbidge Field Office is no longer vegetated by sagebrush-steppe, primarily due to wildfire (BLM, 2007). Surrounding the Jarbidge Field Office, fires have burned approximately 30 percent of the Burley Field Office sage-grouse habitat and roughly 40 percent of the sage-grouse habitat in the BLM Elko District north of Interstate 80 (BLM, 2007). In 2007, two large wildfires in the vicinity of China Mountain have burned approximately 640,000 acres (1,000 square miles) of sagebrush-steppe habitat. Remaining unburned sagebrush-steppe habitat, including the China Mountain project area, are likely crucial to the maintenance and recovery of sage-grouse and other sagebrush obligate species.

In 2007, the Murphy Complex Fires, including the Scott Creek Fire, burned approximately 483,000 acres in south-central Idaho and 170,000 acres in Nevada. This was considered the largest fire in Idaho since 1910. Fires burned during the nine fire seasons spanning 1999 to 2007 in Nevada, including the Scott Creek Fire, represent an 11.6 percent loss of key sagebrush habitat types in Nevada that sage-grouse depend on (Nevada Department of Wildlife [NDOW], 2008a). Surveys were conducted in 2008 at 52 of the 69 sage-grouse leks that were burned in Elko County Nevada in 2007. Only 11 of these leks were active in 2008, and grouse attendance declined by 22 percent (NDOW, 2008b). The proposed wind project, in combination with past and future wildfires, would add cumulatively to the fragmentation of sage-grouse habitat and potentially contribute further to the decline in populations in and beyond the regional analysis area.

Infrastructure

Construction and operation of meteorological towers, communication towers, transmission lines, and wind facilities can directly impact sage-grouse and their habitat through impacts on habitat, direct mortality, and displacement or avoidance. Impacts of wind facilities and transmission lines are described in *Impacts Common to All Action Alternatives*. The impacts of the transmission line on sage-grouse proposed for this project would add cumulatively to the expected impacts of the existing transmission lines (Little Goose Creek, NVN, and Salmon Falls Dam to Wells) and proposed Gateway West and SWIP transmission lines. None of the existing or proposed wind facilities listed in Table 4.0.2-1 occurs within the cumulative impact area for sage-grouse. Guy wire-supported structures (meteorological and communication towers) and transmission lines create a collision risk to sage-grouse. If they are lattice structures, they also can impact sage-grouse by providing increased perching and nesting opportunities for raptors and corvids that prey upon sage-grouse (Steenhof et al., 1993). Several meteorological towers and communication towers exist within the analysis area. The meteorological towers proposed for this project would not be supported by guy wires; however, they would be lattice structures. Therefore, unless mitigation recommending that permanent meteorological towers near greater sage-grouse seasonal habitats be of self-supporting solid steel construction instead of lattice (Section 2.4.6.1) is required, they would add cumulatively to the risk of mortality of others in the analysis area. The proposed project, with its wind turbines, meteorological towers, and transmission line, would add cumulatively to the impacts of other meteorological towers, communication towers and transmission lines existing and/or proposed within the analysis area.

Livestock Grazing

Livestock grazing in the early 1900s was not regulated, and subsequent grazing resulted in changes to vegetation communities (BLM, 2007). Livestock grazing can change vegetative composition from deep rooted perennials to shallow rooted plants, and can contribute to wildlife habitat degradation as a result of reducing vegetative cover, litter, and altering plant composition (Holechek, Pieper, & Herbel, 2001). Livestock grazing (cattle) occurs within the analysis area. Fences associated with pastures can cause mortality of sage-grouse due to direct collisions or indirectly by increasing predation rates by increasing the number of perches for raptors (Connelly et al., 2004). Sage-grouse mortality resulting from barbed-wire fence collisions has been documented by Idaho Department of Fish and Game (IDFG) and BLM employees in the Jarbidge Field Office, some within the China Mountain Area (IDFG, 2009). The higher elevation habitats at China Mountain are generally high quality. This is a product of stable rocky ground surfaces that can tolerate livestock hoof action better than deeper soils, shallow soils producing limited forage value, and steeper slopes inaccessible to livestock. The project area exists in these higher elevation habitats and degradation of the site is not apparent. Therefore, disturbance associated with the wind facility would not have a discernable additive effect to livestock grazing effects on sage-grouse in the cumulative effects analysis area. Further, since the small amount of fencing associated with the project would be chain link, it is not anticipated to add cumulatively to the effect of wildlife collisions with fences.

Recreation

Recreation activities in the analysis area include hunting, fishing, OHV travel, pleasure driving, and camping. Recreation activities can affect sage-grouse habitats by removing and degrading vegetation, aiding noxious and invasive weed establishment, and increasing wildfire ignition sources. They can also result in the displacement of sage-grouse. The primary displacement impact of both motorized and non-motorized recreation activities is temporarily flushing sage-grouse. The grouse likely return to the area after the recreation activity ceases. However, if nesting birds are flushed, it could affect nest success or survival of juvenile sage-grouse. The risk of impacts on birds would increase with repeated disturbance events.

The increase in road density and improvement in current road conditions (from road reconstruction) in the project area as a result of implementing one of the proposed alternatives would likely increase use of the area (Section 4.4.2) by standard and all terrain vehicles (high clearance vehicles and OHVs). Recreational use of the project area could occur year-round due to winter-plowing and on-going maintenance of the roads. Increased access during winter months could result in increased or new use of the project area for winter recreation, such as snowmobiling and cross-country skiing. Reconstructed roads could also result in increased use of the area by hunters, unless the hunters were seeking out areas of more solitude. Increased human access to the project area, and resulting noise produced by road use and other recreation activities, would disturb sage-grouse using the project area. This disturbance could result in avoidance behavior, physiological stress, disruption of breeding activities, displacement, and interference with auditory cues and communication (USFWS, 2008). If one of the southern inbound haul route options were chosen, the reconstruction of this road would facilitate access to the project area from the south and increase hunting pressure in Nevada (hunting

of sage-grouse in the Idaho portion of the project area in not permitted). Disturbance associated with development of the wind facility would add cumulatively to the impact of recreation on sage-grouse and their habitat in the analysis area.

Other Risks

West Nile virus has recently emerged as a regional concern for sage-grouse (Naugle et al., 2004). The virus has been implicated in sage-grouse mortality in some areas of Idaho, including western Owyhee County. Idaho documented eleven cases of the disease in 2006, seven of which were on the Duck Valley Indian Reservation (Gossett, 2008). Sage-grouse mortality associated with West Nile virus has not been documented at China Mountain or within the cumulative effect analysis area. However, the potential for presence of the virus in the analysis area exists and it is possible that birds have been affected but not detected. If the proposed project results in increased mortality from avian predation or collision with transmission lines or turbines, this would add cumulatively to mortality from the West Nile virus in the range of the greater sage-grouse.

Alternative A – No Action Alternative

The No Action Alternative in combination with the present and future actions listed in Table 4.0.2-1 and past, ongoing, and future wildfires, spread of invasive plant species, livestock grazing (including fencing), and recreation could result in continued impacts on sage-grouse habitat and risks to sage-grouse populations.

Alternative B1 – Proposed Action

Acres of key and R1 sage-grouse habitat and seasonal habitat removed, acres of habitat potentially avoided, and number of leks disturbed would increase through implementation of the proposed project. These impacts would add cumulatively to the impacts of past, present, and future wildfires, livestock grazing, recreation, invasive species, and infrastructure projects (Table 4.0.2-1) on sage-grouse. The proposed RMP amendment lifting seasonal restrictions in sage-grouse habitat for construction, major maintenance, and decommissioning could result in direct and indirect impacts on sage-grouse and their habitat during all stages of the project. Given the importance and quality of the habitat in and in the vicinity of the project area to sage-grouse, impacts could have a major long-term adverse effect on sage-grouse populations, contributing to further population declines, with implications beyond the analysis area.

Alternative B2a

Cumulative impacts would be similar to Alternative B1. During operation of only Phase I, direct impacts on sage-grouse habitat would be less, but indirect impacts through behavioral avoidance would be similar. A second pulse of disturbance would occur during construction of Phase II which could result in additional impacts on sage-grouse. Given the project assumptions, habitat potentially avoided after development of both phases would be about the same as Alternative B1.

Alternatives B2b and B2c

Cumulative impacts would be similar to Alternative B2a. However, the exception language written into the 1987 RMP amendment and the retention of seasonal restrictions during emergency maintenance would provide more protection to seasonal sage-grouse use of the project area and vicinity during construction, O&M, and decommissioning. A second pulse of disturbance would occur during construction of Phase II, which could result in additional impacts on sage-grouse.

Alternatives C, D, and F

Cumulative impacts would be similar to Alternative B1. However, there would be fewer acres of sage-grouse habitat removed. Given the project assumptions, habitat potentially avoided would be about the same as Alternative B1. The exception language written into the 1987 RMP amendment and the retention of seasonal restrictions during emergency maintenance would provide more protection to seasonal sage-grouse use of the project area and vicinity during construction, O&M, and decommissioning.

Alternative E

Cumulative impacts would be similar to Alternative B1. However, there would be fewer acres of sage-grouse habitat removed. Given the project assumptions, habitat potentially avoided would be about the same as Alternative B1. Since there would be no amendments to the 1987 Jarbidge RMP, timing limitations near sage-grouse breeding grounds and other seasonal habitats would apply during construction, major maintenance, and decommissioning and therefore, disturbance to sage-grouse during critical seasons would be reduced.

Sharp-Tailed Grouse

The analysis area for sharp-tailed grouse is the area within the expected use area for this species that falls within 4 miles of project disturbance areas and haul routes. The expected use area was identified by IDFG telemetry data. The 4-mile buffer corresponds to the avoidance distance recommended for placement of wind turbines near sharp-tailed leks under current BLM guidance (BLM, 2010). Impacts on winter habitat within the 4-mile buffer are evaluated to identify potential impacts on sharp-tailed grouse.

The indicators for impacts on sharp-tailed grouse are:

- Number of sharp-tailed grouse leks.
- Acres of winter habitat removed and avoided.

Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

There would be no sharp-tailed grouse habitat impacted by wind turbines within 4 miles of the China Mountain area since a ROW would not be granted for development. Since no vegetation removal would occur, there would be no reduction in habitats of sharp-tailed grouse. Sharp-tailed grouse and

their habitats would continue to be managed by IDFG and BLM under existing conditions, as described in Section 3.2.2.3. No changes to sharp-tailed grouse populations associated with a wind energy facility are expected to occur as a result of the No Action Alternative.

Impacts Common to All Action Alternatives

Construction

Construction of the wind facility would lead to moderate long-term adverse impacts through the direct loss of winter habitat and fragmentation of sharp-tailed grouse habitat, and the potential degradation of habitat through the spread of non-native and invasive plants. Human presence, noise, and use of the roads by vehicles during construction would disturb grouse in the area, leading to minor short-term adverse impacts through changes in behavior that result in avoidance of otherwise suitable habitat. Use of roads would also create a collision risk with vehicles.

Application of the seasonal restrictions in sharp-tailed grouse winter habitat or brood-rearing areas as defined by Nevada Department of Wildlife (NDOW) and required in the 1985 Wells RMP (Appendix 2A) would reduce some of the potential impacts of construction in the Nevada portion of the analysis area.

Operation and Maintenance

Noise from the operating turbines and visual disturbances such as shadow flicker (see sage-grouse analysis), would result in moderate long-term adverse impacts on sharp-tailed grouse through behavioral avoidance of the project area. Occasional noise and presence of humans and vehicles during routine and major maintenance activities would have similar impacts and reinforce the behavioral avoidance. Application of the seasonal restrictions in sharp-tailed grouse winter habitat or brood-rearing areas as defined by NDOW and required in the 1985 Wells RMP (Appendix 2A) would reduce some of the potential impacts of maintenance in the Nevada portion of the analysis area.

All other impacts of operation and maintenance on sharp-tailed grouse would be indirect. Operation of the transmission line would pose a risk of collision and electrocution, would create a barrier to movement, and could lead to avoidance. The fragmentation of otherwise suitable habitat could lead to diminished populations within the region. If flight diverters are required on power lines as a result of the stipulations for sage-grouse (Appendix 2A), a reduction in collision risk could occur. Electrocution hazards would also be minimized through design features that discourage perching near areas of concern (Appendix 2A). Operation of the transmission line and meteorological towers would increase the rate of predation by providing raptor perching opportunities. Design features for powerlines and meteorological towers (Appendix 2A) would require placement of perch deterrents on components that would allow perching or nest building. This would minimize the potential for raptors perching or nesting on tower components and subsequently would reduce avian predation. If mitigation recommending that permanent meteorological towers near greater sage-grouse seasonal habitats be of self-supporting solid steel construction instead of lattice (Section 2.4.6.1) were required, then the potential for raptors perching or nesting on meteorological towers would be minimized and subsequently avian predation would be reduced.

Decommissioning

Human presence, noise, and use of the roads by vehicles during decommissioning of the wind facility would disturb sharp-tailed grouse that continue to use the area, leading to minor short-term adverse impacts through changes in behavior and potential avoidance of habitat. Once the project area is reclaimed, vegetation groups have become reestablished, and suitable cover has developed, the project area would be suitable for sharp-tailed grouse.

Application of the seasonal restrictions in sharp-tailed grouse winter habitat or brood-rearing areas as defined by NDOW and required in the 1985 Wells RMP (Appendix 2A) could reduce some of the potential impacts of decommissioning in the Nevada portion of the analysis area.

Alternative B1 (Proposed Action)

Within the analysis area there are no sharp-tailed grouse leks; therefore, none are expected to be directly impacted by O&M of the wind facility. However, telemetry data from IDFG shows use of the project area, so individuals using the analysis area would be impacted. The project area contains winter habitat for sharp-tailed grouse, which is considered to occur within the mountain brush or woodland vegetation group. Direct disturbance of 68 acres of winter habitat during construction would result in a minor long-term adverse impact on wintering habitat for sharp-tailed grouse. Behavioral avoidance of construction activities, O&M, and decommissioning activities within the analysis area would result in a moderate to major long-term adverse impact on up to 18,470 acres of sharp-tailed grouse winter habitat.

Amendment of the 1987 Jarbidge RMP to lift the no occupancy restrictions applicable to sharp-tailed grouse breeding grounds, nesting/brood-rearing habitat, and winter range (Section 2.7.3.3) would allow for the construction, O&M, and decommissioning of the wind energy facility within sharp-tailed grouse habitats. This would result in direct and indirect impacts on sharp-tailed grouse through disturbance in and avoidance of winter habitat. Since no leks exist within 4 miles of the analysis area, this amendment would not impact lek attendance.

Alternative B2a

Types of impacts on sharp-tailed grouse during construction, O&M, and decommissioning of Phase I would be similar to those discussed for Alternative B1. Direct disturbance to 57 acres of winter habitat under Phase I would result in a minor long-term adverse impact on wintering habitat for sharp-tailed grouse. Avoidance within the analysis area during Phase I would result in long-term adverse impacts on up to 11,440 acres sharp-tailed grouse winter habitat. Phase II construction, O&M, and decommissioning would result in similar impacts on an additional 11 acres through surface disturbing activities and through avoidance of an additional 7,040 acres. Phase I and Phase II combined would result in direct disturbance and behavioral avoidance of sharp-tailed grouse winter habitat as described for Alternative B1. The effects of the 1987 Jarbidge RMP amendments would be the same as described for Alternative B1.

Alternative B2b

Types of impacts on sharp-tailed grouse during construction, O&M, and decommissioning of Phase I would be similar to those discussed for Alternative B1. Direct disturbance to 34 acres of winter habitat would result in a minor long-term adverse impact on wintering habitat for sharp-tailed grouse. Avoidance within the analysis area would result in long-term adverse impacts on up to 18,320 acres sharp-tailed grouse winter habitat. Phase II construction, O&M, and decommissioning would result in similar impacts on an additional 34 acres through surface disturbing activities and through avoidance of an additional 150 acres. Phase I and Phase II combined would result in direct disturbance and behavioral avoidance of sharp-tailed grouse winter habitat as described for Alternative B1.

The special status animals and crucial wildlife habitat stipulations in the 1987 Jarbidge RMP would be retained for construction and decommissioning, but some exceptions to the stipulations could be granted (Section 2.9.3.2). This would result in fewer impacts on sharp-tailed grouse than under Alternative B1, as exceptions would likely only be granted when adverse impacts would not occur to sharp-tailed grouse. Since no leks exist within 4 miles of the analysis area, this amendment would not impact current lek attendance. Seasonal restrictions for major maintenance would be retained throughout O&M of the project, which would prevent disturbance within important seasonal habitat during these activities.

Alternative B2c

Types of impacts on sharp-tailed grouse during construction, O&M, and decommissioning of Phase I would be similar to those discussed for Alternative B1. Direct disturbance to 41 acres of winter habitat would result in a minor long-term adverse impact on wintering habitat for sharp-tailed grouse. Avoidance within the analysis area would result in long-term adverse impacts on up to 17,495 acres of sharp-tailed grouse winter habitat. Phase II construction, O&M, and decommissioning would result in similar impacts on an additional 27 acres through surface disturbing activities and through avoidance of an additional 975 acres. Phase I and Phase II combined would result in direct disturbance and behavioral avoidance of sharp-tailed grouse winter habitat as described for Alternative B1. The impacts from the 1987 Jarbidge RMP amendments would be the same as described for Alternative B2b.

Alternative C

Impacts on sharp-tailed grouse winter habitat would be the same as Alternative B1, with the exception that the RMP amendments would differ. The effect of the 1987 Jarbidge RMP amendments would be the same as described for Alternative B2b. No Sharp-tailed grouse leks would be impacted.

Alternative D

Types of impacts on sharp-tailed grouse during construction, O&M, and decommissioning would be similar to those discussed for Alternative B1. Direct disturbance to 52 acres of winter habitat would result in a minor long-term adverse impact on wintering habitat for sharp-tailed grouse. Avoidance

within the analysis area would be the same as described for Alternative B1. The effect of the 1987 Jarbidge RMP amendments would be the same as described for Alternative B2b.

Alternative E

Types of impacts on sharp-tailed grouse during construction, O&M, and decommissioning would be similar to those discussed for Alternative B1. Direct disturbance to 33 acres of winter habitat would result in a minor long-term adverse impact on wintering habitat for sharp-tailed grouse. Avoidance within the analysis area would be the same as described for Alternative B1. Adherence to the 1987 Jarbidge RMP stipulations would decrease adverse impacts on sharp-tailed grouse during construction, O&M, and decommissioning.

Alternative F

Types of impacts on sharp-tailed grouse during construction, O&M, and decommissioning would be similar to those discussed for Alternative B1. Direct disturbance to 36 acres of winter habitat would result in a minor long-term adverse impact on wintering habitat for sharp-tailed grouse. Avoidance within the analysis area would be the same as described for Alternative B1. The effect of the 1987 Jarbidge RMP amendments would be the same as described for Alternative B2b.

Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Types of impacts on sharp-tailed grouse associated with the reconstruction and use of the northern inbound haul route would be similar to those described for sage-grouse. Two sharp-tailed grouse leks are within 4 miles of the northern inbound haul route. Impacts on these leks would be similar to those described for sage-grouse leks. In general, a major increase in traffic during construction and decommissioning would result in moderate to major short-term adverse impacts on sharp-tailed grouse attending these leks during the breeding season.

Southern Inbound Haul Route Option 1 and Option 2

Types of impacts on sharp-tailed grouse habitat associated with the construction, reconstruction, and use of the southern inbound haul routes would be similar to those described for sage-grouse. The southern inbound haul routes would not directly impact sharp-tailed grouse winter habitat. Avoidance within the analysis area would result in long-term adverse impacts on up to 1,362 acres of sharp-tailed grouse winter habitat for option 1 and 1,366 acres for option 2. No sharp-tailed grouse leks occur within 4 miles of the southern inbound haul route options; therefore, no impacts to grouse at leks would result.

Outbound Haul Route

Types of impacts on sharp-tailed grouse associated with the use of the outbound haul route would be similar to those described for sage-grouse. Two sharp-tailed grouse leks are within 4 miles of the outbound haul route. Impacts on these leks would be similar to those described for the northern inbound haul route.

Project as a Whole

Table 4.2.2-50 shows direct and indirect impacts on sharp-tailed winter habitat and the number of sharp-tailed leks within a 4-mile buffer of the project disturbance area and the inbound haul routes. There are no differences between the inbound haul routes and their direct or indirect impacts on sharp-tailed grouse winter habitat. However, the northern inbound haul route would impact two sharp-tailed leks and the southern inbound haul route options would impact none. Alternative E with either of the southern inbound haul route options would result in the fewest direct impacts on sharp-tailed grouse winter habitat and sharp-tailed grouse leks. Alternative B1 or any of the phased alternatives in conjunction with the northern inbound haul route would have the greatest impact on sharp-tailed grouse winter habitat and leks.

Table 4.2.2-50. Impact Summary Table for Project as a Whole – Sharp-tailed Grouse Winter Habitat and Leks.

	Alt A	Alt B1	Alt B2a PI/PII (I + II)	Alt B2b PI/PII (I + II)	Alt B2c PI/PII (I + II)	Alt C	Alt D	Alt E	Alt F
Project Area									
Acres Winter Habitat Removed	0	68	57/11 (68)	34/34 (68)	41/27 (68)	68	52	33	36
Acres Winter Habitat Avoided	0	18,470	11,440/7,040 (18,470)	18,320/150 (18,470)	17,495/975 (18,470)	18,470	18,470	18,470	18,470
Leks Impacted	0	0	0	0	0	0	0	0	0
Project with Northern Inbound Haul Route									
Acres Winter Habitat Removed	0	68	57/11 (68)	34/34 (68)	41/27 (68)	68	52	33	36
Acres Winter Habitat Avoided	0	18,470	11,440/7,040 (18,470)	18,320/150 (18,470)	17,495/975 (18,470)	18,470	18,470	18,470	18,470
Leks Impacted	0	2	2	2	2	2	2	2	2
Project with Southern Inbound Haul Route Option 1									
Acres Winter Habitat Removed	0	68	57/11 (68)	34/34 (68)	41/27 (68)	68	52	33	36
Acres Winter Habitat Avoided	0	18,470	11,440/7,040 (18,470)	18,320/150 (18,470)	17,495/975 (18,470)	18,470	18,470	18,470	18,470
Leks Impacted	0	0	0	0	0	0	0	0	0

Table 4.2.2-50. Impact Summary Table for Project as a Whole – Sharp-tailed Grouse Winter Habitat and Leks (continued).

	Alt A	Alt B1	Alt B2a PI/PII (I + II)	Alt B2b PI/PII (I + II)	Alt B2c PI/PII (I + II)	Alt C	Alt D	Alt E	Alt F
Project with Southern Inbound Haul Route Option 2									
Acres Winter Habitat Removed	0	68	57/11 (68)	34/34 (68)	41/27 (68)	68	52	33	36
Acres Winter Habitat Avoided	0	18,470	11,440/7,040 (18,470)	18,320/150 (18,470)	17,495/975 (18,470)	18,470	18,470	18,470	18,470
Leks Impacted	0	0	0	0	0	0	0	0	0

Cumulative Impacts

The primary threats to sharp-tailed grouse are the same as those described for sage-grouse. The cumulative effects analysis area for sharp-tailed grouse is an approximately 993,000-acre area that includes known use areas of sharp-tailed grouse populations. It includes the entire project area and lands to the north of the project area. A total of seven occupied and one undetermined sharp-tailed grouse leks are within the cumulative impact analysis area. Past, present, and future projects by removing, degrading, and fragmenting seasonal habitat, leading to avoidance of otherwise suitable habitat, and posing the risk of collision, electrocution, and predation described in Table 4.0.2-1 that are within the analysis area could impact sharp-tailed grouse. These include the Salmon Falls Dam to Wells 138 kV, Midpoint to Humboldt 345 kV, and the proposed SWIP 500 kV transmission lines, the Salmon Butte, Stateline, and Jackpot North communication towers, and various aboveground facilities.

Alternative A (No Action Alternative)

The No Action Alternative in combination with the present and future actions described in Table 4.0.2-1 and past and ongoing spread of invasive plant species, recreation, wildfires, and livestock grazing would result in continued impacts on sharp-tailed grouse habitat and risks to sharp-tailed grouse populations within the analysis area.

All Action Alternatives

Removal and avoidance of winter habitat and other seasonal habitat for sharp-tailed grouse from the wind energy facility would add cumulatively to impacts from past, present, and future actions that have resulted in diminished habitat quality and quantity. Removal of winter habitat would add minor long-term adverse cumulative impacts, while potential avoidance of winter habitat would result in moderate long-term adverse cumulative impacts on sharp-tailed grouse within the analysis area. Increased noise and visual disturbances during the life of the project would add cumulatively to impacts described from other sources and result in moderate to major impacts on the sharp-tailed grouse reintroduction efforts in the Shoshone Basin and House Creek areas.

Raptors

Special status raptors are addressed above in Section 4.2.2.2, *Migratory Birds.*

Passerines and Other Birds

Special status passerines and other non-raptor bird species are addressed above in Section 4.2.2.2, *Migratory Birds.*

Bats

The analysis area for bats includes the project area and haul routes. Assumptions for this analysis are listed in Section 4.2.1.1

The indicators for impacts on bats are:

- Estimated fatality of bats in rotor swept area.

In addition to this quantitative indicator, the effect of blasting and habitat removal on bats is qualitatively evaluated.

Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

There would be no bat fatalities associated with wind turbines in the China Mountain area since a wind energy facility would not be developed. Likewise, since there would be no vegetation removal, there would be no associated reduction in insect prey base.

Impacts Common to All Action Alternatives

Construction

Construction of the wind facility would result in fatality of bats if rocky breaks containing roosting bats are removed. Since the presence and number of roosting bats are unknown, impacts are reported in terms of acres of breaks (rock outcrops and cliff faces) permanently disturbed. Approximately 0.5 acre of breaks would be permanently disturbed during construction along the road corridor under the transmission line for all alternatives. If roosting bats are present in these breaks at the time of construction, then bats would potentially be killed. Since this potential impact would be the same across all alternatives, it is not discussed further. A mitigation measure is recommended that would require avoidance of breaks when building the transmission line road (Section 2.4.6.1). If this mitigation were applied, then no fatality of bats would be expected during construction of the project.

There would be a minor reduction of foraging habitat commensurate with the reduction of vegetation and associated insects at the project site. The use of blasting during construction would result in localized ground-borne vibrations in the project area. Depending on proximity to rock outcrops and cliff faces and size of the charge, blasting could potentially cause temporary disturbance to roosting bats or long-term or permanent damage to bat roost sites. Impacts on the insect prey base for bats are

not quantified for each alternative since impacts on vegetation are described in Section 4.2.1.2. Since the location and amount of blasting required is not known by alternative, the potential impact of blasting to bat habitat is not described further by alternative.

Operation and Maintenance

Recent studies have recorded fatalities of bats at utility-scale wind facilities in North America. Bat species consistently affected are long-distance migratory, foliage and tree-roosting species, including hoary bats, silver-haired bats, and eastern red bats (*Lasionycteris borealis*), the first two of which have been documented in the project area in low numbers. In a synthesis of 21 studies at 19 wind facilities in the United States and Canada, hoary bats constituted about half of bat fatalities. Highest bat fatalities have been recorded during late summer and early fall, which coincides with bat southward migration patterns. Fatalities of summer resident species, including little brown bats and big brown bats usually were low in these studies (0 to 13.5%), except at two sites where little brown bats made up nearly 25 percent of the fatalities (Arnett et al., 2008). Based on these studies and the species recorded in the project area, it can be expected that the hoary bats, silver-haired bats, little brown bats and big brown bats would be directly impacted by operation of the proposed wind energy facility during late summer and early fall, with the majority of fatalities being of the migratory species.

Several hypotheses propose that bats are attracted to wind turbines (Cryan & Barclay, 2009) and bats have been observed feeding and foraging around and in the rotor-swept zone of the turbines as well as landing on and investigating motionless and moving turbine blades and monopoles (Horn et al, 2008). Bats may be killed directly by moving turbine blades or possibly by colliding with stationary turbine structures such as the monopole (Horn et al., 2008). It has also been hypothesized that bats are killed after being exposed to rapid pressure changes near the trailing edges and tips of moving rotor blades. Evidence for this has been seen in bats found below turbines with internal injuries, consistent with rapid decompression or barotraumas, of body cavities (Baerwald et al., 2009).

Bat fatality rates are affected by tower height and wind speed. Barclay et al. (2007) found that bat fatalities increased with increasing tower height. Turbines proposed for this project area would be approximately 262 feet high, and up to 427 feet high combined with the rotor blade, which is in the higher range of manufactured turbines thus making bats more susceptible to collision with rotor blades. Kerns et al. (2005) found that more bats were killed on low-wind nights where the rotor blades were still moving. The latter indicates the potential for modification of wind turbine operations to reduce the number of fatalities. Experiments conducted by Baerwald et al. (2009) and Arnett et al. (2009) showed that by altering when turbine rotors begin turning in low winds (cut-in speed), blades were near motionless in low wind speeds which resulted in significant reduction of bat fatalities (greater than 50%). A 52 percent reduction in fatalities was reported by Baerwald et al. (2009) when turbine cut-in speed was changed to 18 feet per second (5.5 meters/sec), and a 53 to 87 percent reduction in fatalities was reported by Arnett et al. (2009) when turbine cut-in speed was changed to between 16.4 and 21.3 feet per second (5 and 6.5 meters/sec).

Quantifying the number of expected bat fatalities for this project is difficult because the risk to bats from wind turbines is unequal between bat species and seasons, because the number and exact composition of species in the analysis area is unknown, and there are no wind facilities operating in a similar ecosystem that have available bat fatality data to make comparisons. Therefore, bat fatality estimates for this project are based on post-construction fatality monitoring data from 12 wind facilities in southeastern Washington and northeastern Oregon in the Columbia Plateau Ecoregion. Bat mortality estimates at these facilities averaged 1.20 bats per MW per year at a range of 0.23 to 2.46 bats per MW per year (Johnson & Erickson, 2010). There has been argument, however, over the methods used to determine fatality estimates and there is evidence that some of the reported estimates are underestimated (Smallwood, 2007; Huso, 2010). The majority of the fatalities were to hoary bats and silver-haired bats; other mortalities consisted of big brown bats, little brown bats, and unidentified bats. A similar range of fatalities and composition of species reported at these facilities are estimated for this project and used to compare impacts by alternatives. Given that the numbers of hoary bats and silver-haired bats reported in the project area are low and that they were more abundant from late June to mid-July (Young et al., 2009), prior to the fall migration period where these bat species are typically affected, the projected risk of mortality to these species would be low. It is assumed for the analysis that the rate of bat fatality would be the same across the entire project area. Although 29 percent of bat passes recorded were in the northern portion of the project area, we do not know if they were long-distant migrant species or resident *Myotis* species. Given the presence of a known roost near this high use area, it can be predicted that a portion of these were long-legged myotis, which are not as susceptible to wind turbine fatality when compared to the long-distance migrants.

If the proposed mitigation altering the cut-in speed of turbine rotors from dusk to dawn between late summer and early fall were implemented for either action alternative (Section 2.4.6.1), the potential for fatalities during the bat migration season would be reduced by 50 percent or greater (Arnett et al., 2009; Baerwald et al., 2009).

An Avian and Bat Protection Plan would be prepared by the Applicants and implemented for this project. This plan would include design features or mitigation designed to protect bat species. Since the plan is not yet prepared, it is not known what the effectiveness of this plan would be in reducing impacts on bats.

Decommissioning

Decommissioning would not result in direct impacts on bats because turbines would no longer be operational and rock outcrops and cliff faces would not be removed. Based on the assumption that blasting would not be used during decommissioning, indirect impacts on roosting bats or roost sites would not occur. Long-term reclamation of vegetation communities after decommissioning would restore the insect forage base. Since these impacts cannot be quantified and are not related to the bat analysis indicator – fatality – impacts of decommissioning on bats are not discussed further.

Alternative B1 (Proposed Action)

Based on the post-construction bat fatality estimates at the 12 wind facilities in the Columbia Plateau Ecoregion (Johnson & Erickson, 2010) and the 340 MW project capacity, the range of bat fatalities that would be expected during O&M under Alternative B1 would be 78 to 836 per year over a 30 year period.

Alternative B2a

The range of bat fatalities that would be expected during O&M of Phase I of Alternative B2a would be 46 to 492 per year at a capacity of 200 MW for 30 years. The range of bat fatalities that would be expected during O&M of Phase II of Alternative B2a, which would be operational during year 10 of the ROW grant, would be 32 to 344 per year at a capacity of 140 MW for 20 years. Collectively, for the last 20 years of operation, the range of bat fatalities that would be expected when both phases were operating would be 78 to 836 bat fatalities per year, as under Alternative B1. Operation of both phases of the project would result in less bat fatalities over the 30 year ROW grant than Alternative B1, since fewer turbines would be operating for the first 10 years.

Alternative B2b

The range of bat fatalities that would be expected during O&M for both phases of Alternative B2b would be the same as described for Alternative B2a since the rate of fatalities is assumed to be the same across the project area.

Alternative B2c

The range of bat fatalities that would be expected during O&M for both phases of Alternative B2c would be the same as described for Alternative B2a since the rate of fatalities is assumed to be the same across the project area.

Alternative C

The range of bat fatalities that would be expected during O&M for Alternative C at a project capacity of 304 MW would be 70 to 748 per year over a 30 year period. Under this alternative, there would be no turbines located near the unnamed spring in the northern portion of the project area where high bat use and bat roosts were recorded. This could potentially reduce the number of expected fatalities, depending on the species present.

Alternative D

The range of bat fatalities that would be expected during O&M for Alternative D at a project capacity of 248 MW would be 57 to 610 per year over a 30 year period. Under this alternative, there would be no turbines located near the unnamed spring in the northern portion of the project area where high bat use and bat roosts were recorded. This could potentially reduce the number of expected fatalities, depending on the species present.

Alternative E

The range of bat fatalities that would be expected during O&M for Alternative E at a project capacity of 240 MW would be 55 to 590 per year over a 30 year period. Under this alternative, there would be no turbines located near the unnamed spring in the northern portion of the project area where high bat use and bat roosts were recorded. This could potentially reduce the number of expected fatalities, depending on the species present.

Alternative F

The range of bat fatalities that would be expected during O&M for Alternative F at a project capacity of 210 MW would be 48 to 517 per year over a 30 year period. Under this alternative, there would be no turbines located near the unnamed spring in the northern portion of the project area where high bat use and bat roosts were recorded. This could potentially reduce the number of expected fatalities, depending on the species present.

Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

The use and reconstruction of the northern inbound haul route would not result in any bat fatalities. Potential roost habitat would not be removed or disturbed due to the absence of rock outcrops, cliffs, or trees along this route. Removal of vegetation during construction would result in a slight reduction in the insect forage base. No bat fatalities from vehicle collisions would occur because all construction activities and associated hauling of materials would occur during the daylight hours.

Southern Inbound Haul Route Option 1

The construction, reconstruction, and use of southern inbound haul route option 1 would not result in any bat fatalities. Potential roost habitat would not be removed. If blasting were required during road construction and reconstruction, it could potentially cause temporary disturbance to roosting bats or long-term or permanent damage to bat roost sites. Removal of vegetation during construction would result in a slight reduction in the insect forage base. No bat fatalities from vehicle collisions would occur because all construction activities and associated hauling of materials would occur during the daylight hours.

Southern Inbound Haul Route Option 2

The construction and reconstruction of southern inbound haul route option 2 could result in bat fatalities due to the proposed permanent disturbance of 4 acres of breaks. If blasting were required during road construction and reconstruction, it could potentially cause temporary disturbance to roosting bats or long-term or permanent damage to bat roost sites. Removal of vegetation during construction would result in a slight reduction in the insect forage base. No bat fatalities from vehicle collisions would occur during use of this route because all construction activities and associated hauling of materials would occur during the daylight hours.

Outbound Haul Route

Use of the outbound haul route could cause the risk of fatalities from vehicle collision if trucks leaving the project site traveled on this road after dusk. However, bats typically do not flock to vehicle headlights, so this potential impact is considered negligible.

Project as a Whole

Table 4.2.2-51 displays the potential impacts of the project by alternative and by haul route based on the analysis indicator fatality. Under any of the action alternatives, operation of the wind facility would likely result in bat fatalities. Of all the action alternatives, Alternative B1 would result in the greatest potential for bat fatality during O&M and Alternative F would result in the lowest potential for bat fatality. Over the 30 year ROW grant period, the phased alternatives would result in slightly less bat fatalities than Alternative B1 since fewer turbines would be operating over the first 10 years. One-half acre of breaks would be permanently disturbed during construction for all alternatives, which could potentially result in additional fatalities. If the assumption that the rate of bat fatality is equal across the project area is incorrect, and fatalities end up being higher in the northern portion of the project area where high bat activity has been reported, then fatalities for Alternatives C, D, E, and F would be less than presented. No bat fatality would be associated with use and construction of the northern inbound haul route or option 1 of the southern inbound haul route. Option 2 of the southern inbound haul route would result in removal of potential roost habitat during construction, which, if roosting bats were present, could potentially result in fatalities.

Table 4.2.2-51. Impact Summary Table for Project as a Whole – Bats.

Alternative	Wind Energy Facility with the Either Haul Route
Alternative A: No Action	No Wind Energy Bat Fatalities.
Alternative B1	78 to 836 bat fatalities per year; 2,346 to 25,092 fatalities over 30 years
Alternative B2a, B2b, B2c	Phase I: 46 to 492 bat fatalities per year; Phase II: 32 to 344 fatalities per year. Phase I + II: 46 to 492 fatalities per year for first 10 years; 78 to 836 per year for the last 20 years; 2,024 to 21,648 fatalities over 30 years.
Alternative C	70 to 748 bat fatalities per year; 2,098 to 22,435 fatalities over 30 years.
Alternative D	57 to 610 bat fatalities per year; 1,711 to 18,302 fatalities over 30 years.
Alternative E	55 to 590 bat fatalities per year; 1,656 to 17,712 fatalities over 30 years.
Alternative F	48 to 517 bat fatalities per year; 1,449 to 15,498 fatalities over 30 years.
Northern inbound haul route	No breaks would be removed, no fatalities expected.
Southern inbound haul route option 1	No breaks would be removed, no fatalities expected.
Southern inbound haul route option 2	4 acres of breaks would be removed, if roosting bats present, fatalities could occur.

Cumulative Impacts

Cumulative impacts on bats consist of incremental effects of the alternatives when added to other past, present, and reasonably foreseeable future actions. These effects would occur over the duration of the 30-year ROW grant, resulting in incremental increases to bat fatality. The cumulative effects analysis area is a 50-mile radius around the project site. This area was chosen because it represents the greatest seasonal movement distance of big brown bats, a non-migrant species, between summer and winter roosts (Kurta & Baker, 1990). Note that this area would not encompass all potential cumulative impacts on long-distance migrant species. Of the past, present, and reasonably foreseeable actions described in Table 4.0.2-1, only operational and proposed wind energy facilities have the potential to add to the cumulative effects of the China Mountain wind project on bat fatality. These include Bell Rapids, Burley Butte, and Milner Butte wind facilities. In addition, Cotterel Mountain Wind Project has been approved approximately 70 miles from the project site. Future operation of the project, when added to the operation of these existing and proposed wind energy facilities, would result in an increased number of bat fatalities per year in this region. It is expected that additional wind facilities exist and would be built in the future within the range of the long-distance migrant species, which are the species most commonly affected by wind projects. Bat fatalities predicted from operation of the China Mountain project would add cumulatively to those existing and expected at other facilities.

Alternative A (No Action Alternative)

The No Action Alternative in combination with current and proposed wind energy facilities would not result in increases in bat fatalities. Bat fatalities associated with existing wind facilities would continue to occur at their current rate and bat fatalities at future wind facilities would add cumulatively to those from existing facilities.

Alternative B1 (Proposed Action)

Operation of 170 wind turbines at the China Mountain wind energy facility for 30 years would add cumulatively to the bat fatalities occurring and expected to occur at other current and future wind facilities in the analysis area by a total of 2,346 to 25,092 bat fatalities.

Alternative B2a, B2b, and B2c

Operation of wind turbines at the China Mountain wind energy facility for 30 years would add cumulatively to the bat fatalities occurring and expected to occur at other current and future wind facilities in the analysis area by a total of 2,024 to 21,648 bat fatalities. The total mortality would be slightly less than Alternative B1 since 100 rather than 170 turbines would be operating during the first 10 years.

Alternative C

Operation of 152 wind turbines at the China Mountain wind energy facility for 30 years would add cumulatively to the bat fatalities occurring and expected to occur at other current and future wind facilities in the analysis area by 2,098 to 22,435 bat fatalities.

Alternative D

Operation of 124 wind turbines at the China Mountain wind energy facility for 30 years would add cumulatively to the bat fatalities occurring and expected to occur at other current and future wind facilities in the analysis area by 1,711 to 18,302 bat fatalities.

Alternative E

Operation of 120 wind turbines at the China Mountain wind energy facility would add cumulatively to the bat fatalities occurring and expected to occur at other current and future wind facilities in the analysis area by 1,656 to 17,712 bat fatalities.

Alternative F

Operation of 105 wind turbines at the China Mountain wind energy facility would add cumulatively to the bat fatalities occurring and expected to occur at other current and future wind facilities in the analysis area by 1,449 to 15,498 bat fatalities.

Small Mammals

The analysis area for special status small mammals is the project disturbance area, including the haul routes. Impacts on small mammals from wind development are largely unknown (WGFD, 2010), but would primarily be associated with removal of habitat and compaction or removal of burrows.

The indicators for impacts on small mammals are:

- Acres of habitat removed.
- Miles of new transmission line that provides raptor perches.

Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

Since a ROW would not be granted for development, impacts on small mammals associated with habitat removal and predators on transmission lines would not occur. Habitat for sensitive small mammal species would continue to be managed by BLM under existing conditions, as described in Section 3.2.2.3. No changes to sensitive small mammal populations are expected to occur as a result of not building the proposed wind facility.

Impacts Common to All Action Alternatives

Construction

Impacts from construction would include loss of habitat from surface disturbance, including burrows and escape cover, destruction of burrows, fatalities from surface disturbance or vehicle-mammal collision, and avoidance of the project disturbance area because of associated construction noise (Section 4.1.5.2) and human presence. Impacts from habitat removal would result in long-term adverse impacts to special status small mammals. Stationary equipment and construction materials

could provide temporary perching opportunities for raptors. If raptors use this equipment for perching, it would result in small mammal fatalities from predation. The design feature requiring surveys for special status animals and the subsequent design of the project to avoid, minimize, or mitigate impacts to resources if found (Appendix 2A) would reduce the potential for impacts on special status small mammals in the analysis area.

Operation and Maintenance

Project features such as transmission lines (19 miles under each alternative), meteorological towers, and other elevated structures would provide increased perching opportunities for raptors. Use of these features by raptors would result in small mammal fatalities from predation during O&M of the wind facility. This would be a long-term adverse impact. Miles of transmission line would not vary by action alternative, and therefore, this indicator is not discussed for each action alternative. Design features for powerlines and meteorological towers (Appendix 2A) would require placement of perch deterrents on components that would allow perching or nest building. This would minimize the potential for raptors perching or nesting on tower components and subsequently would reduce small mammal fatalities from predation. If mitigation recommending that permanent meteorological towers near greater sage-grouse seasonal habitats be of self-supporting solid steel construction instead of lattice (Section 2.4.6.1) were required, then the potential for raptors perching on meteorological towers would be minimized and subsequently small mammal fatalities from predation at these locations would be reduced.

Additional impacts from O&M would include an increased potential for vehicle-mammal collisions. While studies are lacking, it is possible that ground-dwelling mammals would also be adversely impacted by shadow flicker created when the moving turbine blades cast shadows on the ground (WGFD, 2010). These shadows can resemble shadows of a soaring raptor and cause a flight response in small mammals, which would result in increased energy expenditure and interruptions in foraging and breeding behaviors.

Decommissioning

Impacts on small mammals from decommissioning would include direct impacts from injury or fatalities associated with vehicle-mammal collisions. Surface disturbing activities could result in destruction of burrow sites, which could displace small mammals into adjacent habitats resulting in increased competition for resources. Decommissioning activities could lead to short-term avoidance of the analysis areas due to noise. Decommissioning the project would result in minor long-term beneficial impacts on small mammals by improving habitat once the project area is reclaimed, vegetation groups have become reestablished, and suitable cover has developed. However, a total of 25 acres of permanent disturbance in shrubland and grassland vegetation groups would not be reclaimed. In addition, perching opportunities would be reduced once transmission lines and other elevated structures were removed.

Alternative B1 (Proposed Action)

Acres of surface disturbance from construction that would result in minor long-term adverse impacts on special status small mammal species are identified in Table 4.2.2-52.

Table 4.2.2-52. Acres of Impact on Small Mammal Habitat under Alternative B1.

Pygmy Rabbit	Piute and Wyoming Ground Squirrels	Pahranagat Valley Montane Vole	Preble's Shrew
190	741	20	810

Alternative B2a

Acres of surface disturbance from construction that would result in minor long-term adverse impacts on small mammal species are identified in Table 4.2.2-53. Surface disturbance for Phase I and Phase II combined would occur on the same number of acres as Alternative B1 and would result in minor long-term adverse impacts on all special status small mammals.

Table 4.2.2-53. Acres of Impact on Small Mammal Habitat under Alternative B2a.

Phase	Pygmy Rabbit	Piute and Wyoming Ground Squirrels	Pahranagat Valley Montane Vole	Preble's Shrew
Phase I	62	476	15	536
Phase II	128	265	5	274
Phase I + Phase II	190	741	20	810

Alternative B2b

Acres of surface disturbance from construction that would result in minor long-term adverse impacts on small mammal species are identified in Table 4.2.2-54. Surface disturbance for Phase I and Phase II combined would occur on the same number of acres as Alternative B1 and would result in minor long-term adverse impacts on all special status small mammals.

Table 4.2.2-54. Acres of Impact on Small Mammal Habitat under Alternative B2b.

Phase	Pygmy Rabbit	Piute and Wyoming Ground Squirrels	Pahranagat Valley Montane Vole	Preble's Shrew
Phase I	134	488	17	523
Phase II	66	253	3	287
Phase I + Phase II	190	741	20	810

Alternative B2c

Acres of surface disturbance from construction that would result in minor long-term adverse impact son small mammal species are identified in Table 4.2.2-55. Surface disturbance for Phase I and Phase

II combined would occur on the same number of acres as Alternative B1 and would result in minor long-term adverse impacts on all special status small mammals.

Table 4.2.2-55. Acres of Impact on Small Mammal Habitat under Alternative B2c.

Phase	Pygmy Rabbit	Piute and Wyoming Ground Squirrels	Pahranagat Valley Montane Vole	Preble's Shrew
Phase I	167	520	16	562
Phase II	23	221	4	248
Phase I + Phase II	190	741	20	810

Alternative C

Acres of surface disturbance from construction that would result in minor long-term adverse impact on special status small mammal species are identified in Table 4.2.2-56. Acres of surface disturbance for small mammal species would be less than those described for Alternative B1. This would result in a negligible to minor decrease in long-term adverse impacts on small mammals compared to Alternative B1.

Table 4.2.2-56. Acres of Impact on Small Mammal Habitat under Alternative C.

Pygmy Rabbit	Piute and Wyoming Ground Squirrels	Pahranagat Valley Montane Vole	Preble's Shrew
185	675	18	744

Alternative D

Acres of surface disturbance from construction that would result in minor long-term adverse impacts on small mammal species are identified in Table 4.2.2-57. Acres of surface disturbance for small mammal species would be less than those described for Alternative B1. This would result in a negligible decrease in long-term adverse impacts on the pygmy rabbit and a minor decrease in long-term adverse impacts on the Pahranagat Valley montane vole compared to Alternative B1. A moderate decrease in long-term adverse impacts on ground squirrels and Preble's shrew would occur compared to Alternative B1.

Table 4.2.2-57. Acres of Impact on Small Mammal Habitat under Alternative D.

Pygmy Rabbit	Piute and Wyoming Ground Squirrels	Pahranagat Valley Montane Vole	Preble's Shrew
185	576	18	629

Alternative E

Acres of surface disturbance from construction that would result in minor long-term adverse impacts on special status small mammal species are identified in Table 4.2.2-58. Acres of surface disturbance for small mammal species would be less than those described for Alternative B1. This would result in a negligible decrease in long-term adverse impacts on the pygmy rabbit and a minor decrease in long-term adverse impacts on the Pahranagat Valley montane vole compared to Alternative B1. A moderate decrease in long-term adverse impacts on ground squirrels and Preble's shrew would occur compared to Alternative B1.

Table 4.2.2-58. Acres of Impact on Small Mammal Habitat under Alternative E.

Pygmy Rabbit	Piute and Wyoming Ground Squirrels	Pahranagat Valley Montane Vole	Preble's Shrew
188	621	18	655

Alternative F

Acres of surface disturbance from construction that would result in minor long-term adverse impacts on special status small mammal species are identified in Table 4.2.2-59. Acres of surface disturbance for small mammal species would be less than for Alternative B1. This would result in a minor decrease in long-term adverse impacts on the Pahranagat Valley montane vole and pygmy rabbit compared to Alternative B1. A moderate decrease in long-term adverse impacts on ground squirrels and Preble's shrew would occur compared to Alternative B1.

Table 4.2.2-59. Acres of Impact on Small Mammal Habitat under Alternative F.

	Pygmy Rabbit	Piute and Wyoming Ground Squirrels	Pahranagat Valley Montane Vole	Preble's Shrew
Alternative F	176	505	17	542

Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route, Southern Inbound Haul Route Option 1 and Option 2

The reconstruction and use of the northern inbound haul route would create surface disturbing activities that would result in negligible to minor long-term adverse impacts on all special status small mammal species. These impacts would be related to the removal of foraging and burrowing habitats as well as the increased risk of injury or fatality from vehicle collisions associated with increased traffic.

Reconstruction and construction of the southern inbound haul route options and use during construction, major maintenance, and decommissioning of the project would create the same types of impacts as described for the northern inbound haul route. A comparison of acres of small mammal habitat impacted for each haul route is presented in Table 4.2.2-60.

Table 4.2.2-60. Acres of Impact on Small Mammal Habitat from the Inbound Haul Routes.

	Acres			
	Pygmy Rabbit	Piute and Wyoming Ground Squirrels	Pahranagat Valley Montane Vole	Preble's Shrew
Northern Inbound Haul Route	0	18	NA[1]	39
Southern Inbound Haul Route Option 1	1	86	22	86
Southern Inbound Haul Route Option 2	1	86	24	90

[1] NA = Not Applicable. The Pahranagat Valley montane vole is not known to occur in Idaho and therefore only the southern inbound haul route options in Nevada are considered to have potential habitat.

Outbound Haul Route

The use of the outbound haul route would have negligible to minor adverse impacts on small mammals from injuries and fatalities associated with vehicle collisions.

Project as a Whole

Table 4.2.2-61 shows impacts on habitats of special status small mammals for the project area and the project area with each of the inbound haul route options. Of the inbound haul routes, the northern inbound haul route would have the fewest long-term adverse impacts on small mammal habitat from surface disturbance. The difference in acres of habitat impacted by the two southern inbound haul route options would be negligible; both would result in similar long-term adverse impacts on small mammals.

Potential impacts from vehicle collisions would be greater for species occurring along the northern inbound haul route as it is a longer route. For all phased alternatives, impacts from project construction would occur a second time during and following construction of Phase II. Impacts would be similar to Phase I and include major increases in vehicle traffic, noise, and human disturbance. Impacts on small mammals would be greater under Alternative B1 or full build out of any of the phased alternatives. Alternative F in combination with the northern inbound haul route would have the fewest adverse impacts on small mammals.

Table 4.2.2-61. Impact Summary Table for Project as a Whole – Small Mammal Habitat.

	Acres of Habitat Impacted								
	Alt A	Alt B1	Alt B2a PI/PII (I + II)	Alt B2b PI/PII (I + II)	Alt B2c PI/PII (I + II)	Alt C	Alt D	Alt E	Alt F
Project Area									
Pygmy Rabbit	0	190	62/128 (190)	134/66 (190)	167/23 (190)	185	185	188	176
Ground Squirrels	0	741	476/265 (741)	488/253 (741)	520/221 (741)	675	576	621	505
Pahranagat Valley Montane Vole	0	20	15/5 (20)	17/3 (20)	16/4 (20)	18	18	18	17
Preble's Shrew	0	810	536/274 (810)	523/287 (810)	562/248 (810)	744	629	655	542
Project with Northern Inbound Haul Route									
Pygmy Rabbit	0	190	62/128 (190)	134/66 (190)	167/23 (190)	185	185	188	176
Ground Squirrels	0	759	494/265 (759)	506/253 (759)	538/221 (759)	693	594	639	523
Pahranagat Valley Montane Vole	0	20	15/5 (20)	17/3 (20)	16/4 (20)	18	18	18	17
Preble's Shrew	0	849	575/274 (849)	562/287 (849)	601/248 (849)	783	668	694	581
Project with Southern Inbound Haul Route Option 1									
Pygmy Rabbit	0	191	63/128 (191)	135/66 (191)	168/23 (191)	186	186	189	177
Ground Squirrels	0	827	562/265 (827)	574/253 (827)	606/221 (827)	761	662	707	591
Pahranagat Valley Montane Vole	0	42	37/5 (42)	39/3 (42)	38/4 (420	40	40	40	39
Preble's Shrew	0	896	622/274 (896)	609/287 (896)	648/248 (896)	830	715	741	628
Project with Southern Inbound Haul Route Option 2									
Pygmy Rabbit	0	191	63/128 (191)	135/66 (191)	168/23 (191)	186	186	189	177
Ground Squirrels	0	827	562/265 (827)	574/253 (827)	606/221 (827)	761	662	707	591
Pahranagat Valley Montane Vole	0	44	39/5 (44)	41/3 (44)	40/4 (44)	42	42	42	41
Preble's Shrew	0	900	626/274 (900)	613/287 (900)	652/248 (900)	834	719	745	632

Cumulative Impacts

Cumulative impacts on small mammals would consist of incremental effects of the alternatives when added to other past, present, and reasonably foreseeable future actions. These effects would occur over the duration of the 30-year ROW grant, resulting in incremental increases to habitat degradation. The cumulative effects analysis area includes the project area and haul routes.

Past, present, and future impacts on small mammals and their habitats include wildfire, paved and unpaved roads, future ROW authorizations, and livestock grazing. Future operation of the wind

project, when added to the impacts of these existing and future actions, would contribute to habitat degradation.

Alternative A (No Action Alternative)

The No Action Alternative in combination with ongoing and future land use could result in continued impacts on small mammals from habitat degradation and fatalities.

Alternative B1 (Proposed Action) and Phased Alternatives (B2a, B2b, and B2c)

Alternatives B1, B2a, B2b, and B2c would result in habitat degradation that would add cumulatively to the existing impacts. These alternatives would result in minor additions to the cumulative impacts on small mammals within the analysis area.

Alternatives C, D, and E

These alternatives would result in habitat degradation that would add cumulatively to the existing impacts. Alternatives C through E would result in fewer additions to the cumulative impacts on small mammals within the analysis area as compared to Alternative B1.

Alternatives F

Alternative F would result in habitat degradation that would add cumulatively to the existing impacts. Alternative F would result in the fewest additions to the cumulative impacts on small mammals within the analysis area as compared to all other action alternatives.

Reptiles

The analysis area for special status reptile species is the project disturbance area, including that along the haul routes.

The indicators for impacts on reptiles are:

- Acres of habitat removed.

Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

Since no surface disturbance would occur, there would be no reduction in habitats of short-horned lizards. Reptile habitats would continue to be managed by BLM under existing conditions, as described in Section 3.2.2.3.

Impacts Common to All Action Alternatives

Construction

Impacts on short-horned lizards from construction would include direct impacts from injury or fatalities associated with vehicle-reptile collisions. Increases in road density or traffic increase the risk

that wildlife would be killed or injured (direct impacts) and this is exacerbated for reptiles because of the attraction to road surfaces for thermoregulation (Andrews et al., 2008). Surface disturbing activities would remove habitat and result in long-term impacts on foraging, basking, and hibernation sites, which would displace short-horned lizards into adjacent habitats resulting in increased competition for resources. Stationary equipment and construction materials would provide temporary perching opportunities for raptors and could result in increased mortalities through predation on short-horned lizards. Additional indirect impacts from roads can extend outward from 328 feet to 0.5 miles (100 to 800 meters) and include increased risk of pollutants, noise, light, invasive species, and human access into the environment (Andrews et al., 2008).

Operation and Maintenance

Potential vehicle-reptile collisions would have the potential to impact reptiles, but at a lower rate than during construction and decommissioning as vehicle trips per day on project roads would be less. The 19 miles of transmission lines, meteorological towers, and other elevated structures proposed for each alternative would provide increased perching opportunities for raptors and could result in long-term adverse impacts on short-horned lizards through increased mortalities from predation. Design features for powerlines and meteorological towers (Appendix 2A) would require placement of perch deterrents on components that would allow perching or nest building. This would minimize the potential for raptors perching or nesting on tower components and subsequently would reduce fatalities of short-horned lizards from predation. If mitigation recommending that permanent meteorological towers near greater sage-grouse seasonal habitats be of self-supporting solid steel construction instead of lattice (Section 2.4.6.1) were required, then the potential for raptors perching on meteorological towers would be minimized and subsequently fatalities of short-horned lizards from predation at these locations would be reduced.

Decommissioning

Impacts on short-horned lizards from decommissioning activities would include direct impacts from injury or fatalities associated with vehicle-reptile collisions. Surface disturbing activities could result in long-term impacts on foraging, basking, and hibernation sites, which could displace short-horned lizards into adjacent habitats resulting in increased competition for resources. Decommissioning of the project would result in minor long-term beneficial impacts on short-horned lizards by improving habitat once the project area is reclaimed, vegetation groups have become reestablished, and suitable cover has developed. A total of 25 acres of permanent disturbance to short-horned lizard habitat would not be reclaimed. In addition, raptor perching opportunities would be reduced once transmission lines and other elevated structures were removed, which would result in a decrease in short-horned lizard mortalities associated with predation.

Alternative B1 (Proposed Action)

Construction would result in minor long-term adverse impacts on 741 acres of potential habitat for the short-horned lizard through surface disturbing activities.

Alternative B2a

Construction of Phase I would result in minor long-term adverse impacts on 476 acres of potential habitat for the short-horned lizard through ground disturbing activities. Construction of Phase II would result in additional minor long-term adverse impact on 265 acres. Phase I and Phase II combined would result in the same number of acres of long-term impacts as Alternative B1.

Alternative B2b

Construction of Phase I would result in minor long-term adverse impacts on 488 acres of potential habitat for the short-horned lizard through ground disturbing activities. Construction of Phase II would result in additional minor long-term adverse impact on 253 acres. Phase I and Phase II combined would result in the same number of acres of long-term impacts as Alternative B1.

Alternative B2c

Construction of Phase I would result in minor long-term adverse impacts on 520 acres of potential habitat for the short-horned lizard through ground disturbing activities. Construction of Phase II would result in additional minor long-term adverse impact on 221 acres. Phase I and Phase II combined would result in the same number of acres of long-term impacts as Alternative B1.

Alternative C

Construction would result in minor long-term adverse impacts on 675 acres of potential habitat for the short-horned lizard through surface disturbing activities. This is 66 fewer acres than Alternative B1.

Alternative D

Construction would result in minor long-term adverse impacts on 576 acres of potential habitat for the short-horned lizard through surface disturbing activities. This is 165 fewer acres than Alternative B1.

Alternative E

Construction would result in minor long-term adverse impacts on 621 acres of potential habitat for the short-horned lizard through surface disturbing activities. This is 120 fewer acres than Alternative B1.

Alternative F

Construction would result in minor long-term adverse impacts on 505 acres of potential habitat for the short-horned lizard through surface disturbing activities. This is 236 fewer acres than Alternative B1 and the fewest acres of disturbance to short-horned lizard potential habitat of all the alternatives.

Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route, Southern Inbound Haul Route Option 1 and Option 2

The northern inbound haul route would result in negligible long-term adverse impacts on short-horned lizards through surface disturbance of 18 acres of habitat. Both the southern inbound haul route options would result in negligible to minor long-term adverse impacts on short-horned lizards

through surface disturbance of 86 acres under option 1 and 90 acres under option 2. Increases in traffic on these routes, primarily during construction and decommissioning would increase the risk of vehicle-reptile collisions. Since the use of the southern haul route options are expected to increase due to improved access, risk of mortality from vehicles on these routes would also increase during O&M.

Outbound Haul Route

The use of the outbound haul route would have negligible adverse impacts on special status reptiles from injuries and fatalities associated with vehicle collisions.

Project as a Whole

Table 4.2.2-62 shows impacts on short-horned lizard habitat between alternatives in conjunction with each of the inbound haul route options. Of the inbound haul routes, the northern inbound haul route would have the fewest long-term adverse impacts on short-horned lizard habitat from surface disturbance. The two southern inbound haul route options would result in similar long-term adverse impacts on short-horned lizards.

Table 4.2.2-62. Impact Summary Table for Project as a Whole – Short-horned Lizard.

	Acres of Habitat Impacted								
	Alt A	Alt B1	Alt B2a PI/PII (I + II)	Alt B2b PI/PII (I + II)	Alt B2c PI/PII (I + II)	Alt C	Alt D	Alt E	Alt F
Project Area									
	0	741	476/265 (741)	488/253 (741)	520/221 (741)	675	576	621	505
Project with Northern Inbound Haul Route									
	0	759	494/265 (759)	506/253 (759)	538/221 (759)	693	594	639	523
Project with Southern Inbound Haul Route Option 1									
	0	827	562/265 (827)	574/253 (827)	606/221 (827)	761	662	707	591
Project with Southern Inbound Haul Route Option 2									
	0	831	566/265 (831)	578/253 (831)	610/221 (831)	765	666	711	595

Potential impacts from vehicle-reptile collisions would be greater for species occurring along the northern inbound haul route because it is longer route. For all phased alternatives, impacts from project construction would occur a second time following construction of and implementation of Phase II. Impacts would be similar to Phase I and include major increases in vehicle traffic, noise, and human disturbance. Acres of impacts on small mammals would be greatest under Alternative B1 or any of the phased alternatives; acres of impacts would be smallest under Alternative F.

Any of the phased alternatives combined with either of the southern inbound haul route options would have the greatest impact on short-horned lizards through habitat removal and two periods of construction disturbance. Alternative F with the northern inbound haul route would have the fewest adverse impacts on short-horned lizards.

Cumulative Impacts

Cumulative impacts on reptiles would consist of incremental effects of the alternatives when added to other past, present, and reasonably foreseeable future actions. These effects would occur over the duration of the 30-year ROW grant, resulting in incremental increases to habitat degradation. The cumulative effects analysis area includes the project area and haul routes.

Past, present, and future impacts on reptiles and their habitats would include wildfire, paved and unpaved roads, and future ROW authorizations. Future operation of the wind project, when added to the impacts of these existing and future actions, would contribute minor habitat degradation.

Alternative A (No Action Alternative)

The No Action Alternative in combination with ongoing and future land use could result in continued impacts on reptiles from habitat degradation and fatalities.

Alternative B1 (Proposed Action) and the Phased Alternatives (B2a, B2b, and B2c)

Alternatives B1, B2a, B2b, and B2c would result in habitat degradation that would add cumulatively to the existing impacts. These alternatives would result in negligible to minor additions to the cumulative impacts on short-horned lizards within the analysis area.

Alternatives C, D, and E

These alternatives would result in habitat degradation that would add cumulatively to the existing impacts. Alternatives C through E would result in fewer additions to the cumulative impacts on short-horned lizards within the analysis area as compared to Alternative B1.

Alternatives F

Alternative F would result in habitat degradation that would add cumulatively to the existing impacts. Alternative F would result in the fewest additions to the cumulative impacts on short-horned lizards within the analysis area as compared to all other alternatives.

Amphibians

The analysis area for special status amphibians includes all RHCAs in the project area and along the haul routes. Impacts on water quality described in Section 4.1.4 would directly impact amphibian species within these RHCAs. Design features and stipulations (Appendix 2A) that would reduce impacts on water quality would also reduce the risk of impacts on amphibian habitat.

The indicators for impacts on special status amphibians are:

- Number of road crossings over water features.
- Acres of RHCAs removed.

Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

Since a ROW would not be granted for development, impacts on special status amphibians associated with road development and increased predation would not occur. Amphibian habitat would continue to be managed under current BLM guidance.

Impacts Common to All Action Alternatives

Construction

Direct impacts on special status amphibians could include injury or mortality associated with construction activities such as vehicle-amphibian collisions, inadvertent burial or burrow destruction, and blasting. Indirect impacts would include habitat loss, fragmentation, and alteration that could influence behavior, survival, growth, and reproductive success (Jochimsen et al., 2004).

Long-term adverse impacts on habitat would occur through surface disturbing activities associated with construction. These impacts would result in loss of breeding and or foraging habitats within RHCAs. Construction equipment and material would provide increased perching opportunities for raptors and could result in adverse short-term impacts through an increased mortality rate.

Road construction and reconstruction are considered a severe threat to populations (Patla & Keinath, 2005) and would result in a moderate impact on amphibians in the project area. Amphibians migrating between breeding areas and upland terrestrial habitats are sensitive to fragmentation from roads because of the increased mortality and the increased resistance to movements because of the change in the landscape (Jochimsen et al., 2004). Proposed new roads and the increased traffic on current roads would likely contribute to injury and mortality as well as habitat fragmentation. Amphibians are also sensitive to the various toxic substances emitted from vehicles and those associated with road maintenance and weed control, which could alter reproduction and/or result in amphibian mortalities (Andrews et al., 2008). Amphibians could be exposed to these types of toxins during construction; however design features (Appendix 2A) would reduce the potential for these impacts. Construction and use of roads would also pose a risk of sediment delivery to amphibian habitat. However, use of BMPs (Appendix 2A) would reduce this risk. Construction of roads and other features in the project area would affect habitat for amphibian species through the manipulation of current hydrologic functions.

Operation and Maintenance

Impacts on special status amphibians from the use of roads by vehicles during O&M of the wind facility would be similar to those described for construction, but the amount and duration of use would differ. Although fewer vehicle trips per day would occur during O&M, project roads would be used regularly throughout the 30-year ROW grant. Vehicle use of roads crossing water features would pose a risk to amphibian habitat through the potential delivery of sediment, fuel, and petroleum products to water bodies, and would result in a long-term risk of amphibian mortality from vehicles.

The 19 miles of transmission lines, meteorological towers, and other elevated structures proposed for each alternative would provide increased perching opportunities for raptors and would result in long-term adverse impacts on amphibians through an increased mortality rate within the project area. Design features for powerlines and meteorological towers (Appendix 2A) would require placement of perch deterrents on components that would allow perching or nest building. This would minimize the potential for raptors perching or nesting on tower components and subsequently would reduce fatalities of amphibians from predation. If mitigation recommending that permanent meteorological towers near greater sage-grouse seasonal habitats be of self-supporting solid steel construction instead of lattice (Section 2.4.6.1) were required, then the potential for raptors perching on meteorological towers would be minimized and subsequently fatalities of amphibians from predation at these locations would be reduced.

Long-term impacts from construction associated with surface disturbances would continue to impact amphibians through habitat fragmentation during O&M. Information is lacking regarding the amphibian habitats and potential migration corridors within the project area. Therefore, indirect impacts cannot be quantified.

The only special status amphibian confirmed within the project area is the Columbia spotted frog and impacts from habitat fragmentation would be low to none. Columbia spotted frogs that migrate away from breeding ponds typically migrate short distances to other ponds or rivers, and frogs that are isolated (>3,280 feet) from other water bodies remain in breeding ponds (Bull, 2005). This would decrease the likelihood of long upland migrations out of Rocky Canyon and across project features. Beaver dams within Rocky Canyon provide year-round habitat for Columbia spotted frogs while similar habitats have been diminished within the project area due to failure of beaver dams. Rocky Canyon is approximately 300 feet below the level of project roads in a steep canyon environment, making it unlikely to be directly impacted by roads or indirectly impacted by habitat fragmentation. Impacts from sedimentation and runoff, if they were to occur, would have the greatest effect on the Rocky Canyon population of Columbia spotted frogs. Application of erosion control design features (Appendix 2A) would reduce the risk of sediment delivery and associated impacts.

Decommissioning

Decommissioning of the project would have impacts similar to those described for construction. Direct impacts, such as destruction of burrows and vehicle-amphibian collisions could occur during decommissioning activities. Revegetation of RHCAs would provide a minor long-term benefit to special status amphibian species.

Alternative B1 (Proposed Action)

A total of 14 existing roads that cross streams would be reconstructed to provide access to the project area. A total of 20 stream crossings would occur as a result of construction of new roads within the project area. Construction, reconstruction, and use of these roads would have minor adverse long-term impacts on water quality (Section 4.1.4) and Columbia spotted frog habitats within and adjacent to stream crossings through potential delivery of sediment, fuel, and petroleum products. A total of 20

acres of surface disturbance within RHCAs would result in minor long-term adverse impacts on amphibian habitat.

Through an amendment to the 1987 Jarbidge RMP (Section 2.5.3), this alternative would allow construction, maintenance, and decommissioning to take place within 500 feet of reservoirs, ponds, lakes, streams, wetlands, marshes, and riparian areas. There are ten locations where project features are proposed within 500 feet of streams. Impacts on one of the drainages are expected from construction of the site compound and/or northern O&M facility within an intermittent drainage. Special status amphibian species are not known and are not expected to occur in this drainage. If transmission line structures are placed within 500 feet of the unnamed intermittent tributary to North Fork Salmon Falls Creek, then potential impacts to habitat for the Columbia spotted frog could result. However, BMPs would be in place to minimize the potential for impact (Appendix 2A).

Alternative B2a

A total of 20 stream crossings would occur as a result of construction of new roads under Phase I. Phase II would not add any new stream crossings. Impacts from Phase I and Phase II stream crossings combined would be the same as described for Alternative B1. The number of reconstructed roads would be the same as Alternative B1. Impacts on water quality and associated amphibian habitat would be the same as described for Alternative B1. Phase I would impact 15 acres of RHCAs, Phase II would impact an additional 7 acres. Phase I and Phase II combined would impact 20 acres of RHCAs, which is the same as Alternative B1. Impacts of the 1987 Jarbidge RMP special habitats amendment on amphibians would be the same as Alternative B1.

Alternatives B2b and B2c

A total of 19 stream crossings would occur as a result of construction of new roads under Phase I. One additional stream crossing would occur under Phase II. Impacts from Phase I and Phase II stream crossings combined would be the same as described for Alternative B1. The number of reconstructed roads would be the same as Alternative B1. Impacts on water quality and associated amphibian habitat would be the same as described for Alternative B1. Phase I would impact 17 acres of RHCAs under Alternative B2b and 16 acres under Alternative B2c. Phase II would impact an additional 5 acres under Alternative B2b and 6 acres under Alternative B2c. Phase I and Phase II combined would impact 20 acres of RHCAs, which is the same as Alternative B1. Impacts of the 1987 Jarbidge RMP special habitats amendment on amphibians would be the same as Alternative B1.

Alternatives C and D

A total of 20 stream crossings would occur as a result of construction of new roads. Impacts from new roads would be the same as those described for Alternative B1. A total of 13 existing roads that cross streams would receive some level of surface disturbance to provide access to the project area. Impacts from disturbance of existing roads would be less than those described for Alternative B1, but differences would be minor. Impacts on water quality within RHCAs described under Section 4.1.4 .2 would result in impacts to amphibian habitat. Surface disturbance to 18 acres would result in minor

long-term adverse impacts on RHCAs and would be slightly less than Alternative B1. Impacts of the 1987 Jarbidge RMP special habitats amendment on amphibians would be the same as Alternative B1.

Alternative E

No amendments to the 1987 Jarbidge RMP would be granted under this alternative, so there would be no occupancy within 500 feet of reservoirs, ponds, lakes, streams, wetlands, marshes, and riparian areas. This would result in a slight reroute of a small portion of the transmission line and associated road, which would reduce the number of new stream crossings from 20 to 18 compared to Alternative B1. A total of 13 existing roads that cross streams would be reconstructed. Impacts on water quality within RHCAs described under Section 4.1.4 .2 would result in impacts to amphibian habitat. Surface disturbance to 18 acres would result in minor long-term adverse impacts on RHCAs and would be slightly less than Alternative B1.

Alternative F

Number of stream crossings would be the same as described for Alternatives C and D. Impacts on water quality within RHCAs described in Section 4.1.4.2 would result in impacts to amphibian habitat. Surface disturbance to 17 acres would result in the fewest minor long-term adverse impacts on RHCAs among all alternatives, and would be slightly less than Alternative B1. Impacts of the 1987 Jarbidge RMP special habitats amendment on amphibians would be the same as Alternative B1.

Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Impacts on special status amphibians would occur wherever the northern inbound haul route crosses riparian habitat. Impacts would only be expected for the northern leopard frog, since Columbian spotted frogs are not expected this far north. Impacts would be localized and associated with impacts on water quality from erosion and sedimentation, as described in Section 4.1.4.3. Surface disturbance to 2 acres would result in negligible long-term adverse impacts on RHCAs. Increased traffic during construction and decommissioning of the project would increase the potential for adverse impacts from vehicle-amphibian collisions. A total of 76 existing stream crossings occur along the northern inbound haul route. Of these, a total of 4 stream crossings would have road reconstruction associated with them. Reconstruction of these crossings would pose a temporary risk of erosion and delivery of sediment, fuel, and petroleum products. This risk would be reduced through implementation of erosion control BMPs (Appendix 2A). No new stream crossings would be associated with this route.

Southern Inbound Haul Route Option 1 and Option 2

Types of impacts on special status amphibians would be the same as described for the northern inbound haul route, but magnitude of construction impacts would be greater. Impacts would only be expected for Columbia spotted frogs, since northern leopard frogs are not expected to occur this far south. Surface disturbance to 22 acres under option 1 and 24 acres under option 2 would result in major long-term adverse impacts on water quality and associated amphibian habitat in RHCAs. Increased traffic during construction and decommissioning of the project would increase the potential

for adverse impacts from vehicle-amphibian collisions. Increased public access during O&M due to road reconstruction would extend the risk of collision to the entire ROW grant period. A total of 18 new or reconstructed stream crossings would occur for both southern inbound haul route options, resulting in both short- and long-term impacts on amphibian habitat. Of particular concern is the stream crossing over Cottonwood Creek, which is a 303(d) listed water body and would occur on soils with high water erosion potential. Crossings of these streams by project vehicles during construction, major maintenance, and decommissioning, and by the general public throughout the ROW grant period would increase the potential for impacts to amphibian habitat from delivery of sediment, fuel, and petroleum products.

Outbound Haul Route

Impacts on amphibians from the use of this existing road would include negligible to minor short-term impacts from potential petroleum contamination in riparian areas and sedimentation from use of unpaved portions of the road. Negligible adverse impacts would also occur from injuries and fatalities associated with vehicle-amphibian collisions.

Project as a Whole

Impacts on Columbia spotted frogs and northern leopard frogs would occur in different areas of the project and haul routes. The predicted habitat of the northern leopard frog is north of the project area and the species is most likely to occur along the northern inbound haul route (IFWIS, 2010). The predicted habitat of Columbia spotted frog is within the project area and southern inbound haul route options, as well as along the northern inbound haul route between Three Creek and the project area. Therefore, most impacts would occur to northern leopard frogs from impacts associated with the northern inbound haul route while impacts on the Columbia spotted frogs should be considered for the project area and southern inbound haul routes. Impacts presented in the project as a whole table (Table 4.2.2-63) present impacts on all potential amphibian habitats within the project area and haul routes by alternative.

There would be little difference between alternatives regarding impacts on RHCAs and new or reconstructed stream crossings. Between the inbound haul routes, the northern inbound haul route option would result in the fewest adverse impacts on amphibians. Alternative F with the northern inbound haul route would have the fewest adverse impacts on amphibians while Alternative B1 or any of the phased alternatives (full build-out) with the southern inbound haul route option 2 would have the most impacts.

Table 4.2.2-63. Impact Summary Table for Project as a Whole – Amphibians.

	Alt A	Alt B1	Alt B2a PI/PII (I + II)	Alt B2b PI/PII (I + II)	Alt B2c PI/PII (I + II)	Alt C	Alt D	Alt E	Alt F
Project Area									
RHCA Acres	0	20	15/7 (22)	17/5 (22)	16/6 (22)	18	18	17	17
New or Reconstructed Stream Crossings	0	34	29/5 (34)	33/1 (34)	32/2 (34)	33	33	31	33
Project with Northern Inbound Haul Route									
RHCA Acres	0	22	17/7 (24)	19/5 (24)	18/6 (24)	20	20	19	19
New or Reconstructed Stream Crossings	0	38	33/5 (38)	37/1 (38)	36/2 (38)	37	37	35	37
Project with Southern Inbound Haul Route Option 1									
RHCA Acres	0	42	37/7 (44)	39/5 (44)	38/6 (44)	40	40	39	39
New or Reconstructed Stream Crossings	0	52	47/5 (52)	51/1 (52)	50/2 (52)	51	51	49	51
Project with Southern Inbound Haul Route Option 2									
RHCA Acres	0	44	39/7 (46)	41/5 (46)	40/6 (46)	42	42	41	41
New or Reconstructed Stream Crossings	0	52	47/5 (52)	51/1 (52)	50/2 (52)	51	51	49	51

Cumulative Impacts

Cumulative impacts on amphibians would consist of incremental effects of the alternatives when added to other past, present, and reasonably foreseeable future actions. These effects would occur over the duration of the 30-year ROW grant, resulting in incremental increases to habitat degradation.

Past, present, and future impacts on amphibians and their habitats include climate change, wildfire, motorized vehicle use, roads, and livestock grazing. Future operation of the wind project, when added to the impacts of these existing and future actions, would contribute to habitat degradation.

The cumulative impact analysis area is the same as discussed for Water Resources, Section 4.1.4.5, which consists of the subbasins that encompass the project area and haul routes. Amphibians share analysis indicators with water resources in terms of number of roads crossings at streams and acres of impacts on RHCAs. Therefore, how the proposed alternatives add cumulatively to the existing impacts on amphibians would be the same as discussed for water resources (Section 4.1.4.5) and are summarized here.

Alternative A (No Action Alternative)

The No Action Alternative in combination with the past and present actions listed in Table 4.0.2-1 and past and ongoing motorized vehicle use, livestock grazing, and wildfires would result in incremental increases of sedimentation to the headwaters of intermittent and perennial streams within the subbasins. Surface disturbance from these actions would result in minor long-term effects on amphibians by removing existing wetland and riparian vegetation resulting in removal and degradation of amphibian habitat. Existing hydrologic processes including erosion and sedimentation would continue to occur. With the trend of increased use of public lands, stream segments that are already suffering degradation are likely to get worse. These impacts when added to future surface disturbing activities from previous projects presented in Table 4.0.2-1 would result in minor long-term adverse impacts on special status amphibians through increased sedimentation.

All Action Alternatives

Past and ongoing surface disturbance has occurred in localized areas throughout the Salmon Falls Subbasin. This localized site disturbance when added to past and ongoing motorized vehicle use, livestock grazing, and wildfires would result in incremental increases of nutrient and sediment delivery to the headwaters of intermittent and perennial streams within the Salmon Falls Subbasin. These impacts when added to future surface disturbing activities, including this wind project, would result in moderate long-term effects on special status amphibians by removing existing wetland and riparian vegetation. Hydrological alteration and adverse impacts on water quality in the subbasin due to increased nutrient and sediment delivery would also occur resulting in long-term adverse impacts on amphibians.

All action alternatives for the project would result in removal of existing wetland and riparian vegetation, soil erosion, and sedimentation due to existing roads, continued motorized vehicle use, livestock use, wildfire, roads, and other surface disturbing activities. Surface disturbance associated with all action alternatives and any of the haul routes, considered with the projects listed in Table 4.0.2-1 and past and ongoing actions listed above, would have moderate long-term adverse impacts on amphibians, especially the population of Columbia spotted frogs within the Salmon Falls Subbasin.

Redband Trout

The analysis area for direct and indirect impacts on redband trout includes the area within 500 feet of streams (intermittent and perennial) originating from the project area and the southern inbound haul route options and feeding into perennial streams in the Salmon Falls Creek Watershed. It also includes a 500-foot buffer of streams along the non-paved portion of the northern inbound haul route and northern outbound haul route. Assumptions for the analysis are listed in Section 4.2.1.1

The indicators for impacts on redband trout are:

- Number of road crossings of redband trout-bearing streams and tributaries;
- Increase in road mileage within RHCAs for streams crossed that are tributaries to a redband trout-bearing stream; and

- Acres of disturbance within RHCAs for streams crossed that are tributaries to a redband trout-bearing stream.

In addition to these quantitative indicators, downstream effects from sediment and potential spills are qualitatively evaluated. Proximity of new roads and other project infrastructure to stream segments with habitat condition ranking assessments is also discussed.

Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

Since a ROW would not be granted for development, there would be no additional stream crossings, no increase in road mileage, or disturbances associated with a wind facility in proximity to redband trout-bearing streams or their tributaries. Therefore, no new impacts on the condition of fisheries habitat in the project area would occur. Current sources of sediment to streams in the project area (fire, existing roads, and livestock) would continue. The condition of stream habitat and stream restoration priority in the project area would likely remain at current levels.

Impacts Common to All Action Alternatives

The potential impacts of the project on redband trout and their habitat include sedimentation from erosion and surface runoff, fuel or other petroleum product spills, and impacts on individuals from blasting. All potential impacts on redband trout would be indirect with the exception of blasting which could result in direct impacts. The locations of project water sources are not known, but would come from an existing water right within the Salmon Falls Subbasin (see assumptions in Water Resources Section 4.1.4.1). The water quantity balance within the subbasin would not be appreciably impacted (Section 4.1.4) and is therefore not expected to impact redband trout.

Of the redband trout-bearing streams originating in the project area that have had habitat condition rating assessments, Cedar Creek had the best fish habitat with most surveyed reaches rated for conservation (Table 3.2.2-12 and Figure 3.2.2-20). Reconstructing and using the four existing road crossings of tributaries to Cedar Creek under all action alternatives (upstream from the portion of the reach evaluated) would reduce the quality of downstream redband trout habitat if sediment or fuel or other petroleum product entered the tributaries. The potential for sediment transport or petroleum products entering the channel would occur when water is present. The other redband trout-bearing streams in the project area with habitat condition rating assessments include Bear Creek, China Creek, Rocky Canyon, Shack Creek, and North Fork Salmon Falls Creek. Of these, the headwaters of North Fork Salmon Falls Creek (Timber Canyon) would be crossed by a new road under all action alternatives. Construction and use of this road would further reduce the quality of downstream habitat for redband trout if sediment or petroleum products entered the channel. Given the intermittent nature of the streams at the road crossings of Cedar Creek and North Fork Salmon Falls Creek, the potential for transport of sediment and petroleum products would occur primarily during periods of snow and rain runoff. Application of design features during construction would reduce, but would not eliminate these risks. If mitigation proposing to reroute the new road over North Fork Salmon Falls Creek to a

distance of greater than 500 feet from the stream were required (Section 2.4.6.1), then potential impacts on redband trout and their habitat in this stream reach would not be expected.

Construction

Construction of new roads and reconstruction of existing roads over redband trout-bearing streams and their tributaries and construction within RHCAs of trout-bearing streams would create the risk of sediment delivery to these streams. However, erosion control, road design, and revegetation design features and a SWPPP (Appendix 2A) would be implemented that would reduce the risk of sediment delivery to streams. Further, given the width of the RHCAs (Section 3.1.4.1), much of the construction within the RHCAs would be at a distance great enough that it would be unlikely that sediment would enter the stream channels. If sediment were delivered to streams during construction of roads and other infrastructure, indirect impacts on the surface water quality and stream substrate would result (Section 4.1.4.2). If sediment were delivered to redband trout streams or tributaries, there would be adverse, short-term and long-term impacts on fish habitat, depending on the length of time that sediment is maintained in the streambed. This potential is addressed for each alternative based on the analysis indicators for redband trout. The potential for downstream effects of sediment delivery cannot be quantified and therefore are not discussed under each alternative.

Sediment delivery would result in long-term impacts on water quality and fish habitat. The majority of the streams in the project area are intermittent. Low flows in these channels limit their ability to deposit fine sediments on the floodplain where the potential for downstream impacts are reduced (i.e. limited flushing of the channels). Once in the streams, fine sediments (those < 0.3 inch/6.3 mm in diameter) would be transported further downstream or deposited in slow water areas and behind obstructions, which would alter fish habitat conditions. Fine sediment has been shown to fill the interstitial spaces among larger streambed particles, which can restrict intragravel flow and the supply of oxygen in streambed gravels and reduce the available living space for various microorganisms, aquatic macroinvertebrates, and juvenile fish. It can also cement the gravels together making it more difficult for fish to excavate a redd (to deposit fish eggs). Potential impacts of excessive sediment in the streambed have been documented for all life stages of a variety of salmonid species. Impacts vary from the possible suffocation and entrapment of incubating embryos (Rieser & White, 1988), reduction in growth and survival of juveniles (Suttle et al., 2004), interference with respiration of juveniles (Cederholm & Reid, 1987), and loss of summer rearing and overwintering cover for juveniles (Griffith & Smith, 1993), to reduced availability of invertebrate food for resident adults (Bjornn et al., 1977).

Potential sources of contaminants associated with the project include diesel fuel, gasoline, lubricant oils, hydraulic fluid, antifreeze, transmission fluid, and lubricant grease (Section 4.3.7.1). Construction of the project would create a risk for leaks and spills of contaminants from motorized vehicles operating in the project area. Adherence to the SPCCP and implementation of additional pollution control design features as they relate to fueling and containment (Appendix 2A) would be in place to minimize the risk of a measurable spill. If a leak or spill occurred, fuel, chemicals, and/or petroleum products would be transported to fish-bearing streams or their tributaries where project

roads and haul routes cross fish bearing streams and RHCAs. This impact is addressed for each alternative based on the analysis indicators for redband trout. The potential for downstream effects of fuel and petroleum product delivery cannot be quantified and therefore is not discussed under each alternative.

Should measurable quantities of fuel or other petroleum products enter live water, they would affect water quality and injure or kill invertebrates and would directly affect redband trout if there were direct contact between the fish and products. Fuels and other petroleum products can directly poison salmonids and their aquatic invertebrate food source. Fuels and petroleum products are moderately to highly toxic to salmonids, depending on concentrations and exposure time. Free oil and emulsions can adhere to gills and interfere with respiration, and heavy concentrations of oil can suffocate fish McKee & Wolf, 1963). Evaporation, sedimentation, microbial degradation, and hydrology act to determine the fate of fuels entering fresh water (Saha & Konar, 1986). If contaminants were to reach a fish-bearing stream, the contaminants would be diluted from their original concentration at the site of the spill, and would further dilute as they traveled downstream, reducing the degree of impact. The amount of time that the concentration of contaminants would be measurable in the water would be short and the associated impact on aquatic biota important to salmonids (i.e. macroinvertebrates and algal communities) would be temporary.

Blasting during construction of the project would generate pressure waves that can be transmitted through the ground and the air. The effects of ground-borne vibration from overland construction blasting on fishes have not been widely studied; however, a study by Popper and Clarke (1976) concluded that salmon are sensitive to ground-borne sounds. Injury or mortality to fish has been associated with the detonation of explosives in or near water and is related to the change in hydrostatic pressure (Wright & Hopky, 1998). Vibrations from the detonation of explosives may also cause damage to incubating eggs (Wright, 1982). It is thought that small charges (less than 2 pounds) do not produce shock waves that are carried through the ground (United States Forest Service, 2002). If charges used are small, then impacts on trout individuals or redds, if present in nearby streams, would likely be minimal. If larger charges are needed for project construction and trout or redds are present in nearby streams, then impacts on individual fish or eggs would likely result. The severity of the effect of explosives would depend on many physical, environmental, and biological factors, such as size of explosive and distance of fish from the point of detonation. The amount and location of explosives that would be used to construct the project are not known at this time. A design feature would be applied requiring the blasting plan to conform to BLM policy and the *Programmatic Biological Opinion for the Idaho and Nevada Stream Crossing Structure Replacement and Removal Program* (Appendix 2A; USFWS, 2006). This would minimize the size of charge used in RHCAs, not allow blasting in streams containing water, and restrict blasting adjacent to stream channels when trout or trout redds are present, thus minimizing the risk of impacts on redband trout.

The project, through the construction of new roads, would alter the hydrology of the analysis area. If the hydrology were altered to the degree that water sources for streams were reduced or sediment delivery increased, this would impact trout-bearing streams. Potential impacts on hydrology, such as

the alteration or redirection of the natural flow of water, are discussed in Section 4.1.4.2 and are not addressed further in this section.

Operation and Maintenance

Sediment would likely be delivered to redband trout-bearing streams through road use during O&M (Section 4.1.4.2). Since the roads would be surfaced with gravel, the potential for this risk would be reduced. However, given the long-term nature of O&M, the increase in road density, and the expected increase in use of existing and proposed roads in the project area, impacts are expected to be adverse and long-term. Impacts on fish and fish habitat from sediment delivery are described under *Construction.*

There would be the potential for leaks or spill of fuel, chemicals, and petroleum products during O&M. Should measurable quantities of fuel or other petroleum products enter live water, impacts on trout and their habitat would result as described under *Construction.* Since this risk would occur throughout the 30-year ROW grant, this risk would be long-term.

The proposed project, through winter maintenance of roads (snow removal) would have the potential to alter the hydrology of the analysis area. If the hydrology were altered to the degree that water sources for streams were reduced or sediment delivery increased, this would impact trout-bearing streams. Impacts on hydrology, such as the alteration or redirection of the natural flow of water, are further discussed in Section 4.1.4.2.

Decommissioning

Decommissioning the project would have similar impacts on water quality and hydrology, and indirectly to redband trout and their habitat, as those described for project construction. There would be a risk of sediment delivery to trout-bearing streams during decommissioning (Section 4.1.4.2); however, erosion control design features (Appendix 2A) would be implemented to reduce this risk. If sediment were delivered to trout-bearing streams, this would result in adverse short-term or long-term impacts on redband trout habitat. There would be a risk of leaks or spills of contaminants during decommissioning of the wind facility and transport of wind facility components out of the project area; however, adherence to the SPCCP and implementation of additional pollution control design features (Appendix 2A) would be in place to minimize this risk. If a measurable spill occurred in proximity to a redband trout-bearing stream or tributary, it would result in temporary impacts on redband trout habitat. Based on the assumption that blasting would not be used during decommissioning, potential impacts from blasting to redband trout would not occur. Once decommissioning of the wind facility is completed, the original condition of the majority of the project area would be reclaimed. Impacts on redband trout habitat from the presence and use of new roads realized over the ROW grant period would no longer occur. Since reconstructed roads would not be reclaimed, impacts from use of these roads after project decommissioning would still persist.

Alternative B1 (Proposed Action)

There would be six new road crossings of intermittent drainages, which contribute surface flow to redband trout-bearing streams. This is an increase in road crossings of 17 percent compared to existing conditions. One of the new crossings would cross over a redband trout-bearing stream (North Fork Salmon Falls Creek headwaters) and five would cross over tributaries (three crossings of tributaries to Cottonwood Creek and two crossings of an unnamed tributary that feeds into North Fork Salmon Falls Creek). In addition, four existing crossings of tributaries to a trout-bearing stream (Cedar Creek) associated with Monument Springs Road would be reconstructed. There would be an increase in 0.7 miles of roads (a 14% increase) in the RHCAs of redband trout-bearing streams from existing conditions. There would be 2.8 total acres of disturbance that would occur in RHCAs of redband trout-bearing streams or streams that feed into redband trout-bearing streams, of which 1 of these acres would be revegetated. This would result in a short-term impact on 1.8 acres, a minor component of RHCAs in the project area (<1%). Disturbance in RHCAs and new stream crossings would result in the potential for sediment and/or chemical delivery to or ground-borne vibration in proximity to trout-bearing streams, as described in *Impacts Common to All Action Alternatives*. All of the new stream crossings would be of intermittent drainages, thus limiting potential impacts on trout to when water was present.

An amendment to the 1987 Jarbidge RMP is proposed for special status species and crucial wildlife habitat under Alternative B1 that would remove the year-round 500-foot no occupancy restriction for streams containing sensitive fish species (Section 2.5.3.2). Lifting of this restriction would allow the siting, construction, use, and decommissioning of roads and facilities within 500 feet of redband trout-bearing streams and tributaries. There would be six new and four existing project road crossings within 500 feet of a redband trout-bearing stream or tributary. The new road associated with the transmission line would cross two locations in Idaho within 500 feet of the headwaters of a tributary to the North Fork Salmon Falls Creek and three locations in Nevada within 500 feet of tributaries to Cottonwood Creek. A new road would cross within 500 feet of the headwaters of North Fork Salmon Falls Creek. Four portions of Monument Springs Road proposed for reconstruction would cross within 500 feet of tributaries to Cedar Creek. All crossings would be associated with intermittent portions of these streams. If construction associated with these roads resulted in delivery and transport of sediment to these streams, it would indirectly affect trout and trout habitat. Erosion control design features would be in place that would reduce this risk. Use and maintenance of these roads would also present the risk of sediment and fuel, chemicals, and petroleum products delivery to these stream channels. Other than roads, there would be no project features within 500 feet of redband trout-bearing streams.

An amendment to the 1987 Jarbidge RMP is proposed for the stipulation restricting construction activities within 500 feet of reservoirs, ponds, lakes, streams, wetlands, marshes, and riparian areas (Section 2.5.3.3). A one-time exception to this stipulation would be granted as part of this amendment to allow for construction of five turbines, a laydown yard, and the site compound and northern O&M facility within 500 feet of an intermittent stream. Of these locations, none drain into redband trout-bearing streams. Impacts on only one of the drainages are expected from construction of the site

compound and northern O&M facility within an intermittent drainage (Section 4.1.4.2), and this drainage does not feed into a redband trout-bearing stream. Therefore, this amendment is not expected to impact redband trout or their habitat.

Alternative B2a

Total and types of impacts on redband trout and their habitat under Alternative B2a would be the same as that described for Alternative B1 when construction of both phases is completed (Phase I + Phase II). Construction of Phase I would result in five new road crossings of drainages in the project area, which could contribute surface flow to redband trout-bearing streams. This is an increase of 14 percent from existing conditions. Of these, zero would cross over redband trout-bearing streams and five would cross over tributaries (three crossings of tributaries to Cottonwood Creek and two crossings of an unnamed tributary that feeds into North Fork Salmon Falls Creek). Construction of Phase II would result in one new road crossing of a redband trout-bearing stream (North Fork Salmon Falls Creek; a 3 percent increase from existing conditions). Four additional existing crossings of tributaries to a trout-bearing stream (Cedar Creek) associated with Monument Springs Road would be reconstructed during Phase II. With construction of both phases, there would be a total of six new road crossings and four existing crossings that would be reconstructed.

There would be an increase in 0.5 miles of roads in the RHCAs of redband trout-bearing streams from existing conditions during Phase I (a 10% increase over existing conditions) and 0.2 miles in Phase II, for a total of 0.7 miles for both phases combined (a 14% increase). There would be a total of 1.4 acres of disturbance that would occur within RHCAs of redband trout-bearing streams during each phase of development for a total of 2.8 acres of disturbance. Less than 1 acre disturbed in each phase would be revegetated, for a long-term total impact of 0.9 acre after construction of each phase, for a total of 1.8 acres for both phases combined (Phase I + Phase II). This impact would occur to a minor component of RHCAs in the project area (<1%).

The effect of the proposed amendment to the 1987 Jarbidge RMP that would remove the year-round 500-foot no occupancy restriction for streams containing sensitive fish species (Section 2.5.3.2) would be similar to that described for Alternative B1 with the following exceptions. The new road crossing proposed on private land over the headwaters of North Fork Salmon Falls Creek would not be constructed for Phase I, and four of the existing crossings of tributaries to Cedar Creek on Monument Springs Road would not be reconstructed for Phase I. This would reduce the potential impacts on the quality of downstream habitat for redband trout during the first 9 years of the 30-year ROW grant period when compared to Alternative B1. These five road crossings (one new and four existing) would be constructed/reconstructed for Phase II. Therefore, upon commencement of Phase II construction, potential impacts on redband trout habitat would be the same as Alternative B1 for the remainder of the ROW grant period. The amendment to the 1987 Jarbidge RMP stipulation restricting occupancy within 500 feet of streams (Section 2.5.3.3) is not expected to impact redband trout or their habitat, as described for Alternative B1.

Alternative B2b

Total and types of impacts on redband trout and their habitat under Alternative B2b would be the same as that described for Alternative B1 when construction of both phases is completed (Phase I + Phase II). Construction of Phase I would result in five new road crossings of drainages in the project area, which could contribute surface flow to redband trout-bearing streams. This is an increase of 14 percent from existing conditions. Of these, zero would cross over redband trout-bearing streams and five would cross over tributaries (three crossings of tributaries to Cottonwood Creek and two crossings of an unnamed tributary that feeds into North Fork Salmon Falls Creek). In addition, four existing crossings of tributaries to a trout-bearing stream (Cedar Creek) would be reconstructed during Phase I. Construction of Phase II would result in one new road crossing of a redband trout-bearing stream (North Fork Salmon Falls Creek; a 3 percent increase from existing conditions). With construction of both phases, there would be a total of six new road crossings and four existing crossings that would be reconstructed.

There would be an increase in 0.5 miles of roads in the RHCAs of redband trout-bearing streams from existing conditions during Phase I (a 10% increase over existing conditions) and 0.2 mile in Phase II, for a total of 0.7 miles for both phases combined (a 14% increase). There would be a total of 1.4 acres of disturbance that would occur within RHCAs of redband trout-bearing streams during each phase of development for a total of 2.8 acres of disturbance. Less than 1 acre disturbed in each phase would be revegetated, for a long-term total impact of 0.9 acre after construction of each phase, for a total of 1.8 acres for both phases combined (Phase I + Phase II). This impact would occur to a minor component of RHCAs in the project area (<1%). The new road crossing proposed on private land over the headwaters of North Fork Salmon Falls Creek would not be constructed during Phase I. This would reduce the potential impacts on the quality of downstream habitat for redband trout during the first 9 years of the 30-year ROW grant period when compared to Alternative B1.
The risk of potential impacts on trout and trout habitat in Cedar Creek and North Fork Salmon Falls Creek would be reduced compared to Alternative B1, as the proposed amendment to the 1987 Jarbidge RMP for this Alternative would retain but allow exceptions to the year-round 500-foot no occupancy restriction for streams containing sensitive fish species (Section 2.7.3.2). If no exceptions are granted, this could result in modifications of construction activities within 500 feet of trout-bearing streams. The amendment to the 1987 Jarbidge RMP stipulation restricting construction of specific project features within 500 feet of streams (Section 2.5.3.3) is not expected to impact redband trout or their habitat, as described for Alternative B1.

Alternative B2c

Total and types of impacts on redband trout and their habitat under Alternative B2c would be the same as that described for Alternative B1 when construction of both phases is completed (Phase I + Phase II). Construction of Phase I would result in six new road crossings of drainages in the project area, which could contribute surface flow to redband trout-bearing streams. This is an increase of 17 percent from existing conditions. One of the new crossings would cross over North Fork Salmon Falls Creek, a redband trout-bearing stream, and five would cross over tributaries, as described for Alternative B1. In addition, four existing crossings of tributaries to a trout-bearing stream (Cedar

Creek) would be reconstructed during Phase I. Construction of Phase II would not result in any additional road crossings, new or existing. With construction of both phases, there would be a total of six new road crossings and four existing crossings that would be reconstructed.

There would be an increase in 0.7 miles of roads in the RHCAs of redband trout-bearing streams from existing conditions during Phase I and 0 miles in Phase II, for a total of 0.7 miles for both phases combined (a 14% increase). There would be a total of 2.8 acres of disturbance that would occur within RHCAs of redband trout-bearing streams during Phase I and 0 acres in Phase II of development. Approximately 1 acre would be revegetated, for a long-term impact of 1.8 acres after construction of Phase I, 0 after construction of Phase II, for a total of 1.8 acres for both phases combined (Phase I + Phase II). This impact would occur to a minor component of RHCAs in the project area (<1%).

The proposed amendment to the 1987 Jarbidge RMP regarding the year-round 500-foot no occupancy restriction for streams containing sensitive fish species (Section 2.7.3.2) would result in the same reduction of potential impacts on trout, as described for Alternative B2b. The amendment to the 1987 Jarbidge RMP stipulation restricting occupancy within 500 feet of streams (Section 2.5.3.3) is not expected to impact redband trout or their habitat, as described for Alternative B1.

Alternative C

There would be six new road crossings of intermittent drainages, which could contribute surface flow to redband trout-bearing streams, an increase of 17 percent compared to existing conditions, and four existing crossings of tributaries to a trout-bearing stream that would be reconstructed, as described for Alternative B1. There would be an increase in 0.7 miles of roads (a 14% increase) in the RHCAs of redband trout-bearing streams from existing conditions, as under Alternative B1. There would be 2.8 total acres of disturbance that would occur in RHCAs of redband trout-bearing streams or streams that feed into redband trout-bearing streams, of which 1 of these acres would be revegetated, for a short-term impact on 1.8 acres, as under Alternative B1. This disturbance and increase in road crossings would result in the potential for sediment and/or chemical delivery to or ground-borne vibration in proximity to trout-bearing streams, as described in *Impacts Common to All Action Alternatives*. All of the stream crossings would be of intermittent drainages, thus limiting the period of potential impact on trout to when water was present.

The risk of potential impacts on trout and trout habitat in Cedar Creek and North Fork Salmon Falls Creek would be reduced during construction compared to Alternative B1, as the proposed amendment to the 1987 Jarbidge RMP for this Alternative would retain but allow exceptions to the year-round 500-foot no occupancy restriction for streams containing sensitive fish species (Section 2.7.3.2). If exceptions were only granted when water was absent from these streams then the risk of potential impacts on trout would be reduced. The amendment to the 1987 Jarbidge RMP stipulation restricting occupancy within 500 feet of streams (Section 2.5.3.3) is not expected to impact redband trout or their habitat, as described for Alternative B1.

Alternative D

The potential impacts on redband trout and their habitat would be the same as described for Alternative C.

Alternative E

The potential impacts on redband trout and their habitat would be the similar to that described for Alternative B1 with the following differences. No amendments to the 1987 Jarbidge RMP would be granted. Therefore, there would be no occupancy within 500 feet of redband trout-bearing streams in Idaho. This would result in a slight adjustment of the transmission line road alignment, which would reduce the number of new road crossings of intermittent drainages, which could contribute surface flow to redband trout-bearing streams by two in Idaho, for a total of four new crossings. This is an increase of 11 percent compared to existing conditions. One of the new crossings would cross over a redband trout-bearing stream (North Fork Salmon Falls Creek headwaters); three would cross over tributaries to Cottonwood Creek. The four existing crossings of tributaries to Cedar Creek would be reconstructed as described for Alternative B1. There would be an increase in 0.3 mile of roads (a 6% increase) in the RHCAs of redband trout-bearing streams from existing conditions. There would be 2.3 total acres of disturbance that would occur in RHCAs of redband trout-bearing streams or streams that feed into redband trout-bearing streams, of which 1 of these acres would be revegetated, for a short-term impact on about 1.3 acres, a minor component of RHCAs in the project area (<1%).

The two new crossings over an unnamed tributary that feeds into North Fork Salmon Falls Creek described for Alternative B1 would not occur under Alternative E. This would reduce the potential for sediment delivery to the lower reaches of North Fork Salmon Falls Creek compared to Alternative B1. The new road crossing at the headwaters of North Fork Salmon Falls Creek would still be allowed given its location on private land and would therefore impact the upper reach of this trout-bearing stream in the project area. If mitigation proposing to reroute this road slightly to the north were required (Section 2.4.6.1), then potential impacts on trout and their habitat would not be expected.

Alternative F

The potential impacts on redband trout and their habitat would be the same as Alternative C.

Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

The impact on redband trout and their habitat would be associated primarily with the use of the northern inbound haul route. Use of these roads by vehicles is an existing condition, but use and size of vehicle is expected to increase greatly during construction and decommissioning. Increased use would likely result in sediment delivery at one existing crossing of Clover Creek (a redband trout-bearing stream) and seven crossings of tributaries. It would also create the risk of fuel, chemical, and petroleum product contamination at these locations in the event of a spill or collision. Sediment delivery and/or chemical contamination would result in indirect adverse impacts on redband trout and

their habitat, as described in *Impacts Common to All Action Alternatives*. Use of the road during O&M is anticipated to only occur once per year and therefore is expected to have negligible impacts on trout and trout habitat.

There would be no new or reconstructed crossings of redband trout-bearing streams associated with the northern inbound haul route and there would be no new road miles within RHCAs of trout-bearing streams. There would be 2.5 acres of disturbance within the RHCA of Clover Creek associated with the construction near the approach to the Clover Creek Bridge. No instream work would be required for the reconstruction of this road. Localized impacts on fish if present and fish habitat from reconstruction and use of this road would result through increased erosion and sedimentation as described in Section 4.1.4.3. Design features would be applied during construction that would minimize potential delivery of sediment to Clover Creek. The northern inbound haul route does and would occur within 500 feet of a redband trout-bearing stream, including the areas proposed for construction disturbance near the approach to the Clover Creek Bridge. Construction of the pullouts on this route would not result in impacts on trout or trout habitat because they would all be constructed greater than 500 feet of streams.

Southern Inbound Haul Route Option 1 and Option 2

The impact on redband trout and their habitat would be associated primarily with the construction of the southern inbound haul route options due to the magnitude of earthwork required; adverse impacts on water quality and hydrology are expected, as described in Section 4.1.4.3, and indirect impacts on habitat for redband trout would occur. The construction of a culvert across Cottonwood Creek and other construction within the RHCA would result in delivery of sediment to the creek and would create the potential for spills of fuel, chemical, and petroleum products. The effects of these types of impacts on fish are described in *Impacts Common to All Action Alternatives*. These impacts would be reduced through the application of road design, erosion control, and pollution control design features (Appendix 2A).

Use of this road for hauling turbine components and other materials to the project site and for use during major maintenance activities would create a temporary risk of sediment and fuel, chemical, and petroleum product delivery to Cottonwood Creek and its tributaries, and would therefore directly or indirectly impact trout in these streams. Although use of this route is not proposed for routine O&M, increased use of this road is expected by the public and would therefore result in an increased, long-term risk of sediment delivery and potential chemical contamination of Cottonwood Creek. Use of this road during decommissioning would also create the risk of sediment and petroleum product delivery to trout-bearing streams, and associated impacts on trout and their habitat.

There would be one new road crossing of Cottonwood Creek, a redband trout-bearing stream, associated with option 1 of the southern inbound haul route and eight new crossings of its tributaries, for a total of nine new crossings. The crossing of Cottonwood Creek would span up to 70 linear feet of the creek and would use an arch plate/bottomless culvert design with wing walls as described in Section 2.4.2.4. One additional crossing on an existing road would be reconstructed. A 1.6-mile

segment of this road would occur within the RHCA of Cottonwood Creek and its tributaries. Of this distance, 1.5 miles are proposed new road and 0.1 miles are existing road. There would be 13.9 total acres of disturbance that would occur within the RHCA of Cottonwood Creek and its tributaries. None of this area would be reclaimed, and the impact would be permanent.

There would be one new road crossing of Cottonwood Creek associated with option 2 of the southern inbound haul route and nine new crossings of its tributaries, for a total of ten new crossings. The crossing of Cottonwood Creek would use an arch plate/bottomless culvert design as described in Section 2.4.2.4. An additional crossing on an existing road would be reconstructed. A 1.9-mile segment of this road would occur within the RHCA of Cottonwood Creek and its tributaries, of which 1 mile overlaps the RHCA for option 1 of this route. Of the 1.9 miles, 1.8 miles are proposed new road and 0.1 miles are existing road. There would be 16.5 total acres of disturbance that would occur within the RHCA of Cottonwood Creek and its tributaries. None of this area would be revegetated, and the impact would be permanent.

Outbound Haul Route

Potential impacts on trout habitat would be limited to that from the travel of vehicles on this existing road and could occur at the existing road crossing of lower Salmon Falls Creek and at two crossings of tributaries of lower Salmon Falls Creek. Use of this outbound haul route would increase greatly during the construction and decommissioning periods and would create the risk of fuel, chemical, and petroleum product contamination at the crossing of lower Salmon Falls Creek, a redband trout-bearing stream, at Lilly Grade in the rare event of a spill or collision. Use of the unpaved portions of this road would create a minor risk of sedimentation at stream crossings. Use of the outbound haul route during the O&M period would be infrequent and would result in a negligible risk to trout and their habitat. A 1-mile segment of this road would occur within the RHCA of Salmon Falls Creek and its tributaries.

Project as a Whole

The primary impacts on redband trout and trout habitat from the proposed project include sedimentation from surface disturbance and use of project roads. Other potential impacts would include contamination of water from fuel, chemical, and petroleum product spills or impacts from ground-borne vibration. Impacts would be related to road crossings of fish-bearing streams, and road quantity and disturbance acres within RHCAs. These primary analysis indicators are summarized in Table 4.2.2-64 for each alternative alone and for each alternative combined with the inbound haul route options. In summary, there is minimal difference between action alternatives in terms of potential impacts on fish and fish habitat as they relate to the analysis indicators. The primary difference is between Alternative E and the other action alternatives. Alternative E would have two less crossings of tributaries to redband trout-bearing streams and an associated reduction in road miles and disturbance within RHCAs than the other action alternatives. Further, Alternative E would not have an amendment to the 1987 Jarbidge RMP regarding occupancy within 500 feet of streams with sensitive fish species.

There would be no new or reconstructed crossings of redband trout-bearing streams and no new road miles within RHCAs of trout-bearing streams associated with the northern inbound haul route. There would be a total of six new road crossings for Alternatives B1, B2a, B2b, B2c, C, D, and F combined with the northern haul route, of which one would cross over a redband trout-bearing stream and five would cross over tributaries. There would be a total of four new road crossings for Alternative E combined with the northern haul route, of which one would cross over a redband trout-bearing stream and three would cross over tributaries. Four existing crossings of tributaries to a trout-bearing stream (Cedar Creek) associated with Monument Springs Road would be reconstructed under all action alternatives. Clover Creek would continue to be crossed, but use of vehicles over this crossing would increase during the construction and decommissioning periods, and the risk of sedimentation and associated impacts on trout and their habitat would occur.

There would be nine new crossings of redband trout-bearing streams and tributaries associated with option 1 of the southern inbound haul route for a total of 15 when combined with Alternatives B1, B2a, B2b, B2c, C, D, and F (two would cross over a redband trout-bearing stream and 13 would cross over tributaries). When combined with Alternative E, there would be a total of 13 new crossings of redband trout-bearing streams and tributaries; two would cross over a redband trout-bearing stream and 11 would cross over tributaries. Five existing crossings of tributaries to trout-bearing streams, including the four over tributaries of Cedar Creek, would be reconstructed under all action alternatives.

There would be 10 new crossings of redband trout-bearing streams and tributaries associated with option 2 of the southern inbound haul route for a total of 16 when combined with Alternatives B1, B2a, B2b, B2c, C, D, and F (two would cross over a redband trout-bearing stream and 14 would cross over tributaries). When combined with Alternative E, there would be a total of 14 new crossings of redband trout-bearing streams and tributaries; 2 would cross over a redband trout-bearing stream and 12 would cross over tributaries. Five existing crossings of tributaries to trout-bearing streams, including the four over tributaries of Cedar Creek, would be reconstructed under all action alternatives.

The projected impacts on trout habitat would be greater with construction, road construction, and use of either of the southern inbound haul routes compared to the northern inbound haul route. This would be due to the amount of ground disturbance required within the RHCA of Cottonwood Creek, the new crossing at Cottonwood Creek requiring an arch plate/bottomless culvert, and the projected long-term increase in use of either of the southern inbound haul route options over current conditions due to the reconstruction of this road. The increase in use of the northern inbound haul route would only occur during construction, major maintenance, and decommissioning whereas either one of the southern inbound haul route options would receive an increase in use throughout the entire 30-year ROW grant.

Table 4.2.2-64. Impact Summary Table for Project as a Whole – Redband Trout.

ALT	New Road crossings				New road miles in trout RHCAs				Acres disturbance in trout RHCAs				RMP amendments[1]			
	Project	Project and NHR[2]	Project and SHR1[3]	Project and SHR2[4]	Project	Project and NHR	Project and SHR1	Project and SHR2	Project	Project and NHR	Project and SHR1	Project and SHR2	Project	Project and NHR	Project and SHR1	Project and SHR2
A	0	0	0	0	0	0	0	0	0	0	0	0	None			
B1	6	6	15	16	0.7	0.7	2.2	2.5	2.8	5.3	16.7	19.3	Restriction lifted; reduced protection			
B2a[5]	5/1 (6)	6	15	16	0.5/0.2 (0.7)	0.7	2.2	2.5	1.4/1.4 (2.8)	5.3	16.7	19.3	Same as Alt B1			
B2b[5]	5/1 (6)	6	15	16	0.5/0.2 (0.7)	0.7	2.2	2.5	1.4/1.4 (2.8)	5.3	16.7	19.3	Exceptions to restrictions granted if certain criteria are met			
B2c[5]	6/0 (6)	6	15	16	0.7/0 (0.7)	0.7	2.2	2.5	2.8/0 (2.8)	5.3	16.7	19.3	Same as Alt B2b			
C	6	6	15	16	0.7	0.7	2.2	2.5	2.8	5.3	16.7	19.3	Same as Alt B2b			
D	6	6	15	16	0.7	0.7	2.2	2.5	2.8	5.3	16.7	19.3	Same as Alt B2b			
E	4	4	13	14	0.3	0.3	1.8	2.1	2.8	5.0	16.4	19.0	None			
F	6	6	15	16	0.7	0.7	2.2	2.5	2.8	5.3	16.7	19.3	Same as Alt B2b			

[1] The applicable amendment to the 1987 Jarbidge RMP is the year-round 500-foot no occupancy restriction for streams containing sensitive fish species.
[2] Project and northern inbound haul route.
[3] Project and southern inbound haul route option 1.
[4] Project and southern inbound haul route option 2.
[5] Phase I and Phase II separated by a forward slash; combination of Phase I + Phase II presented in parenthesis.

Cumulative Impacts

Cumulative impacts on redband trout consist of incremental effects of the alternatives when added to other past, present, and reasonably foreseeable future actions. These effects can occur over a long period of time, resulting in gradual changes in quality of trout habitat due to sedimentation. The primary direct and indirect impacts on fish and fish habitat are related to water quality impacts related to sedimentation (Section 4.1.4.5). Wherever cumulative impacts on water quality are realized in the subbasin, potential impacts on trout and trout habitat would occur. The primary actions that affect water quality and hydrology, and indirectly redband trout and their habitat, are presence of roads, motorized vehicle use, livestock use, wildfire, and other surface disturbing activities (Section 3.1.4). Motorized vehicle use is expected to continue at current or increased levels. This is expected to maintain, or increase, existing levels of sedimentation into water bodies. Livestock grazing and the frequency and scale of wildfire are expected to continue at current levels. Adverse impacts on water quality and redband trout habitat associated with livestock use and wildfire would also be expected to continue at current levels.

The cumulative effects analysis area for the proposed alternatives and both options of the southern inbound haul route for redband trout is the Salmon Falls Subbasin because impacts on the upper part of a watershed would be transported to the downstream portion of the watershed. Within the subbasin, existing roads, the Midpoint to Humboldt 345 kV and the Upper Salmon Dam to Wells 138 kV transmission lines in Idaho, NVN and other transmission lines in Nevada, the Stateline Site, the Jackpot North Site, and the Salmon Butte Site towers, and additional miscellaneous meteorological and communication towers that are sited on lands throughout the subbasin have resulted in past and ongoing surface disturbance in those localized areas. This localized site disturbance when added to past and ongoing presence of roads, motorized vehicle use, livestock grazing and wildfires could result in incremental increases of sedimentation to the headwaters of trout-bearing intermittent and perennial streams within the subbasin. These impacts, when added to future surface disturbing activities including this project, could result in adverse impacts on water quality in the subbasin due to increased nutrient and sediment delivery.

The cumulative effects analysis area for the northern inbound haul route is the C.J. Strike Reservoir Subbasin and is considered with the proposed Gateway West 500 kV transmission line project (which could occur in the C.J. Strike Reservoir subbasin). The Gateway West 500 kV transmission line project when considered with the northern inbound haul route would have slight short-term and long-term adverse impacts on water quality and associated redband trout habitat and minor impacts on hydrology and redband trout in those subbasins.

Alternative A (No Action Alternative)

The No Action Alternative in combination with the past and present actions listed in Table 4.0.2-1 and past and ongoing presence of roads, motorized vehicle use, livestock grazing and wildfires could result in incremental increases of sedimentation and potentially of fuel and other petroleum product delivery to the headwaters of trout-bearing intermittent and perennial streams within the subbasin. Existing hydrologic processes including erosion and sedimentation would continue to occur. With the

trend of increased use of publie lands, stream segments that are already suffering degradation are likely to get worse. These impacts when added to future surface disturbing activities, including this project could result in minor adverse impacts on quality of fish habitat the subbasin due to increased sedimentation.

Alternative B1 (Proposed Action) and Alternative B2a

Sedimentation (from soil erosion), changes in hydrology, and potential delivery of fuel and other petroleum products could increase throughout the area due to existing roads, continued motorized vehicle use, livestock grazing, wildfire and other surface disturbing activities. Surface disturbance from these alternatives combined with the haul routes, considered with the projects listed above, would have moderate short-term and long-term adverse impacts on quality of trout habitat.

Alternative B2b, B2c, C, D, and F

Sedimentation and potential delivery of fuel and other petroleum products could increase throughout the area, as described for Alternative B1. Cumulative impacts would be the similar to Alternative B1 but reduced in the Cedar Creek and North Fork Salmon Falls Creek drainages due to retention of the 1987 Jarbidge RMP stipulations as they relate to occupancy in trout-bearing streams. If exceptions were granted for this amendment, additional impacts could be incurred.

Alternative E

Sedimentation and potential delivery of fuel and other petroleum products could increase throughout the area, as described for Alternative B1. Cumulative impacts would be the similar to Alternative B1 but reduced in the Cedar Creek and North Fork Salmon Falls Creek drainages since there would be no amendments to the 1987 Jarbidge RMP. This alternative would have two less road crossings of redband trout-bearing streams (North Form Salmon Falls Creek) than Alternative B1.

4.2.2.4 Big Game

The analysis area for mule deer includes the project disturbance area and haul routes plus a 2.3-mile buffer, which corresponds to the furthest mule deer displacement described in a multi-year study of an energy development site in Wyoming (Sawyer et al., 2006). Avoidance areas are quantified by alternative and haul routes based on this distance. This analysis area is used for both elk and pronghorn since both species display avoidance behaviors near disturbances associated with energy development (Hayden-Wing Associates, 1990; Beckmann & Seidler, 2009). A 2.3-mile behavioral avoidance distance from construction, O&M, and decommissioning activities is therefore assumed for all big game species to provide a consistent comparison between alternatives and to show the relative amount of mapped habitat of each species that exists within the avoidance areas.

The indicators for impacts on big game are:

- Acres of habitat avoided.
- Displacement related to road density.

Mule Deer

Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

Since a ROW would not be granted, impacts on mule deer associated with development of the wind facility would not occur. No changes to mule deer populations are expected to occur as a result of not building the proposed wind facility. Current impacts on mule deer include hunting, human disturbance from recreation, loss of habitat to wildfire, and interspecific competition with livestock and other big game. The current road density within the project area is 2.9 miles per square mile.

Impacts Common to All Action Alternatives

Impacts from development would include negligible to minor long-term impacts on mule deer habitat associated with ground disturbance and are not compared between alternatives. Impacts associated with behavioral avoidance of construction, operation, and decommissioning activities on mule deer are presented for each alternative.

Mule deer avoid roads, especially within shrub habitats (Rost & Bailey, 1979). Both elk and pronghorn also show behavioral avoidance and/or increased vigilance near roads (Lyon, 1979; Gavin & Komers, 2006). Increasing road densities would increase behavioral avoidance of the project area because of the increased human disturbance associated with reconstructed road access and increased traffic volumes. Increased access and traffic volumes would also increase the potential for vehicle collisions. Application of seasonal restrictions within mule deer crucial winter range as defined by NDOW and required in the 1985 Wells RMP (Appendix 2A) would reduce the potential for displacement and mortality during construction, O&M, and decommissioning during winter months in the Nevada portion of the analysis area.

Construction

Impacts on mule deer from construction of the wind-energy facility would include direct loss of habitat from surface disturbing activities and increased potential for injuries or fatalities from collisions with vehicles. Impacts from the avoidance of construction activity are also assumed. Traffic (Section 4.3.5) and other human-related activities would result in flight responses by mule deer and cause increased energy expenditure and potentially force animals into less desirable habitats. For instance, mule deer have been shown to move more than 0.5 miles when startled by humans (Krausman et al., 2006). The potential introduction of noxious weeds would decrease the quality of foraging habitat for mule deer; however, design features (Appendix 2A) would minimize the risk of noxious weed encroachment.

Operation and Maintenance

Impacts from O&M of the wind facility would include direct impacts such as injury or mortality from vehicle-big game collisions due to the increased vehicle traffic and loss of habitat from human-caused fires. Reconstructed roads and new project roads would indirectly increase public access to the project

area and would result in increased pressure from hunters and a higher likelihood of human-caused flight responses.

Avoidance of human activity and structures may vary, as Walter et al. (2006) found that elk roamed free and did not leave a wind-power development in Oklahoma. WEST (2010) found that mule deer distanced themselves from wind turbines as compared to pre-construction distributions, and that pronghorn did not alter their distribution in relation to wind turbine placement. However, studies on the effects of wind turbines on big game are lacking and some are not conclusive as to the causes of changes in big game distributions (WEST, 2010). A 2.3-mile behavioral avoidance distance from wind turbines and other project infrastructure is assumed for mule deer. Therefore, indirect impacts, such as avoidance of up to 2.3 miles from project structures, would result in lower mule deer densities within previously high quality habitats (Sawyer et al., 2006). Avoidance of these areas would displace mule deer to habitats adjacent to the project area resulting in increased competition for resources.

Decommissioning

Impacts on mule deer from decommissioning would be similar to those described for construction and associated with increased human and vehicle traffic that would cause temporary behavioral avoidance and potential vehicle-big game collisions.

Alternative B1 (Proposed Action)

Road densities within the project area would increase from an existing level of 2.9 miles per square mile to 4.1 miles per square mile. This would result in minor adverse impacts associated with increased access and vehicle traffic.

Avoidance of areas around construction, O&M, and decommissioning activities and structures, would result in moderate long-term adverse impacts on 116,770 acres of mule deer habitat; 54,400 of which is considered to be winter habitat.

Through an amendment to the 1987 Jarbidge RMP (Section 2.7.3.3), construction, O&M, and decommissioning could occur during seasonal restriction dates that are in place to prevent adverse impacts on big game during sensitive periods. These seasonal restriction periods are in place to protect mule deer during times of the year when they are especially vulnerable to disturbance and harassment. For example, allowing disruptive activities to occur when mule deer are on winter range could result in adverse impacts by displacing herds onto lesser quality winter habitat or causing physical exertion that would lead to exhaustion and potentially increase winter mortality. Lifting of these restrictions would have moderate to major short-term adverse impacts on mule deer during construction and decommissioning, and long-term minor adverse impacts during operation and maintenance.

Alternative B2a

Road densities within the project area would increase from 2.9 to 3.9 miles per square mile under Phase I. Construction of Phase II combined would increase road densities by 0.2 miles per square

mile resulting in road densities from Phase I and Phase II that are 4.1 miles per square mile, which is the same as Alternative B1. Increased road densities would result in minor adverse impacts on mule deer from disturbance associated with increased access and vehicle traffic.

Avoidance of areas around construction, O&M, and decommissioning activities and structures, would result in moderate long-term adverse impacts on 101,390 acres of mule deer habitat from Phase I; 54,240 acres of which is considered to be winter habitat. An additional 15,380 acres of mule deer habitat would be impacted from Phase II, of which 160 acres are winter habitat. Avoidance of project activities from Phase I and Phase II combined would result in moderate long-term adverse impacts on 116,700 acres of habitat, of which 54,400 acres are winter habitat as under Alternative B1. Implementation of two construction phases would result in a second pulse of human disturbance and noise on the project area, which would result in increased temporary behavior modifications compared to Alternative B1.

Amendments proposed to the 1987 Jarbidge RMP would be the same as Alternative B1 and result in the same impacts as Alternative B1.

Alternative B2b

Road densities within the project area would increase from 2.9 to 3.7 miles per square mile under Phase I. Construction of Phase II would increase road densities by 0.4 mile per square mile resulting in road densities from Phase I and Phase II combined that are 4.1 miles per square mile, which is the same as Alternative B1. Impacts on mule deer would be the same as Alternative B2a.

Avoidance of areas around construction, O&M, and decommissioning activities and structures, would result in moderate long-term adverse impacts on 92,980 acres of mule deer habitat from Phase I; 50,800 acres of which is considered to be winter habitat. An additional 23,790 acres of mule deer habitat would be impacted from Phase II, of which 3,600 acres are winter habitat. Avoidance of project activities from Phase I and Phase II combined would result in moderate long-term adverse impacts on 116,700 acres of habitat, of which 54,660 acres are winter habitat as under Alternative B1. Implementation of two construction phases would increase temporary disturbance of mule deer as under Alternative B2a.

An amendment to the 1987 Jarbidge RMP (Section 2.7.3.2) would allow construction and decommissioning to take place during seasonal restriction periods if certain exception criteria are met. Adherence to these criteria would minimize adverse impacts on mule deer herds during construction and decommissioning. Seasonal restrictions for major maintenance would be retained throughout O&M of the project, which would prevent disturbance within important seasonal habitat during these activities.

Alternative B2c

Road densities within the project area would increase the same as Alternative B2a for both Phase I and Phase II, resulting in impacts on mule deer that would be the same as Alternative B2a.

Avoidance of areas around construction, O&M, and decommissioning, activities and structures would result in moderate long-term adverse impacts on 112,650 acres of mule deer habitat from Phase I; 50,280 acres of which is considered to be winter habitat. An additional 4,120 acres of mule deer habitat would be impacted from Phase II, all of which are winter habitat. Avoidance of project activities from Phase I and Phase II combined would result in moderate long-term adverse impacts on 116,700 acres of habitat, of which 54,660 acres are winter habitat as under Alternative B1. Implementation of two construction phases would increase temporary disturbance of mule deer as under Alternative B2a.

Amendments proposed to the 1987 Jarbidge RMP would be the same as Alternative B2b and result in the same impacts as Alternative B2b.

Alternative C

Road densities within the project area would increase the same as Alternative B1, resulting in impacts on mule deer that are the same as Alternative B1.

Avoidance of areas around construction, O&M, and decommissioning activities and structures, would result in moderate long-term adverse impacts on 116,400 acres of mule deer habitat; 54,000 of which is considered to be winter habitat. This is a negligible (< 1%) decrease in mule deer habitat avoided compared to Alternative B1.

Amendments proposed to the 1987 Jarbidge RMP would be the same as Alternative B2b and result in the same impacts as Alternative B2b.

Alternative D

Road densities within the project area would increase from 2.9 to 3.9 miles per square mile. The increase in road densities would be slightly less than Alternative B1, but impacts on mule deer would be similar.

Avoidance of areas around construction, O&M, and decommissioning activities and structures, would result in moderate long-term adverse impacts on 101,950 acres of mule deer habitat; 53,450 of which is considered to be winter habitat. This is a minor (12%) decrease in mule deer habitat avoided compared to Alternative B1.

Amendments proposed to the 1987 Jarbidge RMP would be the same as Alternative B2b and result in the same impacts as Alternative B2b.

Alternative E

Road densities within the project area would increase from 2.9 to 4.0 mile per square mile. The increase in road densities would be slightly less than Alternative B1, but impacts on mule deer would be similar.

Avoidance of areas around construction, O&M, and decommissioning activities and structures, would result in moderate long-term adverse impacts on 114,750 acres of mule deer habitat; 52,480 of which is considered to be winter habitat. This is a negligible (< 2%) decrease in mule deer habitat avoided compared to Alternative B1.

All seasonal restrictions identified in the 1987 Jarbidge RMP and 1985 Wells RMP and any recent BLM updates to these restrictions would be followed. This alternative would provide the greatest level of protection to sensitive mule deer seasonal use areas from disturbances associated with all construction, O&M, and decommissioning activities.

Alternative F

Road densities within the project area would increase from 2.9 to 3.8 miles per square mile. The increase in road densities would be less than Alternative B1, but impacts on mule deer would be similar to Alternative B1.

Avoidance of areas around construction, O&M, and decommissioning activities and structures, would result in moderate long-term adverse impacts on 95,870 acres of mule deer habitat; 49,600 of which is considered to be winter habitat. This is a moderate decrease (18 %) in mule deer habitat avoided compared to Alternative B1.

Amendments proposed to the 1987 Jarbidge RMP would be the same as Alternative B2b and result in the same impacts as Alternative B2b.

Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Increases in traffic along the northern inbound haul route and reconstruction along portions of this route during the 2-year construction window would cause behavioral avoidance similar to that described for the action alternatives (2.3-mile avoidance area). This would result in minor short-term adverse impacts on 144,125 acres of mule deer habitat, of which 128,585 acres are winter habitat. Increased traffic would also lead to short-term adverse impacts from an increased risk of vehicle-big game collisions resulting in injuries or fatalities to mule deer. Once construction activities are complete, avoidance of this haul route is not expected until the road is used again for decommissioning of the project. Impacts from decommissioning activities would be the same as those described for construction. Impacts on mule deer from use of the northern inbound haul route by project vehicles during the O&M of the facility would be negligible.

For all phased alternatives, construction impacts would occur a second time following implementation of Phase II. Impacts would be similar to Phase I, except they would occur over a shorter duration and be associated with major increases in vehicle traffic, noise, and human disturbance.

Southern Inbound Haul Route Option 1

Reconstruction and construction of the haul route and subsequent increases in traffic along the haul route during the 2-year construction of the project would cause behavioral avoidance similar to that described for the northern inbound haul route. This would result in minor short-term adverse impacts on 38,300 acres of mule deer habitat, of which 11,320 acres are winter habitat. This is over 100,000 acres less than the avoidance area described for the northern inbound haul route.

Considering that the construction and reconstruction of the southern inbound haul route option 1 would widen and improve the condition of this road, the expected increase in vehicle traffic from project vehicles and the public would cause or greatly increase behavioral avoidance during all project stages. This would create minor long-term adverse impacts on 38,300 acres of mule deer habitat. Potential vehicle collisions during construction and decommissioning would be less than the northern inbound haul route because the southern inbound haul route is substantially shorter. However, the risk of collision during O&M would increase due to the expected increase public use of this road. Impacts on mule from use of the southern inbound haul route option 1 by project vehicles during the O&M of the facility would be negligible. Improved access for the public would create minor long-term adverse impacts from increased traffic, noise, and human disturbance. Impacts from decommissioning would be similar to those described for construction.

For all phased alternatives, construction impacts would occur a second time following implementation of Phase II. Impacts on mule deer along the southern inbound haul route would be greater under any of the phased alternatives as compared to the non-phased alternatives. Types of impacts would be the same as those described for the northern inbound haul route, but would occur over a much shorter distance.

Southern Inbound Haul Route Option 2

Types of impacts from the construction and use of the southern inbound haul route option 2 would be the same as option 1. Types of impacts from phased alternatives, O&M, and decommissioning would be the same as described for the southern inbound haul route option 1. However, impacts would occur on 40,450 acres of mule deer habitat, of which 12,400 acres are winter habitat. Impacts would occur to slightly more mule deer habitat than described for the southern inbound haul route option 1.

Outbound Haul Route

Increases in traffic along the outbound haul route during the 2-year construction window and during decommissioning would cause behavioral avoidance similar to that described for the northern inbound haul route. This would result in minor short-term adverse impacts on 66,850 acres of mule deer habitat, all of which are winter habitat. Increased traffic would also lead to short-term adverse impacts from an increased risk of vehicle-big game collisions resulting in injuries or fatalities to mule deer. Impacts on mule deer from use of the outbound haul route during O&M would be negligible. For the phased alternatives, this route would be used during two construction periods as described for the northern haul route.

Project as a Whole

Table 4.2.2-65 shows avoidance of mule deer habitat by alternative alone and combined with each of the three inbound haul route options. Alternative F with the either of the southern inbound haul route options would result in the least acres of impact on mule deer habitat, including winter habitat, through potential avoidance among the alternatives. Alternative B1 and the phased alternatives with the northern inbound haul route would result in the greatest acres of habitat avoided. The southern inbound haul route options would require major construction that would increase the size of the road as well as result in a permanent increase in access, as the newly constructed roads would not be reclaimed. The northern inbound haul route is an existing road that would require fewer acres of disturbance than the southern inbound haul routes that would be spread over a much larger area. Alternative B1 alone and phased alternatives alone would result in the greatest acres of habitat avoided and Alternative F would result in the least acres of habitat avoided.

Increases in road density over existing conditions would be highest for Alternative B1, the phased alternatives, and Alternative C and lowest for Alternative F. However, differences between road densities for each alternative would be minor (range 0.1 to 0.3 miles difference).

Table 4.2.2-65. Impact Summary Table for Project as a Whole – Acres of Mule Deer Habitat Avoided.

	Alt A	Alt B1	Alt B2a	Alt B2b	Alt B2c	Alt C	Alt D	Alt E	Alt F
Project Area									
Acres of Habitat Avoided	0	116,770	116,770	116,700	116,700	116,400	101,950	114,750	95,870
Acres of Winter Habitat Avoided	0	54,400	54,400	54,400	54,400	54,000	53,450	52,480	49,600
Project with Northern Inbound Haul Route									
Acres of Habitat Avoided[1]	0	247,570	247,570	247,570	247,570	247,220	232,770	245,550	226,690
Acres of Winter Habitat Avoided[1]	0	169,660	169,660	169,660	169,660	169,300	168,730	167,740	164,890
Project with Southern Inbound Haul Route Option 1									
Acres of Habitat Avoided[1]	0	123,230	123,230	123,230	123,230	122,860	119,530	121,250	115,090
Acres of Winter Habitat Avoided[1]	0	54,420	54,420	54,420	54,420	54,040	53,480	52,500	49,860
Project with Southern Inbound Haul Route Option 2									
Acres of Habitat Avoided[1]	0	122,840	122,840	122,840	122,840	122,470	119,460	121,040	115,000
Acres of Winter Habitat Avoided[1]	0	54,190	54,190	54,190	54,190	53,810	53,400	52,380	49,790

[1] Avoidance areas overlap for the project area and haul routes. Therefore, project as a whole avoidance areas are less than the sum of the individual avoidance areas defined for the project area and haul route as described in *Direct and Indirect Impacts of the Wind Energy Facility* and *Direct and Indirect Impacts of the Haul Routes.*

Cumulative Impacts

Cumulative impacts on mule deer consists of the impacts described for each alternative combined with other past, present, and reasonably foreseeable future actions. These effects would occur over the duration of the 30-year ROW grant. The cumulative effects analysis area covers 1 million acres in Idaho and Nevada. This analysis area was delineated by state wildlife biologists and represents the expanse of habitats likely used by mule deer that also utilize the project area.

Past, present, and future impacts on big game species include habitat degradation from invasive plant species, paved and unpaved roads, interspecific competition with livestock and other big game, wildfire and recreational activities including hunting and OHV use. Of the past, present and reasonably foreseeable actions described in Table 4.0.2-1, the Salmon Falls Dam to Wells 138 kV, Midpoint to Humboldt 345 kV, the proposed SWIP 500 kV, and other transmission lines, the Jackpot North and Stateline communication towers, an overhead telephone line, and various aboveground facilities are within the cumulative effects analysis area for big game species. Future operation of the wind project, when added to the impacts of these existing and proposed actions, would contribute to habitat degradation through potential avoidance of the project disturbance area.

Alternative A (No Action Alternative)

The No Action Alternative would not add cumulatively to existing impacts on mule deer because the facility would not be built. Habitat degradation from existing influences on mule deer would continue.

Alternative B1 (Proposed Action)

Alternative B1 would result in an increase of habitat avoided and add cumulatively to the existing and future impacts, which would result in moderate long-term adverse impacts on mule deer through habitat degradation.

Alternatives B2a, B2b, and B2c

Phase I would result in an increase of habitat avoided and add cumulatively to the existing and future impacts, which would result in moderate adverse impacts on mule deer through habitat degradation. Phase II would result in additional cumulative impacts through a minor increase in habitat avoidance. Phase I and Phase II combined would add cumulatively to existing and future impacts and result in moderate long-term adverse impacts on mule deer.

Alternatives C, D, E, and F

Cumulative impacts on mule deer would be similar to Alternative B1.

Rocky Mountain Elk

The analysis area for elk is the same as for mule deer, which is a 2.3-mile buffer around the project disturbance area and haul routes.

Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

Impacts on elk would be the same as those described for mule deer. Since a ROW would not be granted for development, impacts on elk would not occur. Current impacts on elk include hunting, human disturbance from recreation, loss of habitat to wildfire, and interspecific competition with livestock and other big game. The current road density within the project area is 2.9 miles/square mile.

Impacts Common to All Action Alternatives

Impacts from development would include negligible to minor long-term impacts on elk habitat associated with ground disturbance. Impacts on elk common to all action alternatives would be similar to those described for mule deer. These include direct loss of habitat through ground disturbance, behavioral avoidance of habitat from construction, operation, and decommissioning activities, and avoidance of habitat from an increased human presence and vehicle traffic resulting from increased road density associated with construction of the project.

Alternative B1 (Proposed Action)

Impacts on elk associated with road densities and amendments to the 1987 Jarbidge RMP would be the same as those described for mule deer under Alternative B1. Avoidance of areas around construction, O&M, and decommissioning activities and structures would result in moderate long-term adverse impacts on 86,290 acres of elk habitat.

Alternative B2a

Impacts on elk associated with road densities and amendments to the 1987 Jarbidge RMP would be the same as those described for mule deer under Alternative B2a. Avoidance of areas around construction, O&M, and decommissioning activities and structures would result in moderate long-term adverse impacts on 70,960 acres of elk habitat under Phase I. An additional 15,330 acres of elk habitat would be impacted under Phase II. Avoidance of project activities from Phase I and Phase II combined would result in moderate long-term adverse impacts on 86,290 acres of habitat as under Alternative B1. Implementation of two construction phases would result in a second pulse of human disturbance and noise in the project area, which would result in increased temporary behavior modification of elk compared to Alternative B1

Alternative B2b

Impacts on elk associated with road densities and amendments to the 1987 Jarbidge RMP would be the same as those described for mule deer under Alternative B2b. Avoidance of areas around construction, O&M, and decommissioning activities and structures would result in moderate long-term adverse impacts on 62,500 acres of elk habitat under Phase I. An additional 23,790 acres of habitat would be impacted under Phase II. Avoidance of project activities from Phase I and Phase II combined would result in moderate long-term adverse impacts on 86,290 acres of habitat, as under

Alternative B1. Implementation of two construction phases would increase temporary disturbance of elk, as seen under Alternative B2a.

Alternative B2c

Impacts on elk associated with road densities and amendments to the 1987 Jarbidge RMP would be the same as those described for mule deer under Alternative B2c. Avoidance of areas around construction, O&M, and decommissioning activities and structures would result in moderate long-term adverse impacts on 83,880 acres of elk habitat under Phase I. An additional 2,410 acres of habitat would be impacted under Phase II. Avoidance of project activities from Phase I and Phase II combined would result in moderate long-term adverse impacts on 86,290 acres of habitat, the same as Alternative B1. Implementation of two construction phases would increase temporary disturbance of elk, as under Alternative B2b.

Alternative C

Impacts on elk associated with road densities and amendments to the 1987 Jarbidge RMP would be the same as those described for mule deer under Alternative C. Avoidance areas would result in a long-term adverse impact on 86,290 acres of year-round elk habitat, the same as Alternative B1.

Alternative D

Impacts on elk associated with road densities and amendments to the 1987 Jarbidge RMP would be the same as those described for mule deer under Alternative D. Avoidance areas would result in a long-term adverse impact on 71,850 acres of year-round elk habitat, which is less than Alternative B1.

Alternative E

Impacts on elk associated with road densities and amendments to the 1987 Jarbidge RMP would be the same as those described for mule deer under Alternative E. Avoidance areas would result in a long-term adverse impact on 85,090 acres of year-round elk habitat under Phase I, which is less than of Alternative B1.

Alternative F

Impacts on elk associated with road densities and amendments to the 1987 Jarbidge RMP would be the same as those described for mule deer under Alternative F. Avoidance areas would result in a long-term adverse impact on 65,760 acres of year-round elk habitat, which is less than Alternative B1.

Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Increases in traffic along the northern inbound haul route and reconstruction of portions of this route during the 2-year construction window would cause similar types of impacts on elk as described for mule deer. Impacts from phased alternatives, O&M, and decommissioning would be the same as

those described for mule deer. Disturbance from construction, major maintenance and decommissioning activities and road use by vehicles would result in minor short-term avoidance of 46,420 acres of elk habitat.

Southern Inbound Haul Route Option 1

Types of impacts on elk from reconstruction and construction of the southern inbound haul route option 1 would be the same as those described for mule deer. Impacts from phased alternatives, O&M, and decommissioning would be the same as those described for mule deer. Disturbance from construction, major maintenance and decommissioning activities and road use by vehicles would result in short-term avoidance of 33,750 acres of elk habitat, which would be 12,000 acres less than the avoidance area described for the northern inbound haul route.

Southern Inbound Haul Route Option 2

Types of impacts on elk from reconstruction and construction of the southern inbound haul route option 2 would be the same as those described for mule deer. Types of impacts from phased alternatives, O&M, and decommissioning would be the same as those described for mule deer. Disturbance from construction, major maintenance, and decommissioning would result in short-term avoidance of 35,900 acres of elk habitat, which would be slightly more than option 1. The differences in impacts between southern inbound haul route option 1 and option 2 would be negligible.

Outbound Haul Route

Types of impacts on elk from construction of the project, phased alternatives, O&M, and decommissioning would be the same as those described for mule deer. A total of 8,570 acres of elk habitat would be avoided during use of this road during construction and decommissioning activities.

Project as a Whole

Table 4.2.2-66 shows avoidance of elk habitat by alternatives alone and combined with each of the three inbound haul route options. Alternative B1 or any of the phased alternatives in conjunction with the northern inbound haul route would impact the greatest number of acres of elk habitat. Alternative F in conjunction with the southern inbound haul route option 1 would have the fewest impacts on elk habitat. However, the southern inbound haul route options would require major construction that would increase the size of the road as well as result in a permanent increase in access, as the newly constructed roads would not be reclaimed. The northern inbound haul route is an existing road that would require fewer acres of disturbance that would be spread over a much larger area. Alternative F alone would result in the least amount of habitat avoided of all action alternatives. Increases in road densities by the alternative would be the same as described for mule deer.

Table 4.2.2-66. Impact Summary Table for Project as a Whole – Acres of Elk Habitat Avoided.

	Alt A	Alt B1	Alt B2a	Alt B2b	Alt B2c	Alt C	Alt D	Alt E	Alt F
Project Area									
Acres of Habitat Avoided	0	86,290	86,290	86,290	86,290	86,290	71,850	85,090	65,760
Project with Northern Inbound Haul Route									
Acres of Habitat Avoided	0	132,710	132,710	132,710	132,710	132,710	118,270	131,510	112,180
Project with Southern Inbound Haul Route Option 1									
Acres of Habitat Avoided[1]	0	92,740	92,740	92,740	92,740	92,740	89,420	91,590	84,970
Project with Southern Inbound Haul Route Option 2									
Acres of Habitat Avoided[1]	0	94,490	94,490	94,490	94,490	94,490	91,480	93,500	87,040

[1] Avoidance areas overlap for the project area and both southern haul routes. Therefore, project as a whole avoidance areas are less than the sum of the individual avoidance areas defined for the project area and southern haul routes as described in *Direct and Indirect Impacts of the Wind Energy Facility* and *Direct and Indirect Impacts of the Haul Routes.*

Cumulative Impacts

The past, present, and future actions within the analysis area for elk are and would be the same as described for mule deer.

Cumulative impacts on elk consist of the impacts described for each alternative combined with other past, present, and reasonably foreseeable future actions. These effects would occur over the duration of the 30-year ROW grant. The cumulative effects analysis area covers 516,000 acres in Idaho and Nevada. This analysis area was delineated by state wildlife biologists and represents the expanse of habitats likely used by elk that also utilize the project area.

Alternative A (No Action Alternative)

The No Action Alternative would not add cumulatively to existing impacts on elk because the facility would not be built. Habitat degradation from existing influences on elk would continue.

Alternative B1 (Proposed Action)

Alternative B1 would result in an increase of habitat avoided and add cumulatively to the existing and future impacts, which would result in minor to moderate long-term adverse impacts on elk through habitat degradation.

Alternatives B2a, B2b, and B2c

Phase I would result in an increase of habitat avoided and add cumulatively to the existing and future impacts, which would result in moderate adverse impacts on elk through habitat degradation. Phase II would result in additional cumulative impacts through a minor increase in habitat avoidance. Phase I and Phase II combined would add cumulatively to existing and future impacts and result in moderate long-term adverse impacts on elk.

Alternatives C, D, E, and F

Cumulative impacts would be similar to Alternative B1.

American Pronghorn

The analysis area for pronghorn is the same as that described for mule deer.

Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

Impacts on pronghorn would be the same as that described for mule deer.

Impacts Common to All Action Alternatives

Impacts on pronghorn common to all action alternatives would be the same as that described for mule deer. Application of the seasonal restrictions in pronghorn winter range and kidding areas as defined by NDOW and required in the 1985 Wells RMP (Appendix 2A) would reduce the potential for displacement or mortality of pronghorn during construction, maintenance, and decommissioning during the seasonal restriction periods within winter range and kidding areas (if known) in the Nevada portion of the analysis area.

Alternative B1 (Proposed Action)

Avoidance of areas around construction, O&M, and decommissioning activities and structures would result in moderate long-term adverse impacts on 111,170 acres of pronghorn habitat; 38,490 acres of which is considered to be winter habitat.

Impacts on pronghorn associated with road densities and amendments to the 1987 Jarbidge RMP would be the same as those described for mule deer under Alternative B1.

Alternative B2a

Impacts on pronghorn associated with road densities and amendments to the 1987 Jarbidge RMP would be the same as those described for mule deer under Alternative B2a. Avoidance of areas around construction, O&M, and decommissioning activities and structures would result in moderate long-term adverse impacts on 95,790 acres of pronghorn habitat under Phase I; 38,380 acres of which is considered to be winter habitat. An additional 15,380 acres of pronghorn habitat would be impacted under Phase II, of which 110 acres are winter habitat. Avoidance of project activities from Phase I and Phase II combined would result in moderate long-term adverse impacts on 111,170 acres of pronghorn habitat, 38,490 acres of which is considered to be winter habitat, as under Alternative B1. Implementation of two construction phases would result in a second pulse of human disturbance and noise in the project area, which would result in increased temporary behavior modifications of pronghorn compared to Alternative B1.

Alternative B2b

Impacts on pronghorn associated with road densities and amendments to the 1987 Jarbidge RMP would be the same as those described for mule deer under Alternative B2b. Avoidance of areas around construction, O&M, and decommissioning activities and structures would result in moderate long-term adverse impacts on 87,380 acres of pronghorn habitat under Phase I; 33,890 acres of which is considered to be winter habitat. An additional 23,790 acres of pronghorn habitat would be impacted under Phase II of which 4,610 acres are winter habitat. Avoidance of project activities from Phase I and Phase II combined would result in moderate long-term adverse impacts on 111,170 acres of pronghorn habitat, 38,490 acres of which is considered to be winter habitat, as under Alternative B1. Implementation of two construction phases would increase temporary disturbance of pronghorn, as under Alternative B2a.

Alternative B2c

Impacts on pronghorn associated with road densities and amendments to the 1987 Jarbidge RMP would be the same as those described for mule deer under Alternative B2c. Avoidance of areas around construction, O&M, and decommissioning and activities and structures would result in moderate long-term adverse impacts on 107,060 acres of pronghorn habitat under Phase I; 35,260 acres of which is considered to be winter habitat. An additional 4,110 acres of pronghorn habitat would be impacted under Phase II, of which 3,230 acres are winter habitat. Avoidance of project activities from Phase I and Phase II combined would result in moderate long-term adverse impacts on 111,170 acres of pronghorn habitat, 38,490 acres of which is considered to be winter habitat; as under Alternative B1. Implementation of two construction phases would increase temporary disturbance of pronghorn, as under Alternative B2a.

Alternative C

Impacts on pronghorn associated with road densities and amendments to the 1987 Jarbidge RMP would be the same as those described for mule deer under Alternative C. Avoidance of areas around construction, O&M, and decommissioning activities and structures would result in moderate long-term adverse impacts on 110,800 acres of pronghorn habitat; 38,130 acres of which is considered to be winter habitat. This is a slight decrease compared to Alternative B1, but impacts would be similar.

Alternative D

Impacts on pronghorn associated with road densities and amendments to the 1987 Jarbidge RMP would be the same as those described for mule deer under Alternative D. Avoidance of areas around construction, O&M, and decommissioning activities and structures would result in moderate long-term adverse impacts on 96,360 acres of pronghorn habitat; 35,595 acres of which is considered to be winter habitat. This is a slight decrease compared to Alternative B1, but impacts would be similar.

Alternative E

Impacts on pronghorn associated with road densities and amendments to the 1987 Jarbidge RMP would be the same as those described for mule deer under Alternative E. Avoidance of areas around

construction, O&M, and decommissioning activities and structures would result in moderate long-term adverse impacts on 109,160 acres of pronghorn habitat; 36,600 acres of which is considered to be winter habitat. This is a slight decrease compared to Alternative B1, but impacts would be similar.

Alternative F

Impacts on pronghorns associated with road densities and amendments to the 1987 Jarbidge RMP would be the same as those described for mule deer under Alternative F. Avoidance of areas around construction, O&M, and decommissioning activities and structures would result in moderate long-term adverse impacts on 90,275 acres of pronghorn habitat; 32,955 acres of which is considered to be winter habitat. This is a slight decrease compared to Alternative B1, but impacts would be similar.

Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Increases in traffic along the northern inbound haul route and reconstruction or portions of this route during the 2-year construction window would cause similar types of impacts on pronghorn as described for mule deer. Impacts from phased alternatives, O&M, and decommissioning would be the same as those described for mule deer. Disturbance from construction, major maintenance, and decommissioning activities and road use by vehicles would result in minor short-term avoidance of 86,460 acres of pronghorn habitat, of which 84,120 acres are winter habitat.

Southern Inbound Haul Route Option 1

Types of impacts on pronghorn from construction of the southern inbound haul route option 1 would be the same as those described for mule deer. Impacts from phased alternatives, O&M, and decommissioning would be the same as those described for mule deer. Disturbance from construction, major maintenance, and decommissioning activities and road use by vehicles would result in minor short-term avoidance on 33,610 acres of pronghorn habitat, of which 11,585 acres are winter habitat.

Southern Inbound Haul Route Option 2

Types of impacts on pronghorn from construction of the southern inbound haul route option 2 would be the same as those described for mule deer. Types of impacts from phased alternatives, O&M, and decommissioning would be the same as those described for mule deer. Disturbance from construction, major maintenance and decommissioning activities and road use by vehicles would result in minor short-term avoidance of 35,745 acres of pronghorn habitat, of which 13,110 acres are winter habitat.

Outbound Haul Route

Types of impacts on pronghorn from construction of the project, phased alternatives, O&M, and decommissioning would be the same as those described for mule deer. This would result in minor short-term avoidance of 79,155 acres of pronghorn habitat, of which 77,870 acres are winter habitat.

Project as a Whole

Table 4.2.2-67 shows avoidance of pronghorn habitat by alternatives alone and combined with each of the three inbound haul route options. Alternative F with the either of the southern inbound haul route options would have the least acres of impact on pronghorn habitat, including winter habitat, through potential avoidance among the alternatives. However, the southern inbound haul route options would require major construction that would increase the size of the road as well as result in a permanent increase in access, as the newly constructed roads would not be reclaimed. The northern inbound haul route is an existing road that would require fewer acres of disturbance that would be spread over a much larger area. Alternative B alone and the phased alternatives alone (full build out) would result in the greatest acres of habitat avoided, and AHF would result in the least amount of habitat avoided of all action alternatives.

Increases in road densities by alternative would be the same as described for mule deer.

Table 4.2.2-67. Impact Summary Table for Project as a Whole – Acres of Pronghorn Habitat Avoided.

	Alt A	Alt B1	Alt B2a	Alt B2b	Alt B2c	Alt C	Alt D	Alt E	Alt F
Project Area									
Acres of Habitat Avoided	0	111,170	111,170	111,170	111,170	110,800	96,360	109,160	90,275
Acres of Winter Habitat Avoided	0	38,490	38,490	38,490	38,490	38,130	35,595	36,600	32,955
Project with Northern Inbound Haul Route									
Acres of Habitat Avoided[1]	0	184,300	184,300	184,300	184,300	183,960	169,515	182,295	163,430
Acres of Winter Habitat Avoided[1]	0	109,280	109,280	109,280	109,280	108,940	106,400	107,385	103,765
Project with Southern Inbound Haul Route Option 1									
Acres of Habitat Avoided[1]	0	117,620	117,620	117,620	117,620	117,255	113,930	115,650	109,490
Acres of Winter Habitat Avoided[1]	0	41,340	41,340	41,340	41,340	40,980	40,430	39,450	37,810
Project with Southern Inbound Haul Route Option 2									
Acres of Habitat Avoided[1]	0	119,370	119,370	119,370	119,370	119,000	115,995	117,570	111,550
Acres of Winter Habitat Avoided[1]	0	42,660	42,660	42,660	42,660	42,295	41,885	40,865	39,270

[1] Avoidance areas overlap for the project area and haul routes. Therefore, project as a whole avoidance areas are less than the sum of the individual avoidance areas defined for the project area and haul route as described in *Direct and Indirect Impacts of the Wind Energy Facility* and *Direct and Indirect Impacts of the Haul Routes.*

Cumulative Impacts

Cumulative impacts on pronghorn consist of the impacts described for each alternative combined with other past, present, and reasonably foreseeable future actions. These effects would occur over the duration of the 30-year ROW grant. The cumulative impacts analysis area for pronghorn encompasses 639,000 acres in Idaho and Nevada. The past, present, and future actions within the analysis area for pronghorn are and would be the same as described for mule deer.

Alternative A (No Action Alternative)

The No Action Alternative would not add cumulatively to existing impacts on pronghorn because the facility would not be built. Habitat degradation from existing influences on pronghorn would continue.

Alternative B1 (Proposed Action)

Alternative B1 would result in an increase of habitat avoided and add cumulatively to the existing and future impacts, which would result in moderate long-term adverse impacts on pronghorn through habitat degradation.

Alternatives B2a, B2b, and B2c

Phase I would result in an increase of habitat avoided and add cumulatively to the existing and future impacts, which would result in moderate adverse impacts on pronghorn through habitat degradation. Phase II would result in additional cumulative impacts through a minor increase in habitat avoidance. Phase I and Phase II combined would add cumulatively to existing and future impacts and result in moderate long-term adverse impacts on pronghorn.

Alternatives C, D, E, and F

Cumulative impacts on pronghorn would be similar to Alternative B1.

4.3 SOCIAL AND ECONOMIC RESOURCES

4.3.1 HISTORIC AND CULTURAL RESOURCES

4.3.1.1 Analysis Methods

The analysis area for historic and cultural resources includes a 500-foot-wide corridor around all project features and haul routes (250 feet on each side).

Indicators

Section 106 of the National Historic Preservation Act, as amended, requires Federal agencies to consider the effects of their actions on historic properties and seek comments from an independent reviewing agency, the Advisory Council on Historic Preservation (ACHP). The purpose of Section 106 is to avoid unnecessary harm to historic properties from Federal actions. The procedures for meeting Section 106 requirements are defined in ACHP regulations (36 CFR 800). The Section 106 process includes steps for identifying and evaluating historic properties, assessing effects of an undertaking on them, and consultation about ways to avoid, reduce, minimize, or otherwise address

any possible adverse effects. Assessments of effects on archaeological sites have been calculated based on the following indicators:

- Impacts on number and acreage of identified archaeological sites, based on results of archaeological survey.
- Impacts on number of projected archaeological sites, as determined by analysis of results of sampling procedures.
- Projected acreage of impacts on archaeological sites.

Inventory and Evaluation

Because of the size and complexity associated with design of the project, BLM is using a phased cultural resource identification and evaluation approach to identify specific cultural resources within the project area. Under this approach, BLM would continue completion of field surveys (intensive BLM Class III inventory) during preparation of the Final EIS. The Class III field inventory would identify all archaeological and historic sites that may be directly or indirectly affected by the project. Properties of religious or cultural importance to the Tribes would be identified through consultation or ethnographic research rather than through field inventory.

Four criteria of evaluation are considered to assess site significance. These criteria serve as the standards by which every property nominated to the National Register of Historic Places is judged. The criteria are written broadly to recognize the Nation's wide variety of historic properties, and to identify the range of resources and kinds of significance that qualify properties for National Register listing. The criteria recognize associative, design, and information values, as listed in the CFR Title 36, Part 60:

The quality of significance in American history, architecture, archeology, engineering and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling and association, and

A. That are associated with events that have made significant contributions to the broad pattern of our history; or
B. That are associated with the lives of persons significant in our past; or
C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
D. That have yielded, or may be likely to yield, information important in prehistory or history.

To be listed in the National Register, a property must not only be shown to be significant under one or more criteria, but it also must have integrity. Within the concept of integrity, the National Register recognizes seven aspects or qualities that, in various combinations, define integrity (U.S. Department

of the Interior [USDI], 1998:44). The seven aspects of integrity are location, design, setting, materials, workmanship, feeling, and association. It is recognized that all properties change over time, and it is not necessary for one to retain all historic physical characteristics or features. It must, however, retain essential physical features that enable it to convey its historic identity that define why it is significant and when it was significant (USDI, 1998:44).

Assessing Effects

Sites that are determined eligible to the National Register (i.e., historic properties) require that effects of a proposed project to that resource be determined. If historic properties are identified and would be adversely affected by the project implementation, then prudent and feasible measures to avoid or reduce adverse impacts must be taken. In addition, the ACHP and the State Historic Preservation Officers (SHPOs) must be provided an opportunity to review and comment on these measures. The ACHP has adopted regulations (36 CFR 800) that implement this commenting authority.

Adverse effects occur when an undertaking may directly or indirectly alter characteristics of a historic property that qualify it for inclusion in the National Register. Reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative also need to be considered. Examples of potential adverse effects for the project might include physical destruction or damage; change of use or physical features of a property setting; or visual, atmospheric, or audible intrusions.

The present evaluation of impacts depends on a comprehensive review of existing literature and site-file databases and sample field surveys of proposed alternatives. Tribal views concerning project effects on cultural resources are obtained through ongoing government-to-government consultation.

Sufficient archival research and sample inventory have been conducted to determine the range of archaeological and historical resources likely to be encountered within the project area. However, since the Class III cultural resources field inventory has not been completed for the entire project area, it is not possible to identify all potential impacts on cultural resources in this DEIS. After all archaeological and historical sites and other sites and areas with traditional cultural value within the project area have been identified and evaluated it would be possible to evaluate impacts for all resources designated as historic properties (eligible for listing on the National Register of Historic Places). BLM would complete inventory, identification, and evaluation procedures before beginning any ground-disturbing construction activities in the project area (Appendix 2A). Additionally, to comply with Section 106 of the National Historic Preservation Act, before ground disturbance occurs, BLM would develop a Programmatic Agreement, in consultation with the ACHP, the affected SHPOs, affected Tribes, the project proponent, and other interested parties, to take into account adverse effects on cultural resources (Appendix 2A). The Programmatic Agreement is a document that spells out the terms of a formal, legally binding agreement between the state and Federal agencies involved in the project, including the BLM, state SHPOs, and ACHP. The Programmatic Agreement would establish a process for consultation, review, and historic preservation compliance, and it would describe the actions that would be taken by the parties in order to meet their compliance

responsibilities. The Programmatic Agreement would be approved by the BLM, Nevada and Idaho SHPOs, and, if they choose to participate, the ACHP, affected Tribes, and other consulting parties. Similarly, a Treatment Plan approved by BLM and the SHPOs, and implementation of the Treatment Plan, before issuance of Notice to Proceed and ground-disturbing activities would be developed (Appendix 2A). The Treatment Plan would be a technically oriented document that provides recommendations for the treatment and analysis of archaeological remains identified for mitigation in the Programmatic Agreement, as well as specific research issues and analytical approaches appropriate for the study examination of each issue.

Consequently, the following discussion focuses on common impacts, which would occur at any significant resource found in the project area. In some cases, it is possible to note the presence of certain resources and note the potential for adverse impacts within specific alternatives, although in most cases, full recording and National Register of Historic Places evaluations have not been completed. Selection of preferred alternative segments and design of the final project layout would take into account archaeological sensitivity and historic properties to the extent feasible.

Methods and Assumptions

Comprehensive archaeological inventory of all project components has not yet been completed. Sufficient studies, however, have been conducted to allow for adequate comparison of alternatives, based on an analysis of the relative density of archaeological sites within the footprints of the proposed alternatives, as determined by archaeological sampling. To date, 4,035 acres within the project area have been subject to archaeological inventory, resulting in the identification of 486 sites, or an average of one site per 8.3 acres surveyed. As discussed below, site densities, by frequency, vary for each alternative, ranging from one site for every 11.1 to 20.3 acres surveyed. Such variation in densities results from a number of factors. For example, the proposed project footprint surveyed in 2009 was modified in 2010, resulting in a great many sites located within surveyed project road and transmission line corridors no longer falling within the Area of Potential Affect (APE). In addition, certain areas within the APE contain large exposures of naturally occurring tool stone, resulting in the recordation of very extensive archaeological sites. This resulted in some areas containing a low number of very large sites, while other areas contain a large number of small sites. Such factors resulted in the variable site densities and projected densities given below.

Total numbers of archaeological sites and acreage were derived using GIS data, comparing the known sites with project area layout footprints for each alternative. These figures were then used to derive site densities, and such density figures were used to project estimated numbers of sites based on overall acreage for each alternative.

Within each of the alternatives, an average of 45 to 70 percent of the Area of Potential Effect has been examined, a sample size that is more than sufficient for the current analysis. Evaluation of the significance of identified resources, however, has not yet been completed. Consequently, the analysis presented below is based upon the classes of resources identified within each of the alternatives.

Cultural resources identified during archaeological inventory were placed within one of six site classes based on the amount of surface artifacts observed. These artifact quantity classes are consistent with those used in the Intermountain Antiquities Computer System Guide for recording lithic debitage quantities. Class I sites were identified as those containing from one to five surface artifacts, with or without associated features. Class II sites contain 6 to 24 artifacts, while Class III sites contain 25 to 99 artifacts, Class IV sites have 100 to 499 surface artifacts, and Class V contain 500 or more surface artifacts, with or without features. Class VI sites consist only of cultural features with no associated artifacts.

Based on their limited data potential, the Class I and Class VI sites are likely not eligible for listing on the National Register of Historic Places. The National Register of Historic Places eligibility status of the Class II, III, IV, and V sites has not been determined.

4.3.1.2 Direct and Indirect Impacts of the Wind Energy Facility

Cultural resources may be subject to threat from a multitude of factors in the environmental setting. Key among these are natural agents and human agents, the latter including incidental actions and intentional actions. When sites are damaged, important information about past lifeways is lost, since physical evidence left behind by former peoples is fragile, finite, and cannot renew itself once it has been disturbed.

Natural processes and events include severe storms, ranging from isolated thunderstorms to intense low pressure systems that produce phenomena such as heavy rains and snow, lightning, flooding, landslides, and sediment translocation and deposition. The erosive actions of wind and water may take a great toll on cultural materials, leading to loss of items and cultural deposits, the burying of cultural resources, or the movement and redeposition of cultural materials. Brush fires, common during the summer months, also have the potential for secondary effects such as increased erosion or landslides.

Alternative A (No Action Alternative)

Under the No Action Alternative, no direct, indirect, or cumulative impacts on cultural resources would occur.

Impacts Common to All Action Alternatives

As noted above, sample archaeological inventory of approximately 49 percent of the APE has resulted in the identification of some 486 archaeological sites in the project area; based on observed site density, completion of this inventory would likely approximately double this number. No one alternative would avoid impacts on these resources, although the number of impacted sites does vary by alternative. In addition, construction of any of the identified alternatives would result in visual impacts on historic Toana Freight Wagon Road, as well as to potential traditional cultural properties (TCPs) or other locations of concern to Native Americans. Implementation of BMPs for cultural and paleontological resources would help to reduce impacts to cultural sites (Appendix 2A).

Construction

Human-caused impacts include a broad array of incidental and intentional actions that are not totally independent of each other. Establishment of the wind energy facility, for example, may create interrelated potential impacts, both in the short- and long-term, such as a rise in the incidence of vandalism or depreciative behavior. Incidental actions include activities whose primary motive is not the destruction of archaeological sites and data, but the end result is that impacts lead to either partial or total damage or the mixing and displacement of resources. Such actions are associated with land development and resource exploitation, including increased recreational use due to enhanced access, such as camping, hiking, hunting, wildlife and wildflower viewing, rock hounding, and off-highway vehicle touring and free-play (i.e., cross country travel); construction of project facilities, including wind turbines, project roads, and transmission lines (Gassaway, 2009).

Intentional actions are those activities, guided by personal or commercial gain, that lead to loss of archaeological sites and data. The most widespread form of this activity is looting or vandalism, Harmful activities may include illicit excavation of archaeological deposits, surface collection of artifacts, defacement or dismantling of cultural features, and rearrangement or relocating of artifacts, which compromises their setting and archaeological context. Reconstruction of existing roads, coupled with construction of new roads to project facilities, also has the potential to increase visitor use and opportunities for looting or vandalism.

Nearly all potential direct physical impacts on cultural resources would occur during the construction phase, specifically within the designated ROW. There would be additional construction-related ground disturbances at quarry sites, road crossings, temporary project roads, borrow pits, spoils areas or piles, or other ancillary facility areas. There could also be various forms of indirect impacts during construction. For example, large numbers of workers in the project area would increase the potential for both intentional and unintentional impacts on nearby cultural resources. Excavation and other construction-related ground-disturbing activities could unearth additional cultural materials that, based on previous archaeological surveys, were either thought to occur only at the surface or were previously undetected because they were completely buried. Improved access to remote areas could also increase the likelihood of intentional looting or other damage to archaeological properties during the construction and operation phases of the project. Another indirect impact that would be unavoidable from construction of the project would be visual intrusion effects on the historic Toana Freight Wagon Road, recorded and evaluated as National Register of Historic Places eligible in Idaho and potentially significant but not yet studied in Nevada. Potential TCPs may also be susceptible to visual effects, though a comprehensive study of TCPs has not yet been completed. A more detailed discussion of visual impacts from the project is discussed in Section 4.3.4.

Operation and Maintenance

Activities related to the operation and maintenance of the wind energy facility would have little or no impacts on cultural resources, provided such activities do not involve ground breaking or off-road travel. Reconstruction of existing roads, associated with major maintenance activities, have the potential to cause direct adverse effects on cultural resources. Normal operation and maintenance related activities would have minimal indirect impacts on cultural resources, most likely the result of the occasional increase in the presence of O&M personnel.

Impacts related to the 30-year O&M of the facility would likely be fewer than those of the construction phase. There could be various forms of indirect impacts. For example, the presence of O&M workers would increase the potential for both intentional and unintentional impacts on nearby cultural resources. Improved access to the project area could increase the likelihood or intentional looting or other damage to archaeological properties.

Decommissioning

Activities associated with decommissioning of the wind energy facility would include ground disturbance that would have the potential to directly impact cultural resources. Activities such as the removal of concrete and gravel, back-filling with native soils, removal of fencing and underground cables, regrading, and revegetation would have the potential to disturb, damage, or remove cultural resources. The pre-project level of public access would remain the same, resulting in no increase in indirect impacts, such as vandalism or looting.

Decommissioning of the facility after 30 years would establish reclamation of the project area. Activities related to removing parts would take up to 2 years and introduce the potential for impacts on cultural resources. There would be additional ground disturbances to reconstruct project roads, as well as to the facilities for decommissioning, including meteorological towers, turbine pads, the transmission line, site compound, and other ancillary facility areas. There could also be various forms of indirect impacts. For example, the presence of workers would increase the potential for both intentional and unintentional impacts on nearby cultural resources.

Alternative B1 (Proposed Action)

The cultural resources inventory of the Alternative B1 area included 2,675 acres, representing a 49 percent sample of the total 5,441 acres (Table 4.3.1-1). The survey resulted in the identification of 177 resources, or one site per 15.1 acres surveyed, including prehistoric, historic, and multiple component sites (Table 4.3.1-1). Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 101 sites, (57% of the known total), and a total impact on 111 acres of archaeological site area. These resources include 6 Class I, 32 Class II, 14 Class III, 10 Class IV, 33 Class V, 3 Class VI, and 3 unspecified class (Table 4.3.1-2). Potentially significant visual impacts on the historic Toana Freight Wagon Road would result from selection of this alternative, given the placement of a large number of turbines on the ridgelines that run along the eastern margins of the project area. Visual impacts on potential TCPs have not yet been identified.

Using data from the sample survey, it is estimated that inventory of the remaining 2,237 acres within the layout for this alternative would result in the identification of an additional 183 archaeological resources for a total of 360 sites, including prehistoric, historic, and multiple component sites. Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 205 of the projected 360 sites. A projected total acreage of archaeological site impact, based on results of sample survey, is approximately 226 acres. These resources could include 12 Class I, 65 Class II, 28 Class III, 21 Class IV, 67 Class V, 6 Class VI, and 6 unspecified class (Table 4.3.1-3).

Table 4.3.1-1. Alternatives by Acreage, Known Sites[1], and Projected Sites.

Alternative	Total Acres	Surveyed Acres	Site Density (Acres/Site)	# Known Sites	# Known Sites with Potential for Impact	# Projected Sites (Complete inventory)	# Projected Sites with Potential for Impact
B1	5,441	2,675	15.1	177	101	361	205
B2a, Phase I	4,078	1,841	17.2	107	49	237	109
B2a, Phase II	1,581	964	11.1	87	54	143	89
B2a Phase I and II	5,659	2,805	14.5	194	103	390	206
B2b Phase I	4,092	1,980	13.6	146	82	303	169
B2b Phase II	1,517	770	20.3	38	24	76	48
B2b Phase I and II	5,609	2,750	14.9	184	106	379	217
B2e Phase I	4,430	2,036	15.4	132	76	287	166
B2c Phase II	1,454	999	15.9	63	34	92	49
B2e Phase I and II	5,884	3,035	15.6	195	110	379	215
C	5,209	2,532	14.8	171	97	352	199
D	4,715	2,293	13.9	165	93	339	190
E	4,956	2,416	14.4	168	98	344	201
F	4,421	2,186	13.5	162	90	327	182

[1] Sites inelude prehistorie, historie and multiple eomponent site.

Table 4.3.1-2. Known Site[1] Data by Site Class and Potential Impact.

Alternative	#Known Sites	#Known Sites with Potential Impact	No. of Known Sites with Potential Impact by Class						
			Class I	Class II	Class III	Class IV	Class V	Class VI	Undetermined Class
B1	177	101	6	32	14	10	33	3	3
B2a, Phase I	107	49	2	19	5	6	13	2	2
B2a, Phase II	87	54	4	13	9	4	22	1	1
B2a Phase I and II[2]	194	103	6	32	14	10	35	3	3
B2b Phase I	146	82	6	30	12	9	18	3	4
B2b Phase II	38	24	0	2	2	2	16	2	0
B2b Phase I and II[2]	184	106	6	32	14	11	34	5	4
B2e Phase I	132	76	4	19	12	6	32	0	3
B2e Phase II	63	34	2	15	2	6	6	3	0
B2e Phase I and II[2]	195	110	6	34	14	12	38	3	3
C	171	97	6	30	14	9	33	2	3
D	165	93	6	30	13	9	30	2	3
E	168	98	6	30	14	10	33	2	3
F	162	90	6	28	13	8	30	2	3

[1] Sites inelude prehistorie, historie and multiple eomponent site.
[2] Known number of sites impaeted for full build out of the phased alternatives would be slightly greater than for Alternative B1 due to repeat disturbanee of some areas during Phase II.

Table 4.3.1-3. Projected Site[1] Data by Site Class and Potential Impact.

Alternative	#Projected Sites (Full inventory)	#Projected Sites with Potential Impact	No. of Known Sites with Potential Impact by Class						
			Class I	Class II	Class III	Class IV	Class V	Class VI	Undetermined Class
B1	360	205	12	65	28	21	67	6	6
B2a, Phase I	237	109	5	42	11	13	28	5	5
B2a, Phase II	143	89	6	21	15	7	36	2	2
B2a Phase I and II[2]	390	206	12	64	28	20	70	6	6
B2b Phase I	303	169	12	61	26	19	37	7	7
B2b Phase II	76	48	0	4	4	4	32	4	0
B2b Phase I and II[2]	379	217	12	65	30	23	69	11	7
B2e Phase I	287	166	9	42	27	13	70	0	5
B2e Phase II	92	49	3	21	3	9	9	4	0
B2e Phase I and II[2]	379	215	12	63	30	22	79	4	5
C	352	199	12	62	28	18	69	4	6
D	339	190	12	61	27	19	61	4	6
E	344	201	12	62	29	20	68	4	6
F	327	182	13	37	26	16	61	4	5

[1] Sites inelude prehistorie, historie and multiple eomponent site.
[2] Projeeted number of sites impaeted for full build out of the phased alternatives would be slightly greater than for Alternative B1 due to repeat disturbanee of some areas during Phase II.

Alternative B2a

Phase I

The cultural resources inventory of the Alternative B2a Phase I area included 1,841 acres, representing a 45 percent sample of the total 4,078 acres (Table 4.3.1-1). The survey resulted in the identification of 107 known resources (Table 4.3.1-1). Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 49 known sites, 82 acres of which would be affected. These resources include 2 Class I, 19 Class II, 5 Class III, 6 Class IV, 13 Class V, 2 Class VI, and 2 unspecified class (Table 4.3.1-2). Potentially significant visual impacts on the historic Toana Freight Wagon Road would result from selection of this alternative, given the placement of a large number of turbines on the ridgelines that run along the eastern margins of the project area. Visual impacts on potential TCPs have not yet been identified.

Using data from the sample survey, it is estimated that inventory of the remaining 2,237 acres within the layout for Phase I of this alternative would result in the identification of an additional 130 archaeological resources for a total of 237 sites. Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 109 of the projected 237 sites, with a projected impact on 182 acres of archaeological site area. These resources could include 5 Class I, 42 Class II, 11 Class III, 13 Class IV, 28 Class V, 5 Class VI, and 5 unspecified class (Table 4.3.1-3).

Phase II

The cultural resources inventory of the Alternative B2a Phase II area included 964 acres, representing a 61 percent sample of the total 1,581 acres. The survey resulted in the identification of 87 resources (Table 4.3.1-1). Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 54 sites, 31 acres of which would be affected. These resources include 4 Class I, 13 Class II, 9 Class III,4 Class IV, 22 Class V, 1 Class VI, and 1 unspecified class (Table 4.3.1-2). Addition of Phase II turbines would not significantly add to visual impacts on Toana Freight Wagon Road, given the placement of new turbines to the west of the Phase I turbines.

Using data from the sample survey, it is estimated that inventory of the remaining 617 acres within the layout for this alternative would result in the identification of an additional 56 archaeological resources for a total of 143 sites. Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 89 of the projected 143 sites, or a total affected acreage of 51 acres. These resources could include 6 Class I, 21 Class II, 15 Class III, 7 Class IV, 36 Class V, 2 Class VI, and 2 unspecified class (Table 4.3.1-3).

Phase I and Phase II

The cultural resources inventory of the combined Alternative B2a Phase I and Phase II areas included 2,805 acres, representing a 49 percent sample of the total 5,659 acres. The survey resulted in the identification of 194 resources (Table 4.3.1-1). Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 103 sites individual archaeological sites, or 113 acres.

These resources include 6 Class I, 32 Class II, 14 Class III, 10 Class IV, 35 Class V, 3 Class VI, and 3 unspecified class based on their limited data potential, the Class I and Class VI sites (Table 4.3.1-2).

Using data from the sample survey, it is estimated that inventory of the remaining 2,805 acres within the layout of this alternative would result in the identification of an additional 194 archaeological resources for a total of 390 sites. Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 206 of the projected 390 sites, for a projected impact of 233 acres of archaeological site area. These resources could include 12 Class I, 64 Class II, 28 Class III, 20 Class IV, 70 Class V, 6 Class VI, and 6 unspecified class (Table 4.3.1-3).

Alternative B2b

Phase I

The cultural resources inventory of the Alternative B2b Phase I area included 1,980 acres, representing a 48 percent sample of the total 4,092 acres. The survey resulted in the identification of 146 resources (Table 4.3.1-1). Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 82 sites, for an estimated impact of 39 acres. These resources include 6 Class I, 30 Class II, 12 Class III, 9 Class IV, 18 Class V, 3 Class VI, and 4 unspecified class (Table 4.3.1-2). Potentially significant visual impacts on the historic Toana Freight Wagon Road would result from selection of this alternative, given the placement of a large number of turbines on the ridgelines that run along the eastern margins of the project area. In this initial phase, however, these impacts would be fewer than in Alternative B1, given the reduction in turbines in the southern extent of the project. Visual impacts on potential TCPs have not yet been identified.

Using data from the sample survey, it is estimated that inventory of the remaining 2,112 acres within the layout of this alternative would result in the identification of an additional 157 archaeological resources for a total of 303 sites. Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 169 of the projected 303 sites, for a projected impact of 82 acres. These resources could include 12 Class I, 61 Class II, 26 Class III, 19 Class IV, 37 Class V, 7 Class VI, and 7 unspecified class (Table 4.3.1-3).

Phase II

The cultural resources inventory of the Alternative B2b Phase II area included 770 acres, representing a 51 percent sample of the total 1,517 acres. The survey resulted in the identification of 38 resources (Table 4.3.1-1). Construction activities would result in direct and indirect impacts on 24 sites, for an estimated impact on 74 acres. These resources include 2 Class II, 2 Class III, 2 Class IV, 16 Class V, and 2 unspecified class (Table 4.3.1-2). Addition of Phase II turbines would significantly add to visual impacts on Toana Freight Wagon Road, given the placement of new turbines to the south of the Phase I turbines, effectively making these impacts comparable to those in Alternative B1.

Using data from the sample survey, it is estimated that inventory of the remaining 747 acres within the layout of this alternative would result in the identification of an additional 38 archaeological resources for a total of 76 sites. Construction, O&M, and decommissioning activities would result in

direct and indirect impacts on 48 of the projected 76 sites, for a projected impact on 144 acres of archaeological site area. These resources could include 4 Class II, 4 Class III, 4 Class IV, 32 Class V, and 4 Class VI (Table 4.3.1-3).

Phase I and Phase II

The cultural resources inventory of the combined Alternative B2b Phase I and Phase II areas included 2,750 acres, representing a 49 percent sample of the total 5,609 acres. The survey resulted in the identification of 184 resources (Table 4.3.1-1). Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 106 sites or 113 acres of archaeological site area. These resources include 6 Class I, 32 Class II, 14 Class III, 11 Class IV, 34 Class V, 3 Class VI, and 6 unspecified class (Table 4.3.1-2).

Using data from the sample survey, it is estimated that inventory of the remaining 2,859 acres within the layout of this alternative would result in the identification of an additional 195 archaeological resources for a total of 379 sites. Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 217 of the projected 379 sites. Total projected impacts on archaeological site area under this alternative is 226 acres.. These resources could include 12 Class I, 65 Class II, 30 Class III, 23 Class IV, 69 Class V, 11 Class VI, and 7 unspecified class (Table 4.3.1-3).

Alternative B2c

Phase I

The cultural resources inventory of the Alternative B2c Phase I area included 2,036 acres, representing a 46 percent sample of the total 4,430 acres. The survey resulted in the identification of 132 resources (Table 4.3.1-1). Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 76 sites, for a total impact on 91 acres of archaeological site area. These resources include 4 Class I, 19 Class II, 12 Class III, 6 Class IV, 32 Class V, and 3 unspecified class (Table 4.3.1-2). Fewer potentially significant visual impacts on the historic Toana Freight Wagon Road would result from selection of Phase I of this alternative over Alternative B1, given the reduction in number of a large number of turbines on the ridgelines that run along the eastern margins of the project area. Visual impacts on potential TCPs have not yet been identified.

Using data from the sample survey, it is estimated that inventory of the remaining 2,394 acres within the layout of this alternative would result in the identification of an additional 155 archaeological resources for a total of 287 sites. Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 166 of the projected 287 sites, for a projected impact on 197 acres of archaeological site area. These resources could include 9 Class I, 42 Class II, 27 Class III, 13 Class IV, 70 Class V, and 5 unspecified class (Table 4.3.1-3).

Phase II

The cultural resources inventory of the Alternative B2c Phase II area included 999 acres, representing a 69 percent sample of the total 1,454 acres. The survey resulted in the identification of 63 resources (Table 4.3.1-1). Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 34 sites, for an impact on 20 acres of archaeological site area. These resources include 2 Class I, 15 Class II, 2 Class III,6 Class IV, 6 Class V, and 3 Class VI (Table 4.3.1-2). The addition of Phase II turbines would add to visual impacts on Toana Freight Wagon Road. Given the placement of Phase II turbines to the north of the Phase I turbines, the impacts would be comparable to those for Alternative B1.

Using data from the sample survey, it is estimated that inventory of the remaining 854 acres within the layout of this alternative would result in the identification of an additional 29 archaeological resources for a total of 92 sites. Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 49 of the projected 92 sites, for a projected impact on 29 acres. These resources could include 3 Class I, 21 Class II, 3 Class III, 9 Class IV, 9 Class V, and 4 unspecified class (Table 4.3.1-3).

Phase I and Phase II

The cultural resources inventory of the combined Alternative B2c Phase I and Phase II areas included 3,035 acres, representing a 51 percent sample of the total 5,884 acres. The survey resulted in the identification of 195 resources (Table 4.3.1-1). Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 110 sites, for a total impact of 111 acres of archaeological site area. These resources include 6 Class I, 34 Class II, 14 Class III, 12 Class IV, 38 Class V, 3 Class VI, and 3 unspecified class (Table 4.3.1-2).

Using data from the sample survey, it is estimated that inventory of the remaining 2,849 acres within the layout of this alternative would result in the identification of an additional 184 archaeological resources for a total of 379 sites. Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 215 of the projected 379 sites, for a projected impact of 226 acres of archaeological site area. These resources could include 12 Class I, 63 Class II, 30 Class III, 22 Class IV, 79 Class V, 4 Class VI, and 5 unspecified class (Table 4.3.1-3).

Alternative C

The cultural resources inventory of the Alternative C area included 2,532 acres, representing a 49 percent sample of the total 5,209 acres. The survey resulted in the identification of 171 resources (Table 4.3.1-1). Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 97 sites, for a total impact on 110 acres of archaeological site area. These resources include 6 Class I, 30 Class II, 14 Class III, 9 Class IV, 33 Class V, 2 Class VI, and 3 unspecified class (Table 4.3.1-2). Potentially significant visual impacts on the historic Toana Freight Wagon Road would result from selection of this alternative, given the placement of a large number of turbines on the ridgelines that run along the eastern margins of the project area. Visual impacts on potential TCPs have not yet been identified.

Using data from the sample survey, it is estimated that inventory of the remaining 2,677 acres within the layout of this Alternative would result in the identification of an additional 180 archaeological resources for a total of 352 sites. Construction, O&M, and decommissioning activities would result in direct and indirect impacts on a projected 199 sites, or a projected impact on 226 acres of archaeological site area. These resources could include 12 Class I, 62 Class II, 28 Class III, 18 Class IV, 69 Class V, 4 Class VI, and 6 unspecified class (Table 4.3.1-3).

Alternative D

The cultural resources inventory of the Alternative D area included 2,293 acres, representing a 49 percent sample of the total 4,715 acres. The survey resulted in the identification of 165 resources (Table 4.3.1-1). Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 93 sites, for a total impact on 73 acres of archaeological site area. These resources include 6 Class I, 30 Class II, 13 Class III, 9 Class IV, 30 Class V, 2 Class VI, and 3 unspecified class (Table 4.3.1-2). Potentially significant visual impacts on the historic Toana Freight Wagon Road would result from selection of this alternative, given the placement of a large number of turbines on the ridgelines that run along the eastern margins of the project area. Because fewer turbines are proposed for the southern extent of this ridgeline; however, these impacts would be reduced in comparison to those anticipated under Alternative B1. Visual impacts on potential TCPs have not yet been identified.

Using data from the sample survey, it is estimated that inventory of the remaining 2,422 acres within the layout of this alternative would result in the identification of an additional 174 archaeological resources for a total of 339 sites. Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 190 of the projected 339 sites, for a projected impact of 149 acres of archaeological site area. These resources could include 12 Class I, 61 Class II, 27 Class III, 19 Class IV, 61 Class V, 4 Class VI, and 3 unspecified class (Table 4.3.1-3).

Alternative E

The cultural resources inventory of the Alternative E area included 2,416 acres, representing a 49 percent sample of the total 4,956 acres. The survey resulted in the identification of 168 resources. Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 98 sites (Table 4.3.1-1), for a total impact on 97 acres of archaeological site area. These resources include 6 Class I, 30 Class II, 14 Class III, 10 Class IV, 33 Class V, 2 Class VI, and 3 unspecified class (Table 4.3.1-2).

Using data from the sample survey, it is estimated that inventory of the remaining 2,540 acres within the layout of this alternative would result in the identification of an additional 178 archaeological resources for a total of 344 sites. Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 201 of the projected 344 sites, for a projected total impact on 198 acres of archaeological site area. These resources could include 12 Class I, 62 Class II, 29 Class III, 20 Class IV, 68 Class V, 4 Class VI, and 6 unspecified class (Table 4.3.1-3). Potentially significant visual impacts on the historic Toana Freight Wagon Road would result from selection of this

alternative, given the placement of turbines on the ridgelines that run along the eastern margins of the project area. However, because fewer turbines are proposed for the southern extent of this ridgeline, these impacts would be reduced in comparison to those anticipated under Alternative B1. Visual impacts on potential TCPs have not yet been identified.

Alternative F

The cultural resources inventory of the Alternative F area included 2,186 acres, representing a 49 percent sample of the total 4,421 acres. The survey resulted in the identification of 162 resources. Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 90 sites (Table 4.3.1-1), for a total impact on 52 acres of archaeological site area. These resources include 6 Class I, 28 Class II, 13 Class III, 8 Class IV, 30 Class V, 2 Class VI, and 3 unspecified class (Table 4.3.1-2). Potentially significant visual impacts on the historic Toana Freight Wagon Road would result from selection of this alternative, given the placement of turbines on the ridgelines that run along the eastern margins of the project area. However, because the number of turbines has been significantly reduced over that proposed under other alternatives, these visual impacts would also be significantly reduced. Visual impacts on potential TCPs have not yet been identified.

Using data from the sample survey, it is estimated that inventory of the remaining 2,235 acres within the layout of this Alternative would result in the identification of an additional 167 archaeological resources for a total of 327 sites. Construction, O&M, and decommissioning activities would result in direct and indirect impacts on 182 of the projected 327 sites, for a projected total impact on 105 acres of archaeological site area. These resources could include 13 Class I, 57 Class II, 26 Class III, 16 Class IV, 61 Class V, 4 Class VI, and 5 unspecified class (Table 4.3.1-3).

4.3.1.3 Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Comprehensive record searches and archaeological inventory have not yet been conducted along the northern inbound haul route. However, at this point, an estimated 39 acres would be impacted by proposed cut and fill activities associated with the development of this route. Based on a known archaeological site density of one site per 8.3 acres surveyed within the current APE, at least five archaeological sites are predicted to occur within the 39 acres that would be impacted by development of this route. Because the majority of reconstruction along this route would be within the existing road ROW, potential adverse effects on National Register of Historic Places eligible sites would be reduced or mitigated according to the stipulations of the Programmatic Agreement and following procedures of the Treatment Plan (Appendix 2A). These procedures would be implemented to avoid, minimize, or otherwise reduce impacts on archaeological sites to the greatest extent practicable. Use of this haul route would not result in any direct or indirect impacts on the historic Toana Freight Wagon Road.

Southern Inbound Haul Route Option 1 and Option 2

Comprehensive archaeological inventory has not yet been conducted along the southern inbound haul route options. However, at this point, an estimated 86 acres would be impacted by proposed cut and fill activities along option 1 of the southern inbound haul route and 90 acres would be impacted along option 2. Based on a known archaeological site density of one site per 8.3 acres surveyed within the current APE, at least 10 archaeological sites are predicted to occur within each area of proposed reconstruction, providing a total of 20 sites. Previous archaeological surveys have identified at least two archeological sites that would be affected by construction and reconstruction of option 1 of the southern inbound haul route, and one known site along option 2 of the southern inbound haul route. In addition, under both option 1 and option 2, the southern inbound haul route would likely follow the route of an unrecorded portion of the historic Toana Freight Wagon Road. Although this portion of the Toana Freight Wagon Road has not yet been recorded or evaluated, construction and use of the either option for the southern inbound haul route would result in direct impacts on a potentially significant historic resource.

Given the potential for numerous additional archeological sites besides those previously recorded, avoidance is likely infeasible. Implementation of mitigation measures, which could include monitoring, sampling, or data recovery, would likely reduce adverse effects on significant archaeological resources.

Outbound Haul Route

Comprehensive record searches and archaeological inventory have not yet been conducted along the outbound haul route. Consequently, specific impacts on cultural and historic resources potentially present along this route cannot be identified. Because no reconstruction or construction would occur along this route, adverse effects on significant archeological resources are not anticipated.

4.3.1.4 Project as a Whole

Under any of the action alternatives, project activities, primarily related to construction and maintenance, present a high potential for direct and indirect impacts on significant archaeological sites. Comprehensive studies necessary to identify and characterize these impacts have not yet been completed; however, approximately one-half of the project APE has been inventoried for cultural resources. While it is not possible to fully compare impacts by alternative, reasonable estimates of potential impacts can be offered (Table 4.3.1-4). Alternative F would impact the lowest estimated number of archaeological sites (n=182), while Alternative B2b would impact the greatest number of sites (n=217). Alternative F would also impact the fewest archaeological site acres (n=105), while Alternative B2a would impact the greatest number of site acres (n=233). The estimated total acres impacted for the proposed alternatives would range from 105 to 233 acres, with the exception of Alternative A, which would be zero (Table 4.3.1-4).

Table 4.3.1-4. Summary of Impacts on Cultural Resources by Alternative.

Alternative	Known No. of Sites Impacted	Percent of Alternative Surveyed (%)	Estimated Total No. of Sites Impacted	Known Site Acres Impacted	Estimated Total Site Acres Impacted
Alternative A: No Action	N/A	N/A	N/A	N/A	N/A
Alternative B1	101	49	205	111	226
Alternative B2a Phase I	49	45	109	82	182
Alternative B2a Phase II	54	61	89	31	51
Alternative B2a Phase I & II[1]	103	49	206	113	233
Alternative B2b Phase I	82	48	169	39	82
Alternative B2b Phase II	24	51	48	74	144
Alternative B2b Phase I & II[1]	106	49	217	113	226
Alternative B2c Phase I	76	46	166	91	197
Alternative B2c Phase II	34	69	49	20	29
Alternative B2c Phase I & II[1]	110	51	215	111	226
Alternative C	97	49	199	110	226
Alternative D	93	49	190	73	149
Alternative E	98	49	201	97	198
Alternative F	90	49	182	52	105

[1] Known and estimated number of sites impacted for full build out (Phase I + II) of the phased alternatives would be slightly greater than for Alternative B1 due to repeat disturbance of some areas during Phase II.

The addition of the inbound haul routes to the various alternatives would result in a slight increase in the number of archaeological sites estimated to receive impacts from construction related activities (Table 4.3.1-5). The addition of the northern inbound haul route would increase the number of estimated sites by five for Alternatives B1 through F, while the addition of the southern inbound haul route options would increase the number of affected sites by ten. Given the fact that those areas of the proposed haul routes that would be constructed or reconstructed have not yet been surveyed for cultural resources, it is not possible to determine the site acres that would be impacted. However, given the relatively small number of sites anticipated to occur within each haul route, the number of additional acres impacted would be relatively low. Therefore, the addition of the haul routes to the various alternatives would not substantially change the relative estimates of potential impacts described in Section 4.3.1.2 and listed in Table 4.3.1-4.

Alternative A would have no potential for impacts on cultural and historical resources within the project area and haul roads. Alternatives B1, B2a, B2b, B2c, C, D, and E would all have a high

potential for direct impacts on numerous archaeological sites, as well as a moderate to high potential for indirect impacts associated with increased access over pre-project levels to the China Mountain area. Alternative F would have moderate to high potential for direct impacts on numerous archaeological sites and a moderate potential for indirect impacts. The northern inbound haul route would have a low potential for additional direct impacts for all alternatives. Construction and reconstruction along both option 1 and option 2 of the southern inbound haul route would have a high potential for direct impacts on several archaeological sites. The potential for indirect impacts associated with the southern inbound haul route is high for Alternative B1 and Alternatives B2a, B2b, and B2c and moderate for all other alternatives.

Potential adverse effects on National Register of Historic Places eligible sites would be reduced or mitigated according to the stipulations of the Programmatic Agreement and following procedures of the Treatment Plan (Appendix 2A). These procedures would be implemented to avoid, minimize, or otherwise reduce impacts on archaeological sites to the greatest extent practicable. Table 4.3.1-5 provides a summary of anticipated impacts on cultural and historical resources by alternative and includes the inbound haul routes (northern and southern).

Table 4.3.1-5. Summary of Impacts on Cultural Resources from the Project as a Whole[1] – Known Number of Sites and Estimated Total Number of Sites Impacted.

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Route – Option 1	Wind Energy Facility with the Southern Inbound Haul Route – Option 2
Alt. A: No Action	No potential for impacts	No potential for impacts	No potential for impacts
Alt. B1	Known Number of Sites: 101 Estimated Total Sites: 210	Known Number of Sites: 103 Estimated Total Sites: 215	Known Number of Sites: 102 Estimated Total Sites: 215
Alt. B2a[2]	**Phase I** Known Number Sites: 49 Estimated Total Sites: 114 **Phase II** Known Number of Sites: 54 Estimated Total Sites: 94 **Phase I + Phase II** Known Number of Sites: 103 Estimated Total Sites: 211	**Phase I** Known Number of Sites: 51 Estimated Total Sites: 119 **Phase II** Known Number of Sites: 56 Estimated Total Sites: 99 **Phase I + Phase II** Known Number of Sites: 105 Estimated Total Sites: 216	**Phase I** Known Number of Sites: 50 Estimated Total Sites: 119 **Phase II** Known Number of Sites: 55 Estimated Total Sites: 99 **Phase I + Phase II** Known Number of Sites: 104 Estimated Total Sites: 216

Table 4.3.1-5. Summary of Impacts on Cultural Resources from the Project as a Whole[1] – Known Number of Sites and Estimated Total Number of Sites Impacted (cont'd).

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Route – Option 1	Wind Energy Facility with the Southern Inbound Haul Route – Option 2
Alt. B2b[2]	**Phase I** Known Number of Sites: 82 Estimated Total Sites: 174 **Phase II** Known Number of Sites: 24 Estimated Total Sites: 53 **Phase I + Phase II** Known Number of Sites: 106 Estimated Total Sites: 222	**Phase I** Known Number of Sites: 84 Estimated Total Sites: 179 **Phase II** Known Number of Sites: 26 Estimated Total Sites: 58 **Phase I + Phase II** Known Number of Sites: 108 Estimated Total Sites: 227	**Phase I** Known Number of Sites: 83 Estimated Total Sites: 179 **Phase II** Known Number of Sites: 25 Estimated Total Sites: 58 **Phase I + Phase II** Known Number of Sites: 107 Estimated Total Sites: 227
Alt. B2c[2]	**Phase I** Known Number of Sites: 76 Estimated Total Sites: 171 **Phase II** Known Number of Sites: 34 Estimated Total Sites: 54 **Phase I + Phase II** Known Number of Sites: 110 Estimated Total Sites: 220	**Phase I** Known Number of Sites: 78 Estimated Total Sites: 176 **Phase II** Known Number of Sites: 36 Estimated Total Sites: 59 **Phase I + Phase II** Known Number of Sites: 112 Estimated Total Sites: 225	**Phase I** Known Number of Sites: 77 Estimated Total Sites: 176 **Phase II** Known Number of Sites: 35 Estimated Total Sites: 59 **Phase I + Phase II** Known Number of Sites: 111 Estimated Total Sites: 225
Alt. C	Known Number of Sites: 97 Estimated Total Sites: 204	Known Number of Sites: 99 Estimated Total Sites: 209	Known Number of Sites: 98 Estimated Total Sites: 209
Alt. D	Known Number of Sites: 93 Estimated Total Number of Sites Impacted: 195	Known Number of Sites: 95 Estimated Total Number of Sites Impacted: 200	Known Number of Sites: 94 Estimated Total Number of Sites Impacted: 200
Alt. E	Known Number of Sites: 98 Estimated Total Number of Sites Impacted: 206	Known Number of Sites: 100 Estimated Total Number of Sites Impacted: 211	Known Number of Sites: 99 Estimated Total Number of Sites Impacted: 211
Alt. F	Known Number of Sites: 90 Estimated Total Number of Sites Impacted: 187	Known Number of Sites: 92 Estimated Total Number of Sites Impacted: 192	Known Number of Sites: 91 Estimated Total Number of Sites Impacted: 192

[1] Known site acres and estimated total site acres impacted are not presented as they are not known for the inbound haul routes.

[2] Known and estimated number of sites impacted for full build out (Phase I + II) of the phased alternatives would be slightly greater than for Alternative B1 due to repeat disturbance of some areas during Phase II.

4.3.1.5 Cumulative Impacts

Alternative A (No Action Alternative)

Implementation of the No Action Alternative would not result in direct impacts on cultural or historical resources within the project area. Indirect impacts would be limited to ongoing impacts from erosion, recreational use, looting, and similar actions. Consequently, Alternative A would not result in any measurable cumulative impacts on cultural resources.

All Action Alternatives

The cumulative impact analysis area for cultural and historical resources has been defined as extending approximately 100 miles in radius surrounding the project area. This area incorporates an extensive portion of the Northern Basin and Range and Snake River Plain ecological provinces and includes much of the traditional territories of the Native American inhabitants that utilized the resources of this region. A large number of wind energy, electrical transmission distribution, communications, and similar projects are either planned or underway in this region (Table 4.0.2-1). Each of these projects would result in ground-disturbing activities that have the potential to affect significant cultural and historical resources. Comprehensive archaeological studies for each of these projects are not currently available. Consequently, the numbers and diversity of the resources present within these project areas is not clearly understood. However, all of these large-scale projects would have Programmatic Agreements or Memoranda of Agreement developed in consultation with SHPOs, the ACHP, and Tribes to lessen adverse cumulative effects on the greatest extent possible.

Furthermore, it can be anticipated that regulatory permitting activities would help to reduce or eliminate impacts on significant resources during the construction and operation of these projects. Archaeological sites, however, are a finite resource and cannot be replaced once damaged or destroyed. Consequently, while they cannot be specified at this time, each of these projects may result in incremental but irreversible and irretrievable impacts on cultural resources. However, implementation of mitigation measures would result in a greater understanding of long-term human adaptations to the region.

Construction of any of the action alternatives would result in direct and indirect impacts on archaeological sites. As discussed in Section 3.3.1, sample archaeological inventory has resulted in the identification of 486 archaeological sites in the project area; based on observed site density, completion of this inventory would add significantly to this number. No one alternative would avoid impacts on these resources, although the number of impacted sites would vary by alternative (Table 4.3.1-4). Consequently, this project, in conjunction with past disturbances in the region and future actions, would add to an overall reduction of cultural resources within the cumulative impact analysis area. Specifically, proposed construction of several large transmission lines, the Cotterel Wind Power facility, and other planned and proposed infrastructure projects, would all add to the loss of these resources. The proposed action (Alternative B1) would add substantially to these cumulative effects, as would implementation of both phases of Alternatives B2a, B2b, and B2c. Alternatives with smaller footprints, such as Alternative D and particularly Alternative F, would result in fewer impacts on cultural resources than those with larger footprints. Consequently, while implementation of any action

alternative would cumulatively affect the region's archaeological sites, these impacts would vary by alternative.

4.3.2 TRIBAL TREATY RIGHTS AND INTERESTS

This section discusses potential impacts on tribal treaty rights and interests that would result from implementing the proposed alternatives for the project.

4.3.2.1 Analysis Methods

Indicators

The indicators for impacts on tribal treaty rights and interests include the following:

- Alternatives that result in the greatest amount of ground disturbance (i.e., removal of landforms, native flora, native fauna, and cultural resources) have a high potential to impact the integrity of tribal treaty rights and interests.
- Actions that limit or avoid surface disturbing activities would protect the integrity of tribal treaty rights and interests.

Methods and Assumptions

As discussed in Section 3.3.2, the locations of traditional cultural properties within the project area are currently not known. However, it is known from existing literature and tribal consultation that certain landforms, biological resources, and archaeological resources are of special importance to the Tribes. These include prominent ridgelines, hills and mountains, springs, caves, sage-grouse, golden eagles, mule deer, pronghorn, elk, bitterroot, chokecherry, willow, tobacco, and many other medicinal and food plants. Such resources are not equally distributed across the landscape; therefore, impacts on traditional cultural properties could be measured according to the degree of impacts on the natural and cultural environment caused by the various alternatives. For example, certain economic species, such as chokecherry, blue elderberry, and wax currant, tend to occur on the steeper, more shaded, east-facing slopes of the project area, and are less frequent on the open, gentle, west-facing slopes. Other plants and animals are more or less confined to riparian zones and shaded canyons, or occur more frequently atop rocky hills and ridgelines.

Because traditional cultural properties are associated with the natural landscape, it can be assumed that the greater the project footprint and associated infrastructure the greater the potential for impacts on traditional cultural properties, cultural belief systems, and other tribal interests. In the project area, the integrity of the historical setting is a critical element to certain topographic features, natural resources, and archaeological, historic, and rock art sites that play prominent roles in contemporary traditional Native American religious beliefs and practices. Alternatives that affect the viewshed of these places, add new facilities, add loud and sustained noise, or remove native plant or animal species could negatively affect the attributes of a place of traditional cultural importance to Native American Tribes that give it value. Alternatives that reduce or eliminate physical, visual, and acoustic

impacts in the vicinity of places of traditional cultural importance would enhance the values and functions associated with these sites.

4.3.2.2 Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

Under the No Action Alternative, no impacts on sites or locations of tribal concern would occur.

Impacts Common to All Action Alternatives

Systematic evaluations of traditional sacred sites or places within the project area have not yet been completed that allow for an opportunity for appropriate tribal representatives to fully evaluate the effects of the project. Without completion of these studies and continuation of the consultation process, no specific statements about impacts on particular locations can be provided at this time. However, the general placement of turbine strings and project roads atop prominent ridgelines would have both direct and indirect impacts on the integrity of a great many archaeological sites and features, as well as other locations of tribal concern.

There is a potential for direct and indirect impacts on sites and locations of interest to Native Americans from construction activities, the presence of workers, and increased access to the project area, particularly impacts on the physical evidence of past use of the cultural landscape (artifacts, cultural features, archaeological sites, etc.) important to tribal peoples. In addition, there is a high potential for visual effects on known springs and caves, particularly for springs located within the project area. With regard to archaeological sites, complete inventory of the project area, evaluation of all recorded resources in accordance with criteria established for listing on the National Register, assessment of adverse impacts, and application of mitigation measures for identified impacts would be conducted prior to the initiation of any ground-disturbing construction activities (Section 4.3.1). Mitigation, which could include avoidance, monitoring, data recovery, or other techniques, could be used to reduce or eliminate potential impacts on significant archaeological sites.

Alternative B1 (Proposed Action)

Under Alternative B1, there would be a high potential for direct and indirect impacts on sites and locations of interest to Native Americans from construction activities, the presence of additional workers, and increased access to the project area, particularly impacts on the physical evidence of past use of the cultural landscape (artifacts, cultural features, and archaeological sites) important to tribal peoples. In addition, there is a high potential for visual impacts on springs and caves of the project area and vicinity. As stated above, the studies necessary to identify and characterize these impacts have not yet been completed. Comments passed on by tribal representatives during the ongoing consultation process, however, clearly express the concern that the project would directly impact locations of tribal concern.

Alternative B2a

Under Phase I of Alternative B2a, there would be a reduced potential for direct and indirect impacts on sites and locations of interest to Native Americans from construction activities, given the reduced size of the project footprint. Project activities, including construction, the presence of workers, and increased access to the project area, however, may result in impacts on the physical evidence of past use of the cultural landscape important to tribal peoples. As stated above, the studies necessary to identify and characterize these impacts have not yet been completed. Comments passed on by tribal representatives during the ongoing consultation process, however, clearly express the concern that the project would directly impact locations of tribal concern. Tribal perceptions about the types and magnitudes of potential impacts on sites and locations of Native American interests within the project area are unlikely to vary considerably by project alternative.

Under Phase II, impacts on traditional cultural properties and similar places of concern to Native Americans would be the same as Alternative B1.

Alternative B2b

Under Alternative B2b, there would be a reduced potential for direct and indirect impacts on sites and locations of interest to Native Americans from construction activities, given the reduced size of the project footprint. Project activities, including construction, the presence of workers, and increased access to the project area, however, may result in impacts on the physical evidence of past use of the cultural landscape important to tribal peoples. As stated above, the studies necessary to identify and characterize these impacts have not yet been completed. Comments passed on by tribal representatives during the ongoing consultation process, however, clearly express the concern that the project would directly impact locations of tribal concern. Tribal perceptions about the types and magnitudes of potential impacts on sites and locations of Native American interests within the project area are unlikely to vary considerably by project alternative.

Under Phase II, impacts on traditional cultural properties and similar places of concern to Native Americans would be the same as Alternative B1.

Alternative B2c

Under Alternative B2c, there would be a reduced potential for direct and indirect impacts on sites and locations of interest to Native Americans from construction activities, given the reduced size of the project footprint. Project activities, including construction, the presence of workers, and increased access to the project area, however, may result in impacts on the physical evidence of past use of the cultural landscape important to tribal peoples. As stated above, the studies necessary to identify and characterize these impacts have not yet been completed. Comments passed on by tribal representatives during the ongoing consultation process, however, clearly express the concern that the project would directly impact locations of tribal concern. Tribal perceptions about the types and magnitudes of potential impacts on sites and locations of Native American interests within the project area are unlikely to vary considerably by project alternative.

Under Phase II, impacts on traditional cultural properties and similar places of concern to Native Americans would be the same as Alternative B1.

Alternative C

Alternative C would slightly decrease the potential for direct and indirect impacts on sites and locations of interest to Native Americans from construction activities, the presence of workers, and increased access to the project area, as compared to Alternative B1, given that fewer turbines would be built in the northernmost portion of the project area. Impacts on the physical evidence of past use of the cultural landscape important to tribal peoples could still occur, as could visual effects on traditional cultural properties. As stated above, the studies necessary to identify and characterize these impacts have not yet been completed. Comments passed on by tribal representatives during the ongoing consultation process, however, clearly express the concern that the project would directly impact locations of tribal concern. Tribal perceptions about the types and magnitudes of potential impacts on sites and locations of Native American interests within the project area are unlikely to vary considerably by project alternative.

Alternative D

Alternative D would be comprised of considerably fewer turbines that Alternative B1; a reduction from 170 to 124. Consequently, there would be a reduced potential for direct and indirect impacts on sites and locations of interest to Native Americans from construction activities, the presence of workers, and increased access to the project area, particularly impacts on the physical evidence of past use of the cultural landscape important to tribal peoples. In addition, proposed turbines could result in visual effects on traditional cultural properties or other locations of significance to Native Americans. As stated above, the studies necessary to identify and characterize these impacts have not yet been completed. Comments passed on by tribal representatives during the ongoing consultation process, however, clearly express the concern that the project would directly impact locations of tribal concern. Tribal perceptions about the types and magnitudes of potential impacts on sites and locations of Native American interests within the project area are unlikely to vary considerably by project alternative.

Alternative E

Alternative E would be comprised of considerably fewer turbines that Alternative B1; a reduction from 170 to 120. Consequently there would be a reduced potential for direct and indirect impacts on sites and locations of interest to Native Americans from construction activities, the presence of workers, and increased access to the project area, particularly impacts on the physical evidence of past use of the cultural landscape important to tribal peoples. In addition, proposed turbines could result in visual effects on traditional cultural properties or other locations of significance to Native Americans. As stated above, the studies necessary to identify and characterize these impacts have not yet been completed. Comments passed on by tribal representatives during the ongoing consultation process, however, clearly express the concern that the project would directly impact locations of tribal concern. Tribal perceptions about the types and magnitudes of potential impacts on sites and locations

of Native American interests within the project area are unlikely to vary considerably by project alternative.

Alternative F

Alternative F would be comprised of the lowest number of turbines in comparison to Alternative B1; 105 as opposed to 170. Consequently, this alternative should result in the lowest potential for direct and indirect impacts on sites and locations of interest to Native Americans from construction activities, the presence of workers, and increased access to the project area, particularly impacts on the physical evidence of past use of the cultural landscape important to tribal peoples. In addition, proposed turbines could result in visual effects on traditional cultural properties or other locations of significance to Native Americans. As stated above, the studies necessary to identify and characterize these impacts have not yet been completed. Comments passed on by tribal representatives during the ongoing consultation process, however, clearly express the concern that the project would directly impact locations of tribal concern. Tribal perceptions about the types and magnitudes of potential impacts on sites and locations of Native American interests within the project area are unlikely to vary considerably by project alternative.

4.3.2.3 Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Reconstruction of the northern inbound haul route may result in direct and indirect impacts on sites and locations of interest to Native Americans from construction activities, the presence of additional workers, and particularly impacts on the physical evidence of past use of the cultural landscape (artifacts, cultural features, and archaeological sites) important to tribal peoples. As stated above, the studies necessary to identify and characterize these impacts have not yet been completed. Tribal representatives during the ongoing consultation process, have not yet expressed specific concerns that construction and reconstruction of the northern haul route would impact locations of tribal concern.

Southern Inbound Haul Route Option 1 and Option 2

Reconstruction of the southern inbound haul route may result in direct and indirect impacts on sites and locations of interest to Native Americans from construction activities, the presence of additional workers, and increased access to the project area, particularly impacts on the physical evidence of past use of the cultural landscape (artifacts, cultural features, and archaeological sites) important to tribal peoples. As stated above, the studies necessary to identify and characterize these impacts have not yet been completed. Comments passed on by tribal representatives during the ongoing consultation process, however, clearly express the concern that the project would directly impact locations of tribal concern. Given the greater extent of construction required for either option 1 or option 2 of the southern inbound haul route versus the northern inbound haul route, total impacts from use of this route are likely considerably greater.

Outbound Haul Route

No construction or reconstruction is proposed for the northern outbound haul route. Consequently, no impacts on sites or locations of concern to Native Americans are anticipated.

4.3.2.4 Project as a Whole

Under any of the alternatives, project activities, primarily related to construction and O&M of the project, present a high potential for direct and indirect impacts on sites and locations of interest to Native Americans, particularly impacts on the physical evidence of past use of the cultural landscape (artifacts, cultural features, and archaeological sites) important to tribal peoples.

Alternatives B1, B2a, B2b, and B2c would all include a basically similar layout of roads and turbine strings. These alternatives would have the greatest impact on locations of tribal concern. Having several fewer miles of roads and 18 less turbines in the northern project area, Alternative C would have less impact than any of the B alternatives. Alternative D would have 28 fewer turbines and 8 fewer miles of roads than Alternative C, and is designed to avoid sage-grouse movement areas. Again, this would lessen the impact on locations of tribal concern. Alternative E would have four fewer turbines than Alternative D, but 4 additional miles of road. This alternative would be designed to avoid sensitive plant species along certain areas of the eastern ridgelines, and would likely have similar impacts on those of Alternative D. Alternative F would have 65 fewer turbines and 16 fewer miles of road than the B alternatives. All turbines along the eastern ridge, south of China Mountain, would be removed from the project, thus avoiding a significant number of archaeological sites, including most of the very large lithic procurement sites, as well as some of the sites containing the greatest diversity of formed artifacts. In terms of cultural resources and natural resources, Alternative F would have the least amount of direct and indirect impacts.

As previously stated, the studies necessary to identify and characterize these impacts have not yet been completed. Consequently, it is not possible to compare these impacts by alternative. Comments passed on by tribal representatives during the ongoing consultation process, however, clearly express the concern that the project would directly impact locations of tribal concern. Tribal perceptions about the types and magnitudes of potential impacts on sites and locations of Native American interests within the project area are unlikely to vary considerably by project alternative.

4.3.2.5 Cumulative Impacts

Alternative A (No Action Alternative)

Many of the projects identified above under the discussion of cumulative impacts would result in impacts on sites, areas, and landscapes important to the Native American peoples of the region. Tribal interests in environmental resources are not limited to archaeological or historical sites, but include natural resources and geological formations present throughout the region. Natural resources constitute critical components of Native American daily life and religious beliefs. Any project that affects one or more of these aspects of the environment has the potential to impact resources of

traditional value. Under the No Action Alternative, the project would not add to the cumulative impact of these resources.

All Action Alternatives

Native American views on construction and operation of the project, as currently understood, suggest that the construction and operation of the project would seriously impact the traditional lands of the Western Shoshone, Northern Shoshone, and Bannock peoples and would disturb cultural, biological, botanical, geological, and other environmental resources within the project area. The numerous planned and proposed transmission lines and wind energy facilities throughout the region, including the Cotterel Wind Power project and similar infrastructure developments, would all add to the cumulative effects on places of concern to Native Americans. Comprehensive studies to identify specific sites, locations, or other traditional cultural properties in and adjacent to the project area, however, have not yet been completed. As a result, these impacts cannot be quantified or compared by alternative. Tribal perceptions about the types and magnitudes of potential impacts on sites and locations of Native American interest within the project area are unlikely to vary considerably by project alternative, and, following completion of these studies, all action alternatives would likely be found to contribute to the cumulative impact of places of traditional value to Native American peoples. Alternatives which reduce direct and indirect impacts on the natural and cultural environment, however, should help to reduce cumulative effects on places of importance to Native Americans. The Proposed Action, Alternative B1, would add significantly to cumulative effects, as would implementation of both phases of alternatives B2a, B2b, and B2c. Alternatives with smaller footprints, such as Alternative D and Alternative F, would result in fewer impacts than those with larger footprints. Consequently, while implementation of any action alternative would cumulatively affect places of traditional value within the region, these impacts do vary by alternative.

4.3.3 ECONOMIC CONDITIONS

This section presents the estimated economic impacts of the project, focusing on the increased economic output, income, and employment impacts that are expected in the analysis area (Twin Falls and Elko counties) during project construction, O&M, and decommissioning (Figure 3.3.3-1).

4.3.3.1 Analysis Methods

Indicators

The indicators to be used in evaluating the alternatives are as follows:

- The total number of jobs created during construction (temporary) and O&M (long-term);
- The changes in economic output within the analysis area during construction and O&M;
- The changes in labor income during construction and O&M;
- The change in fiscal impacts at county and state levels during construction and O&M;
- Changes in ROW rental streams, i.e., property leases to Federal, state and private entities; and
- Effects on private property values.

In addition to the quantitative indicators, there would be a qualitative discussion of changes in values that cannot be expressed in monetary terms.

Methods and Assumptions

The general approach to measure economic impacts is to look at the local economy with and without the project to assess net changes. The economic effects of wind energy projects are comparable to other large industrial developments that have a construction, O&M period, and decommissioning, such as a dam, power plant, or manufacturing facility. Such projects normally provide a short-term boost to the local economy during project construction as goods and services are purchased locally and local labor is used. When construction is complete, project operation extends local economic benefits into the long-term through spending on goods and services and labor to support O&M.

It is the amount of the construction cost spent locally that generates economic impacts on the analysis area. Wind projects are different from other construction projects in the sense that the type of capital equipment and workforce required are very specialized. Compared to conventional building construction, a much larger proportion of the capital equipment is manufactured elsewhere and only assembled on-site. This includes turbine towers, turbine blades, nacelles, and the substations. The more technical parts of the labor are done by specialized turbine assembly crews who travel from project to project. As a result, only a small proportion of the total costs of a wind energy facility are used to make local purchases of goods and services.

Only this small proportion of local purchases generates indirect and induced effects, so that the total economic impact of a wind energy facility project is less than for a similarly-priced conventional construction project. Indirect impacts are caused by the economic linkages between businesses in a local economy. For example, an increase in construction spending leads to an increase in business activity by those firms who supply materials, equipment, and support services to construction businesses. Direct and indirect effects, in turn cause increases in household consumption as employees and business owners spend their earnings. These are known as induced effects or impacts.

Due to the confidential nature of project financial information and ongoing negotiations between the Applicants' financial partners of the project, data on project costs are based on the experience of Renewable Energy Systems America Development, Inc. (RES) with other representative projects. To the degree possible, costs have been tailored specifically to the project, e.g. the estimated number of linear feet of cable trenching or the number of new or reconstructed road miles. Nevertheless, the cost estimates given here are preliminary in nature and should not be taken as an exact template for actual expenditures.

This analysis estimates the direct economic impact of construction and annual operation in two separate accounts. The construction account is further divided into investment in Idaho and Nevada for tax revenue purposes. Both accounts are also separated into local expenditures and monies spent outside the analysis area. These local expenditures are the direct impacts used as the change in demand to the local economy, with indirect and induced impacts being generated by an economic

input-output model called IMPLAN (Minnesota IMPLAN Group, 2006), specified to the analysis area of Twin Falls and Elko counties.

Labor impacts were calculated in two ways, (1) estimates of labor requirements taken directly from the construction budgets to estimate full-time equivalents being hired for two construction years and (2) employment impacts were estimated using the IMPLAN model.

ROW rental fees, or property lease payments, are one of the O&M costs. They are estimated for each alternative, using the $4,155 per MW of installed capacity per year for turbines built on public land as specified by BLM policy (BLM, 2008). Payments to BLM for the turbines on Federal lands are not retained in the District Office, and so are assumed to be expended outside the analysis area. Similarly, payments to the State of Idaho for the up to 15 turbines on state land would go to the Permanent Endowment Fund and are used to support public education statewide. These payments are assumed to leave the analysis area. State and private rental fees are estimated to be four percent of gross power production value. The private landowners are ranchers, who would likely consider the lease payments for the turbines on private land an energy enterprise within a larger ranching operation. This analysis assumes that half of these private lease payments would be used outside the analysis area to pay down debt, pay taxes, or make investments into savings. The other half of these payments is assumed to be spent locally on goods and services consistent with a cattle ranching business.

An important part of project analysis is to compare the fiscal impacts on units of local government with and without the project. This project crosses a state line and would create fiscal impacts in both Twin Falls County, Idaho and Elko County, Nevada with two different taxing systems. This analysis focuses on taxes accruing within the analysis area. A rough estimate is made of state fiscal impacts, but these are necessarily crude as detailed state fiscal impact models are beyond the scope of this analysis. Similarly, a good faith effort is made to incorporate the exemptions and abatements the project may be eligible for, but these may be subject to discretionary action on the part of the developer. Tax impacts would vary by project year, so this analysis presents values of the streams of fiscal impacts over time as present values, in addition to first year values.

To calculate energy production, a representative capacity factor of thirty percent (30%) is used in this analysis, which is drawn from other wind projects in the Northwest. A price of $75 per MW hour is the best estimate of power value provided by utility economist Dr. Don Reading of Ben Johnson Associates (Reading, 2009). For example, the project can be expected to produce $77 million of electricity per year in Alternative B1, with $67 million produced in Idaho.

The 2007 Idaho Legislature passed House Bill 189, which provided a three percent tax on gross energy receipts for wind projects in lieu of paying property taxes. The tax is collected at the state level and apportioned to the relevant taxing districts in proportion to their levies. The tax lags production by a year, as the previous calendar year production must be filed by the producer to the Idaho Tax Commission.

Nevada uses ad valorem property taxes on wind energy projects, in contrast to the Idaho wind energy tax. With an independent developer, the project would normally be assessed locally by the Elko County Assessor. However, NV Energy has a contract to take an equity position on the first 200 MW of capacity in the project. This means that NV Energy's investment in the project would be taxed centrally by the Nevada Department of Taxation as part of their portfolio of utility property. The project would be assessed on December 31 of the year it is constructed, with the first tax collected roughly at the end of year 2.

Working in collaboration with the Nevada Department of Taxation, the Elko County Assessor, NV Energy, and RES preliminary estimates of Nevada fiscal impacts were developed for this analysis. They are not binding in any way, but represent a consensus baseline estimate. Property values were depreciated using the 1.5 percent straight-line rate allowed for real property. In practice, portions of the property would likely be depreciated using various personal property depreciation schedules, and some property values may be adjusted for replacement value.

Renewable energy projects in Nevada qualify for an abatement of 45 percent of their property tax bill for 20 years, provided they meet certain conditions regarding capital cost, job creation, and wage and benefit rates. Of the remaining tax, 45 percent is distributed to the Nevada Renewable Energy Fund and the rest is apportioned to the local taxing districts in proportion to their levies. It appears that this project would qualify for this abatement, but eligibility may be subject to certain management decisions regarding job creation within Nevada, wage rates, etc.

Materials used for renewable energy projects are exempt from sales tax in Idaho, and services are not subject to sales tax. However, materials purchased by private contractors for indirect use and the purchases by households from induced income would be subject to sales tax and individual income tax. State of Idaho General Account taxes represented 6.1 percent of Idaho personal income in FY 2007, 6.0 percent in FY 2008, and 5.1 percent in FY 2009. This analysis applied 5.5 percent to the indirect and induced economic impacts to calculate the taxes that would accrue to the State of Idaho (Ferguson, 2009).

Elko County assesses a total sales tax of 6.85 percent. It is not clear how many purchases would be made in Nevada, given the sales tax exemption in Idaho and the possible tax abatements the project may qualify for. In addition, the location of much of the spending is determined by the existing community economies, and Twin Falls, Idaho is the regional retail trade center. Nevada sales tax revenues are estimated for construction based on the amount of investment prorated for Nevada. The state of Nevada offers several tax incentive programs to new business activities in Nevada, which are administered by the Nevada Energy Commissioner. Among these are a Sales and Use Tax Abatement, a Personal Property Tax Abatement, and a modified Business Tax Abatement (Nevada Revised Statutes 360.750, 374.357, 361.0687, 372.397, 363B.120). Each has requirements for capital investment, job creation, and wages. The project is assumed to be eligible for the reduced sales tax abatement rate of 2.25 percent.

Fiscal impacts in Idaho and Nevada are presented both in annual terms and as a present value of the entire stream of future impacts in 2008 dollars. The analysis of Alternative B1, from which impact estimates for the other alternatives were based, can be seen in greater detail in a technical report called "*The Economic Impacts of the China Mountain Wind Project*" (Gardner, 2010).

The impact estimates presented in this analysis are conservative for the following reasons:

- The representative wind capacity factor of 30 percent is representative of projects in the Pacific Northwest, but likely underestimates the wind generation potential of this site, especially those turbines situated on the ridgeline of China Mountain.
- Local spending by non-resident workers on living expenses (e.g. taxable food, lodging, and other personal expenditures) has not been quantified into this analysis.
- Some out-of-state wage earnings may be liable for Idaho income tax.
- Some purchases made by private contractors during construction may fall outside the exemptions and be subject to either Idaho or Nevada sales tax.
- There would clearly be some taxable sales from indirect or induced spending and from operation spending that would generate revenue for the state of Nevada and relevant local jurisdictions.
- Similarly, there would be Nevada business taxes generated during project operation.
- A higher capacity factor or larger capacity turbines would result in higher tax revenues for one or both counties.
- Economic output, labor income, and jobs created by project decommissioning have not been quantified due to lack of experience with decommissioning in the U.S.
- Fiscal impacts on local governmental units are substantial net new revenues. Economic output, labor income, and jobs would all be generated as local governments spend these new revenues on community betterment. These impacts have not been quantified into the analysis as local governments have choices between new spending and tax reduction, but they appear to be of a scale to nearly match the long-term jobs generated by project O&M.
- Economic impacts from local expenditures for environmental mitigation of the project have not been included in this analysis.

One factor that could lower the impacts estimates presented here would be negative changes in the non-market values placed on open space by the analysis area's residents and visitors. Such changes are difficult to quantify and exceed the scope of this analysis. Open space values may fluctuate before and after the construction of any alternative, because the literature on property values shows that residents tend to perceive higher property value impacts prior to construction than actually occur, and actual negative changes in property values tend to fade with time after construction. Open space values may follow a path similar to property values (Gardner, 2010).

Assumptions:

- A social discount rate of 3 percent is assumed for purposes of estimating the present value of various cost and revenue streams. Present value represents the current value of the future stream of output and income impacts. Future monetary values are discounted because society values money in the present more than the same amount of money at a future date. This social discount rate represents a long-term, inflation-free, and tax-free rate of return on investments. Construction costs exclude debt financing costs. These are normally paid to financial institutions outside the analysis area.
- Although final turbine selection would be between 2.0 and 3.0 MW capacity, construction costs are based on turbines with 2.3 MW capacity each.
- All costs and revenues are stated in 2008 constant dollars.
- Project costs and revenues have been tailored to the project as specifically as possible, but many are representative costs or revenues taken from similar projects.
- A capacity factor for wind turbine power generation of 30 percent is used for analysis purposes and does not necessarily represent the actual capacity factor for the project. This capacity factor is the ratio of actual wind energy production to the maximum possible wind energy production.
- A representative electricity price of $75 per MWH is used, which includes the value of the green tags, which certify the electricity came from a renewable source.
- The economic life of the wind turbines is assumed to be 25 years. This should not be confused with the 30 year ROW for the project.
- Construction costs are assumed to follow in proportion to the number of turbines. Costs are split between Nevada and Idaho in proportion to the number turbines within each state. In alternatives with no Nevada turbines, the costs of the interconnect and transmission line are still allocated to Nevada.
- Most of the engineering services are imported from outside the analysis area by specialty firms.
- O&M staff are assumed to reside in either Twin Falls or Elko counties.
- Federal and state ROW rentals, or property lease payments, are assumed to be spent out of the analysis area.
- Half of private land lease payments are assumed to be spent within the analysis area on ranching and land improvements, with the other half leaving the analysis area for debt reduction, investment, or tax payments.
- The Applicants are assumed to take action to qualify for partial tax abatements in Nevada for property and sales taxes.
- The salvage value of the project is assumed to be 20 percent of construction cost after 25 years.

4.3.3.2 Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

The No Action Alternative would continue existing conditions. There would be no economic impacts from project construction, O&M, or decommissioning. There would be no changes in economic output, jobs, labor income, fiscal conditions, or property values from implementing the project. Economic conditions would continue as described in Chapter 3.

Impacts Common to All Action Alternatives

Construction

The economic impacts of the project would extend beyond the analysis area. The project expenditures outside the analysis area on large capital equipment like the turbines and towers would generate hundreds of jobs for the U.S. and world economies (depending on where the materials are produced and how they are transported) (Ayee et al., 2009). In addition, many of the local purchases are for goods imported into the analysis area for resale.

To the extent that local labor is not available and/or specialized labor is needed, workers would be drawn in from surrounding counties and/or states with larger and more diverse construction work forces. This would result in employment benefits and generate wage earnings that would be leaked outside the county, thereby benefiting other regional economies.

There is no suggested mitigation for economic impacts. However, there would be economic impacts that result from local spending on environmental mitigation. It is difficult to predict the direct, indirect, and induced economic impacts of mitigation, as these impacts would vary with the type of mitigation activities purchased. For example, money spent on studies may go to firms outside the analysis area, with only a portion spent locally on travel expenses for field work. Money spent on vegetative rehabilitation may entail high local spending, while money spent on a conservation easement may all go to debt retirement outside the analysis area. To the extent that mitigation leads to local purchases of materials and labor, it would generate one-time positive economic impacts not unlike construction spending.

Operation and Maintenance

Upon completion, the project would generate ongoing O&M activities that generate long-term economic impacts on Twin Falls and Elko counties. The economic impacts would be associated with local O&M expenditures, including lease payments, as well as the size, location and estimated payroll associated with the O&M workforce. These local expenditures would continue over the life of the project.

Wind energy facility operation would generate a number of positive economic impacts outside the analysis area. There are over 8,000 precision parts in a single wind turbine, and approximately half of those components are manufactured in the U.S. (Ayee et al., 2009). Purchases of parts, equipment,

and services for O&M outside the analysis area would generate jobs and income in the areas where they are procured.

The recommended mitigation for bat mortality (Section 2.4.6.1) that would modify the speed at which rotors begin turning would serve to reduee power production and thus project revenue and wind energy tax revenues. These mitigation compliance losses would vary with weather conditions and the meteorological data is not available for a quantitative analysis.

Decommissioning

The project has an expected economic life of 25 years, while the ROW grant would be for 30 years. Given that the construction of the project would take place over 2 years (for most alternatives), this means the useful life of the project ends after year 27. Beginning year 28, one of three things would happen: (1) the project's actual useful life extends beyond 25 years or (2) the project is decommissioned. Both options carry positive economic impacts for the analysis area, either in terms of continued O&M or short-term jobs and spending associated with decommissioning. Decommissioning has been estimated by the developer to cost approximately the salvage value of the project, or 20 percent of construction costs. It is worth noting that economic impacts in year 28 would still carry a present value of 44 percent. This means that either of the options would have economic impacts with meaningful value today.

Decommissioning is the assumed option, but economic impacts have not been quantified into the analysis because no modern wind project on Federal lands has yet been decommissioned. Note that a much higher proportion of the decommissioning cost would be labor, because there are few, if any, new materials required. The number of workers for decommissioning would be large, but the skills and wage levels of these jobs would generally be lower than for construction, i.e. it takes less skill to cut turbines into scrap than to assemble a complex electrical machine. Workers for decommissioning are more likely to be from the local analysis area because fewer specialized skills are required, increasing local one-time impacts. Economic impacts of decommissioning can be generally assumed to vary with the number of wind turbines. Fiscal impacts from Idaho wind energy taxes would cease with the end of the project. Nevada fiscal impacts would end only when the land improvements are removed.

The literature generally supports the hypothesis that wind energy developments do not adversely affect property values (Hoen & Wiser, 2009; Entrix, 2009). This is especially true for agricultural properties and for residential properties more than 1 mile from the project. Portions of the project would be visible from some locations along US-93 and from areas of Salmon Falls Reservoir. There are no permanent residents within the project area, nor any commercial or industrial property. Some turbines would be visible from Rogerson, Idaho at distances approaching 5 miles. Given that the distance from residential properties to the nearest wind tower is well over 1 mile, no negative impacts on property values are expected from the project (Gardner, 2010).

Alternative B1 (Proposed Action)

Construction

Construction costs would total $705 million, of which the wind turbines themselves would account for 78 percent, or $553 million. In terms of direct labor costs, the total construction payroll for both local and non-local workers would be nearly $58 million, with about $49 million in labor payments for installation of the foundations, wind turbines and electrical connections, and $9 million in labor for other construction activities. Of the total project costs, $656.8 million, or 93.2 percent of expenditures, would be for equipment and labor located outside the analysis area. The construction costs can be split between the two states, with Idaho targeted for $596 million in investment, while Nevada would get $109 million. These are based on the switchyard and substation being built in Nevada, with remaining costs allocated in proportion to turbine numbers.

Estimates of labor requirements taken directly from the construction budgets yield an average of 239 full-time equivalents being hired for two construction years. Employment impacts were also estimated using the IMPLAN model. A total of 396 part and full-time jobs are estimated to be created by project construction. With indirect and induced jobs, total part and full-time employment impacts from construction would be 749 temporary jobs over two years. Including the $705 million in direct investment, Alternative B1 would have a total economic impact of $737 million and a total impact on labor income within the analysis area of $41 million. Spending by workers outside the analysis area for living expenses within the analysis area have not been quantified into the analysis, making the impacts reported here conservative.

Operation and Maintenance

Alternative B1 would support about 34 long-term full-time employees, including management, administrative, and staff for security and O&M on project facilities, based on the Applicants' budget. Many of these positions would be with the turbine manufacturer in support of the turbine service and maintenance warranty. The total payroll for these 34 positions, including benefits, is estimated to be approximately $2.44 million per year (Table 4.3.3-1).

Table 4.3.3-1. Alternative B1 China Mountain Wind Project Operation and Maintenance Budget.

Item	Cost	Non-Local Parts & Services	Local Parts & Services	Local Labor
O&M Turbines	$4,213,000	$2,125,000	$213,000	$1,875,000
O&M Facilities	$754,000	$141,000	$47,000	$566,000
Insurance	$1,370,000			
Utilities	$125,000		$125,000	
Fuel	$75,000		$75,000	
Land Royalties	$2,624,000			
TOTAL	**$9,161,000**	**$2,266,000**	**$460,000**	**$2,441,000**

Note: One-half private land royalties assumed spent locally.

The Applicants would also make annual lease payments to BLM, the state of Idaho, and private landowners for wind turbines and other facilities of $1.6, $0.3, and $0.7 million respectively. The total O&M budget of the project would be approximately $9.2 million per year for the expected 25 year economic life of the project, excluding tax payments. Of this total, project O&M would require expenditures on local goods and services totaling $2.9 million annually. It is estimated that over a third of total expenditures would be for materials and services not produced locally (such as replacement parts for wind turbines). However, nearly half a million dollars in annual purchases would be made locally for routine hardware and electrical supplies, lubricants, fuel and utility services.

The project would generate positive economic activity in Twin Falls and Elko counties over the life of the project. A summary of the total economic effects of project O&M is presented in Table 4.3.3-2. Project O&M would increase local economic output by $11.3 million annually. Total local labor income effects would be estimated at $3.1 million annually, while total annual employment benefits of project O&M would be 46 additional jobs. The 46 total full and part-time jobs estimated by IMPLAN for total project O&M impacts appear consistent with the estimate of 34 full-time equivalents derived from the O&M budget.

Table 4.3.3-2. Summary of Economic Impacts, Alternative B1.

Economic Impact	Construction (One-Time)	O&M (Annual)	Present Value Project Total
Output (millions $)			
Direct Effects	$705.0	$9.2	$855.4
Indirect Effects	$14.9	$1.1	$33.0
Induced Effects	$17.1	$1.1	$34.7
Total Output Effects	**$737.1**	**$11.3**	**$923.2**
Labor Income (millions $)			
Direct Effects	$29.4	$2.4	$69.5
Indirect Effects	$5.4	$0.3	$10.5
Induced Effects	$6.7	$0.4	$12.9
Total Income Effects	**$41.4**	**$3.1**	**$92.8**
Employment (Jobs)			
Direct Effects	396	24	n/a
Indirect Effects	157	9	n/a
Induced Effects	196	13	n/a
Total Employment Effects	**749**	**46**	

Note: Totals may not add due to rounding.
Employment includes both full and part-time jobs.
One-time construction impacts would occur during the 2-year construction period.

Total Economic Impacts

Total analysis area economic impacts of project construction and O&M are presented in Table 4.3.3-2. Table 4.3.3-2 also presents the total economic impacts of the project in present value terms. The present value of total direct, indirect, and induced economic output generated in the two counties

by the project is estimated at $923.2 million. This economic activity would generate labor income to the analysis area's residents of $92.8 million over the 25-year life of the project, as well as employment of 749 full or part-time temporary jobs in the construction years and 46 full or part-time permanent jobs each year of full operation.

Fiscal Impacts

Table 4.3.3-3 shows the wind energy tax revenue generated totals $2.01 million on average per year, with Twin Falls County receiving the majority of the funds, followed by Twin Falls Highway District and the College of Southern Idaho. The present value of the stream of tax revenues over the life of the project is shown in Table 4.3.3-3 to be $33.0 million for the expected configuration of 391 MW (170 turbines of 2.3 MW each). For comparison purposes, the range of first year wind tax revenues based on the allowable project size could vary from $1.03 million for 200 MW to $2.06 million for 400MW.

Table 4.3.3-3. Idaho Wind Energy Tax Revenues, Alternative B1.

Taxing District	2008 tax charge	Wind Tax @ 391 MW	% of 2008 Tax Charge	Present Value Wind Tax, 25 years, 3%
College of Southern Idaho	$4,260,760	**$270,491**	6.3%	$4,439,719
Twin Falls County	$15,663,040	**$1,252,180**	8.0%	$20,552,730
Twin Falls County Ambulance	$620,095	**$56,100**	9.0%	$920,803
Twin Falls County Pest Abatement	$441,857	**$35,324**	8.0%	$579,795
Twin Falls Highway	$3,182,188	**$318,546**	10.0%	$5,228,476
Three Creek Elementary (TCA 20)	$0	**$----**		$0
Castleford School #417 (TCA 22)	$435,681	**$78,140**	17.9%	$1,282,553
West End Cemetery (TCA 22)	$58,544	**$2,004**	3.4%	$32,900
		$2,012,785		**$33,036,975**

Notes:

1) Assumes 140 turbines placed in TCA 20, and 8 turbines placed in TCA 22
2) Assumes representative capacity factor of 30% and energy price of $75/MWH in green tags.
3) Assumes 391 MW is minimum generating capacity of project, with 352 MW in Idaho.
4) Note that State of Idaho would receive revenue from direct, indirect, and induced employment via income taxes. Construction materials for renewable energy projects are exempt from sales tax, but sales tax revenues would be generated from indirect and induced business activity.
5) Note also that property tax revenues would be generated in Nevada from turbines built there.

Source: Revenue estimates and apportionment developed with the assistance of Greg Cade and Alan Dornfest of the Idaho Tax Commission.

Nevada property tax revenues that include a partial tax abatement are shown in Table 4.3.3-4. The first year tax of Alternative B1 would be $1,204,355, with Elko County taxing districts receiving $638,359 and Nevada the rest. The present value of this tax is $18.8 million.

Table 4.3.3-4. Nevada Ad Valorem Tax Apportionment with Abatement.

Tax District	First Tax Bill	Present Value of Tax During Project Life
Elko County	$93,133	$3,057,712
Senior Citizens	$2,828	$92,841
Jail Operation	$2,771	$90,984
Med/Indigent Care	$8,992	$295,234
County Capital Projects	$7,069	$232,102
Hospital/Indigent	$2,121	$69,631
Youth Service Assessment	$1,654	$54,312
School District	$106,042	$3,481,530
School GID	$106,042	$3,481,530
State of Nevada	$24,036	$789,147
TV District	$4,086	$134,155
ECVA	$5,542	$181,968
NV Renewable Energy Fund	$541,960	$6,827,377
Total	**$1,204,355**	**$18,788,522**

Source: Personal correspondence with Terry Rubald, Nevada Department of Taxation, Division of Assessment Standards, and Katrinka Russell, Elko County Assessor

Note: Nevada law provides for a partial property tax abatement for renewable energy projects meeting capital investment, employment, and wage requirements (NRS 701A.300-390). Abatement reduces tax to 55% of normal bill for 20 years. The Nevada Renewable Energy Fund receives 45% of the remaining tax, with the rest allocated through the normal distribution. Assumes 3% discount rate, 20% salvage value in year 26, and 1.5% straight-line depreciation.

Idaho would also receive an estimated $1.8 million in state income, sales, and other state taxes during the construction period. During O&M, the state of Idaho would see increased taxes of $0.4 million per year. The present value of both construction and O&M revenues over the life of the project to the state of Idaho is estimated to be $6.8 million.

Sales tax revenues of $2,444,000 would be collected in Nevada from construction investment based on a reduced rate of 2.25 percent, with $2,426,000 distributed to the Elko County School District. Due to the complications of whether purchases for operation are made in Idaho or Nevada, no sales tax was estimated for operation.

Overall, Twin Falls County, Elko County, the state of Idaho and state of Nevada would all experience increases in their tax receipts over the life of the project. Table 4.3.3-5 shows the present value of all the increases in tax receipts totals $62.7 million.

Table 4.3.3-5. Summary of Fiscal Impacts of China Mountain Wind Project, Alternative B1.

Tax	Twin Falls County	Idaho	Elko County	Nevada	Present Value
Idaho Wind Energy Tax	$2,012,785				$33,036,975
Nevada Property Tax			$638,359	$565,996	$18,788,522
NV Possessory Interest Tax				*Negligible*	
Idaho State Taxes – Construction		$1,763,500			$1,763,500
Idaho State Taxes – O&M		$409,000			$6,712,792
Nevada Sales Tax			$2,426,000	$18,000	$2,444,000
Nevada Business Tax				*Uncertain*	
Total	**$2,012,785**	**$2,172,500**	**$3,064,359**	**$583,996**	**$62,745,789**

Alternative B2a

Alternative B2a would build the same 170 turbines as Alternative B1. The only changes would come with the timing of the Phase II of the project. For analysis purposes, Phase II is assumed to be approved and fully constructed in year 10 of the project. This would cause delays in Phase II construction impacts, operating costs, and tax revenue streams. The 9-year delay for Phase II would lower the present value of the tax revenue streams.

The construction impacts would be the same as Alternative B1 (Table 4.3.3-6). Table 4.3.3-6 shows the direct, indirect, and induced economic impacts from construction of the first and second phases of Alternative B2a, individually and combined.

Table 4.3.3-6. Alternative B2a Economic Impacts from Construction by Project Phase.

Economic Impact from Construction	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Phase I (Year 1 & 2)				
Output (millions 2008 $)	$360.5	$7.6	$8.7	$376.9
Labor Income (millions 2008 $)	$17.5	$3.2	$4.0	$24.6
Employment (Jobs)	236	93	117	446
Phase II, Year 9				
Output (millions 2008 $)	$344.5	$7.3	$8.4	$360.2
Labor Income (millions 2008 $)	$11.9	$2.2	$2.7	$16.8
Employment (Jobs)	160	64	79	303
Phase I + II (Year 1 & 2)				
Output (millions 2008 $)	$705.0	$14.9	$17.1	$737.1
Labor Income (millions 2008 $)	$29.4	$5.4	$6.7	$41.4
Employment (Jobs)	396	157	196	749

Note: These impacts apply also to Alternatives B2b and B2c.
Employment includes both full and part-time jobs.

Operation expenditures would vary between years 3 to 10 when only Phase I is operational and years 10 to 30 when both phases are operational. The operating expenditures are summarized in Table 4.3.3-7. Annual ROW rental payments are estimated to be $1.6 million to BLM, $0.3 million to the State of Idaho, and $0.7 million to private landowners.

Table 4.3.3-7. Alternative B2a China Mountain O&M Budget by Project Phase.

	Cost	Non-Local Parts & Services	Local Parts & Services	Local Labor
Years 3 to 10 (Phase I)	$5,154,053	$1,228,500	$356,006	$1,525,559
Years 10 to 30 (Phase II)	$14,121,941	$3,444,500	$810,994	$3,922,441

Note: One-half private land royalties assumed spent locally.

Note that because the ROW grant would be for 30 years, the delay in constructing Phase II to year 9 would have the effect of shortening the operating life of the Phase II turbines from 25 years to 20 years. This would reduce total economic impacts by $11.2 million and labor income by $2.6 million. This may impact the economic feasibility decision the developer faces with Phase II.

The total economic impacts of Alternative B2a would be the same as Alternative B1, but they would be spread over a longer time period, making the present value lower (Table 4.3.3-8). The total economic impacts of Alternative B2a would be the same as Alternative B1 during years 10 to 30 (Phase II) and would be proportionately less in years 3 to 10 (Phase I). Total economic impacts can be summarized similarly to Table 4.3.3-2, but with present values altered by the timing of Phase II in Table 4.3.3-8.

Table 4.3.3-8. Summary of Economic Impacts, Alternative B2a – Phase I + Phase II.

	Construction (One-Time PV)	O&M (Annual)	Present Value Project Total
Output (millions $)			
Direct Effects	$616.8	$9.2	$743.3
Indirect Effects	$13.1	$1.1	$28.3
Induced Effects	$15.0	$1.1	$29.9
Total Output Effects	**$645.0**	**$11.3**	**$793.6**
Labor Income (millions $)			
Direct Effects	$25.7	$2.4	$59.4
Indirect Effects	$4.7	$0.3	$9.0
Induced Effects	$5.8	$0.4	$11.1
Total Income Effects	**$36.3**	**$3.1**	**$79.5**
Employment (Jobs)			
Direct Effects	396	24	n/a
Indirect Effects	157	9	n/a
Induced Effects	196	13	n/a
Total Employment Effects	**749**	**46**	

Note: Totals may not add due to rounding.
Employment includes both full and part-time jobs.
Annual Operations is for maximum period, years 12-26.
PV = Present value, using a social discount rate of 3 percent (see assumptions).

The fiscal impacts for Alternative B2a are displayed in Table 4.3.3-9. The delay in building Phase II of the project until year 9 would cause the present value of the tax revenue streams to be much smaller than in Alternative B1 (Table 4.3.3-5). Building Phase II in year 9 means that the effective life of Phase II turbines extends beyond the proposed 30 year ROW lease. The elimination of the last 5 years of Phase II turbine production would reduce tax revenues compared to Alternative B1. The distribution of Idaho and Nevada taxes to local taxing districts would be in the same proportions as displayed in Tables 4.3.3-3 and 4.3.3-4.

Table 4.3.3-9. Summary of Fiscal Impacts, Alternative B2a – Phase I and Phase II Combined.

Tax	Present Value, B2a
Idaho Wind Energy Tax	$27,005,477
Nevada Property Tax	$18,788,522
NV Possessory Interest Tax	
Idaho State Taxes -construction	$1,098,229
Idaho State Taxes - O&M	$5,645,849
Nevada Sales Tax	$2,444,000
Nevada Business Tax	
Total	**$54,982,077**

Alternative B2b

Construction and operation budgets would be the same as Alternative B2a. ROW rental payments would be the same as in Alternative B2a. With regard to fiscal impacts, construction of the Nevada wind turbines would be delayed to the second phase in year 9 in Alternative B2b. This would cause a sharp reduction in the present value of the Nevada property tax and sales tax. Fiscal impacts of Alternative B2b are shown in Table 4.3.3-10. The elimination of the last 5 years of Phase II turbine production would reduce tax revenues compared to Alternatives B1 and B2a. The distribution of Idaho and Nevada taxes to local taxing districts would be in the same proportions as displayed in Tables 4.3.3-3 and 4.3.3-4.

Table 4.3.3-10. Summary of Fiscal Impacts, Alternative B2b – Phase I and Phase II Combined.

Tax	Present Value
Idaho Wind Energy Tax	$28,313,513
Nevada Property Tax	$12,630,237
NV Possessory Interest Tax	
Idaho State Taxes – Construction	$1,183,947
Idaho State Taxes – O&M	$6,050,302
Nevada Sales Tax	$1,818,566
Nevada Business Tax	
Total	**$49,996,565**

Alternative B2c

Economic impacts would be the same as Alternative B2a.

Alternative C

In Alternative C, 152 turbines would be erected, including all the 22 Nevada turbines. Compared to Alternative B1, there are 18 fewer turbines on public land in Idaho. Construction costs would total $611.3 million, of which $564.7 million is for capital goods, and $46.6 million is for labor. Local purchases would consist of $16.4 million of materials and equipment and $27.3 million is for local labor. A total of $508.9 million would be expended in Idaho, with the remaining $102.4 million in Nevada. The total economic impacts of Alternative C are displayed in Table 4.3.3-11 below. A total of $639 million in increased economic output, $38.5 million in labor income, and 696 full and part-time jobs would be one-time impacts that would result from Alternative C.

The O&M budget would be $7.8 million and include $400,000 in local parts and materials purchases and $2.2 million in local purchases of labor services. Annual ROW rental payments would be $0.9 million to BLM, $0.3 million to the State of Idaho, and $0.7 to private landowners. The stream of O&M impacts, together with construction impacts, total to a present value of $802 million in economic output.

Table 4.3.3-11. Summary of Economic Impacts, Alternative C.

	Construction (One-Time)	Operations (Annual)	Present Value Project Total
Output (millions $)			
Direct Effects	$611.3	$7.8	$741.6
Indirect Effects	$12.9	$1.0	$29.3
Induced Effects	$14.8	$1.0	$31.2
Total Output Effects	**$639.0**	**$10.0**	**$802.1**
Labor Income (millions $)			
Direct Effects	$27.3	$2.2	$63.4
Indirect Effects	$5.0	$0.3	$9.9
Induced Effects	$6.2	$0.4	$12.8
Total Income Effects	**$38.5**	**$2.9**	**$86.1**
Employment (Jobs)			
Direct Effects	368	22	n/a
Indirect Effects	146	9	n/a
Induced Effects	182	12	n/a
Total Employment Effects	**696**	**43**	

Note: Totals may not add due to rounding.
Employment includes both full and part-time jobs.

Fiscal impacts of Alternative C are summarized in both first year and present value terms in Table 4.3.3-12. The distribution of Idaho and Nevada taxes to local taxing districts would be in the same proportions as displayed in Tables 4.3.3-3 and 4.3.3-4.

Table 4.3.3-12. Summary of Fiscal Impacts, Alternative C.

Tax	Twin Falls County	Idaho	Elko County	Nevada	Present Value
Idaho Wind Energy Tax	$1,767,987				$29,018,968
Nevada Property Tax			$638,359	$565,996	$18,788,522
NV Possessory Interest Tax				*Negligible*	
Idaho State Taxes – Construction		$1,523,500			$1,523,500
Idaho State Taxes -O&M		$354,145			$5,812,782
Nevada Sales Tax			$2,426,000	$18,000	$2,444,000
Nevada Business Tax				*Uncertain*	
Total					**$57,587,772**

Alternative D

In Alternative D, 124 turbines would be erected in a 2-year construction period. There would be no turbines in Nevada, but all the turbines on private and state land in Idaho would remain. Construction costs would total $509.4 million, of which $469.2 million would be for capital goods, and $40.2 million would be for labor. Local purchases would consist of $14.2 million of materials and equipment and $23.2 million is for local labor. A total of $490.9 million would be expended in Idaho, with the remaining $18.5 million in Nevada. The economic impacts of Alternative D are displayed in

Table 4.3.3-13 below. A total of $533 million in increased economic output, $32.7 million in labor income, and 591 full and part-time jobs would be the one-time impacts that result from Alternative D.

The operating budget would be somewhat lower, with annual expenditures of $6.9 million that include $400,000 in local parts and materials purchases and $1.9 million in local purchases of labor services. Annual ROW rental payments would be $0.7 million to BLM, $0.3 million to the State of Idaho, and $0.7 million to private landowners. The total economic impacts of Alternative D are shown in Table 4.3.3-13.

Table 4.3.3-13. Summary of Economic Impacts, Alternative D.

Economic Impact	Construction (One-Time)	O&M (Annual)	Present Value Project Total
Output (millions $)			
Direct Effects	$509.4	$6.9	$618.5
Indirect Effects	$10.8	$0.8	$23.9
Induced Effects	$12.4	$0.8	$25.5
Total Output Effects	**$532.5**	**$8.5**	**$667.9**
Labor Income (millions $)			
Direct Effects	$23.2	$1.9	$59.3
Indirect Effects	$4.3	$0.2	$9.2
Induced Effects	$5.3	$0.3	$11.9
Total Income Effects	**$32.7**	**$2.4**	**$80.4**
Employment (Jobs)			
Direct Effects	312	19	n/a
Indirect Effects	124	7	n/a
Induced Effects	155	10	n/a
Total Employment Effects	**591**	**36**	

Note: Totals may not add due to rounding.
Employment includes both full and part-time jobs.

Fiscal impacts of Alternative D are summarized in both first year and present value terms in Table 4.3.3-14. The fiscal impacts would be sharply lower due to the very small investment in Nevada subject to Nevada property or sales taxes. The distribution of Idaho and Nevada taxes to local taxing districts would be in the same proportions as displayed in Tables 4.3.3-3 and 4.3.3-4.

Table 4.3.3-14. Summary of Fiscal Impacts, Alternative D.

Tax	Twin Falls County	Idaho	Elko County	Nevada	Present Value
Idaho Wind Energy Tax	$1,686,388				$27,679,631
Nevada Property Tax			$112,960	$92,422	$3,204,063
NV Possessory Interest Tax				*Negligible*	
Idaho State Taxes – Construction		$1,276,000			$1,276,000
Idaho State Taxes – O&M		$235,510			$3,865,558
Nevada Sales Tax			$409,800	$6,000	$415,800
Nevada Business Tax				*Uncertain*	
Total					**$36,441,052**

Alternative E

In Alternative E, 120 turbines would be erected in a 4-year construction period. Fifteen Nevada turbines and all turbines on state and private land in Idaho are included. Construction costs would total $495.5 million, of which $455.8 million would be capital goods, and $39.7 million would be labor. Local purchases would consist of $14.1 million of materials and equipment and $23.0 million for local labor. A total of $409.4 million would be expended in Idaho, with the remaining $86.1 million in Nevada. The economic impacts of constructing Alternative E are displayed in Table 4.3.3-15. A total of $518 million in increased economic output, $32.5 million in labor income, and 586 full and part-time jobs would be one-time impacts that result from Alternative E.

The operating budget would be lower than Alternative B1. Annual expenditures of $6.3 million would include $400,000 in local parts and materials purchases and $1.9 million in local purchases of labor services. Annual ROW rental payments would be $0.6 million to BLM, $0.2 million to the State of Idaho, and $0.6 million to private landowners. The total economic impacts of Alternative E are shown in Table 4.3.3-15.

Table 4.3.3-15. Summary of Economic Impacts, Alternative E.

Economic Impact	Construction (One-Time)	O&M (Annual)	Present Value Project Total
Output (millions $)			
Direct Effects	$495.5	$6.3	$593.6
Indirect Effects	$10.5	$0.8	$22.2
Induced Effects	$12.0	$0.8	$23.7
Total Output Effects	**$518.0**	**$7.8**	**$639.5**
Labor Income (millions $)			
Direct Effects	$23.0	$1.9	$52.4
Indirect Effects	$4.2	$0.2	$7.8
Induced Effects	$5.2	$0.3	$10.0
Total Income Effects	**$32.5**	**$2.4**	**$70.3**
Employment (Jobs)			
Direct Effects	310	19	n/a
Indirect Effects	123	7	n/a
Induced Effects	153	10	n/a
Total Employment Effects	**586**	**36**	

Note: Totals may not add due to rounding.
Employment includes both full and part-time jobs.

Fiscal impacts of Alternative E are summarized in both first year and present value terms in Table 4.3.3-16. Total fiscal impacts amount to $47.3 million in present value. The distribution of Idaho and Nevada taxes to local taxing districts would be in the same proportions as displayed in Tables 4.3.3-3 and 4.3.3-4.

Table 4.3.3-16. Summary of Fiscal Impacts, Alternative E.

Tax	Twin Falls County	Idaho	Elko County	Nevada	Present Value
Idaho Wind Energy Tax	$1,400,790				$21,672,119
Nevada Property Tax			$524,950	$429,500	$15,855,130
NV Possessory Interest Tax				*Negligible*	
Idaho State Taxes – Construction		$1,237,500			$1,237,500
Idaho State Taxes – O&M		$426,000			$6,590,350
Nevada Sales Tax			$1,923,000	$14,000	$1,937,000
Nevada Business Tax				*Uncertain*	
Total					**$47,292,099**

Alternative F

Alternative F would have the fewest turbines of any action alternative, at 105. Construction costs would total $439.6 million, of which $404.1 million would be capital goods, and $35.5 million would be for labor. Local purchases would consist of $12.4 million of materials and equipment and $20.0 million for local labor. A total of $421.1 million would be expended in Idaho, with the remaining $18.5 million in Nevada. The economic impacts of constructing Alternative F are displayed in Table

4.3.3-17. A total of $459.6 million in increased economic output, $28.2 million in labor income, and 510 full and part-time jobs would be one-time impacts that result from Alternative F.

Just as the construction cost would be the lowest of the action alternatives, the operating cost would be the lowest as well, with annual expenditures of $5.6 million. This operating budget would include $354,000 in local parts and materials purchases and $1.5 million in local purchases of labor services. The total economic impacts of Alternative F are shown in Table 4.3.3-17. Annual ROW rental payments would be $0.6 million to BLM, $0.3 million to the State of Idaho, and $0.5 million to private landowners.

Table 4.3.3-17. Summary of Economic Impacts, Alternative F.

Economic Impact	Construction (One-Time)	O&M (Annual)	Present Value Project Total
Output (millions $)			
Direct Effects	$439.6	$5.6	$506.0
Indirect Effects	$9.3	$0.7	$20.8
Induced Effects	$10.7	$0.7	$22.2
Total Output Effects	**$459.6**	**$6.9**	**$549.0**
Labor Income (millions $)			
Direct Effects	$20.0	$1.5	$43.8
Indirect Effects	$3.7	$0.2	$6.6
Induced Effects	$4.6	$0.2	$8.5
Total Income Effects	**$28.2**	**$1.9**	**$58.9**
Employment (Jobs)			
Direct Effects	269	14	n/a
Indirect Effects	107	6	n/a
Induced Effects	133	8	n/a
Total Employment Effects	**510**	**27**	

Note: Totals may not add due to rounding.
Employment includes both full and part-time jobs.

Fiscal impacts of Alternative F are summarized in both first year and present value terms in Table 4.3.3-18. The fiscal impacts would be the lowest in terms of present value of any of the alternatives at $34.3 million. The distribution of Idaho and Nevada taxes to local taxing districts would be in the same proportions as displayed in Tables 4.3.3-3 and 4.3.3-4.

Table 4.3.3-18. Summary of Fiscal Impacts, Alternative F.

Tax	Twin Falls County	Idaho	Elko County	Nevada	Present Value
Idaho Wind Energy Tax	$1,427,990				$23,438,397
Nevada Property Tax			$112,960	$92,422	$3,204,063
NV Possessory Interest Tax				*Negligible*	
Idaho State Taxes – Construction		$1,028,500			$1,028,500
Idaho State Taxes – O&M		$379,500			$6,229,128
Nevada Sales Tax			$409,800	$6,000	$415,800
Nevada Business Tax				*Uncertain*	
Total					**$34,315,888**

4.3.3.3 Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

The northern inbound haul route would be expected to require $2 million in road reconstruction costs over a 3-month construction season. Table 4.3.3-19 summarizes the economic impacts of this road work, which would create a total increase in economic output of $3.3 million, labor income increase of $1.7 million, and the creation of an additional 96.5 temporary jobs during construction. Because the road reconstruction would be on public lands, they would not be subject to taxation.

Table 4.3.3-19. Northern Inbound Haul Route Construction Impacts.

Economic Impact	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Output (millions 2008 $)	$2.0	$0.6	$0.7	$3.3
Labor Income (millions 2008 $)	$1.2	$0.2	$0.3	$1.7
Employment (Full & Part-Time Temporary Jobs)	51	20.2	25.2	96.5

Note: Based on three month construction period

Southern Inbound Haul Route Option 1

Option 1 of the southern inbound haul route would be expected to require $1 million in road construction and reconstruction costs over a 3-month construction season. Table 4.3.3-20 summarizes the economic impacts of this road work, which would create a total increase in economic output of $1.7 million, labor income increase of $0.8 million, and the creation of an additional 49.2 temporary jobs during construction. Because the road construction and reconstruction would be on public lands they would not be subject to taxation.

Table 4.3.3-20. Southern Inbound Haul Route Construction Impacts.

Economic Impact	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Output (millions 2008 $)	$1.0	$0.3	$0.4	$1.7
Labor Income (millions 2008 $)	$0.6	$0.1	$0.1	$0.8
Employment (Full & Part-Time Temporary Jobs)	26	10.3	12.9	49.2

Note: Based on three month construction period

Southern Inbound Haul Route Option 2

Construction of option 2 of the southern inbound haul route would have the same economic impacts as that of option 1.

Outbound Haul Route

The outbound haul route needs no road construction or reconstruction, so there would be no economic impacts of this route.

4.3.3.4 Project as a Whole

Table 4.3.3-21 summarizes the economic and fiscal impacts across the eight action alternatives. Both economic and fiscal impacts would vary in relation to the number of turbines with the exception of the B2 alternatives (B2a, B2b, and B2c) that would have somewhat lower impact than B1 due to the delayed construction of 70 turbines in Phase II at year 9. It would be expected that the lowest number of proposed turbines in Alternative F would have 60% of the turbines and nearly 60% of the economic impact as Alternative B1. The northern haul route would be expected to have nearly doubled the economic impact than the south haul route alternatives. Note that all impacts are based on a representative 2.3 MW turbine. Impacts would be slightly lower to moderately higher for 2.0 MW or 3.0 MW turbines respectively.

Table 4.3.3-21 includes the economic impacts of the haul routes, and the impacts within Table 4.3.3-21 are additive between haul route and alternative.

Table 4.3.3-21. Summary of Impacts Across Action Alternatives.

Alternative	Number of Turbines	Total Construction Employment	Total O&M Employment (Long-term)	Total Labor Income Impacts Present Value	Total Project Econ Impacts Present Value	Total Project Fiscal Impacts Present Value
Alternative B1	170	749	46	$92.8	$923.2	$62.7
Alternative B2a	170	749	46	$79.5	$793.6	$54.9
Alternative B2b	170	749	46	$79.5	$793.6	$54.0
Alternative B2c	170	749	46	$79.5	$793.6	$50.0
Alternative C	152	696	43	$86.1	$802.1	$57.6
Alternative D	124	591	36	$80.4	$667.9	$36.4
Alternative E	120	586	36	$70.3	$646.9	$47.3
Alternative F	105	510	27	$58.9	$549.0	$34.3
Northern Inbound Haul Route		97	n/a	$1.7	$3.3	n/a
Southern Inbound Haul Route Option 1		49	n/a	$0.8	$1.7	n/a
Southern Inbound Haul Route Option 2		49	n/a	$0.8	$1.7	n/a

Notes: Costs and Impacts in millions 2008 $.
Jobs are full and part-time jobs.
Construction costs for Alternatives B2a,b, and c are present values at 3%.
Operating costs for Alternatives B2a,B, and C are for maximum cost period of years 12-26.

4.3.3.5 Cumulative Impacts

The analysis area for cumulative impacts is Twin Falls and Elko counties (Figure 3.3.3-1). The analysis area matches data availability and allows comparisons of project impacts with the regional economy using the IMPLAN input-output-model. The indicators of change are the changes in economic output, labor income, and employment that occur in comparison to the regional economy as a whole. A second comparison is made of project impacts on the economic activity within the relevant industry sectors.

Alternative A (No Action Alternative)

The baseline conditions for the No Action Alternative are the levels of economic output, labor income, and full and part-time employment within the economy of the analysis area and the relevant industry sectors. The relevant industry sectors are the Construction sector for comparisons with project construction impacts, and the Maintenance & Power Generation, Transmission, and Distribution sectors for comparisons with project O&M. Note that both the construction and maintenance sectors include work on residential structures, so that comparisons with action alternatives are conservative. A more true comparison would only include commercial and industrial construction and maintenance. Table 4.3.3-22 shows the levels of economic activity in the analysis area from 2008 IMPLAN data in the column under Alternative A. The analysis area had $9.6 billion of economic output, $2.7 billion of labor income, and 69,986 total employment in 2008. These figures represent the cumulative total of all economic transactions in the analysis area. The project alternatives range from a high of 7.31 percent of regional economic output in Alternative B1 to a low

of 4.26 percent for Alternative F for construction. Construction labor income amounts to only 0.7 percent to 1.08 percent of the regional total. Construction employment would range from 0.37 percent to 0.57 percent of total employment in the two counties. O&M activities are much lower still, ranging from 0.06 percent to 0.1 percent of economic output and even less for O&M labor income and employment.

The project appears larger in comparison to the annual totals in its industry. Construction would amount to between 81 percent and 140 percent of economic output in the construction sector, and 6.5 percent to 10 percent of construction employment. O&M activities would range from 4.75 percent to 8.1 percent of economic output in the maintenance and power generation sectors, or 1.7 percent to 2.9 percent of employment in those sectors.

Table 4.3.3-22. Cumulative Impacts.

	Alt. A	Alt. B1	Alt. B2a	Alt. B2b	Alt. B2c	Alt. C	Alt. D	Alt. E	Alt. F
Two-County Region Total (compared to project construction)									
Economic Output ($1,000)	$9,640,970	7.31%	6.40%	6.40%	6.40%	6.34%	5.28%	5.14%	4.26%
Labor Income ($1,000)	$2,722,775	1.08%	0.94%	0.94%	0.94%	1.00%	0.85%	0.84%	0.70%
Employment (Full and part-time jobs)	69,986	0.57%	0.57%	0.57%	0.57%	0.53%	0.45%	0.44%	0.37%
Two-County Region Total (compared to project O&M)									
Economic Output ($1,000)	$9,640,970	0.10%	0.10%	0.10%	0.10%	0.08%	0.07%	0.07%	0.06%
Labor Income ($1,000)	$2,722,775	0.09%	0.09%	0.09%	0.09%	0.08%	0.07%	0.07%	0.05%
Employment (Full and part-time jobs)	69,986	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	0.02%
Construction Sector (compared to project Construction)									
Economic Output ($1,000)	$505,001	139.60%	122.14%	122.14%	122.14%	121.05%	100.87%	98.12%	81.37%
Labor Income ($1,000)	$127,316	23.09%	20.19%	20.19%	20.19%	21.44%	18.22%	18.07%	14.92%
Employment (Full and part-time jobs)	3,965	9.99%	9.99%	9.99%	9.99%	9.28%	7.87%	7.82%	6.46%
Maintenance & Power Generation Sector (compared to project O&M)									
Economic Output ($1,000)	$113,582	8.10%	8.10%	13.95%	13.95%	7.04%	6.07%	5.55%	4.75%
Labor Income ($1,000)	$42,005	5.71%	5.71%	8.73%	8.73%	5.24%	4.52%	4.52%	3.33%
Employment (Full and part-time jobs)	832	2.88%	2.88%	3.26%	3.26%	2.64%	2.28%	2.28%	1.68%

Note: No Action Alternative baseline amounts from 2008 IMPLAN data for Twin Falls and Elko counties.
Action alternative are the direct impacts expressed as a percentage of No Action level.
Construction comparisons assume project construction completed in a single year.
Maintenance and repair construction, and electric power generation, transmission, and distribution are the formal names for the sectors used to compare project operations.

Table 4.3.3-23 shows the present value of the stream of Idaho wind energy taxes expressed as a percentage of the present value of a 25 year stream of the total property taxes for the affected taxing districts in Twin Falls County, or $429.4 million. Although this analysis holds property taxes constant and assumes no growth in valuations, it provides a useful rough guide to the size of the fiscal impact compared to all local government activities by the affected taxing districts in Twin Falls County. The project would add from 5.0 percent to 7.7 percent to the tax revenues of those taxing districts over the life of the project. A comparison with Elko County property tax revenues would be difficult due to complex depreciation schedules of project assets over time.

Table 4.3.3-23. Cumulative Fiscal Impacts.

Alternative	Idaho Wind Energy Tax as % of Total Property Tax (2008)
No Action	0.0%
B1	7.7%
B2a	6.3%
B2b	6.6%
B2c	6.3%
C	6.8%
D	6.4%
E	5.0%
F	5.5%

Note: The present value of the stream of wind energy taxes expressed as a % of the present value of 25 years of 2008 total property taxes for the affected taxing districts.

Agglomeration Economies

The construction of the project would increase the number of wind energy facility projects and wind turbines that exist within the analysis area. Together with the Oregon Trail Wind Farm, which is a 122 turbine project recently begun by Exergy on private lands in the Hagerman and Burley areas, the approved project at the Cotterel site, a 34-turbine project at Milner Butte and other existing projects on private land in the Magic Valley, this would create agglomeration economies-of-scale, which occur as the total amount of economic activity reaches the critical mass needed for associated businesses to emerge serving this industry. For example, there would be more demand for wind turbine technicians trained at the College of Southern Idaho. Wind turbine manufacturers may open larger maintenance branches to serve multiple projects, or may even choose to construct some wind turbine parts within the analysis area. The project may choose to use one brand of turbine because of the presence of similar turbines on other existing projects. Among the action alternatives these agglomeration economies vary with the number of turbines that would be constructed in each alternative. Although they cannot be quantified or monetized, these economies of scale create opportunities to capture significant economic impacts into the analysis area.

Alternative B1 (Proposed Action)

The project would create an increase in economic output in the analysis area of 7.31 percent, and a 1.08 percent increase in labor income and a 0.57 percent increase in total employment on a temporary

basis. The contribution of project operation is very small with 0.1 percent or less of each measure. Fiscal impacts in the relevant taxing districts of Twin Falls County total 7.7 percent of the property tax revenues for those taxing districts over the 25 year economic life of the project.

If the basis for comparison is the relevant industry sector of the regional economy rather than the entire regional economy, the project would have a much larger impact. Construction of the project would result in a 139.6 percent increase in construction economic output. Because wind energy projects are capital intensive and rely on goods produced outside the analysis area, the project would have a smaller 23.09 percent increase in construction labor income. Construction employment would increase by nearly 10 percent. The fact that labor income increases much more than employment means that the project would pay its workers much more than the regional average wage. When project operation is compared to the combination of the Construction Maintenance and Repair and Electric Power Generation, Transmission, and Distribution sectors, the project would increase economic output by 8.1 percent, labor income by 5.71 percent, and employment by 2.88 percent.

Alternative B2a

The project would create an increase in economic output of 6.32 percent, and a 0.93 percent increase in labor income and a 0.57 percent increase in total employment on a temporary basis. Impacts are somewhat lower because the construction impacts for the second stage would be discounted to present value from year 9. Fiscal impacts in the relevant taxing districts of Twin Falls County total a meaningful 6.3 percent of the property tax revenues for those taxing districts over the 25 year economic life of the project.

If the basis for comparison is the relevant sector of the regional economy, the project would have a much larger impact. Construction of the project would mean a 120.67 percent increase in construction economic output. Because wind energy projects are capital intensive and rely on goods produced outside the analysis area, the project would have a smaller 19.95 percent increase in construction labor income. Construction employment would increase by nearly 10 percent. Project operation would have the same impacts as Alternative B1.

Alternative B2b

Same as Alternative B2a, except fiscal impacts in the relevant taxing districts of Twin Falls County total 6.6 percent of the property tax revenues for those taxing districts over the 25 year economic life of the project.

Alternative B2c

Same as Alternative B2a.

Alternative C

The project would create a significant increase in economic output of 6.34 percent, and a meaningful 1.0 percent increase in labor income and a 0.53 percent increase in total employment on a temporary

basis. The contribution of project operation is negligible with less than 0.1 percent of each measure. Fiscal impacts in the relevant taxing districts of Twin Falls County total 6.8 percent of the property tax revenues for those taxing districts over the 25 year economic life of the project.

If the basis for comparison is the relevant sector of the regional economy, the project would have a much larger impact. Construction of the project would mean a 121.05 percent increase in construction economic output. Because wind energy projects are capital intensive and rely on goods produced outside the analysis area, the project would have a smaller 21.44 percent increase in construction labor income. Construction employment would increase by 9.28 percent. When project operation is compared to the combination of the Construction Maintenance and Repair and Electric Power Generation, Transmission, and Distribution sectors, the project would increase economic output by 7.04 percent, labor income by 5.24 percent and employment by 2.64 percent.

Alternative D

The project would create a significant increase in economic output of 5.28 percent, and a 0.85 percent increase in labor income and a 0.45 percent increase in total employment on a temporary basis. The contribution of project operation is negligible with less than 0.1 percent of each measure. Fiscal impacts in the relevant taxing districts of Twin Falls County total 6.4 percent of the property tax revenues for those taxing districts over the 25 year economic life of the project.

If the basis for comparison is the relevant sector of the regional economy, the project would have a much larger impact. Construction of the project would mean a doubling of construction economic output. The project would have a smaller 18.22 percent increase in construction labor income. Construction employment would increase by 7.87 percent. When project operation is compared to the combination of the Construction Maintenance and Repair and Electric Power Generation, Transmission, and Distribution sectors, the project would increase economic output by 6.07 percent, labor income by 4.52 percent, and employment by 2.28 percent.

Alternative E

The project would create an increase in economic output of 5.14 percent, and a 0.84 percent increase in labor income and a 0.44 percent increase in total employment on a temporary basis. The contribution of project operation is negligible with less than 0.1 percent of each measure. Fiscal impacts in the relevant taxing districts of Twin Falls County total 5 percent of the property tax revenues for those taxing districts over the 25 year economic life of the project.

If the basis for comparison is the relevant sector of the regional economy, the project would have a much larger impact. Construction of the project would mean a near doubling of construction economic output. The project would have a smaller 18.07 percent increase in construction labor income. Construction employment would increase by 7.82 percent. When project operation is compared to the combination of the Construction Maintenance and Repair and Electric Power Generation, Transmission, and Distribution sectors, the project would increase economic output by 5.55 percent, labor income by 4.52 percent, and employment by 2.28 percent.

Alternative F

The project would create a significant increase in economic output of 4.26 percent, and a 0.7 percent increase in labor income and a 0.37 percent increase in total employment on a temporary basis. These impacts would be the smallest of the action alternatives. The contribution of project operation is very small with 0.06 percent of economic output, 0.05 percent of Labor income, and 0.02 percent of total employment. Fiscal impacts in the relevant taxing districts of Twin Falls County total 5.5 percent of the property tax revenues for those taxing districts over the 25 year economic life of the project.

If the basis for comparison is the relevant sector of the regional economy, the project would have a larger impact. Construction of the project would mean an 81.37 percent increase in construction economic output. The project would have a smaller 14.92 percent increase in construction labor income. Construction employment would increase by 6.46 percent. When project operation is compared to the combination of the Construction Maintenance and Repair and Electric Power Generation, Transmission, and Distribution sectors, the project would increase economic output by 4.75 percent, labor income by 3.33 percent, and employment by 1.68 percent.

4.3.3.6 Environmental Justice

The following indicators were used to identify minority and low-income populations in the Economic Analysis Region:

- Percentage of minorities in the population;
- Income levels for affected communities of place; and
- Poverty Rates.

Given the small differences in the proportion of very low income households and poverty rates between the Economic Analysis Region and the State of Idaho, the affected community of place does not appear to qualify as an environmental justice low-income population (Section 3.3.3.7). Because the non-white population of the Economic Analysis Region is less than the Idaho average, and the Hispanic proportion of population is only slightly higher, the affected community of place does not appear to qualify as a minority population. Nor are there significant numbers of tribal members living within the Economic Analysis Region. Lacking any qualifying Environmental Justice populations on which to analyze impacts, there are no Environmental Justice impacts.

4.3.4 VISUAL RESOURCES

This section discusses potential impacts on visual resources that could result from implementing the proposed alternatives for the project.

4.3.4.1 Analysis Methods

The impact analysis was restricted to areas located within 10 miles of the project area, with views of proposed turbines. The analysis area was restricted to 10 miles based on the assumption that the visual contrast between the project area and natural landscape would be weak beyond this distance.

Views of project features, or the "Seen Area," were calculated using a GIS viewshed analysis tool. Viewshed analysis is a technique for determining whether an observation point has a direct or clear view of a proposed feature across the landscape based on a digital terrain model derived from elevation data. The viewshed analysis assumed a Siemens SWT-2.3-93 MW turbine with a total height of 427 feet (130 meters) would be used, and that no structural or vegetation shielding would be present. The resulting "Seen Area" represents the area that may theoretically contain views of one or more turbines, and does not represent any measure of detectability of the turbines. The analysis area, shown in Figure 3.3.4-1 includes 407,968 acres. The current BLM Visual Resource Management (VRM) classes for the project area are presented in Section 3.3.4.

Indicators

Indicators used to measure potential impacts on visual resources that could result from the project include:

- Impacts on visual resources, measured by the level of visual contrast created by the project;
- The approximate number of turbines seen from each of the four viewshed areas; and
- Impacts on the 1987 Jarbidge RMP. These are defined by the maximum acres of public land impacted by the project that would require a plan amendment to change VRM Class II lands to VRM Class IV, and the maximum acres of public land impacted by the project for which a plan amendment would be proposed to change VRM Class III lands to VRM Class IV.

Additional qualitative indicators include the expected level of change to the existing landscape aesthetic, such as movement, activity (measured in terms of change in vehicular traffic and amount of people), noise, or naturalness.

Methods and Assumptions

The BLM Contrast Rating procedure was used to determine visual contrast that may result from the construction and operation of the project (BLM, 1986). This method assumes that the extent to which the project results in adverse effects on visual resources is a function of the visual contrast between the project and the existing landscape character. Impact determinations are based on the identified level of contrast, and are not a measure of the overall attractiveness of the project.

The contrast rating was conducted within the four viewshed areas described in Section 3.3.4. The viewshed areas differ by landscape analysis factors, such as their distance from the project, predominant angle of observation, dominant use (i.e., recreation or travel), and average travel speed at which the project could be viewed. For the purposes of this analysis, viewshed areas were assigned to one of three distance zones: Immediate-Foreground (0 to 3 miles), Foreground-Middleground (3 to 5 miles), and Background (5 to 15 miles). Landscape analysis factors for each of the four viewshed areas are summarized below:

- **Salmon Falls Creek Reservoir:** The landscape character of the Salmon Falls Creek Reservoir viewshed area is predominantly enclosed due to steep cliffs that rise from the east. Views of the project are from an inferior (lower elevation) position located within the Immediate Foreground and Foreground-Middleground distance zone. Viewers located in this area may be stationary, such as bank fisherman, or moving at variable speeds on boat. The viewer's angle of observation would vary due to the length of the reservoir in the north/south direction, and its location parallel to the project.

- **US-93:** US-93 is located in a low-lying valley, situated between north-south trending mountain ranges. The configuration of the mountain ranges results in an enclosed landscape when viewed to the east and west, and more panoramic landscape character when viewed to the north and south. US-93 is located approximately 10 miles east of the project area, in the Background distance zone. Motorists traveling at speeds of up to 65 mph could observe the project from an oblique or right angle.

- **Monument Springs Road:** The landscape of the Monument Springs Road viewshed area is characterized as enclosed. Although panoramic views are present to the east, the silhouette of the ridgeline in the foreground creates a distinct perimeter. Because Monument Springs Road and associated OHV roads pass through the project area, the project would be seen from a variety of viewer positions, all of which are located in the Immediate-Foreground and Foreground-Middleground positions. Viewers could be stationary or moving through the project area at variable speeds.

- **Southern Primitive Road Network:** The landscape character of the Southern Primitive Road Network viewshed area is characterized by large-scale panoramic qualities to the north and south, but is punctuated by localized landforms that create a more enclosed landscape. Views of the project would vary based on the viewer's specific location within this viewshed. Views of the project would be primarily from the south/southeast, where the angle of observation would be in line with the predominant orientation of the project. Viewers would observe turbine arrays from a perpendicular angle. The project would be viewed from a predominantly Foreground-Middleground distance zone, and at variable travel speeds.

The contrast rating procedure was implemented through Key Observation Points (KOPs) established along commonly traveled routes (US-93), developed recreation areas (Salmon Falls Creek Reservoir), and dispersed recreation areas in and around the analysis area (Figure 4.3.4-1). KOP locations were selected to address concerns about impacts on visual resources voiced during public scoping. The KOPs were located within the Immediate Foreground, Foreground-Middleground, and Background distance zones. KOPs corresponding to each viewshed area were summarized and used to derive overall effects on visual resources. A description of the 13 KOPs is presented in Table 4.3.4-1. No KOPs have been established to date for the southern inbound haul route option 1 or option 2, the

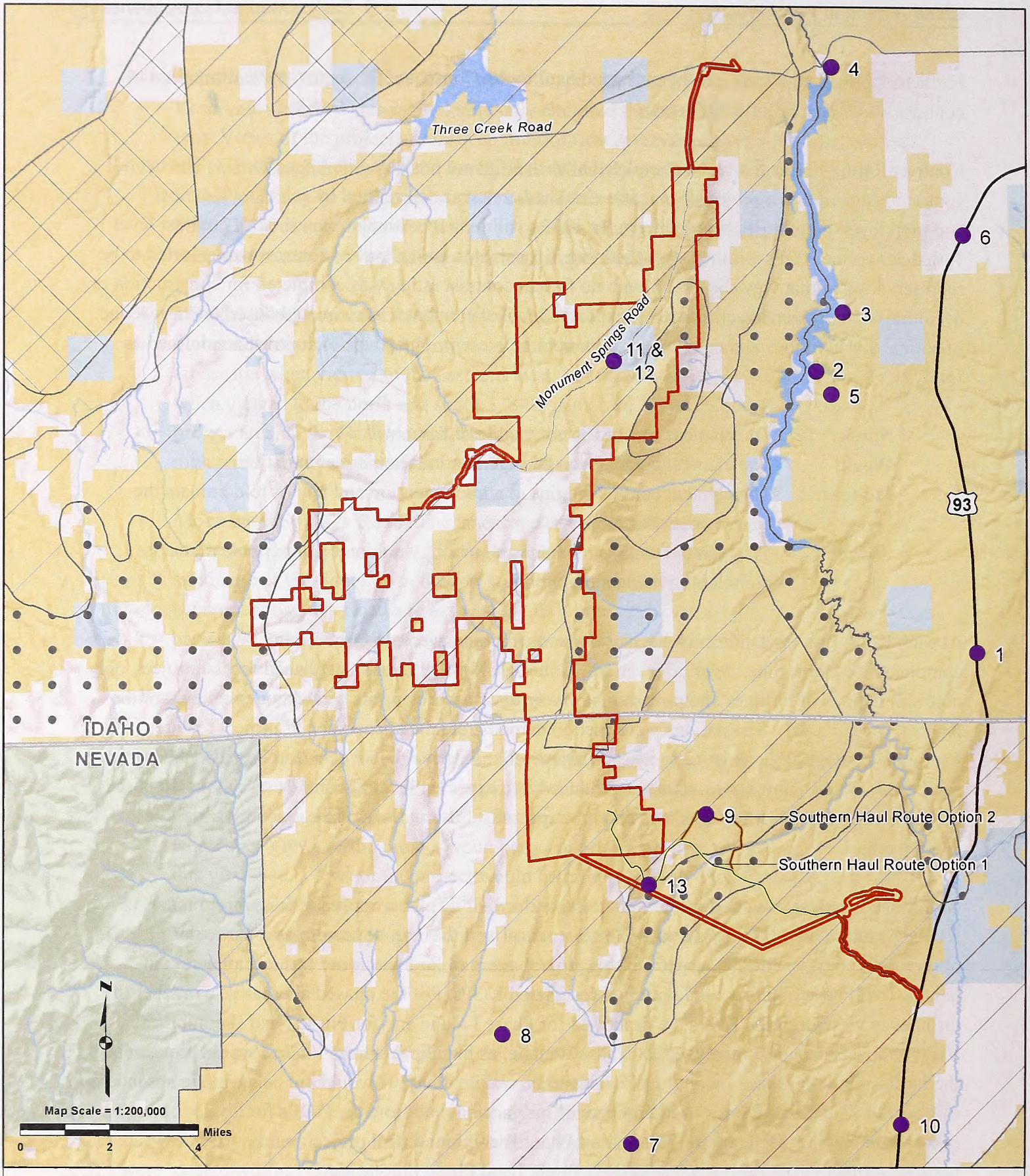
northern inbound haul route, or the outbound haul route. Consequently, a qualitative discussion of contrast was prepared for these areas.

Contrast Rating Forms that were completed at each KOP are presented in Appendix 3G. The overall contrast assigned to the project from each viewshed area was determined by selecting the most common level of contrast observed from the KOPs within that particular viewshed. If contrast level varied across the KOPs within a viewshed, the highest (strongest) level of contrast was selected to be representative of that viewshed. Although no formal contrast rating was completed for construction or decommissioning related activities, the expected level of contrast was estimated based on knowledge of anticipated activities and equipment that would be present. The levels of contrast are defined as follows:

None:	The element contrast is not visible or perceived.
Weak:	The element contrast can be seen but does not attract attention.
Moderate:	The element contrast begins to attract attention and begins to dominate the characteristic landscape.
Strong:	The element contrast demands attention, would not be overlooked, and is dominant in the landscape.

At each KOP, existing landforms, vegetation, and structures were described using the basic components of form, line, color, and texture. Although 13 KOPs were established for the project, only nine simulations of turbines and project roads were developed using images obtained at eight of the KOPs (Appendix 4B). Simulations were used to demonstrate the appearance of project features within the context of the existing landscape character and derive the level of perceived contrast from each KOP. Where simulations were not produced, the expected level of contrast was assumed based on knowledge of project features, and resource specialist observations of the existing landscape components.

A viewshed analysis was performed to determine the visibility of proposed turbines from ten of the KOPs, by alternative. The results indicate all areas of land that can be seen from a particular observation point, or for the purpose of this project, areas of land that wind turbines of a certain height would be visible from a number of designated KOPs. For the phased alternatives, number of turbines in view from the KOPs are described for Phase I alone and for Phase I and II combined. Visual impacts cannot be analyzed for Phase II alone, as the impacts from Phase I would remain (i.e., the turbines built in Phase I would still exist and be visible; Phase II would not occur in the absence of Phase I). Therefore, the reported numbers of turbines in view from the KOPs for Phase II are also equal to the numbers in view for Phase I and Phase II combined (full project build out). Likewise, contract ratings for Phase II are reported for Phase I and Phase II combined.



LEGEND

- Project Area Boundary
- Key Observation Points

VRM Class

- II
- III
- IV

Land Status (Ownership)

- BLM
- Private
- State
- USFS

Figure 4.3.4-1. Location of Key Observation Points

CHINA MOUNTAIN WIND PROJECT EIS

IDAHO - NEVADA

No warranty is made by the Bureau of Land Management for use of the data for purposes not intended by BLM. No warranty is made by the BLM as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

Table 4.3.4-1 Description of KOPs.

Viewshed Area	KOP Number	Location	Distance Zone[1]	Distance to Closest Turbine (miles)	Attributes
Salmon Falls Creek Reservoir	2	Salmon Falls Creek Reservoir at the mouth of Norton Canyon	IF	2.7	Recreation Destination – This undeveloped site provides a small craft boat launch on Salmon Falls Creek Reservoir, swimming, hiking, and fishing opportunities.
	3	Grey's Landing	F/M	3.3	Recreation Destination – This partially developed site provides a secondary boat launch on Salmon Falls Creek Reservoir, developed picnic area, swimming, hiking, and fishing opportunities.
	4	Lud Drexler Park	IF	2.1	Recreation Destination – This developed campsite provides a primary boat launch to Salmon Falls Creek Reservoir, picnic shelters, restrooms, RV hookups, and parking for visitors to the Historic Salmon Falls Creek Dam.
US-93	1	US-93 near Idaho/Nevada state line	B	5.6	Travel Corridor – Views of the project area for travelers entering Idaho from Nevada on US-93.
	5	Norton Canyon Road	F/M	3.2	Travel Corridor – Views of the project area for travelers approaching Salmon Falls Creek Reservoir from US-93.
	6	US-93 at Historic Sign	B	5.5	Travel Corridor – Views of the project area for travelers along US-93. This location provides an interpretive sign for Salmon Falls Dam history.
	10	Nevada, US-93	F/M	2.9	Travel Corridor – Views of the project area for travelers from Idaho on US-93.
Monument Springs Road	11	Monument Springs Road, Idaho	IF	.05	Recreation Destination Travel Corridor. View looking south from the roadway.
	12	Monument Springs Road, Idaho	IF	.05	Recreation Destination Travel Corridor. View looking east from the roadway.

Table 4.3.4-1 Description of KOPs (continued).

Viewshed Area	KOP Number	Location	Distance Zone[1]	Distance to Closest Turbine (miles)	Attributes
Southern Primitive Road Network	7	Nevada, south of project area	B	5.2	Represents viewers engaged in dispersed recreation, such as hunting, and permittees with livestock operations.
	8	Nevada, south of project area	F/M	3.9	Represents viewers engaged in dispersed recreation, such as hunting, and permittees with livestock operations.
	9	Nevada, south of project area	IF	.95	Represents viewers engaged in dispersed recreation, such as hunting, and permittees with livestock operations.
	13	Proposed Transmission Line at BLM RD #1222)	IF	.10	Recreation Destination. View looking south from the roadway, toward location of proposed transmission line.

[1] IF = Immediate Foreground (< 3miles), F/M = Foreground-Middleground (3 to 5 miles), B = Background (5 to 15 miles)

Management Plan Impacts

Public lands administered by the BLM within the project area are managed by specific VRM objectives. Where it is determined that project actions would result in visual contrast that is not consistent with VRM Class II objectives, an amendment to the 1987 Jarbidge RMP to reclassify those lands to VRM Class IV would be required (Table 4.3.4-2). Although not required, this amendment would also reclassify VRM Class III lands to VRM Class IV in order to better address wind energy development in the project area (Section 2.5.3.1). Impacts on the RMP were determined by calculating the acres of public land requiring a plan amendment, or for which a plan amendment would be proposed to reclassify the existing VRM class. For analysis purposes, it is assumed that the area within 0.5 miles of each turbine within VRM Class II or VRM Class III would no longer conform with these VRM management classes and would require a plan amendment that would reclassify the area to VRM Class IV. A determination of conformance with VRM objectives was made based on the results of the contrast rating performed for this project. The following method for conformance was used.

Table 4.3.4-2. Relationship of Visual Contrast to VRM Conformance.

Level of Contrast	Conforming VRM Class
None	I
Weak	II
Moderate	III
Strong	IV

Potential impacts on the BLM 1987 Jarbidge RMP were analyzed by calculating the total area (acres) that would require a plan amendment to reclassify affected areas from a VRM Class II to a VRM Class IV and those acres for which a plan amendment would be proposed to reclassify effected areas from a VRM Class III to a VRM Class IV. For the phased alternatives, impacts on the RMP were based on full build-out of both phases. No amendments were assigned to potential impacts resulting from operation of Phase I.

Impact Determination

Impact determinations were based on the parameters listed below.

- Effect would be considered major where: project components would result in strong contrast against the existing landscape, where visual contrast is not consistent with existing VRM objective; or where sensitive views located in the Immediate Foreground (<3 miles) and Foreground-Middleground distance zone (3 to 5 miles) would be affected.

- Effect would be considered moderate where: project components would result in moderate contrast against the existing landscape; where visual contrast is not consistent with existing VRM objective; or where sensitive views located in the Foreground-Middleground distance zone (3 to 5 miles) would be affected.

- Effect would be considered minor where: project components would result in weak contrast against the existing landscape; where visual contrast is consistent with existing VRM objective; or where sensitive views located in the Background (5 to 15 miles) distance zone would be affected.

- No effect would occur if: the facilities would be isolated; screened by prevailing vegetation or topography; not noticed in the view; most often seen from the Background distance zone; or where no visually sensitive resources would be affected.

In all cases, the impact determination was based on the most common visual contrast perceived from the KOPs and from KOPs of all viewshed areas (i.e, dominant level of contrast).

The following assumptions were used when analyzing impacts of the project on visual resources:

- Impacts on visual resources that result from construction and decommissioning of the project are considered equal, although less construction vehicles would be required for decommissioning;
- Impacts on visual resources resulting from operation of the project would begin post-construction (2 years), and are thus considered short- and long-term impacts; and
- Due to the cultural value, high recreational use, and the proximity of travel routes, viewer sensitivity in the analysis area is assumed to be strong.

4.3.4.2 Direct and Indirect Impacts of the Wind Energy Facility

Visibility of project features would vary based on the specific location of the viewer, and the configuration of project components defined by each alternative. For example, views of project roads, haul routes, and laydown areas that would be constructed within the ground plane would be expected to be limited to visibility from higher elevation (superior) positions. The wind turbines would be visible from all viewshed elevations surrounding the project; however the number of turbines visible from each viewshed area would vary by alternative. The degree of contrast resulting from the turbines would further depend upon site-specific factors such as the predominant landscape character and the relative scale of project features in that landscape. Perceived contrast would be further defined by the viewer's angle of observation and the duration of their view. All features constructed for the project would result in direct, long-term impacts on visual resources.

Alternative A (No Action Alternative)

Under Alternative A, impacts on visual resources resulting from dispersed recreation, grazing, and operation of meteorological towers within the project area would continue. The visual contrast of such activities against the surrounding landscape is expected to remain weak with a minor effect to visual resources.

Impacts Common to All Action Alternatives

Construction

Construction related actions and the expected level of visual contrast are summarized in Table 4.3.4-3. Potential direct temporary and short-term impacts on visual resources are expected to result from the increase in people, construction vehicles, traffic, and the construction activities. The aesthetic quality of the landscape would be temporarily altered by the increase of people and vehicular traffic not typically present in the existing landscape. The numerous construction vehicles, staging areas, and turbine delivery trucks would introduce a mosaic of color, angular lines, and smooth texture to the landscape, that would introduce strong contrast in form, line, color, and texture against the enclosed landscape of the project area.

Table 4.3.4-3. Level of Visual Contrast Expected to Result from Construction of the Project.

Project Feature	Expected Contrast[1]	Assumptions
Project Roads	Incremental increase in bold lines across the project area during construction would create strong contrast in line, color, and texture as vegetation is removed and roads are resurfaced. Project roads used specifically for transmission lines are expected to result in an incremental linear footprint that creates weak contrast against the surrounding environment.	Dust suppression design features for fugitive dust control would minimize impacts on visual resources that could result from reduced visibility. Only minor alterations to landforms would be required and project road construction would not include blasting.
Turbine Structures	Alteration of landforms where leveling is required would create incremental weak contrast in form and line due to contrast between flat, horizontal lines, and the gently rolling appearance of the existing landscape. Clear Zone required for hub/blade assembly would result in strong short-term contrast in form (shape), line, color, and texture against the surrounding area.	Dust suppression design features for fugitive dust control would minimize impacts on visual resources that could result from reduced visibility. All vegetation would be cleared in the "Clear Zone."
Underground Collection System	Where not sited adjacent to roads, construction of the underground collection system trenching would result in an incremental temporary increase in a bold line that would create strong contrast in form, line, color, and texture.	Underground collection cables would be sited along-side roads to the greatest extent possible. Construction of underground collection cables would occur concurrently with road construction. Where sited adjacent to roads, construction of the underground collection system would be indistinguishable from road-building activities when viewed by the casual observer.
Project Substations	Installation of these structures would cause an incremental change in line, color, and texture that would result in strong contrast.	No alteration to landform would be required beyond clearing or grading.
Interconnect Substation	Installation of this structure would cause an incremental change in line, color, and texture that would result in weak contrast due to three existing parallel transmission lines at this location.	No alteration to landform would be required beyond clearing or grading.
Overhead Transmission Interconnect Line	Installation of support structures would cause an incremental change in line, and texture that would result in weak contrast.	No alteration to landform would be required beyond clearing or grading.
O&M Facilities	Installation of these structures would result in an incremental change in line, color and texture where clearing, grading, and resurfacing is required. Installation of the building would result in an immediate contrast in line, color, and texture.	No alteration to landform would be required beyond clearing or grading. The structure would be delivered pre-built, as described in Chapter 2 and the Applicants' Plan of Development.

Table 4.3.4-3. Level of Visual Contrast Expected to Result from Construction of the Project (continued).

Project Feature	Expected Contrast[1]	Assumptions
Laydown Areas	Strong short-term contrast in form (shape), line, color, and texture due to removal of vegetation and resurfacing with gravel. Consolidation of construction materials could mimic appearance of structures, and could create strong short-term contrast in form, line, color, and texture.	No major alteration to landforms would be required.
Concrete Batch Plant	Short-term increase in strong visual contrast in form (shape), line, color, and texture due to removal of vegetation and resurfacing with gravel.	Depression created for concrete washout would create a strong contrast in landform.
Rock Quarry	Strong long-term contrast in form, line, color, and texture against the surrounding landscape would be introduced through construction, and. operation of this facility, and is expected to persist.	Alterations to landform would create a strong contrast.
Rock Crusher	Strong short-term contrast in line, color, and texture would result from the presence of this structure.	Dust suppression design features for fugitive dust control would minimize impacts on visual resources that could result from reduced visibility.
Supervisory Control and Data Acquisition and Fiber Optic Communication	Strong short-term contrast in line, color, and texture as vegetation is removed by trenching equipment to bury the lines. This impact would be reduced after trenches are backfilled, compacted, and revegetated with BLM-approved seed mix.	Fiber-optic cables would be buried in underground collection system trenches.
General Construction Activities / Work Force	Operation of construction vehicles would introduce a mosaic of form, line, color, and texture that would result in strong visual contrast. Increased activity and movement by people and vehicles would result in a strong contrast to existing aesthetics during construction of the project.	Dust suppression design features for fugitive dust control would minimize impacts on visual resources that could result from reduced visibility.

[1] All project contrast was assumed based on knowledge of construction related activities, incremental results and outcomes of the activities (leading to operation), and were measured against conditions documented during the operations-related contrast rating.

All construction related activities would be considered direct, short-term impacts. Long-term contrast in form, line, color, and texture, would be expected to result. Operation of the rock quarry where removal of vegetation and material extraction would alter the shape of the landform and expose color and texture would be inconsistent with the surrounding landscape.

Strong visual contrast would be expected to be perceived from the Monument Springs Road viewshed and more proximate locations of the Southern Primitive Road Network viewshed. Viewers in these locations would see the project from varying angles and would be able to observe construction related activities from a stationary position. Weak visual contrast would be expected to be perceived from inferior (lower elevation) viewer positions (i.e. Salmon Falls Creek Reservoir and US-93), as the

majority of construction activities would be out of view. Fisherman located on the banks or in boats on Salmon Falls Creek Reservoir may see localized construction of turbines; however, the level of contrast is expected to be weak due to scale of the action in view relative to the surrounding landscape. An exception to this would be at Lud Drexler Park, where construction related actions located in the north portion of the project would likely be seen by visitors. Because recreators located at Lud Drexler Park would view construction activities at close proximity and from a stationary position, the level of visual contrast at this location is expected to be strong.

Construction related activities and the resulting visual contrast would vary across viewshed areas (Table 4.3.4-4). It is expected that visual contrast resulting from construction would increase incrementally as project features, such as turbines, come into view. These features may draw attention to the project area, and the construction activities that would be underway.

Table 4.3.4-4. Anticipated Contrast Expected to Result from Construction of the Project.

General Viewshed Area	Anticipated Visual Contrast
Salmon Falls Creek Reservoir	Weak
US-93	Weak
Southern Primitive Road Network	Moderate
Monument Springs Road	Strong

Operation and Maintenance

Indirect impacts resulting from O&M of the project would include a general change in perception of the visual resources of the area over time. Increased year-around access could result in more frequent visitation by roadway travellers due to overall improvement in road conditions. Such changes could decrease the aesthetic quality of the area by increasing motion, light, and sound to the landscape throughout the year. Short-term impacts would result from the presence of large equipment brought to the project area during major maintenance of turbines or substations. These major maintenance activities would be anticipated to occur once per year.

Direct impacts are described in terms of the level of contrast expected to result from each project component.

Wind Turbines and Meteorological Towers

Operation of the wind turbines would result in the introduction of movement that would create bold, white, vertical, and angular (predominantly diagonal) lines to the landscape. The texture of lines would appear smooth and uniform, resulting in an overall visual contrast to the existing landscape. Visual contrast would be strongest when viewed by roadway travelers and recreators (hunters and dispersed campers) located within the project area (i.e., on and around Monument Springs Road) and would decrease with distance from the project area (Appendix 4B). Visual contrast would be perceived as strong from certain locations on Salmon Falls Creek Reservoir, such as Lud Drexler Park (Table 4.3.4-5). The configuration of turbine strings would create a sequence of vertical lines.

This systematic repetition of structures would contrast the landscape to varying degrees depending on the angle of observation. The contrast in color and texture of the structures is expected to attenuate during winter months when the surrounding landscape is covered by snowpack. Across all seasons, operation of turbines would introduce motion to an otherwise still environment, and the radiant color of turbine lighting, as proposed, would contrast darkness of existing night skies. The movement of turbines blades could cause shadow flicker under certain seasonal and atmospheric conditions.

Table 4.3.4-5. Expected Level of Contrast resulting from Operation of Wind Turbines by Viewshed Area (Based on Alternative B1).

General Viewshed Area	Visual Contrast
Salmon Falls Creek Reservoir	Strong
US-93	Weak
Southern Primitive Road Network	Moderate
Monument Springs Road	Strong

Operation of meteorological towers would also introduce vertical and diagonal lines to the landscape; however, the more diminutive form of this structure relative to the turbines would result in a weak contrast against the surrounding landscape. At the current design stage, the specific location of meteorological towers is not known. For the purpose of this analysis, the level of contrast resulting from meteorological towers is assumed constant across alternatives and viewer position until additional siting detail is known. No further discussion of potential impacts from meteorological towers is presented in this document.

Best management practices (design features) described in the BLM Programmatic Wind Environmental Impact Statement (BLM, 2005) have been applied across alternatives. Specific measures include: integrating turbine arrays with the surrounding landscape; addressing design elements of uniformity, tubular towers, color; and use of non-reflective paints; and prohibition of commercial messages on turbines. The proposed design features are not expected to reduce visual contrast of turbines when viewed in the Immediate Foreground or Foreground-Middleground distance zones. No design features have been proposed for turbine lighting.

Recommended mitigation to reduce visual contrast resulting from lighting includes use of a Federal Aviation Administration (FAA) approved Audio Visual Warning System. Such a system would allow FAA strobe lights to remain off, unless an aircraft is detected at an unsafe heading. This on-demand, radar-based system would be applied across the project, or limited to those turbines sited along the eastern ridgeline. Use of this technology could eliminate strong level of contrast resulting from turbine lighting, particularly when viewed from US-93.

Project Roads

Project roads are expected to appear as bold, grey lines with a rough texture that would create contrast in line, color, and texture against the surrounding landscape. Views of the project roads, and related contrast would be strongest when viewed by roadway travelers and recreators (hunters and dispersed campers) located within the Monument Springs Road viewshed (Table 4.3.4-6). Contrast would

persist throughout the year due to ongoing maintenance and winter plowing. When viewed from within the project area, the network of project roads would appear dense due to the enclosed landscape character where they would be sited. It is expected that the strong visual contrast resulting from project roads would be consistent across alternatives when viewed from the Monument Springs Road viewshed area, despite reduction in total miles of project roads across alternatives.

Table 4.3.4-6. Expected Level of Contrast Resulting from Operation of Project Roads, by Viewshed Area (Based on Alternative B1).

General Viewshed Area	Project Roads in View	Degree of Contrast
Salmon Falls Creek Reservoir	Yes	Weak
US-93	Yes	Weak
Southern Primitive Road Network	Yes	Moderate
Monument Springs Road	Yes	Strong

Due to the inferior position (lower elevation) of viewers located at Salmon Falls Creek Reservoir, US-93, and some portions of the Southern Primitive Road Network viewsheds, the majority of project roads would likely not be detected by viewers in the area. Potential views of project roads from Salmon Falls Creek Reservoir and US-93 viewsheds would be limited to those situated on the eastern ridge of the project area. Potential views of project roads from the Southern Primitive Road Network viewshed would be limited to those located in the southern portion of the project area and would be most distinctive when viewed from a higher elevation. The introduction of horizontal lines from project roads is expect to result in weak to moderate contrast in line, color, and texture against the predominantly horizontal ridgeline. The level of contrast perceived from these more distant (and inferior) viewer positions could be greatest during winter months, when contrast between plowed roads and surrounding snowpack could be greater. The level of contrast resulting from project roads when viewed from Salmon Falls Creek Reservoir, US-93, and the Southern Primitive Road Network viewsheds is expected to vary by alternative, based on the configuration of turbines along the ridgeline.

Underground Collection System, Supervisory Control and Data Acquisition (SCADA), and Fiber Optic Communications

The underground collection system, SCADA, and fiber optic communications would result in exposed soils that would introduce temporary, short-term contrast the line, color, and texture of the surrounding landscape. Following successful revegetation, no contrast in form, line, color, or texture is expected. Contrast resulting from the underground collection system, SCADA, and fiber optic communications is only expected to be detectable from the Monument Springs Road viewshed.

Substations

It is expected that the operation of the substations would result in strong contrast in form, line, color, and textures against the surrounding landscape. The creation of broad gravel areas (3.5 acres) would create flat, geometric shapes that result in strong contrast against the soft, contiguous vegetation and rolling hills present in the surrounding landscape. The structure of the substations and associated chain-linked fence would create vertical, horizontal, and angular lines, grey color, and smooth texture

that would appear unnatural amidst the largely undeveloped surroundings. The substation would only be seen by viewers located in and around Monument Springs Road, and would be consistent across all alternatives. It is assumed that the substations would not be visible from the Southern Primitive Road Network, Salmon Falls Creek Reservoir, and US-93 viewsheds.

Overhead Transmission Interconnect Lines

Transmission lines and associated transmission poles would introduce structures to the existing undeveloped landscapes. Transmission lines would be supported by single steel poles that, over time, would weather to create a color and texture that would become a weak contrast against the surrounding landscape (Table 4.3.4-7; Appendix 4B). Distance between poles would range from 600 to 800 feet, thereby reducing contrast of the vertical lines and sequential pattern of the structures. Overhead transmission interconnect lines would result in a minor contrast in line, color, and texture against the surrounding landscape. If placement of bird diverters on transmission lines is required as a stipulation or as mitigation, the level of contrast resulting from the transmission lines could increase. Anticipated transmission-line related contrast would be consistent across alternatives.

Where the fiber optic communication would be mounted near the top of the transmission line, no additional contrast beyond what results from the transmission lines is expected.

Table 4.3.4-7. Expected Level of Contrast Resulting from Operation of Overhead Transmission Interconnect Lines by Viewshed Area (Based on Alternative B1).

General Viewshed Area	Transmission Line in View	Degree of Contrast
Salmon Falls Creek Reservoir	Yes	None
US-93	Yes	Weak
Southern Primitive Road Network	Yes	Variable by Alternative
Monument Springs Road	Yes	Weak

Anticipated impacts from O&M of project features are presented in Table 4.3.4-8.

Table 4.3.4-8. Anticipated Contrast Expected to Result from Operation of the Project.

Project Feature	Impacts	Assumptions
Project Roads	Introduction of a network of bold lines that would create strong contrast in form, line, color, and texture against the surrounding landscape. Contrast in lines would continue throughout the year, as roads would be maintained and plowed during the winter months.	The 10-foot road shoulders would be successfully revegetated within 5 years. Although revegetation of the shoulders is assumed to be successful, these actions would not reduce contrast created by the road network.
Wind Turbines	Introduction of bold vertical and angular lines would create strong contrast in line, color, and texture. Introduction of movement would result in a strong contrast to existing conditions.	Specifications of the Siemens SWT-2.3-93 MW turbine. Tower height of 262 feet, rotor diameter of 331 feet, and maximum blade height of 427 feet aboveground.
Turbine Lighting	Turbine lighting would create strong, luminescent contrast against the night sky.	Contrast assumed, not simulated. Turbine lighting would affect all viewer groups, regardless of distance zone to turbines or angle of observation.
Turbine Maintenance	Increased activity and movement by people and vehicles would create a moderate contrast to existing conditions.	Scheduled maintenance would occur daily. Level of impact would be greatest at viewer positions located within the project area. Accuracy of the social natural resource recreation spectrum presented in Section 4.4.1.
Underground Collection System / SCADA	Underground collection system would result in weak contrast to surrounding landscape until disturbed areas are successfully revegetated. Following successful revegetation, no contrast in form, line, color, or texture is expected.	Surface disturbance would be successfully revegetated.
Project Substations	Structures would create strong contrast in form, line, color, and texture to the surrounding landscape.	Structural contrast assumed, not simulated.
Interconnect Substation	Due to the presence of three parallel transmission lines at this location, structure would create weak contrast in form, line, color, and texture to the surrounding landscape.	Structural contrast assumed, not simulated.
Overhead Transmission Interconnect Line	Structure would create weak contrast in line, color, and texture against the surrounding landscape.	Assume no blasting is required to site transmission line monopoles.
O&M Facilities	Structure would introduce moderate contrast against the surrounding landscape.	Structural contrast assumed, not simulated.

Decommissioning

Decommissioning activities would have similar effect to visual resources as the construction activities described previously. As project features are removed during decommissioning, an incremental reduction to visual contrast would be expected. Fisherman located on the banks or in boats on Salmon Falls Creek Reservoir may see localized decommissioning of turbines; however, the level of contrast is expected to be weak due to the scale of the action in view relative to the surrounding landscape. An exception to this would be at Lud Drexler Park, where decommissioning related activities located in the north portion of the project would likely be seen by visitors. Because recreators located at Lud Drexler Park would view decommissioning at close proximity and from a stationary position, the level of visual contrast at this location is expected to be strong. Decommissioning activities and the expected level of visual contrast are summarized in Table 4.3.4-9.

Table 4.3.4-9. Level of Visual Contrast Expected to Result from Decommissioning of the Project.

Project Feature	Expected Contrast[1]	Assumptions
Project Roads	A gradual decrease in the bold lines across the project area during decommissioning and revegetation would result in an overall decrease in contrast in line, color, and texture created by the operation of project roads.	Dust suppression design features for fugitive dust control would minimize impacts on visual resources that could result from reduced visibility.
Turbine Structures	A gradual decrease in the bold vertical lines created by the turbines would result from decommissioning of the turbine structures Revegetation of the ground plane affected by both operation and decommissioning of the project would reduce contrast in line, color, and texture.	Dust suppression design features for fugitive dust control would minimize impacts on visual resources that could result from reduced visibility.
Underground Collection System	Where not sited adjacent to roads, decommissioning of the underground collection system trenching would result in an incremental temporary increase in a bold line that would create strong contrast in form, line, color, and texture.	The underground collection system would be decommissioned at the end of the project.
Project Substations	Decommissioning of these structures would eliminate the element contrast created by the structures. Following decommissioning and successful revegetation, decommissioning of substations would result in a gradual decrease in contrast created by gravel pads.	Dust suppression design features for fugitive dust control would minimize impacts on visual resources that could result from reduced visibility.
Interconnect Substation	Decommissioning of this structure would eliminate the element contrast of this structure. Following decommissioning and successful revegetation, decommissioning of the substation would result in a gradual decrease in contrast created by gravel pads.	No alteration to landform would be required beyond clearing or grading.

Table 4.3.4-9. Level of Visual Contrast Expected to Result from Decommissioning of the Project (continued).

Project Feature	Expected Contrast[1]	Assumptions
Overhead Transmission Interconnect Line	Decommissioning of this structure would eliminate the element contrast of this structure.	No alteration to landform would be required beyond clearing or grading.
O&M Facilities	Decommissioning of this structure would eliminate the element contrast of this structure.	No alteration to landform would be required beyond clearing or grading.
Laydown Areas	Strong short-term contrast in line, color, and texture due to removal of gravel. Following successful revegetation, decommissioning of laydown areas would result in a gradual decrease in contrast.	No major alteration to landforms would be required.
Concrete Batch Plant	Not applicable to decommissioning related actions.	No major alteration to landforms would be required.
Rock Quarry	Not applicable to decommissioning related actions.	The quarry would not be decommissioned.
Rock Crusher	Not applicable to decommissioning related actions.	No major alteration to landforms would be required.
Supervisory Control and Data Acquisition and Fiber Optic Communication	Strong short-term contrast in line, color, and texture as vegetation is removed by trenching equipment to reclaim lines. This impact would be reduced after trenches are backfilled, compacted, and revegetated with BLM-approved seed mix.	Fiber-optic cables would be buried in underground collection system trenches.
General Decommissioning Activities / Work Force	Operation of decommission-related vehicles would introduce a mosaic of form, line, color, and texture that would result in strong visual contrast. Increased activity and movement by people and vehicles would result in a strong contrast to existing aesthetics during decommissioning of the project.	Dust suppression design features for fugitive dust control would minimize impacts on visual resources that could result from reduced visibility

[1] All project contrast was assumed based on knowledge of decommissioning related activities, incremental results and outcomes of the activities, and were measured against conditions documented during the operations-related contrast rating.

Decommissioning related activities and the resulting visual contrast would vary across viewshed areas (Table 4.3.4-10). It is expected that visual contrasts resulting from decommissioning activities would result in an incremental reduction to visual contrast as the project features are removed.

Table 4.3.4-10. Anticipated Contrast Expected to Result from Decommissioning of the Project.

General Viewshed Area	Anticipated Visual Contrast
Salmon Falls Creek Reservoir	Weak
US-93	Weak
Southern Primitive Road Network	Moderate
Monument Springs Road	Strong

Alternative B1 (Proposed Action)

Construction and Decommissioning

Activities associated with construction and decommissioning of the project would create short-term, deviations in landscape character as described above in *Impacts Common to All Action Alternatives*. Impacts on visual resources caused by construction and decommissioning activities for the project would generally be the same.

Construction and decommissioning of Alternative B1 would create short-term, localized, deviations in landscape character that would result in strong visual contrast within the Immediate Foreground and Foreground-Middleground distance zones. When viewed from certain locations, short-term modifications to the landscape character would dominate the view of the casual observer, and would not be consistent with VRM Class II or III objectives.

Alternative B1 would result in a localized major short-term effect to visual resources. Because impacts would not adhere to the current VRM class objectives, a plan amendment to the 1987 Jarbidge RMP would be required for this alternative.

Operation and Maintenance

Alternative B1 would impact approximately 3,298 acres of lands managed under VRM Class II objectives and 12,332 acres managed by VRM Class III objectives. Of these lands, 3,298 acres of VRM Class II lands and 9,871 acres of VRM Class III lands are currently administered by the Jarbidge Field Office. A total of 2,461 acres of VRM Class III lands are currently administered by the Wells Field Office Field Office.

Turbines and roads would result in visual contrast detected across all viewshed areas, with strong contrast when viewed from the Monument Springs Road, Salmon Falls Creek Reservoir, and certain locations within the Southern Primitive Road Networks viewsheds (Table 4.3.4-11). Although, based on a viewshed analysis, the highest number of turbines is expected to be visible from US-93; the resulting contrast was ranked as low due to distance and the corresponding reduction in scale of the project relative to the surrounding landscape.

Impacts related to O&M of the underground collection system, substations, overhead transmission interconnect lines, and SCADA are consistent with those described in the preceding section, *Impacts Common to All Action Alternatives.*

Table 4.3.4-11. Number of Turbines in View and Related Contrast by KOP (Alternative B1).

Viewshed	Salmon Falls Creek Reservoir				US-93			Monument Springs Road		Southern Primitive Road Network		
KOP Number	*2*	*3*	*4*	*5*	*1*	*6*	*10*	*11*	*12*	*7*	*8*	*9*
Number of Turbines in View[1]	44	56	102	108	165	123	77	170	170	83	97	76
Perceived Contrast	strong	strong	mod	strong	mod	weak	weak	strong	strong	weak	strong	mod
Overall Contrast	Strong				Weak			Strong		Strong		

[1] Based on results of the viewshed analysis that indicated the number of turbines that could be seen from each KOP.

Operation of the Alternative B1 would create long-term, localized, deviations in landscape character that would result in strong visual contrast within the Immediate Foreground and Foreground-Middleground distance zones. Modifications to the landscape character would not repeat the basic elements of form, line, color, and texture, and would dominate the view of the casual observer. Consequently, operations of Alternative B1 would not be consistent with VRM Class II or Class III objectives. Should Alternative B1 be selected, a plan amendment to the 1987 Jarbidge RMP would be required to change lands classified as VRM Class II (3,298 acres) to VRM Class IV. In addition, a plan amendment is proposed to change lands classified as VRM Class III (9,871acres) to VRM Class IV. VRM amendment acreages are based on a 0.5-mile radius around each turbine. Alternative B1 would result in a major short- and long-term impact on visual resources.

Mitigation could include aesthetic offsets within the affected Seen Area of Alternative B1, which includes approximately 38,341 and 237,252 acres of VRM Class II and Class III lands, respectively. Specific mitigation opportunities within the affected viewshed have not been identified at this time.

Alternative B2a

Both phases of Alternative B2a would impact the same amount of VRM Class II and VRM Class III lands as described for Alternative B1.

Construction and Decommissioning

Activities would result in similar visual contrast as described in Alternative B1; however, the aerial extent of contrast detected from the Monument Springs and Southern Primitive Road Network viewsheds would be reduced during Phase I, due to reduced construction of roads and turbines. Because Phase I includes operation of turbines along the eastern-most ridgeline of the project area, the same number of turbines would be in view from the US-93 and Salmon Falls Creek Reservoir viewshed areas as described in Alternative B1. Consequently, Alternative B2a would result in a localized major short-term effect to visual resources viewed from the Immediate Foreground and

Foreground-Middleground distance zones. Visual impacts relative to the number of turbines that would be constructed under both Phase I and Phase II and visible at each KOP are summarized in Table 4.3.4-12.

Operation and Maintenance

Because Phase I includes operation of turbines along the eastern-most ridgeline of the project area, the same number of turbines would be in view from each of the viewshed areas as described in Alternative B1. Visual impacts from both Phase I and Phase II visible at each KOP are summarized in Table 4.3.4-12.

Table 4.3.4-12. Number of Turbines in View and Related Contrast by KOP (Alternative B2a).

Viewshed	Salmon Falls Creek Reservoir				US-93			Monument Springs Road		Southern Primitive Road Network		
KOP Number	*2*	*3*	*4*	*5*	*1*	*6*	*10*	*11*	*12*	*7*	*8*	*9*
Number of Turbines in View (Phase I)[1]	31	41	84	94	100	100	63	100	100	33	57	67
Perceived Contrast (Phase I, estimated)	strong	strong	mod	strong	mod	weak	weak	strong	strong	weak	strong	mod
Number of Turbines in View (Phase II)[1]	44	56	102	108	165	123	77	170	170	83	97	76
Perceived Contrast (Phase II, estimated)	strong	strong	mod	strong	mod	weak	weak	strong	strong	weak	strong	mod
Overall Contrast Phase I + II	Strong				Weak			Strong		Strong		

[1] Based on results of the viewshed analysis that indicated the number of turbines that could be seen from each KOP. Number of turbines in view during Phase II is equal to Phase I + Phase II.

Impacts related to the underground collection system, substations, overhead transmission interconnect lines, and SCADA are consistent with that described in the preceding section, Impacts Common to All Action Alternatives.

Alternative B2a would require the same plan amendment to the 1987 Jarbidge RMP to change lands classified as VRM Class II (3,298 acres) and VRM Class III (9,871 acres) to VRM Class IV, as described in Alternative B1. VRM amendment acreages are based on a 0.5-mile radius around each turbine.

Operation of Alternative B2a would result in the same major impact on visual resources described above for Alternative B1.

The same mitigation opportunities would be available for Alternative B2a as described for Alternative B1.

Alternative B2b

Both phases of Alternative B2b would impact the same amount of VRM Class II and VRM Class III lands as described for Alternative B1.

Construction and Decommissioning

Construction and decommissioning activities would result in similar visual contrast as those described under Alternative B1; however the aerial extent of contrast detected from all viewsheds would be reduced during Phase I, as it would not include turbines located in the southern portion of the project. It is possible that visual contrast of construction related activities would be weak when viewed from the Southern Primitive Road Network viewshed. Still, based on the magnitude and extent of Phase I construction and decommissioning related activities, Alternative B2a would result in a localized major short-term effect to visual resources viewed from the Immediate Foreground and Foreground-Middleground distance zones. Visual impacts relative to the number of turbines that would be constructed under both Phase I and Phase II and visible at each KOP are summarized in Table 4.3.4-13.

Operation and Maintenance

Alternative B2b would result in similar visual contrast as described in Alternative B1; however, based on a viewshed analysis, it was determined that the aerial extent of project-related contrast detected from all viewsheds would be reduced by approximately 41 turbines located in the southern portion of the project during Phase I. The reduction in turbines could reduce the perception of the scale of the project within the landscape, thereby reducing contrast when viewed from the Southern Primitive Road Network, Salmon Falls Creek Reservoir, or US-93 viewsheds (Table 4.3.4-13). However, it is expected that the strong visual contrast perceived from the Monument Springs Road viewshed would dominate the existing landscape and would attract the attention of the casual observer. The same plan amendments described in Alternative B1 would be required. Operation of Phase II of the project would result in the same impacts as those described in Alternative B1.

Impacts related to the underground collection system, substations, overhead transmission interconnect lines, and SCADA are consistent with that described in the preceding section, *Impacts Common to All Action Alternatives.*

Alternative B2b would require the same plan amendment to the 1987 Jarbidge RMP to change lands classified as VRM Class II (3,298 acres) and VRM Class III (9,871 acres) to VRM Class IV, as described in Alternative B1. VRM amendment acreages are based on a 0.5-mile radius around each turbine.

Operation of Alternative B2b would result in the same major impact on visual resources described above for Alternative B1.

The same mitigation opportunities would be available for Alternative B2b as described Alterative B1.

Table 4.3.4-13. Number of Turbines in View and Related Contrast by KOP (Alternative B2b).

Viewshed	Salmon Falls Creek Reservoir				US-93			Monument Springs Road		Southern Primitive Road Network		
KOP Number	*2*	*3*	*4*	*5*	*1*	*6*	*10*	*11*	*12*	*7*	*8*	*9*
Number of Turbines in View (Phase I)[1]	44	56	64	68	95	79	59	100	100	29	33	41
Perceived Contrast (Phase I, estimated)	strong	strong	mod	strong	mod	weak	weak	strong	strong	weak	weak	weak
Number of Turbines in View (Phase II)[1]	44	56	102	108	165	123	77	170	170	83	97	76
Perceived Contrast (Phase II, estimated)	strong	strong	mod	strong	mod	weak	weak	strong	strong	weak	strong	mod
Overall Contrast Phase I + II	Strong				Weak			Strong		Strong		

1 Based on results of the viewshed analysis that indicated the number of turbines that could be seen from each KOP. Number of turbines in view during Phase II is equal to Phase 1 + Phase II.

Alternative B2c

Both phases of Alternative B2c would impact the same amount of VRM Class II and VRM Class III lands as described for Alternative B1.

Construction and Decommissioning

Construction and decommissioning related activities would result in similar visual contrast as those described under Alternative B1; however the aerial extent of contrast detected from all viewsheds would be reduced during Phase I as it would not include turbines located in the northern portion of the project. Still, based on the magnitude and extent of Phase I construction and decommissioning related actions, Alternative B2c would result in a localized major short-term effect to visual resources viewed from the Immediate Foreground and Foreground-Middleground distance zones. Visual impacts relative to the number of turbines that would be constructed under both Phase I and Phase II and visible at each KOP are summarized in Table 4.3.4-14.

Table 4.3.4-14. Number of Turbines in View and Related Contrast by KOP (Alternative B2c).

Viewshed	Salmon Falls Creek Reservoir				US-93			Monument Springs Road		Southern Primitive Road Network		
KOP Number	*2*	*3*	*4*	*5*	*1*	*6*	*10*	*11*	*12*	*7*	*8*	*9*
Number of Turbines in View (Phase I)[1]	0	0	35	50	96	53	27	100	100	83	86	44
Perceived Contrast (Phase I, estimated)	mod	mod	weak	mod	mod	weak	weak	strong	strong	weak	strong	mod
Number of Turbines in View (Phase II)[1]	44	56	102	108	165	123	77	170	170	83	97	76
Perceived Contrast (Phase II, estimated)	strong	strong	mod	strong	mod	weak	weak	strong	strong	weak	strong	mod
Overall Contrast Phase I + II	Strong				Weak			Strong		Strong		

[1] Based on results of the viewshed analysis that indicated the number of turbines that would be seen from each KOP. Number of turbines in view during Phase II is equal to Phase 1 + Phase II.

Operation and Maintenance

During Phase I, turbines and roads would result in visual contrast detected across all viewshed areas, with strong contrast when viewed from locations within the Monument Springs Road and Southern Primitive Road Network viewsheds. Based on the results of a viewshed analysis, it was determined that project-related visual contrast observed from locations on Salmon Falls Creek Reservoir (i.e. Lud Drexler Park), would be reduced due to the reduction of turbines in view. The same plan amendments described in Alternative B1 would be required. Operation of Phase II would result in the same impacts as those described previously under Alternative B1. Visual impacts from O&M activities of both Phase I and Phase II at each KOP are presented in Table 4.3.4-14.

Impacts related to the underground collection system, substations, overhead transmission interconnect lines, and SCADA are consistent with that described in the preceding section, *Impacts Common to All Action Alternatives*.

Alternative B2c would require the same plan amendment to the 1987 Jarbidge RMP to change lands classified as VRM Class II (3,298 acres) and VRM Class III (9,871 acres) to VRM Class IV, as described in Alternative B1. VRM amendment acreages are based on a 0.5-mile radius around each turbine.

Operation of Alternative B2c would result in the same major impact on visual resources described above for Alternative B1.

The same mitigation opportunities would be available for Alternative B2c as described Alterative B1.

Alternative C

Alternative C would impact 3,298 acres of lands managed by VRM Class II objectives, and 10,372 acres managed by VRM Class III objectives. Of these lands, 3,298 acres of VRM Class II lands and 7,911 acres of VRM Class III lands are currently administered by the Jarbidge Field Office. A total of 2,461 acres of VRM Class III lands are currently administered by the Wells Field Office.

Construction and Decommissioning

Construction and decommissioning activities would result in similar visual contrast as those described under Alternative B1. Although the aerial extent of construction activities would be reduced, it is not likely that a reduction in contrast would be visible from any location beside Lud Drexler Park on the Salmon Falls Creek Reservoir. The magnitude and extent of construction and decommissioning activities would result in localized major short-term impact on visual resources viewed from the Immediate Foreground and Foreground-Middleground distance zones.

Operation and Maintenance

Alternative C would include operation of 152 turbines and a combined total 80 miles of project roads. Turbines and roads would result in visual contrast detected across all viewshed areas, with strong contrast when viewed from the Monument Springs Road and the Southern Primitive Road Network viewsheds (Table 4.3.4-15). Due to the reduction of approximately 14 turbines from the northern portions of the project area, project-related contrast perceived from Lud Drexler Park on the Salmon Falls Creek Reservoir would be reduced from Alternative B1.

Table 4.3.4-15. Number of Turbines in View and Related Contrast by KOP (Alternative C).

Viewshed	Salmon Falls Creek Reservoir				US-93			Monument Springs Road		Southern Primitive Road Network		
KOP Number	*2*	*3*	*4*	*5*	*1*	*6*	*10*	*11*	*12*	*7*	*8*	*9*
Number of Turbines in View[1]	26	38	84	90	147	105	72	152	152	83	97	76
Perceived Contrast	strong	strong	mod	strong	mod	weak	weak	strong	strong	weak	strong	mod
Overall Contrast	Strong				Weak			Strong		Strong		

[1] Based on results of the viewshed analysis that indicated the number of turbines that could be seen from each KOP.

Alternative C would require a plan amendment to the 1987 Jarbidge RMP to change lands classified as VRM Class II (3,298) to VRM Class IV. In addition, a plan amendment is proposed to change lands classified as VRM Class III (7,911 acres) to VRM Class IV. VRM amendment acreages are based on a 0.5-mile radius around each turbine.

Alternative C would result in major long-term impacts on visual resources.

Mitigation could include aesthetic offsets within the affected viewshed of Alternative C. Approximately 38,247 and 237,168 acres of VRM Class II and Class III lands, respectively, would be located in the Seen Area of this alternative. Specific mitigation opportunities within the affected viewshed have not been identified at this time.

Alternative D

Alternative D would impact 2,359 acres of lands managed by VRM Class II objectives and 7,652 acres managed by VRM Class III objectives. All of these lands are administered by the Jarbidge Field Office.

Construction and Decommissioning

Alternative D would result in similar visual contrast as described in Alternative B1; however the aerial extent of construction and decommissioning activities would be reduced due to the reduction in the number of proposed turbines in the southern (41 turbines) and northern (14 turbines) portions of the project. The reduction in turbines could reduce the perception of the scale of the project within the landscape, thereby reducing contrast when viewed from the Southern Primitive Road Network, Salmon Falls Creek Reservoir, or US-93 viewsheds. Still, based on the magnitude and extent of construction and decommissioning activities, Alternative D would result in a localized major short-term impact on visual resources viewed from within the Immediate Foreground and Foreground-Middleground distance zones.

Operation and Maintenance

Alternative D would include operation of 124 turbines and a combined total of 72 miles of project roads sited in the central portion of the project. Turbines and roads would result in visual contrast detected across all viewshed areas, with strong contrast when viewed from locations within the project area (Monument Springs Road). Views of turbines and roads and perceived contrast would be reduced for many portions of the Southern Primitive Road Network viewed area. This would be due to the elimination of turbines in the southern portion of the project area and the increase in the distance of the project from this viewshed. Likewise, perceived contrast from Lud Drexler Park on Salmon Falls Creek Reservoir would be reduced due to elimination of turbines in the extreme northern portion of the project area (Table 4.3.4-16).

Table 4.3.4-16. Number of Turbines in View and Related Contrast by KOP (Alternative D).

Viewshed	Salmon Falls Creek Reservoir				US-93			Monument Springs Road		Southern Primitive Road Network		
KOP Number	*2*	*3*	*4*	*5*	*1*	*6*	*10*	*11*	*12*	*7*	*8*	*9*
Number of Turbines in View[1]	26	38	56	62	119	77	61	124	124	58	71	53
Perceived Contrast	strong	strong	mod	strong	mod	weak	weak	strong	strong	weak	weak	mod
Overall Contrast	Strong				Weak			Strong		Weak		

[1] Based on results of the viewshed analysis that indicated the number of turbines that could be seen from each KOP.

Alternative D would require a plan amendment to the 1987 Jarbidge RMP to change lands classified as VRM Class II (2,359 acres) to VRM Class IV. In addition, a plan amendment is proposed to change lands classified as VRM Class III (7,652 acres) to VRM Class IV. VRM amendment acreages are based on a 0.5-mile radius around each turbine.

Despite reduction in visual contrast from some areas, Alternative D would result in major long-term effects on visual resources.

Mitigation could include aesthetic offsets within the affected viewshed of the Alternative D. Approximately 36,264 and 220,893 acres of VRM Class II and Class III lands, respectively, would be located in the Seen Area of Alternative D. Specific mitigation opportunities within the affected viewshed have not been identified at this time.

Alternative E

Alternative E would impact 10,171 acres of lands managed by VRM Class III objectives. Of these, 7,828 acres would be administered by the Jarbidge Field Office and 2,343 acres would be managed by the Wells Field Office. Under Alternative E, no turbines would be sited on lands managed by VRM Class II objectives.

Construction and Decommissioning

Construction and decommissioning activities would result in similar visual contrast as those described in Alternative B1. However, the aerial extent of construction decommissioning activities would be reduced along the eastern ridgeline of the project area, thereby reducing the potential to observe these activities from locations within the Salmon Falls Creek Reservoir and US-93 viewsheds. Still, it is expected that the level of construction occurring within the Monument Springs viewshed would remain high and would result in increased visual contrast to the landscape. Consequently, the magnitude and extent of construction and decommissioning activities would result in localized major short-term impact on visual resources viewed from within the Immediate Foreground and Foreground-Middleground distance zones.

Operation and Maintenance

Alternative E would include operation of 120 turbines and a combined total of 76 miles of project roads sited in the central portion of the project. No turbines would be operated in VRM Class II areas. The configuration of turbines defined by Alternative E would limit the number of turbines viewed from the Salmon Falls Creek Reservoir and US-93 viewsheds. The limited number of turbines visible from these locations could reduce the overall level of project-related visual contrast perceived from these locations. Still, it is expected that turbines and roads would result in moderate to strong contrast when viewed from locations within the project area (Table 4.3.4-17).

Table 4.3.4-17. Number of Turbines in View and Related Contrast by KOP (Alternative E).

Viewshed	Salmon Falls Creek Reservoir				US-93			Monument Springs Road		Southern Primitive Road Network		
KOP Number	*2*	*3*	*4*	*5*	*1*	*6*	*10*	*11*	*12*	*7*	*8*	*9*
Number of Turbines in View[1]	17	26	59	58	116	73	52	120	120	77	81	50
Perceived Contrast	mod	mod	mod	mod	weak	weak	weak	strong	strong	weak	strong	mod
Overall Contrast	Moderate				Weak			Strong		Strong		

[1] Based on results of the viewshed analysis that indicated the number of turbines that could be seen from each KOP.

Operation would create long-term deviations in landscape character that would result in strong visual contrast within the Immediate Foreground and Foreground-Middleground distance zones. Modifications to the landscape character would attract attention and would dominate the view of the casual observer in two of the viewsheds analyzed. Alternative E would result in major long-term impact on visual resources. However, no amendments to the 1987 Jarbidge RMP are being considered under this alternative.

Mitigation could include aesthetic offsets within the affected viewshed of the Alternative E. Approximately 37,517 and 235,035 acres of VRM Class II and Class III lands, respectively, would be located in the Seen Area of Alternative E. Specific mitigation opportunities within the affected viewshed have not been identified at this time.

Alternative F

Alternative F would impact 1,420 acres of lands managed by VRM Class II objectives and 6,394 acres managed by VRM Class III objectives. All of these lands are administered by the Jarbidge Field Office.

Construction and Decommissioning

Construction and decommissioning activities would result in similar visual contrast as those described in Alternative B1. However, the aerial extent of construction and decommissioning activities would be reduced in the southern and northern portions of the of the project area, thereby reducing potential to observe these activities from locations within the Southern Primitive Road Network viewshed or Lud Drexler Park in the Salmon Falls Creek Reservoir viewshed area. Still, it is expected that the level of construction occurring within the Monument Springs Road viewshed would remain high and would result in an increased visual contrast. Consequently, the magnitude and extent of construction and decommissioning activities would result in localized major short-term effect to visual resources viewed from within the Immediate Foreground and Foreground-Middleground distance zones.

Operation and Maintenance

Alternative F would include operation of 105 turbines and 66 miles of project roads sited in the central portion of the project. Turbines and roads would result in visual contrast detected across all viewshed areas, with strong contrast when viewed from locations within the project area (Monument Springs Road) and certain locations from the Salmon Falls Creek Reservoir. Because Alternative F removes turbines from the southern portion of the project, selection of this alternative would reduce visual contrast of turbines when viewed from southern locations in Nevada (Table 4.3.4-18).

Operation of would create long-term deviations in landscape character that would result in strong localized visual contrast within the Foreground-Middleground distance zones. Modifications to the landscape character would dominate the view of the casual observer, and would not be consistent with VRM Class II or III objectives. Consequently, Alternative F would result in major long-term effect to visual resources and would require a plan amendment to the 1987 Jarbidge RMP to change lands classified as VRM Class II (1,420 acres) to VRM Class IV. In addition, a plan amendment is proposed to change lands classified as VRM Class III (6,394 acres) to VRM Class IV. VRM amendment acreages are based on a 0.5-mile radius around each turbine.

Mitigation could include aesthetic offsets within the affected viewshed of Alternative F. Approximately 35,297 and 217,765 acres of VRM Class II and Class III lands, respectively, would be located in the Seen Area of this alternative. Specific mitigation opportunities within the affected viewshed have not been identified at this time.

Table 4.3.4-18. Number of Turbines in View and Related Contrast by KOP (Alternative F).

Viewshed	Salmon Falls Creek Reservoir				US-93			Monument Springs Road		Southern Primitive Road Network		
KOP Number	*2*	*3*	*4*	*5*	*1*	*6*	*10*	*11*	*12*	*7*	*8*	*9*
Number of Turbines in View[1]	26	38	49	49	92	61	54	105	105	44	45	41
Perceived Contrast	strong	strong	weak	strong	weak	weak	weak	strong	strong	weak	weak	weak
Overall Contrast	Strong				Weak			Strong		Weak		

[1] Based on results of the viewshed analysis that indicated the number of turbines that could be seen from each KOP.

4.3.4.3 Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Construction

Reconstruction of existing roads and construction of new roads for the 119-mile northern inbound haul route is expected to result in weak contrast in form, line, color, and texture against the existing landscape. Contrast would be perceived where cut and fill is required, or where pullouts or corners are expanded to accommodate large trucks. Should nighttime work be required, lighting would introduce contrast to the night sky. It is assumed that dust suppression design features would be implemented, thus eliminated dust-related impacts on visual resources.

Collectively, the construction activities would result in minor temporary direct impacts on visual resources.

Operation and Maintenance

This haul route would be used primarily during the 2-year construction period (or 3 years for the phased alternatives and 4 years for Alternative E) when wind turbines would be delivered the project area. This route would be used during major maintenance of turbines or substations that is expected to occur once per year. It would also be used in the event unanticipated major repairs to turbines or substations are required. Due to size, novelty of the truckloads, and frequency of trips, turbine delivery trucks are expected to be noticed by the casual observer. Consequently, operation of the northern inbound haul route is expected to result in moderate temporary direct impacts on visual resources.

The northern inbound haul route passes through approximately 38.9 acres of VRM Class III lands. It is expected that operation of this haul route would retain the existing character of the landscape and the level of change would be low, thereby conforming to VRM Class III objectives. No plan amendment would be required for operation of the northern inbound haul route.

Decommissioning

This haul route is an established roadway that would not be decommissioned; no impacts on visual resources would result from road decommissioning.

Southern Inbound Haul Route Option 1

Construction

Construction of this route is expected to result in an incremental strong contrast in form, line, color, and texture against the existing landscape in areas where 11 miles of roads would be constructed. The route would appear as a single line intersecting large areas of rolling hills and flat plateaus situated in a predominately panoramic landscape. Where the route requires culvert replacement, blasting, cut, and fill, permanent moderate to strong contrast in form, line, color, and texture is expected. Areas requiring cut and fill are characterized by a more enclosed landscape character with prominent rock cliffs. Alteration of these landforms may result in strong long-term contrast due to the magnitude of the impact and the relatively small scale of the immediate landscape where these actions are proposed. The level of contrast would be determined at a later design stage using visual simulations. If the roadway is designed to repeat the basic elements of form, line, color, and texture of the landscape, visual contrast may be greatly reduced.

Indirect impacts resulting from construction of this haul route option may include a general change in perception of the landscape over time. Increased access may result in more frequent visitation by roadway travellers, who may also travel at higher speeds due to overall improvement in road conditions.

The haul route would include a 23-acre vehicle staging area for turbine component delivery. This area would create strong short-term contrast in form (shape), line, color, and texture due to removal of vegetation and resurfacing with gravel. The increase in vehicular traffic and visitors during construction activities would temporarily alter the landscape character. It is assumed that dust suppression design features would be implemented, thus reducing potential dust-related impacts on visual resources.

The staging area and haul route would cross VRM Class II and Class III lands. Cut and fill with potential blasting would occur in VRM Class II areas. Collectively, these activities are expected to result in long-term contrast that may attract the attention of the casual observer. Unless designed to repeat the elements of form, line, color, and texture of the surrounding landscape, these features would not be consistent with VRM Class II objectives on approximately 19.2 acres of land currently administered by the BLM Wells Field Office. The route would also cross approximately 23.2 acres of lands managed under VRM Class III objectives. The haul route is expected to partially retain the existing panoramic character of the landscape and not dominate the view of the casual observer, thereby meeting VRM Class III objectives. Construction of this haul route would result in major long-term direct impacts on visual resources.

Operation and Maintenance

The southern inbound haul route would be used primarily during the 2-year construction period (or 3 years for the phased alternatives and 4 years for Alternative E) when wind turbines would be delivered to the project area. If selected, this route would be used during major maintenance of turbines or substations that is expected to occur once per year. The route would also be used in the event unanticipated major repairs to turbines or substations are required. Consolidation of construction vehicles in these areas could mimic the appearance of structures, thereby creating strong short-term contrast in form, line, color, and texture. Consequently, operation of this haul route is expected to result in major long-term direct impacts on visual resources.

Indirect impacts resulting from operation of the project may include a general change in perception of the landscape over time. Increased access may result in more frequent visitation by roadway travellers, who may also travel at higher speeds due to overall improvement in road conditions.

Decommissioning

This roadway would not be decommissioned and no impacts on visual resources would result from road decommissioning activities.

Southern Inbound Haul Route Option 2

Construction

Construction of this route is expected to result in an incremental strong contrast in form, line, color, and texture against the existing landscape in areas where 13 miles of roads would be constructed. The route would appear as a single line intersecting large areas of rolling hills and flat plateaus situated in a predominately panoramic landscape. This haul route would include a 23-acre vehicle staging area for turbine component delivery. This area would create strong short-term contrast in form (shape), line, color, and texture due to removal of vegetation and resurfacing with gravel. High use of the haul route and staging area during construction of the turbines would attract attention of the casual observer. Consolidation of construction vehicles in these areas could mimic the appearance of structures, thereby creating strong short-term contrast in form, line, color, and texture. The increase in vehicular traffic and visitors during construction would temporarily alter the landscape character. It is assumed that dust suppression design features would be implemented, thus reducing potential dust-related impacts on visual resources.

The staging area and haul route would cross approximately 13.6 acres of VRM Class II lands, and approximately 53.4 acres of VRM Class III lands. Because construction-related activities are expected to result in short-term contrast that may attract the attention of the casual observer, these activities would not be consistent with VRM Class II objectives.

Indirect impacts resulting from construction of this haul route option may include a general change in perception of the landscape over time. Increased access may result in more frequent visitation by roadway travellers, who may also travel at higher speeds due to overall improvement in road conditions.

Operation and Maintenance

Operation of this haul route option would occur primarily during the 2-year construction period (3 years under the phased alternatives and 4 years for Alternative E) when turbines would be delivered to the project area. Operation of the this haul route option would result in major long-term direct impacts on visual resources by creating lasting contrast in from, line, color and texture against the existing landscape. It is expected, however, that visual contrast would meet VRM Class III objectives in the long-term. However, VRM Class II objectives are not expected to be achieved in the long-term.

Indirect and direct impacts resulting from operation of the project would be similar to that described for option 1.

Decommissioning

This roadway would not be decommissioned and no impacts on visual resources would result from road decommissioning activities.

Outbound Haul Route

Construction

No construction or road reconstruction would take place along the outbound haul route; therefore, no indirect or direct impacts on visual resources would be caused by construction activities.

Operation and Maintenance

The outbound haul route overlaps with the Thousand Springs Scenic Byway. Use of this route would result in a temporary increase in traffic during the 2-year construction period (3 years for the phased alternatives and 4 years for Alternative E) as the unloaded turbine delivery trucks would use this route to exit the project area. The route would also be used during major maintenance of turbines or substations that is expected to occur once per year and in the event, unanticipated major repairs to turbines or substations are required. The increase in the frequency and type of vehicles is expected to result in weak contrast to visual resources, as use would likely be episodic and temporary. Consequently, operation of the outbound haul route is expected to result in minor temporary direct impacts on visual resources.

Decommissioning

This haul route would not be decommissioned and no impacts on visual resources would result from road decommissioning activities.

4.3.4.4 Project as a Whole

Construction and operation of the project under all action alternatives would result in major short- and long-term direct impacts on visual resources (Table 4.3.4-19). Project components including underground and overhead transmission lines, substations, operation facilities, construction laydown yards, aggregate and concrete facilities, and meteorological towers, would result in similar impacts on visual resources across all of the action alternatives. With the exception of the overhead transmission line, the components listed above would be most visible and would result in the strongest visual

contrast when viewed from locations within the Monument Springs Road viewshed area. Visual contrast resulting from the overhead transmission lines is expected to be weak across the project area, thereby resulting in no need to reclassify lands managed by VRM Class II or Class III objectives. Consequently, no plan amendment would be required to the 1987 Jarbidge RMP as a result of transmission line poles or overhead transmission lines.

Table 4.3.4-19. Impact Summary Table – Visual Resources.

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Route Option 1	Wind Energy Facility with the Southern Inbound Haul Route Option 2
Alternative A	No plan amendment required for the Jarbidge District RMP.	No plan amendment required for the Jarbidge District RMP.	No plan amendment required for the Jarbidge District RMP.
Alternative B1	**Short-term Impacts** Incremental increase in a strong contrast in form, line, color and texture resulting from construction and operation of the project. Weak contrast in form, line, color, and texture resulting from construction and operation of the northern inbound haul route. Major short-term impacts on visual resources. **Long-term Impacts** Overall strong contrast in form, line, color and texture resulting from construction and operation of the project. Major long-term impacts on visual resources. An amendment to the 1987 Jarbidge District RMP would reclassify 3,298 acres of VRM Class II lands, and 9,871 acres of VRM Class III lands.	**Short-term Impacts** Incremental increase in a strong contrast in form, line, color and texture resulting from construction and operation of the project. Strong contrast in form, line, color, and texture resulting from construction and operation of the southern inbound haul route option 1. Major short-term impacts on visual resources. **Long-term Impacts** Overall strong contrast in form, line, color and texture resulting from construction and operation of the project. Overall strong contrast anticipated due to construction and operation of the southern inbound haul route option 1. Major long-term impacts on visual resources. Approximately 19.2 acres of land managed as VRM Class II, and 23.2 acres of land managed as VRM Class III (Wells Field Office) would be affected.	**Short-term Impacts** Incremental increase in a strong contrast in form, line, color and texture resulting from construction and operation of the project. Strong contrast in form, line, color, and texture resulting from construction and operation of the southern inbound haul route option 2. Major short-term impacts on visual resources. **Long-term Impacts** Overall strong contrast in form, line, color and texture resulting from construction and operation of the project. Overall strong contrast anticipated due to construction and operation of the southern inbound haul route option 1. Major long-term impacts on visual resources. An amendment to the 1987 Jarbidge District RMP would reclassify 3,298 acres of VRM Class II lands, and 9,871 acres of VRM Class III lands.

Table 4.3.4-19. Impact Summary Table – Visual Resources (continued).

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Route Option 1	Wind Energy Facility with the Southern Inbound Haul Route Option 2
Alternative B1 (continued)	**Short- and long-term Impacts** Contrast perceived from all viewer positions, with the greatest contrast perceived from Monument Springs Road, Salmon Falls Creek, and Southern Primitive Road Network viewshed areas.	An amendment to the 1987 Jarbidge District RMP would reclassify 3,298 acres of VRM Class II lands, and 9,871 acres of VRM Class III lands. **Short- and long-term Impacts** Contrast perceived from all viewer positions, with the greatest contrast perceived from Monument Springs Road, Salmon Falls Creek, and Southern Primitive Road Network viewshed areas.	**Short- and long-term Impacts** Contrast perceived from all viewer positions, with the greatest contrast perceived from Monument Springs Road, Salmon Falls Creek, and Southern Primitive Road Network viewshed areas.
Alternative B2a	**PHASE I** **Short- and Long-term Impacts** Phase I would result in the same level of contrast perceived from each viewshed area as for Alternative B1. Same permanent impacts on visual resources as for B1. **PHASE II** **Short- and Long-term Impacts** Same as that described for Alternative B1. **PHASE I & II** **Short- and Long-term Impacts** Same as that described for Alternative B1. A plan amendment to the 1987 Jarbidge RMP to reclassify VRM Class II and Class III lands would be the same as for Alternative B1.	**PHASE I** **Short- and Long-term Impacts** Phase I would result in the same level of contrast perceived from each viewshed area as for Alternative B1. Same permanent impacts on visual resources as for B1. Same impacts resulting from southern inbound haul route option 1 as for Alternative B1. **PHASE II** **Short- and Long-term Impacts** Same as that described for Alternative B1. **PHASE I & II** **Short- and Long-term Impacts** Same as that described for Alternative B1. A plan amendment to the 1987 Jarbidge RMP to reclassify VRM Class II and Class III lands would be the same as for Alternative B1.	**PHASE I** **Short- and Long-term Impacts** Phase I would result in the same level of contrast perceived from each viewshed area as for Alternative B1. Same permanent impacts on visual resources as for B1. Same impacts resulting from southern inbound haul route option 2 as for Alternative B1. **PHASE II** **Short- and Long-term Impacts** Same as that described for Alternative B1. **PHASE I & II** **Short- and Long-term Impacts** Same as that described for Alternative B1. A plan amendment to the 1987 Jarbidge RMP to reclassify VRM Class II and Class III lands would be the same as for Alternative B1.

Table 4.3.4-19. Impact Summary Table – Visual Resources (continued).

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Route Option 1	Wind Energy Facility with the Southern Inbound Haul Route Option 2
Alternative B2b	**PHASE I** **Short- and Long-term Impacts** Strong contrast perceived from Monument Springs Road, Salmon Falls Creek, and Southern Primitive Road Network Viewshed Areas. Weak contrast perceived from the US-93 viewshed area. **PHASE II** **Short- and Long-term Impacts** Same as that described for Alternative B1. **PHASE I & II** **Short- and Long-term Impacts** Same as that described for Alternative B1. A plan amendment to the 1987 Jarbidge RMP to reclassify VRM Class II and Class III lands would be the same as for Alternative B1.	**PHASE I** **Short- and Long-term Impacts** Strong contrast perceived from Monument Springs Road, Salmon Falls Creek, and Southern Primitive Road Network Viewshed Areas. Weak contrast perceived from the US-93 viewshed area. Same impacts resulting from southern inbound haul route option 1 as for Alternative B1. **PHASE II** **Short- and Long-term Impacts** Same as that described for Alternative B1. **PHASE I & II** **Short- and Long-term Impacts** Same as that described for Alternative B1. A plan amendment to the 1987 Jarbidge RMP to reclassify VRM Class II and Class III lands would be the same as for Alternative B1.	**PHASE I** **Short- and Long-term Impacts** Strong contrast perceived from Monument Springs Road, Salmon Falls Creek, and Southern Primitive Road Network viewshed areas. Weak contrast perceived from the US-93 viewshed area. Same impacts resulting from southern inbound haul route option 2 as for Alternative B1. **PHASE II** **Short- and Long-term Impacts** Same as that described for Alternative B1. **PHASE I & II** **Short- and Long-term Impacts** Same as that described for Alternative B1. A plan amendment to the 1987 Jarbidge RMP to reclassify VRM Class II and Class III lands would be the same as for Alternative B1.
Alternative B2c	**PHASE I** **Short- and Long-term Impacts** Strong contrast perceived from Monument Springs Road viewshed area. Moderate contrast perceived from the Salmon Falls Creek and Southern Primitive Road Network viewshed areas. Weak contrast perceived from the US-93 viewshed area.	**PHASE I** **Short- and Long-term Impacts** Strong contrast perceived from Monument Springs Road viewshed area Moderate contrast perceived from the Salmon falls Creek and Southern Primitive Road Network viewshed areas. Weak contrast perceived from the US-93 Viewshed area. Same impacts resulting from southern inbound haul route option 1 as for Alt. B1.	**PHASE I** **Short- and Long-term Impacts** Strong contrast perceived from Monument Springs Road viewshed area Moderate contrast perceived from the Salmon falls Creek and Southern Primitive Road Network viewshed areas. Weak contrast perceived from the US-93 viewshed area. Same impacts resulting from southern inbound haul route option 2 as for Alt. B1.

Table 4.3.4-19. Impact Summary Table – Visual Resources (continued).

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Route Option 1	Wind Energy Facility with the Southern Inbound Haul Route Option 2
Alternative B2c (continued)	**PHASE II** **Short- and Long-term Impacts** Same as that described for Alternative B1. **PHASE I & II** **Short- and Long-term Impacts** Same as that described for Alternative B1. A plan amendment to the 1987 Jarbidge RMP to reclassify VRM Class II and Class III lands would be the same as for Alternative B1.	**PHASE II** **Short- and Long-term Impacts** Same as that described for Alternative B1. **PHASE I & II** **Short- and Long-term Impacts** Same as that described for Alternative B1. A plan amendment to the 1987 Jarbidge RMP to reclassify VRM Class II and Class III lands would be the same as for Alternative B1.	**PHASE II** **Short- and Long-term Impacts** Same as that described for Alternative B1. **PHASE I & II** **Short- and Long-term Impacts** Same as that described for Alternative B1. A plan amendment to the 1987 Jarbidge RMP to reclassify VRM Class II and Class III lands would be the same as for Alternative B1.
Alternative C	**Short- and Long-term Impacts** Strong contrast perceived from Monument Springs Road, Salmon Falls Creek, and Southern Primitive Road Network viewshed areas. Weak Contrast perceived from the US-93 viewshed area. An amendment to the 1987 Jarbidge District RMP would reclassify 3,298 acres of VRM Class II lands, and 7,911 acres of VRM Class III lands.	**Short- and Long-term Impacts** Strong contrast perceived from Monument Springs Road, Salmon Falls Creek, and Southern Primitive Road Network viewshed areas. Weak Contrast perceived from the US-93 viewshed area. Same impacts resulting from southern inbound haul route option 1 as for Alt. B1. An amendment to the 1987 Jarbidge District RMP would reclassify 3,298 acres of VRM Class II lands, and 7,911 acres of VRM Class III lands.	**Short- and Long-term Impacts** Strong contrast perceived from Monument Springs Road, Salmon Falls Creek, and Southern Primitive Road Network viewshed areas. Weak Contrast perceived from the US-93 viewshed area. Same impacts resulting from southern inbound haul route option 2 as for Alt. B1. An amendment to the 1987 Jarbidge District RMP would reclassify 3,298 acres of VRM Class II lands, and 7,911 acres of VRM Class III lands.
Alternative D	**Short- and Long-term Impacts** Strong contrast perceived from Monument Springs Road and Salmon Falls Creek viewshed areas. Weak contrast perceived from the Southern Primitive Road Network and US-93 viewshed areas.	**Short- and Long-term Impacts** Strong contrast perceived from Monument Springs Road and Salmon Falls Creek viewshed areas. Weak contrast perceived from the Southern Primitive Road Network and US-93 viewshed areas. Same impacts resulting from southern inbound haul route option 1as for Alt. B1.	**Short- and Long-term Impacts** Strong contrast perceived from Monument Springs Road and Salmon Falls Creek viewshed areas. Weak contrast perceived from the Southern Primitive Road Network and US-93 viewshed areas. Same impacts resulting from southern inbound haul route option 2 as for Alt. B1.

Table 4.3.4-19. Impact Summary Table – Visual Resources (continued).

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Route Option 1	Wind Energy Facility with the Southern Inbound Haul Route Option 2
Alternative D (continued)	An amendment to the 1987 Jarbidge District RMP would reclassify 2,358 acres of VRM Class II lands, and 7,652 acres of VRM Class III lands.	An amendment to the 1987 Jarbidge District RMP would reclassify 2,358 acres of VRM Class II lands, and 7,652 acres of VRM Class III lands.	An amendment to the 1987 Jarbidge District RMP would reclassify 2,358 acres of VRM Class II lands, and 7,652 acres of VRM Class III lands.
Alternative E	**Short- and Long-term Impacts** Strong contrast perceived from Monument Springs Road and Southern Primitive Road Network viewshed areas. Moderate contrast perceived from Salmon Falls Creek viewshed area. Weak contrast perceived from US-93 viewshed area. No amendment to the 1987 Jarbidge District RMP	**Short- and Long-term Impacts** Strong contrast perceived from Monument Springs Road and Southern Primitive Road Network viewshed areas. Moderate contrast perceived from Salmon Falls Creek viewshed area. Weak contrast perceived from US-93 viewshed area. Same impacts resulting from southern inbound haul route option 1 as for Alternative B1. No amendment to the 1987 Jarbidge District RMP	**Short- and Long-term Impacts** Strong contrast perceived from Monument Springs Road and Southern Primitive Road Network viewshed areas. Moderate contrast perceived from Salmon Falls Creek viewshed area. Weak contrast perceived from US-93 viewshed area. Same impacts resulting from southern inbound haul route option 2 as for Alternative B1. No amendment to the 1987 Jarbidge District RMP
Alternative F	**Short- and Long-term Impacts** Strong contrast perceived from Monument Springs Road and Salmon Falls Creek viewshed areas. Weak contrast perceived form the Southern Primitive Road Network and US-93 viewshed areas. An amendment to the 1987 Jarbidge District RMP would reclassify 1,420 acres of VRM Class II lands, and 6,394 acres of VRM Class III lands.	**Short- and Long-term Impacts** Strong contrast perceived from Monument Springs Road and Salmon Falls Creek viewshed areas. Weak contrast perceived form the Southern Primitive Road Network and US-93 viewshed areas. Same impacts resulting from southern inbound haul route option 1 as for Alternative B1. An amendment to the 1987 Jarbidge District RMP would reclassify 1,420 acres of VRM Class II lands, and 6,394 acres of VRM Class III lands.	**Short- and Long-term Impacts** Strong contrast perceived from Monument Springs Road and Salmon Falls Creek viewshed areas. Weak contrast perceived form the Southern Primitive Road Network and US-93 viewshed areas. Same impacts resulting from southern inbound haul route option 2 as for Alternative B1. An amendment to the 1987 Jarbidge District RMP would reclassify 1,420 acres of VRM Class II lands, and 6,394 acres of VRM Class III lands.

The extent to which the perception of visual contrast resulting from turbines and project roads could vary by alternative is largely due to change in the number of turbines, their configuration, and the landscape character of each viewshed (Table 4.3.4-20).

It is assumed that, despite reductions in numbers of turbines across alternatives, construction and operation of the project would result in strong short- and long-term impacts on visual resources when viewed from the Monument Springs Road viewshed. Views from this location are within the Immediate Foreground distance zone, resulting in a level of contrast that would not be absorbed by the surrounding enclosed landscape. Likewise, the overall visual contrast observed from the US-93 viewshed is assumed to be weak across all alternatives.

The number of turbines in view and the expected level of resulting visual contrast would fluctuate across alternatives when viewed from the Salmon Falls Creek Reservoir and Southern Primitive Road Network viewsheds. The level of visual contrast observed from the Salmon Falls Creek Reservoir viewshed is expected to be strong across all alternatives, with the exception of Alternative E, where contrast is assumed to be moderate. The level of visual contrast observed from the Southern Primitive Road Network viewshed is expected to be strong across all alternatives, with the exception of Alternatives D and F, where contrast is assumed to be weak. Across all Alternatives, both options of the Southern Haul Route could result in major short-term, long-term, and permanent impacts on visual resources.

Table 4.3.4-20. Number of Turbines in View of Each KOP Across All Action Alternatives.

Viewshed	Number of Turbines in View[1]											
	Salmon Falls Creek Reservoir				US-93			Monument Springs Road		Southern Primitive Road Network		
KOP Number	2	3	4	5	1	6	10	11	12	7	8	9
Alternative B1	44	56	102	108	165	123	77	170	170	83	97	76
Alternative B2a (Phase I)	31	41	84	94	100	100	63	100	100	33	57	67
Alternative B2a (Phase II)	44	56	102	108	165	123	77	170	170	83	97	76
Alternative B2b (Phase I)	44	56	64	68	95	79	59	100	100	29	33	41
Alternative B2b (Phase II)	44	56	102	108	165	123	77	170	170	83	97	76
Alternative B2c (Phase I)	0	0	35	50	96	53	27	100	100	83	86	44
Alternative B2c (Phase II)	44	56	102	108	165	123	77	170	170	83	97	76
Alternative C	26	38	84	90	147	105	72	152	152	83	97	76
Alternative D	26	38	56	62	119	77	61	124	124	58	71	53
Alternative E	17	26	59	58	116	73	52	120	120	77	81	50
Alternative F	26	38	49	49	92	61	54	105	105	44	45	41

[1] Based on results of the viewshed analysis that indicated the number of turbines that could be seen from each KOP.

Note: The alternative with the fewest number of turbines in view from each viewshed area is highlighted in grey.

4.3.4.5 Cumulative Impacts

The analysis area for cumulative impacts includes:

- Locations within 10 miles of the project area (Seen Area);
- The Seen Area of all KOPs, with the exception of those located on US-93;
- The Seen Area for 24 miles of Three Creek Road centered on the intersection with Monument Springs Road;
- The Seen Area for 18 miles of US-93, beginning at the southern edge of the US-93 viewshed and extending to the south; and
- The Seen Area for 18 miles of US-93, beginning at the northern edge of the US-93 viewshed, and extending to the north toward Twin Falls, Idaho.

The analysis area was selected because it addresses potential cumulative impacts on areas located within Background distance zone of the project, and the viewsheds of the KOPs. The viewer positions located on US-93 were analyzed within the context of a much larger area that represents the experience of a roadway traveler who may retain the memory of repeated views of projects when traveling north or southbound. For the purpose of this analysis, the relevant time frame for retaining a viewing experience was defined as 15 minutes. Based on an average travel speed of 65 mph on US-93, and 45 mph on Three Creek Road, the analysis area was expanded to cover 36 miles of US-93 and 24 miles of Three Creek Road.

Cumulative impacts would result from the construction and operation of wind energy projects (including meteorological towers), transmission lines, and communication towers. Cumulative impacts on visual resources are expected to be greatest in the northern portion of the analysis area, and along US-93. Impacts of past, future, and reasonable foreseeable future actions would be perceived as strongest by roadway travelers moving north or south along US-93. The landscape character surrounding US-93 could be altered by an increase in the number and size of overhead transmission lines, particularly where sited between US-93, and more focal landscape features such as Salmon Falls Creek Reservoir or China Mountain. When traveling north toward the city of Twin Falls, the collective impact of transmission lines, wind projects, and communication towers clustered toward the north portion of the analysis area could result in changes in landscape character from a generally pastoral to a more industrialized landscape.

Cumulative impacts are expected to be greatest along the US-93 viewshed area. Visual resources associated with the Monument Springs Road, Southern Primitive Road Network, and some portions of Salmon Falls Creek Reservoir viewshed areas would be less affected, as views of past, future and reasonable foreseeable future actions would be limited due to topographic shielding, viewer position, and distance.

Indirectly, these changes could result in a change in perception of the overall landscape character of the analysis area.

Alternative A (No Action Alternative)

Impacts on visual resources within the cumulative impacts analysis area would occur from past, present and future actions that are listed in Table 4.0.2-1.

All Action Alternatives)

Impacts from Alternative B1 would result in views of turbines sited along the eastern-most ridgeline of the project area that would increase the spatial extent of development-related visual contrast, and accelerate the transition to a more industrialized aesthetic in the analysis area. Roadway travelers on US-93 would experience views of turbines, meteorological towers, and related infrastructure (i.e., transmission interconnect lines, substation) for a larger percentage of their journey through the analysis areas and would likely perceive the overall landscape character in a different way. The combined incremental impact of the project, and all other past, future, and reasonably foreseeable actions would increase the perception of the scale of development in the area. Project-related actions would dominate the existing landscape character as seen from US-93, and result in major long-term, impacts on visual resources.

Phase I of Alternative B2a would include construction and operation of turbines along the east ridgeline of the project area, thereby contributing to the combined incremental change in landscape character from a natural to a more industrialized landscape. Both phases of Alternative B2b would eliminate turbines located in the southern portion of the project area may reduce the spatial extent of cumulative impacts on visual resources; however, the expected level of change to the existing landscape character would remain as describe in Alternative B1. Both phases of Alternative B2c would eliminate turbines located in the northern portion of the project area may reduce the spatial extent and pattern of cumulative impacts on visual resources; however, the expected level of change to the existing landscape character would remain as describe in Alternative B1. Alternatives C, D, E and F would result in the same cumulative impacts as described in Alternative B1. Alternative D would eliminate turbines located in the northern and southern portion of the project area, which may reduce the spatial extent and pattern of cumulative impacts on visual resources. Alternative E would reduce the number of turbines located along the eastern ridgeline of the project area may reduce the spatial extent and pattern of cumulative impacts on visual resources. Among all action alternatives, Alternative F would construct the least number of turbines and could reduce the spatial extent and pattern of cumulative impacts on visual resources.

4.3.5 TRANSPORTATION AND ACCESS

This section discusses potential impacts on local transportation and public access that could result from implementing the proposed alternatives for the project. The analysis area for transportation and access varies by indicator. The analysis area for route density includes the project area. The analysis area for road reconstruction includes the project area, project roads, and the haul routes. The analysis areas specific to traffic are: the northern inbound haul route that includes State Highway 51 (SH-51) from Mountain Home to Bruneau, Idaho; the southern inbound haul route that includes US-93 from United States Highway 30 (US-30) in Idaho to Jackpot, Nevada and from Wells, Nevada to Jackpot; and the outbound haul route that includes US-30 from Filer to Twin Falls Idaho.

4.3.5.1 Analysis Methods

Indicators

The indicators for impacts on transportation and access include the following:

- Changes to route density from new roads;
- Reconstruction of existing roads; and
- Changes to local traffic volume.

Methods and Assumptions

The primary impacts on transportation and access from the project are tied to the changes in route density (miles of road per square mile) resulting from new roads, changes to access as a result of reconstructing roads, and disruption to local traffic. Impacts on local traffic are measured for sections of state and Federal highways that would be used for access to the project area by assessing current use levels with the additive level of use during construction and decommissioning of the project. Change of use from the current levels would be negligible for regular O&M activities.

Data for traffic analysis was obtained from the Idaho Transportation Department (ITD) and Nevada Department of Transportation. The potential for the project to result in an increase in vehicular traffic accidents was analyzed for sections of the haul routes with traffic count data by assessing current use levels with the additive level of use during construction and decommissioning of the project (URS, 2010). The sections assessed are: along SH-51 from Mountain Home to Bruneau, Idaho; the section of US-30 from 1400 Road to Twin Falls, Idaho; along US-93 from its intersection with US-30 to Jackpot, Nevada; and along US-93 from Wells, Nevada to Jackpot. The potential for the project to result in an increase in vehicular traffic accidents was assessed by adding the project related traffic numbers to the average number of crashes per 100 million average vehicle miles traveled.

The following assumptions were used when analyzing effects of the project on transportation and access.

- No existing roads would be closed or obliterated.
- No newly constructed roads would be closed to the public.
- All roads constructed for the project would be permanent for the life of the project; there would be no temporary roads constructed for project use.
- No new points of access would be created off of any existing paved county, state, or Federal roads.
- As part of decommissioning, the pre-project level of access to public, private and IDL lands would be maintained.
- For construction traffic impacts, it was assumed that construction would occur year-round for two years. For the phased alternatives, construction would occur year-round for two years during Phase I and year-round for one year during Phase II.

- Operational traffic associated with the project consisting of up to 24 vehicles per day would not affect local travel patterns or increase accident rates.
- New and reconstructed roads could cause an increase in the occurrence of user-created roads. User-created roads would increase the potential for additional transportation and access in the area.

4.3.5.2 Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

Cross-country motorized vehicle use and limited access would continue in the project area. Current route density within the project area is 2.9 miles of road per square mile. Road density, location, and condition would remain mostly unchanged unless resource or resource use management actions prescribe otherwise. Access would continue to be limited by weather and road conditions. Seasonal restrictions on travel by snow vehicles within identified mule deer and pronghorn winter range, if the IDFG or NDOW determines harassment, could periodically be implemented.

Impacts Common to All Action Alternatives

Construction

The action alternatives would increase route density by constructing new roads; including 19 miles of transmission interconnect line road, and reconstructing some existing roads in the project area. This would result in moderate, direct long-term impacts on transportation and access by providing access to the project area year-round.

The transportation of equipment and materials to the site during construction would cause short-term increase in the use of local roadways during the construction period. This increased use could impact transportation and access by disrupting local traffic due to over-sized, slow-moving vehicles on smaller roadways and increased vehicular traffic from construction personnel. Project design features would require implementation of a traffic management plan that would serve to reduce potential traffic delays as a result of the proposed project.

New roads and reconstruction of existing roads would allow for a larger range of vehicle types (i.e., two-wheel drive passenger vehicles) to access the project area. This would result in minor, indirect long-term impacts on transportation and access to the project area.

Operation and Maintenance

Roads would be maintained to allow project personnel year-round access to perform wind facility O&M activities (including snow plowing). During operations, transportation activities would be limited to daily trips by project pick-up trucks or sport-utility vehicles, which would have no measurable increase to local traffic under all of the action alternatives. Major turbine or substation maintenance is expected to occur approximately once per year, requiring large truck loads to access the project area. Such shipments would be expected to be infrequent but would cause short-term

delays to local traffic while the long turbine delivery trucks are accessing the project area. These impacts would be expected to be the same under all action alternatives.

Decommissioning

The transportation of equipment and materials to the site during project decommissioning would have the same traffic related impacts that occur during project construction, including disruption to local traffic from over-sized, slow-moving vehicles on smaller roadways and increased vehicular traffic delays from decommissioning personnel. Decommissioning of all new project roads would reduce the level of access back to pre-project levels. However, the reconstructed existing roads would not be decommissioned and would continue to provide improved access for a wider range of vehicles. This would have moderate, long-term impacts on transportation.

Alternative B1 (Proposed Action)

Construction

Construction of 62 miles of new road would increase route density from 2.9 to 4.1 miles of road per square mile. This, combined with reconstruction of 21 miles of existing roads in the project area, would have moderate, long-term impacts by providing year-round and increased access to the area.

Traffic associated with approximately 15,130 truck trips would result in short-term impacts on transportation and access by disrupting local traffic over the two-year construction period.

Operation and Maintenance

Project roads would be used during routine O&M activities for the wind energy facility. Traffic volume from these activities by project pick-up trucks or sport-utility vehicles would have no measurable increase to local traffic volume. During major maintenance of turbines or substations, large equipment would have to be brought into the project area and could result in short-term traffic delays caused by slow-moving vehicles and large loads.

Use of the project roads could also result in indirect, long-term impacts on transportation and access on primitive roads in the area. These impacts would be due to road reconstruction in the project area and the associated potential for increased user-created roads.

Decommissioning

Decommissioning 62 miles of project specific roads and reducing the route density back to pre-project conditions (from 4.1 to 2.9 miles of road per square mile) would have moderate, long-term impacts by reducing access to the project area.

Alternative B2a

Construction

Phase I would result in 49 miles of new road, which would increase route density from 2.9 to 3.9 miles of road per square mile. This, combined with reconstruction of 14 miles of existing roads in the

project area, would have moderate, long-term impacts by providing year-round and increased access to the area. Phase II would result in an addition of 13 miles of new road (increasing route density from the current 2.9 to 3.1). Phase I and Phase II combined would increase route density from 2.9 to 4.1 miles of road per square mile. This, combined with 7 miles of existing road that would be reconstructed under Phase II, would have the same impacts as Alternative B1, but would vary temporally.

Phase I construction would require 8,900 truck trips; Phase II construction would require 6,230 truck trips and would occur for a shorter duration than Phase I or Alternative B1. The number of truck trips required under Phase II reflects the assumption that more truck trips would occur during the construction of Phase I in association with the support facilities (e.g., rock crushing plant, concrete batch plant, substations, etc.) that would not need to be constructed under Phase II. Phase I and Phase II combined would have the same number of large truck trips as Alternative B1 but would vary temporally. Short-term impacts on transportation and access would be caused by disruption of local traffic during the construction stage of the project.

Operation and Maintenance

Impacts from O&M activities would be the same as those described under Alternative B1.

Decommissioning

Decommissioning 62 miles of project specific roads and reducing the route density back to pre-project conditions (from 4.1 to 2.9 miles of road per square mile) would have the same impacts from decommissioning activities as those described under Alternative B1.

Alternative B2b

Construction

Phase I would result in 41 miles of new road, which would increase route density from 2.9 to 3.7 miles of road per square mile. This, combined with reconstruction of 21 miles of existing roads in the project area, would have moderate, long-term impacts by providing year-round and increased access to the area. Phase II would result in an addition of 21 miles of new road (increasing route density from the current 2.9 to 3.3). Phase I and Phase II combined would increase route density from 2.9 to 4.1 miles of road per square mile. No reconstruction of existing roads would occur under Phase II. Phase I and Phase II combined would have the same impacts as Alternative B1, but would vary temporally.

Phase I construction would require 8,900 truck trips; Phase II construction would require 6,230 truck trips and would occur for a shorter duration than Phase I or Alternative B1. Phase I and Phase II combined would have the same number of truck trips as Alternative B1 but would vary temporally. Short-term impacts on transportation and access would be caused by disruption of local traffic during the construction stage of the project.

Operation and Maintenance

Impacts from O&M activities would be the same as those described under Alternative B1.

Decommissioning

Decommissioning 62 miles of project specific roads and reducing the route density back to pre-project conditions (from 4.1 to 2.9 miles of road per square mile) would have the same impacts from decommissioning activities as those described under Alternative B1.

Alternative B2c

Construction

Phase I would result in 50 miles of new road, which would increase route density from 2.9 to 3.9 miles of road per square mile. This, combined with reconstruction of 20 miles of existing roads in the project area, would have moderate, long-term impacts by providing year-round and increased access to the area. Phase II would result in an addition of 12 miles of new road (increasing route density from the current 2.9 to 3.1). Phase I and Phase II combined would increase route density from 2.9 to 4.1 miles of road per square mile. This, combined with 1 mile of existing road that would be reconstructed under Phase II, would have the same impacts as Alternative B1, but would vary temporally.

Phase I construction would require 8,900 truck trips; Phase II construction would require 6,230 truck trips and would occur for a shorter duration than Phase I or Alternative B1. Phase I and Phase II combined would have the same number of truck trips as Alternative B1 but would vary temporally. Short-term impacts on transportation and access would be caused by disruption of local traffic during the construction stage of the project.

Operation and Maintenance

Impacts from O&M activities would be the same as those described under Alternative B1.

Decommissioning

Decommissioning 62 miles of project specific roads and reducing the route density back to pre-project conditions (from 4.1 to 2.9 miles of road per square mile) would have the same impacts from decommissioning activities as those described under Alternative B1.

Alternative C

Construction

Construction of 59 miles of new road would increase route density from 2.9 to 4.1 miles of road per square mile. This, combined with reconstruction of 20 miles of existing roads, would have moderate, long-term impacts by providing year-round and increased access to the area.

Traffic associated with 13,528 truck trips would result in short-term impacts on transportation and access by disrupting local traffic.

Operation and Maintenance

Impacts from O&M activities would be the same as those described under Alternative B1.

Decommissioning

Decommissioning 59 miles of project specific roads and reducing the route density back to pre-project conditions (from 4.1 to 2.9 miles of road per square mile) would have moderate, long-term impacts on transportation and access by reducing access to the project area.

Alternative D

Construction

Construction of 51 miles of new road (11 fewer miles than Alternative B1) would increase route density from 2.9 to 3.9 miles of road per square mile. This, combined with reconstruction of 20 miles of existing roads (1 less mile than Alternative B1), would have moderate, long-term impacts by providing year-round and increased access to the area.

Traffic associated with 11,036 truck trips would result in short-term impacts on transportation and access by disrupting local traffic.

Operation and Maintenance

Impacts from O&M activities would be the same as those described under Alternative B1.

Decommissioning

Decommissioning 51 miles of project specific roads and reducing the route density back to pre-project conditions (from 3.9 to 2.9 miles of road per square mile) would have moderate, long-term impacts on transportation and access by reducing access to the project area

Alternative E

Construction

Construction of 55 miles of new road would increase route density from 2.9 to 4.0 miles of road per square mile. This, combined with reconstruction of 21 miles of existing roads, would have moderate, long-term impacts by providing year-round and increased access to the area.

Traffic associated with 10,680 truck trips would result in short-term impacts on transportation and access by disrupting local traffic.

Operation and Maintenance

Impacts from O&M activities would be the same as those described under Alternative B1.

Decommissioning

Decommissioning 55 miles of project specific roads and reducing the route density back to pre-project conditions (from 4.0 to 2.9 miles of road per square mile) would have moderate, long-term impacts on transportation and access by reducing access to the project area.

Alternative F

Construction

Construction of 46 miles of new road would increase route density from 2.9 to 3.8 miles of road per square mile. This, combined with reconstruction of 20 miles of existing roads, would have moderate, long-term impacts by providing year-round and increased access to the area.

Traffic associated with 9,345 truck trips would result in short-term impacts on transportation and access by disrupting local traffic.

Operation and Maintenance

Impacts from O&M activities would be the same as those described under Alternative B1.

Decommissioning

Decommissioning 46 miles of project specific roads and reducing the route density back to pre-project conditions (from 3.8 to 2.9 miles of road per square mile) would have moderate, long-term impacts on transportation and access by reducing access to the project area.

4.3.5.3 Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Construction

Reconstruction of portions of the 119 miles of existing roadway comprising the northern inbound haul route would result in short-term increased impact on local transportation and access. Traffic on this route would increase for 2 years during the time of project construction (3 years for the phased alternatives and 4 years for Alternative E). Depending upon the alternative selected, turbine component delivery trucks, and other construction support vehicles would include from 9,345 to 15,130 truck trips into the project area. This increased level of use would result in delays to local traffic. Minor traffic delays would also occur where the large turbine component delivery trucks slow to make turns. These impacts on traffic would be short-term in duration.

Accident rates were calculated for the segment of SH-51 where existing traffic data was available. This segment is defined by ITD and applicable data is classified according to this roadway segments characteristics. The rates calculated for this roadway type were averaged for the following analysis.

The average annual accident rate along the analyzed portions of SH-51 was determined to be 1.12 accidents per million vehicle miles. The average base rate for accidents along this stretch of SH-51 is 1.34 accidents per million vehicle miles. The base rate is the expected number of accidents for similar

roadway types as tabulated and measured by ITD. Therefore, this section of SH-51 is as safe as, or safer than, the average roads in the same classification within the state of Idaho. Using ITD safety evaluation methodology, during construction of the project the accident rates along SH-51 are not expected to increase from the existing annual rate of 1.12 accidents per million vehicle miles.

Operation and Maintenance

The northern inbound haul route would be used during major maintenance of turbines or substations that is expected to occur once per year. This haul route would also be used in the event unanticipated major repairs to turbines or substations are required. These O&M activities would cause short-term delays to local traffic while the long turbine delivery trucks and heavy equipment are accessing the project area.

Use of this haul route could also result in indirect, long-term impacts on transportation and access on primitive roads in the area. These impacts would be due to road reconstruction in the project area and the associated potential for increased user-created roads.

Decommissioning

Impacts of decommissioning the project would be similar to construction impacts. This haul route is an established roadway that would not be decommissioned and no impacts on transportation and access would result from road decommissioning.

Southern Inbound Haul Route Option 1

Construction

The construction of 5 miles of new road and reconstruction of 6 miles of existing road for this haul route would result in short-term increased access and level of use to the project area. Traffic levels on this route would increase for 2 years during the time of project construction (3 years for the phased alternatives and 4 years for Alternative E). Depending upon the alternative selected, turbine component delivery trucks, and other construction support vehicles would include from 9,345 to 15,130 truck trips into the project area. This increased level of use would result in delays to local traffic. Minor traffic delays would also occur where the large turbine component delivery trucks slow to make turns. These impacts on traffic would be short-term in duration.

The ITD methodology was used for US-93 through both Idaho and Nevada to come up with an average rate for the entire highway section analyzed. The average annual accident rate along the analyzed portions of US-93 was determined to be 0.88 accidents per million vehicle miles. The base, or expected, rate for accidents along this stretch of US-93 is 1.07 accidents per million vehicle miles. Therefore, this section of US-93 is as safe as, or safer than, the average roads in the same classification within the state of Idaho. It is assumed that the section of US-93 in Nevada would be the same or similar to the Idaho accident rate. Using ITD safety evaluation methodology, during construction of the project, the accident rates along US-93 are not expected to increase from the existing annual rate of 0.88 accidents per million vehicle miles.

Operation and Maintenance

This haul route would be used during major maintenance of turbines or substations that is expected to occur once per year. It would also be used in the event unanticipated major repairs to turbines or substations are required. These O&M activities would cause short-term delays to local traffic while the long turbine delivery trucks and heavy equipment are accessing the project area.

Use of this haul route could also result in indirect, long-term impacts on transportation and access on primitive roads in the area. These impacts would be due to road reconstruction in the project area and the associated potential for increased user-created roads.

Decommissioning

Impacts of decommissioning the project would be similar to construction impacts. This roadway would not be decommissioned and no impacts on transportation and access would result from road decommissioning activities.

Southern Inbound Haul Route Option 2

Impacts from construction, O&M, and decommissioning of option 2 would be the same as those described under option 1.

Outbound Haul Route

Construction

No construction or reconstruction would take place along this haul route. However, use of this 60-mile route would increase for 2 years during the time of project construction (3 years for the phased alternatives and 4 years for Alternative E). Depending upon the alternative selected, turbine component delivery trucks, and other construction support vehicles would include from 9,345 to 15,130 truck trips into the project area. This increased level of use would result in delays to local traffic. Minor traffic delays would also occur where the large turbine component delivery trucks slow to make turns. These impacts would be short-term in duration.

The average annual accident rate along the analyzed portions of US-30 was determined to be 0.90 accidents per million vehicle miles. The base, or expected, rate for accidents along this stretch of US-30 is 1.40 accidents per million vehicle miles. Therefore, this section of US-30 is as safe as, or safer than, the average roads in the same classification within the state of Idaho. Using ITD safety evaluation methodology, during construction of the project the accident rates along US-30 are not expected to increase from the existing annual rate of 0.90 accidents per million vehicle miles.

Operation and Maintenance

This haul route would be used during major maintenance of turbines or substations that is expected to occur once per year. It would also be used in the event unanticipated major repairs to turbines or substations are required. These O&M activities would cause short-term delays to local traffic while the long turbine delivery trucks and heavy equipment are accessing the project area.

Use of this haul route could also result in indirect, long-term impacts on transportation and access on primitive roads in the area. These impacts would be due to road reconstruction in the project area and the associated potential for increased user-created roads.

Decommissioning

Impacts of decommissioning the project would be similar to construction impacts. This haul route would not be decommissioned and no impacts on transportation and access would result from road decommissioning activities.

4.3.5.4 Project as a Whole

Each of the action alternatives in conjunction with the inbound and outbound haul routes would result in direct, short-term impacts on access and traffic volume in the project area. These impacts would occur during the construction and decommissioning stages of the project. The phased alternatives (B2a, B2b, and B2c) would take approximately 3 years, and Alternative E would take 4 years to complete construction and the associated transportation and access impacts would be present for 1 or 2 year more than with the other alternatives. Alternatives C, D, E, and F would require fewer truck trips during construction and decommissioning activities and would result in fewer impacts associated with local traffic delays. The selected haul routes would not be decommissioned and continued use following construction would result in direct, long-term impacts. The northern inbound haul route would provide more miles of travel and would result in more direct, short- and long-term impacts on transportation and access than compared to the other inbound haul route options. Indirect long-term impacts on access from project road reconstruction would occur from increased use of the primitive roads and user-created roads in the area.

4.3.5.5 Cumulative Impacts

Cumulative impacts on transportation and access consist of incremental effects of the alternatives when added to other past, present, and reasonably foreseeable future actions. The cumulative effects analysis area for transportation and access is from Interstate 84 at the northern extent of the northern inbound haul route to the southern extent of the southern inbound haul route options, and from Interstate 84 just north of Twin Falls, Idaho to the western edge of the northern inbound haul route. This analysis area was chosen because it is unknown where the project related construction and delivery trucks would originate and what destination they would have after they have unloaded at the project site.

Alternative A (No Action Alternative)

The No Action Alternative in combination with the past and present actions including those listed in Table 4.0.2-1 could result in incremental increases to existing and future traffic and access use patterns. These effects can occur over a long period of time, resulting in gradual changes in transportation and access due to new roads and road reconstruction. Existing traffic and level of access in the cumulative impacts analysis area would continue with change based on local population and future management designations. With the trend of increased use of public lands due to

population growth, traffic could increase but until the economy recovers or gas prices fall, it would likely remain steady or possibly decline (as seen by the downward trend in traffic numbers along US-93 from Twin Falls to Jackpot).

Past actions that have involved construction of wind power facilities, transmission lines, and miscellaneous meteorological and communication towers that are sited on lands throughout the analysis area have been found to result in short-term impacts on transportation caused by increased traffic during the construction period. The present facilities in the area have either new roads associated with them or use existing roads for O&M purposes, which has created long-term impacts by increasing route density and access into those areas.

Cumulative impacts on transportation and access from decommissioning cannot be determined, as none of the past, present, or future foreseeable projects have been decommissioned.

All Action Alternatives

The impacts from past and present actions described above, when added to future construction of new roads and reconstruction of existing roads, including this project, could result in moderate short-term impacts on traffic and moderate long-term impacts on access. Cumulative impacts on transportation and access from decommissioning the project cannot be determined, as it is unknown if any of the past, present, or future foreseeable projects would also be decommissioned during overlapping periods.

Under each of the action alternatives, changes to transportation and access when considered with the projects listed in Table 4.0.2-1 would have major short-term impacts on traffic and moderate long-term impacts on access.

4.3.6 PUBLIC HEALTH AND SAFETY

This section discusses potential impacts on public health and safety from implementing the action alternatives for the project. The analysis area for public health and safety is the project area including the inbound and outbound haul routes.

4.3.6.1 Analysis Methods

Issues relevant to public health and safety that were identified during the public scoping process (Section 1.6) include access limitations and the use of hazardous materials during construction, O&M, and decommissioning activities. Potential public health and safety effects are described for each alternative in the context of relative indicators.

Indicators

All indicators are qualitative and include:

- Increases in traffic in the project area;
- Physical hazards of construction;

- Exposure to electromagnetic fields;
- Increased risk of fire hazards; and
- Visibility issues to drivers from construction-related dust.

Methods and Assumptions

Potential impacts on public health and safety were evaluated by determining changes to public health and safety that could be attributable to the project if it were approved. The public health and safety variables between proposed alternatives are the number of truckloads necessary for transport of equipment and materials, and whether or not the project would be phased with two periods of construction.

Assumptions:

- The number of wind turbines to be constructed determines the number of truckloads necessary to transport materials to the project area during construction and from the project area during decommissioning.
- Increased truckloads could lead to an increased potential for vehicle collisions within the project area.
- The alternatives proposing a phased approach to construction would expose the public to two intervals of public health and safety impacts.
- New and reconstructed roads would cause an increase in the occurrence of user-created roads. User-created roads would increase the potential for accidents associated with public recreation and increased travel in the area.

4.3.6.2 Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

Under Alternative A, the public health and safety environment would remain the same as it currently is described in Section 3.3.6. There would be no adverse impacts on health and safety from project construction, O&M, and decommissioning activities because the project would not occur.

Impacts Common to All Action Alternatives

Construction

Occupational hazards are common to construction activities. Project related public safety hazards include risk of personal injury associated with: increased construction traffic (over-width, slow-moving, vehicles on smaller roadways, increased vehicular traffic from construction personnel); establishing site access; excavating and installing the tower foundations; erecting towers; and constructing the central control building, electrical substations, meteorological towers, and project roads. Construction hazards would be minimized as workers are required to adhere to Federal Occupational Safety and Health Act (29 USC 651 et seq.), the Idaho General Health and Safety Standards (Idaho Division of Building Safety, 1997), and the Nevada Revised Statutes Chapter 618 – Occupation Safety and Health (Nevada Legislature, 2010).

Depending on the number of turbines constructed under each alternative, between an estimated 14,498 and 15,130 truckloads would access the project area. Increased construction traffic in the project area from large haul trucks on new roads and reconstructed roads could have direct, short-term, adverse impacts on public health and safety. Impacts from increased construction traffic could cause fugitive dust and reduced visibility for drivers, with increased risk of vehicle collision. Traffic disruption and vehicle accident rates are discussed in Section 4.3.5. Conversely, newly constructed all-weather roads and road reconstruction could make the project area safer for vehicle traffic, resulting in indirect long-term beneficial impacts on public health and safety.

Fire hazards would be present for all three stages of the project and could pose impacts on public health and safety. Fire hazards are described in Section 4.3.10. Design features described in Appendix 2A require a Fire Prevention Plan to be developed by the Applicants, which would be reviewed and approved by the BLM before construction could begin. The Fire Prevention Plan would reduce the risk of human-caused fires in the project area during construction.

As discussed in Section 3.4.1, the primary recreation opportunities within the project area include hunting, OHV travel, and dispersed camping. Pleasure driving on one of the project area's primary access routes, Monument Spring Road, is common in the northern portion of the project area (Kling, 2010a). The southern portion of the project area is also known for rock hounding opportunities (Kling, 2010b). Therefore, outdoor recreational activities are common throughout the project area. As a result, the siting of the project could increase the public health and safety risks attributed to heavy equipment and construction traffic on area roads and the presence of physical structures (e.g., turbines, transmission poles, support facilities) in the project area.

Project design features listed in Appendix 2A would be implemented to minimize project impacts on public health and safety including: a public education program; site access control with fencing; preparation of SPCC and Health and Safety plans; requiring project area roads to identify 20 mph maximum speed limit; travel restrictions; and other standard traffic control information.

Operation and Maintenance

Hazards during O&M activities would be risks associated with working at heights, high winds, and rotating/spinning systems. The International Electrotechnical Commission has published minimum safety requirements for wind turbine generator systems (International Electrotechnical Commission, 1999). The International Electrotechnical Commission requires that the wind turbine generator systems manufacturer provide an operator instruction manual with supplemental information on special local conditions (BLM, 2005). The manual would include an emergency procedures plan to address such wind energy facility hazards as overspeeding, icing conditions, lightning storms, earthquakes, broken or loose guy wires, brake failure, rotor imbalance, loose fasteners, lubrication defects, sandstorms, fires, floods, and other causes of component failures (BLM, 2005). These hazards could result in direct, short-term impacts on health and safety of the operation personnel.

Turbine-caused physical hazards could have direct, long-term impacts on public health and safety as a result of malfunction over the course of the wind energy operations. One of the primary safety hazards at wind energy facilities occurs if a rotor blade breaks and parts are thrown off. This could occur as a result of rotor overspeed or material fatigue (Hau, 2000). These types of events are very rare and the probability of a fragment hitting a person is even lower (Manwell et al., 2002; Hau, 2000). The maximum documented distance a blade or turbine part has travelled in the case of a failure is approximately 1,640 feet from the tower (Manwell et al, 2002).

Ice throw can occur when ice builds up on the turbine blades. Because of the rural location of the project, no set-back requirements for development to minimize these risks would be implemented but simultaneous land uses such as recreation and livestock grazing would allow for people other than facility workers to be within the area of potential hazard.

Snow removal and road maintenance conducted during O&M activities would result in indirect, beneficial, long-term impacts on public health and safety by providing safer passage and decreasing the possibility that visitors could get stranded due to adverse weather and poor road conditions.

The physical obstruction of a wind turbine and the electromagnetic fields effects on communications, navigation, and surveillance systems such as radar are the two primary aviation safety considerations in the development of wind energy facilities (Department of Trade and Industry [DTI], 2002). Any tall structure such as a wind turbine could pose a hazard to aircraft arriving or departing at a nearby airfield as well as to military training and other low-flying aircraft (DTI, 2002). Obstructions to aviation could result in a direct, long-term, adverse impact on public health and safety. Moving wind turbine blades can interfere with radar by creating radar echoes (American Wind Energy Association, 2004). Radar installations can be modified so that air safety is maintained in the presence of wind turbines.

Small municipal airports located within 50 miles of the project area include Jackpot/Hayden Field, Murphy Hot Springs, Oakley Municipal Airport, and Buhl Municipal Airport. Mountain Home Air Force Base is located approximately 140 miles to the northeast of the project. Any physical obstruction that is greater than 200 feet in height is required by the FAA to have lighting to warn pilots of low-flying aircraft about the presence of the obstruction. Towers with the blade extended to full height reach approximately 427 feet and meteorological towers can be up to 260 feet tall. Each of these structures requires lighting in accordance with the FAA Technical Note: *Developing Obstruction Lighting Standards for Wind Turbine Farms* (Federal Aviation Administration, 2005), which would to help minimize potential hazards to low-flying aircraft.

Electromagnetic interference, with other electromagnetic transmissions, can occur when a large wind turbine is placed between a radio, television, or microwave transmitter and receiver (Manwell et al., 2002). Public safety issues could arise if there were electromagnetic interference disruptions to public safety communication systems. The modern glass-reinforced epoxy blades do not create detectable

electromagnetic interference, but the lightning protection on blade surfaces can increase electromagnetic interference (Manwell et al., 2002).

The possibility of adverse health effects due to exposure to low-frequency electromagnetic fields generated by electric transmission and distribution lines could cause direct, long-term impacts on public health and safety. Extremely low-frequency electromagnetic fields are generated by electric transmission and distribution lines. There has been recent concern about potential adverse health effects from residential and occupational electromagnetic fields. Many research studies have concluded that there is no scientific basis to support a finding of adverse human health effects from electromagnetic fields (Jahn, 2000), but some epidemiological studies have found that there may be a link between electromagnetic fields and chronic lymphocytic and childhood leukemia (BLM, 2005). While there is the potential for any generator to produce electromagnetic fields, the 60 Hertz associated with wind energy facilities are thought to be too low to damage human tissue, but definitive data are not available (BLM, 2005).

Decommissioning

The public health and safety impacts during project decommissioning activities would be the same as those associated with construction of the proposed alternatives. Approximately the same number of truckloads would be needed to move turbine components and equipment from the project area. Decommissioning would include removal of all new roads, access to the project area would eventually be reduced, and the potential for accidents related to public recreation use would be similar to the current conditions. However, existing roads that are reconstructed would not be decommissioned and would continue to provide improved access to a wide range of vehicles.

Alternative B1 (Proposed Action)

Construction

Potential public health and safety impacts would be associated with activities required for construction of 170 wind turbines; including 15,130 truck trips, which could have direct, short-term adverse impacts on public health and safety from increased traffic and associated reduced visibility caused by fugitive dust. However, as per the project design features, road surfaces would be watered or otherwise treated to control dust. Impacts under this alternative would be greater than the current impacts under Alternative A. The construction of 83 miles of new and reconstructed roads could result in direct, short-term adverse impacts during construction but would later become indirect long-term beneficial impacts on public health and safety by providing improved road conditions and quicker emergency response time to the area.

Operation and Maintenance

Hazards from the O&M of 170 wind turbines could result in direct, short- and long-term adverse impacts on the health and safety of the operation personnel that would be caused by travel conditions on rural roads during possible inclement weather conditions and general factors of wind turbine operations described above. The O&M of 83 miles of new and reconstructed roads could also result in

indirect long-term beneficial impacts on public health and safety by providing improved road conditions and quicker emergency response time to the area.

Decommissioning

Potential public health and safety impacts associated with the decommissioning of 170 wind turbines would be the same as those resulting from the construction activities. All new roads constructed for the project would be decommissioned and access to the area by recreation users and the public would be reduced. Impacts on public health and safety would be increased during decommissioning activities but would then resume to the current conditions under Alternative A.

Alternative B2a

Construction

General impacts on public health and safety from construction activities under both Phase I and Phase II would be the same as Alternative B1 but would vary temporally. Under Phase I there would be 100 turbines and 63 miles of new or reconstructed roads, resulting in 8,900 truck trips. Under Phase II there would be 70 turbines and 20 miles of new or reconstructed roads, resulting in 6,230 truck trips. Phase I and Phase II combined would result in the same miles of new road and same total truck trips as Alternative B1.

Operation and Maintenance

Hazards as a result of the O&M of both Phase I and Phase II would be the same as Alternative B1, but would vary temporally. Under Phase I, O&M would occur on 63 miles of new and reconstructed roads. Under Phase II, O&M would occur on 20 miles of new and reconstructed roads. Phase I and Phase II combined would result in O&M on the same miles of new road as Alternative B1.

Decommissioning

Potential public health and safety impacts associated with the decommissioning activities under both Phase I and Phase II would be the same as Alternative B1.

Alternative B2b

Construction

General impacts on public health and safety from construction activities under both Phase I and Phase II would be the same as Alternative B1 but would vary temporally. Under Phase I, there would be 100 turbines and 62 miles of new or reconstructed roads, resulting in 8,900 truck trips. Under Phase II, there would be 70 turbines and 21 miles of new or reconstructed roads, resulting in 6,230 truck trips. Phase I and Phase II combined would result in the same miles of new road and same total truck trips as Alternative B1.

Operation and Maintenance

Impacts on public health and safety would be the same as Alternative B1 but would vary temporally. Hazards as a result of the O&M of both Phase I and Phase II would be the same as Alternative B1,

but would vary temporally. Under Phase I, O&M would occur on 62 miles of new and reconstructed roads. Under Phase II, O&M would occur on 21 miles of new and reconstructed roads. Phase I and Phase II combined would result in O&M on the same miles of new road as Alternative B1

Decommissioning

Potential public health and safety impacts associated with the decommissioning activities under both Phase I and Phase II would be the same as Alternative B1.

Alternative B2c

Construction

General impacts on public health and safety from construction activities under both Phase I and Phase II would be the same as Alternative B1 but would vary temporally. Under Phase I, there would be 100 turbines and 70 miles of new or reconstructed roads, resulting in 8,900 truck trips. Under Phase II, there would be 70 turbines and 13 miles of new or reconstructed roads, resulting in 6,230 truck trips. Phase I and Phase II combined would result in the same miles of new road and same total truck trips as Alternative B1.

Operation and Maintenance

Impacts on public health and safety from O&M would be the same as AlternativeB1 but would vary temporally. Hazards as a result of the O&M of both Phase I and Phase II would be the same as Alternative B1, but would vary temporally. Under Phase I, O&M would occur on 70 miles of new and reconstructed roads. Under Phase II, O&M would occur on 13 miles of new and reconstructed roads. Phase I and Phase II combined would result in O&M on the same miles of new road as Alternative B1

Decommissioning

Potential public health and safety impacts associated with the decommissioning activities under both Phase I and Phase II would be the same as Alternative B1.

Alternative C

Construction

Potential public health and safety impacts would be associated with activities required for the construction of 152 wind turbines; including 13,528 truck trips. This would be 18 fewer turbines and 1,602 fewer truck trips than Alternative B1, resulting in fewer adverse impacts. The construction of 80 miles of new and reconstructed roads would result in slightly fewer impacts on public health and safety than Alternative B1.

Operation and Maintenance

Hazards from the O&M of 152 wind turbines could result in direct, short- and long-term adverse impacts on health and safety of the operation personnel. This would be 18 fewer turbines to operate and maintain than Alternative B1, so impacts would be slightly less. The impacts on public health and

safety from the O&M of 80 miles of new and reconstructed roads would result in slightly fewer impacts than Alternative B1.

Decommissioning

Potential public health and safety impacts associated with the decommissioning of 152 wind turbines would be the same as those resulting from the construction activities. Decommissioning 80 miles of new and reconstructed roads for the project would reduce access to the area by recreation users and the public and result in slightly fewer than Alternative B1.

Alternative D

Construction

Potential public health and safety impacts would be associated with activities required for the construction of 124 wind turbines; including 11,036 truck trips. This would be 46 fewer turbines and 4,094 fewer truck trips than Alternative B1, resulting in fewer impacts. The construction of 72 miles of new and reconstructed road would result in slightly fewer impacts on public health and safety than Alternative B1.

Operation and Maintenance

Hazards from the O&M of 124 wind turbines could result in impacts on health and safety of the operation personnel. This would be 46 fewer turbines to operate and maintain than Alternative B1, so impacts would be less. The impacts on public health and safety from the O&M of 72 miles of new and reconstructed roads would result in slightly fewer impacts than Alternative B1.

Decommissioning

Potential public health and safety impacts associated with the decommissioning of 124 wind turbines would be the same as those resulting from the construction activities. Decommissioning 72 miles of new and reconstructed roads for the project would reduce access to the area by recreation users and the public and result in slightly fewer impacts than Alternative B1.

Alternative E

Construction

Potential public health and safety impacts would be associated with activities required for construction of 120 wind turbines; including 10,680 truck trips. This would be 50 fewer turbines and 4,450 fewer truck trips than Alternative B1, resulting in fewer impacts. The construction of 76 miles of new and reconstructed road would result in slightly fewer impacts on public health and safety than Alternative B1.

Operation and Maintenance

Hazards from the O&M of 120 wind turbines could result in impacts on health and safety of the operation personnel. This would be 50 fewer turbines to operate and maintain than Alternative B1, so

impacts would be less. The impacts on public health and safety from the O&M of 76 miles of new and reconstructed road could result in slightly fewer impacts than Alternative B1.

Decommissioning

Potential public health and safety impacts associated with the decommissioning of 120 wind turbines would be the same as those resulting from the construction activities. Decommissioning 76 miles of new roads constructed for the project would reduce access to the area by recreation users and the public and result in slightly fewer impacts than Alternative B1.

Alternative F

Construction

Potential public health and safety impacts would be associated with activities required for construction of 105 wind turbines; including 9,345 truck trips. This would be 65 fewer turbines and 5,785 fewer truck trips than Alternative B1, resulting in fewer impacts. The construction of 66 miles of new and reconstructed roads would result in slightly fewer impacts on public health and safety than Alternative B1.

Operation and Maintenance

Hazards from the O&M of 105 wind turbines could result in impacts on health and safety of the operation personnel. This would be 65 fewer turbines to operate and maintain than Alternative B1, so impacts would be less. The impacts on public health and safety from the O&M of 66 miles of new and reconstructed road could result in slightly fewer impacts than Alternative B1.

Decommissioning

Potential public health and safety impacts associated with the decommissioning of 105 wind turbines would be the same as those resulting from the construction activities. Decommissioning 66 miles of new roads constructed for the project would reduce access to the area by recreation users and the public and result in slightly fewer impacts than Alternative B1.

4.3.6.3 Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Construction

Reconstruction of portions of 119 miles for the northern inbound haul route could result in direct, short-term adverse impacts during road construction. This route would be used during the construction stage to deliver wind turbine equipment to the project area. Use of this route would increase for 2 years during the time of project construction (3 years for the phased alternatives and 4 years for Alternative E). Direct, short-term adverse impacts on public health and safety could result from use of the northern inbound haul route due to increased volume of heavy equipment vehicles, increased possibility of collisions, and impaired visibility from fugitive dust on gravel roads. Project design features to control traffic speed and fugitive dust would be implemented. Traffic disruption and vehicle accident rates are discussed in Section 4.3.5. Following construction, these impacts could

become indirect long-term, beneficial impacts from increased road safety for public traffic and quicker emergency response times to and from the project area.

Operation and Maintenance

The northern inbound haul route would be used approximately once per year for major maintenance of the wind energy facility. When the northern inbound haul route is used to access the site for major maintenance activities, the public could experience delays due to slow moving trucks and an increase in the potential for vehicle collision due to the increase in traffic. These impacts would be short-term and would be expected to have minimal impacts on public health and safety in the project area.

Decommissioning

This route would be used during the decommissioning stage to remove wind turbine equipment from the project area and impacts would be similar to those caused by construction activities. This haul route is an existing roadway and would not be decommissioned; therefore, no impacts on public health and safety would be caused by road decommissioning activities.

Southern Inbound Haul Route Option 1

Construction

Development of option 1 of the southern inbound haul route could result in direct, short-term adverse impacts during road construction. This route would be used during the construction stage to deliver wind turbine equipment to the project area. Use of this route would increase for 2 years during the time of project construction (3 years for the phased alternatives and 4 years for Alternative E). Direct, short-term, adverse impacts could result from use of option 1 of the southern inbound haul route due to increased volume of heavy equipment vehicles, increased possibility of collision, and visual impairment from fugitive dust. Project design features to control traffic speed and fugitive dust would be implemented. Following construction, these impacts could become indirect long-term, beneficial impacts from increased road safety for public traffic and quicker emergency response times to and from the project area.

Operation and Maintenance

Option 1 of the southern inbound haul route would be used approximately once per year for major maintenance of the wind energy facility. When option 1 of the southern inbound haul route is used to access the site for major maintenance activities, the public could experience delays due to slow moving trucks and an increase in the potential for vehicle collision due to the increase in traffic. These impacts would be short-term and would be expected to have minimal impacts on public health and safety in the project area.

Decommissioning

The route would be used during the decommissioning stage to remove wind turbine equipment from the project area and impacts would be similar to those caused by construction activities. This haul

route would not be decommissioned; therefore, no impacts on public health and safety would be caused by decommissioning activities.

Southern Inbound Haul Route Option 2

Impacts for construction, operation and maintenance, and decommissioning would be the same as described under option 1 of the southern inbound haul route.

Outbound Haul Route

Construction

No road construction or reconstruction is anticipated for the outbound haul route. The road would only be used during the construction stages of the wind energy facility for unloaded equipment leaving the project area. Use of this haul route would increase for 2 years during the time of project construction (3 years for the phased alternatives and 4 years for Alternative E). Increased vehicle traffic from use of the outbound haul route could result in direct short-term, adverse impacts on public health and safety caused by increased volume of heavy equipment vehicles, increased possibility of collisions, and impaired visibility from fugitive dust on gravel roads. Project design features to control traffic speed and fugitive dust would be implemented.

Operation and Maintenance

The outbound haul route would be used approximately once per year for major maintenance of the wind energy facility. When the outbound haul route is used by trucks exiting the area following major maintenance activities, the public could experience delays due to slow moving trucks and an increase in the potential for vehicle collision due to the increase in traffic. These impacts would be short-term and would be expected to have minimal impacts on public health and safety in the project area.

Decommissioning

The outbound haul route would not be used during decommissioning of the project. This haul route is an existing roadway and would not be decommissioned; there would be no impacts on public health and safety caused by decommissioning activities.

4.3.6.4 Project as a Whole

The project impacts on public health and safety would be similar for each of the action alternatives. All of the action alternatives would include road construction, reconstruction, and maintenance that could cause direct, short-term adverse impacts. These impacts could become indirect, long-term beneficial impacts on public health and safety following construction by providing safer travel and faster emergency response time to and from the project area.

The phased alternatives (B2a, B2b, and B2c) would take approximately 3 years, and Alternative E would take 4 years, to complete construction, so the associated safety risks would be present for 1 more year than with the other alternatives. Alternatives (C, D, E, and F) with fewer turbines could have slightly fewer impacts than the alternatives that include the construction of up to 170 turbines.

Alternatives C, D, E, and F also require fewer truck trips, which could result in fewer adverse impacts on road safety. Use of the northern inbound haul route during all three stages of the project would require more miles of travel and could result in more direct, short- and long-term adverse impacts on public health and safety than compared to the southern inbound haul route options.

4.3.6.5 Cumulative Impacts

Cumulative impacts on public health and safety consist of incremental effects of the alternatives when added to other past, present, and reasonably foreseeable future actions. These effects can occur over a long period of time, resulting in gradual changes in public health and safety due to new roads and reconstructed roads. The cumulative effects analysis area for public health and safety includes other areas of wind development within the Magic Valley Region of Idaho. This analysis area was chosen because it includes several other wind energy projects in varying stages of development. Cumulative impacts associated with an increase in traffic and potential for increased vehicle accidents are discussed in Section 4.3.5.5.

Alternative A (No Action Alternative)

The No Action Alternative in combination with the past and present actions listed in Table 4.0.2-1 could result in incremental increases in health and safety risks to O&M personnel with benefits from safer travel on reconstructed roads that would occur from other projects. These impacts when added to future construction and O&M of projects could result in moderate short-term impacts on public health and safety and minor long-term impacts on safer public access to these areas.

Past actions that have involved construction of wind power facilities, transmission lines, and miscellaneous meteorological and communication towers that are sited on lands throughout the analysis area may have had direct short-term impacts on public health and safety due to construction activities. The O&M of these actions pose occupational risks to personnel over the long term. The present facilities have either new roads associated with them or use existing roads for O&M purposes, which have created indirect long-term impacts by providing safer public access and faster emergency access into those areas.

All Action Alternatives

The impacts from past and present actions described above, when added to future construction and O&M of new roads and reconstruction of existing roads, including this project, could result in moderate short-term impacts on public health and safety and moderate long-term impacts on safer public access to these areas.

The authorized Cotterel Mountain Wind Energy project that would be sited on public lands is located approximately 70 miles northeast of China Mountain. The Cotterel project would result in the construction 23 miles of new road and the siting of 81 turbines. The Cotterel Mountain site provides similar recreation uses as this project area. The public health and safety risks described above for this project would also occur at the Cotterel Mountain Wind Energy project. Therefore, the additive effects of the two wind energy projects would increase the risk of injury to users of public lands.

Meteorological towers and wind turbines, both existing and proposed to be built, pose a risk to low flying aircraft in the area. There are currently 21 wind turbines in operation in the vicinity of Bell Rapids located approximately 50 miles north of China Mountain. There are an additional 222 turbines proposed throughout the Magic Valley Region. These turbines when added to the turbines proposed for this project could result in an increased risk to low-flying aircraft. However, since all of these turbines would be taller than 200 feet above the ground, they would be required to have FAA aircraft warning light markings to reduce the risk of collision from low flying aircraft.

Cumulative impacts on public health and safety from decommissioning the project cannot be determined, as it is unknown if any of the past, present, or future foreseeable projects would also be decommissioned during the same period.

4.3.7 HAZARDOUS MATERIALS AND PETROLEUM PRODUCTS

4.3.7.1 Analysis Methods

This section addresses the potential for impacts of the project related to hazardous materials and petroleum products. Activities performed during the project would include the use of gasoline, diesel fuel, crankcase oil, lubricants, and cleaning solvents. Use of these products could create the potential for accidental release or spills.

The analysis area is defined as the project area with the northern and southern inbound haul routes and the outbound haul route. Basis for defining the analysis area is associated with vehicle transport of materials and the potential use, storage, and disposal of hazardous materials and petroleum products.

Indicators

Indicators for potential impacts on the environment from hazardous materials and petroleum products include:

- Number of wind turbines that would be constructed during the project; and
- Number of road miles that would be used during the project.

Methods and Assumptions

Impacts related to hazardous material and petroleum products that could result from implementing the project are a result of accidental releases based on the level of project activity and miles of roads used for the project. The variables to determine impacts between alternatives would be: the number of wind turbines, as it relates to the level of construction, O&M, and decommissioning effort; and the miles of road, as it relates to the opportunity for accidental discharge of hazardous materials or petroleum products through vehicle and equipment travel within the project area. Roads also provide potential access for illegal dumping by the public.

The primary impacts related to hazardous materials and petroleum products are tied to the use and storage of materials during construction activities, O&M, and eventual decommissioning of the wind energy facility. Potential risk of impacts from the project activities would be greatly reduced through design features and several required management plans regarding proper use, storage, and disposal of hazardous materials and petroleum products (Appendix 2A and 2B).

The following assumptions were used when analyzing the potential impacts of the project related to hazardous materials and petroleum products:

- Project design features, including compliance with Federal, state, and local regulations, would be adhered to by the project.
- All project equipment and passenger vehicles would be properly maintained at the appropriate project O&M building or by a suitable off-site contractor.
- Impacts related to hazardous materials and petroleum products would be generally the same for construction and decommissioning activities, with less potential impact anticipated during O&M activities.
- New and reconstructed roads would cause an increase in the occurrence of user-created roads. User-created roads would increase the potential for illegal dumping in the project area.

4.3.7.2 Direct and Indirect Impacts of the Wind Energy Facility

Potential adverse impacts associated with improper management of hazardous materials use, storage, and disposal of waste associated with a typical wind energy project could be significant (BLM, 2005). In general, most potential impacts are associated with the release of these materials to the environment.

Project design features specifically address each of these potential occurrences (Appendix 2A) and would serve to reduce risk of impact. Implementation of the wind energy project would require that a SPCC plan be prepared which would require proper storage of hazardous materials and petroleum products (e.g., fuels, lubricants, and chemicals) and reduce the risk of leaks or spills (Appendix 2A). If appropriate management practices are implemented, the impacts associated with hazardous materials and wastes are expected to be minimal to nonexistent (BLM, 2005).

Alternative A (No Action Alternative)

The wind energy project would not be developed and no associated new sources of hazardous materials or petroleum products would be introduced. Impacts would continue to be related to current available access to the area and the associated opportunity for illegal dumping or accidental petroleum product releases from vehicles. The continuation of existing impacts and management guidelines, directed by the Jarbidge and Wells RMPs, would maintain hazardous materials and petroleum products within the analysis area under the current conditions.

Impacts Common to All Action Alternatives

Construction

Accidental releases could occur during storage and transport of materials during project construction associated with the maintenance and operation of vehicles and heavy equipment. Leaks and spills could range from small, such as those potentially occurring during equipment malfunctions to large, such as from the potential, but unlikely, rupture of a mobile fuel storage tank. Direct impacts of such releases would include contamination of vegetation, soil, and water, which could result in indirect impacts on human and wildlife populations.

Operation and Maintenance

Impacts from hazardous materials during O&M would be similar to those described for construction. In addition, direct impacts could also result from incidents of illegal dumping associated with increased and improved public access along new and reconstructed roadways within the analysis area.

Decommissioning

Potential impacts from accidental release of hazardous materials associated with decommissioning would be similar to those described for construction. However, all new project roads would be decommissioned and access to the area by recreational users and the public would be reduced, therefore reducing the risk of potential illegal dumping on public land. Impacts on hazardous waste and petroleum products would be increased during decommissioning activities but would then resume to the current conditions under Alternative A.

Alternative B1 (Proposed Action)

Construction

Potential impacts on the environment related to hazardous materials and petroleum products would be associated with the placement of 170 wind turbines with 83 miles of new and reconstructed project roads. During the construction of these features, direct, short-term impacts from the accidental release of hazardous materials and petroleum products could result. Project design features would reduce the risk of such impacts.

Operation and Maintenance

The O&M of 170 wind turbines and 83 miles of new or reconstructed roads could result in direct, short-term impacts from hazardous materials and petroleum products. Project design features would reduce the risk of such impacts.

Decommissioning

Potential impacts associated with the accidental release of hazardous materials during decommissioning of 170 wind turbines and 62 miles of road would be similar to those resulting from the construction activities. Access would be reduced within the project area, which would reduce the potential for illegal dumping and the accidental release of hazardous materials.

Alternative B2a

Construction

Impacts on the environment related to hazardous materials and petroleum products would be similar to Alternative B1, but would occur in two separate phases. Phase I would introduce potential impacts related to the accidental release of hazardous materials associated with the construction of 100 wind turbines and 63 miles of new roads or road reconstruction. Phase II introduce potential impacts associated with the construction of 70 wind turbines and 20 miles of new roads or road reconstruction. The phased approach would establish a longer duration of construction activities than Alternative B1, but with no measurable increase of potential impact, as the project features and road miles would generally be similar for the combined phases.

Operation and Maintenance

General impacts from O&M activities would be the same as Alternative B1 but would vary temporally.

Decommissioning

Decommissioning would have the same impacts as described for Alternative B1.

Alternative B2b

Construction

Impacts on the environment related to hazardous materials and petroleum products would be similar to Alternative B1, but would occur in two separate phases. Phase I would introduce potential impacts related to the accidental release of hazardous materials associated with the construction of 100 wind turbines and 62 miles of new roads or road reconstruction. Phase II introduce potential impacts associated with the construction of 70 wind turbines and 21 miles of new roads or road reconstruction. The phased approach would establish a longer duration of construction activities than Alternative B1, but with no measurable increase of potential impact, as the project features and road miles would generally be similar for the combined phases.

Operation and Maintenance

General impacts from O&M activities would be the same as Alternative B1 but would vary temporally.

Decommissioning

Decommissioning would have the same impacts as described for Alternative B1.

Alternative B2c

Construction

Impacts on the environment related to hazardous materials and petroleum products would be similar to Alternative B1, but would occur in two separate phases. Phase I would introduce potential impacts

related to the accidental release of hazardous materials associated with the construction of 100 wind turbines and 70 miles of new roads or road reconstruction. Phase II introduce potential impacts associated with the construction of 70 wind turbines and 13 miles of new roads or road reconstruction. The phased approach would establish a longer duration of construction activities than Alternative B1, but with no measurable increase of potential impact, as the project features and road miles would generally be similar for the combined phases.

Operation and Maintenance

General impacts from O&M activities would be the same as Alternative B1 but would vary temporally.

Decommissioning

Decommissioning would have the same impacts as described for Alternative B1.

Alternative C

Construction

Construction activities under this alternative would involve 152 turbines and 80 miles of new roads or road reconstruction. Impacts related to hazardous materials and petroleum products would be less than those associated with Alternative B1 due to 18 fewer turbines and 3 less miles of new roads or reconstructed roads.

Operation and Maintenance

The O&M of 152 wind turbines and 80 miles of new or reconstructed roads could result in direct, short-term impacts from hazardous materials and petroleum products. The impacts related to hazardous materials and petroleum products would be less than Alternative B1.

Decommissioning

Decommissioning activities would have the same impacts as described for Alternative B1. However, Alternative C would require decommissioning of 18 fewer turbines and 3 less miles of road, which would result in fewer impacts related to hazardous materials and petroleum products than Alternative B1.

Alternative D

Construction

Construction activities under this alternative would involve 124 turbines and 72 miles of new roads or road reconstruction. Impacts related to hazardous materials and petroleum products would be less than those associated with Alternative B1 due to 46 fewer turbines and 11 less miles of new roads or reconstructed roads.

Operation and Maintenance

The O&M of 124 wind turbines and 72 miles of new or reconstructed roads could result in direct, short-term impacts from hazardous materials and petroleum products. The impacts related to hazardous materials and petroleum products would be less than Alternative B1.

Decommissioning

Decommissioning activities would have the same impacts as described for Alternative B1. However, Alternative D would require decommissioning of 46 fewer turbines and 11 less miles of road, which would result in fewer impacts related to hazardous materials and petroleum products than Alternative B1.

Alternative E

Construction

Construction activities under this alternative would involve 120 turbines and 76 miles of new roads or road reconstruction. Impacts related to hazardous materials and petroleum products would be less than those associated with Alternative B1 due to 50 fewer turbines and 7 less miles of new roads or reconstructed roads.

Operation and Maintenance

The O&M of 120 wind turbines and 76 miles of new or reconstructed roads could result in direct, short-term impacts from hazardous materials and petroleum products. The impacts related to hazardous materials and petroleum products would be less than Alternative B1.

Decommissioning

Decommissioning activities would have the same impacts as described for Alternative B1. However, Alternative E would require decommissioning of 50 fewer turbines and 7 less miles of road, which would result in fewer impacts related to hazardous materials and petroleum products than Alternative B1.

Alternative F

Construction

Construction activities under this alternative would involve 105 turbines and 66 miles of new roads or road reconstruction. Impacts related to hazardous materials and petroleum products would be less than those associated with Alternative B1 due to 65 fewer turbines and 17 less miles of new roads or reconstructed roads.

Operation and Maintenance

The O&M of 105 wind turbines and 66 miles of new or reconstructed roads could result in direct, short-term impacts from hazardous materials and petroleum products. The impacts related to hazardous materials and petroleum products would be less than Alternative B1.

Decommissioning

Decommissioning activities would have the same impacts as described for Alternative B1. However, Alternative F would require decommissioning of 65 fewer turbines and 17 less miles of road, which would result in fewer impacts related to hazardous materials and petroleum products than Alternative B1.

4.3.7.3 Direct and Indirect Impacts of the Haul Routes

Direct impacts related to hazardous materials and petroleum products would be caused by accidental spills or incidents of illegal dumping by the public, which could result in indirect impacts on human and wildlife populations. Project design features would serve to reduce risk of potential impact.

Northern Inbound Haul Route

Construction

Portions of reconstruction on up to 119 miles of the road would accommodate material transport and heavy equipment travel. Use of the haul road would introduce increased travel to support project activities and could result in impacts related to the accidental release of hazardous materials and petroleum products.

Operation and Maintenance

This route would be used approximately once per year for major maintenance of the wind energy facility. The O&M of this haul route is expected to have minimal impacts related to hazardous materials and petroleum products in the project area.

Decommissioning

This route would be used during the decommissioning stage to remove wind turbine equipment from the project area and impacts would be similar to those caused by construction activities. This haul route is an existing roadway and would not be decommissioned; therefore, no impacts related to hazardous materials and petroleum products would be caused by road decommissioning activities.

Southern Inbound Haul Route Option 1

Construction

The reconstruction and construction of 11 miles of road would accommodate material transport and heavy equipment travel. Use of the haul road would introduce travel within the area to support project activities and could result in impacts related to the accidental release of hazardous materials and petroleum products. Use of this route would increase for 2 years during the time of project construction (3 years for the phased alternatives and 4 years for Alternative E).

Operation and Maintenance

This haul route would be used approximately once per year for major maintenance of the wind energy facility. The O&M of the haul route is expected to have minimal impacts related to hazardous materials and petroleum products.

Decommissioning

The route would be used during the decommissioning stage to remove wind turbine equipment from the project area and impacts would be similar to those caused by construction activities. This haul route would not be decommissioned; therefore, no impacts related to hazardous materials and petroleum products would be caused by decommissioning activities.

Southern Inbound Haul Route Option 2

Construction

The reconstruction and construction of 13 miles of road would accommodate material transport and heavy equipment travel. Use of the haul road would introduce travel within the area to support project activities and could result in impacts related to the accidental release of hazardous materials and petroleum products. Use of this route would increase for 2 years during the time of project construction (3 years for the phased alternatives and 4 years for Alternative E).

Operation and Maintenance

This haul route would be used approximately once per year for major maintenance of the wind energy facility. The O&M of the haul route is expected to have minimal impacts related to hazardous materials and petroleum products.

Decommissioning

The route would be used during the decommissioning stage to remove wind turbine equipment from the project area and impacts would be similar to those caused by construction activities. This haul route would not be decommissioned; therefore, no impacts related to hazardous materials and petroleum products would be caused by decommissioning activities.

Outbound Haul Route

Construction

No road construction or reconstruction is anticipated for the outbound haul route. The road would only be used primarily during the construction stages of the wind energy facility for unloaded equipment leaving the project area. Use of this haul route would increase for 2 years during the time of project construction (3 years for the phased alternatives and 4 years for Alternative E). Accidental release of hazardous materials or petroleum products could occur from associated vehicle and heavy equipment travel to support the project.

Operation and Maintenance

The haul route would not be used for O&M activities. Maintenance of the haul route is expected to have minimal impacts related to hazardous materials and petroleum products.

Decommissioning

This route would not be used during decommissioning activities. This is an established roadway and would not be decommissioned; therefore, no impacts related to hazardous materials and petroleum products would occur.

4.3.7.4 Project as a Whole

Impacts related to hazardous material and petroleum products that could result from implementing the project as a whole are a result of accidental releases based on the level of construction and miles of road used for the project. Impacts could also result from incidents of illegal dumping associated with project roads within the analysis area (Table 4.3.7-1). Based on the project variables, Alternative B1 would result in the greatest potential impact; Alternative F would result in the least potential impact associated with hazardous materials and petroleum products.

Table 4.3.7-1. Impact Summary Table – Hazardous Materials and Petroleum Products.

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Route – Option 1	Wind Energy Facility with the Southern Inbound Haul Route – Option 2
Alternative A: No Action	Impacts would continue to be related to current access to the area and opportunity for illegal dumping or accidental petroleum product releases from vehicles.	Impacts would continue to be related to current access to the area and opportunity for illegal dumping or accidental petroleum product releases from vehicles.	Impacts would continue to be related to current access to the area and opportunity for illegal dumping or accidental petroleum product releases from vehicles.
Alternative B1	Hazardous materials and petroleum products use, storage, and disposal to build 170 wind turbines. Miles of road travel – 83 miles of project area plus 119 miles for the northern inbound haul route.	Hazardous materials and petroleum products use, storage, and disposal to build 170 wind turbines. Miles of road travel – 83 miles of project area plus 11 miles for the southern haul route.	Hazardous materials and petroleum products use, storage, and disposal to build 170 wind turbines. Miles of road travel – 83 miles of project area plus 13 miles for the southern haul route.
Alternative B2a	**Phase I** 100 wind turbines. 63 miles of project roads plus 119 miles for the northern inbound haul route. **Phase II** Impacts associated with building 70 wind turbines.	**Phase I** 100 wind turbines. Miles of road travel – 63 miles of project area plus 11 miles for the southern inbound haul route option 1.	**Phase I** 100 wind turbines. Miles of road travel – 63 miles of project area plus 13 miles for the southern inbound haul route option 2.

Table 4.3.7-1. Impact Summary Table – Hazardous Materials and Petroleum Products (cont'd).

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Route – Option 1	Wind Energy Facility with the Southern Inbound Haul Route – Option 2
Alternative B2a (continued)	Miles of road travel – 20 miles of project area plus 119 miles for the northern inbound haul route. **Phase I & II** Impacts associated with building 170 wind turbines. Miles of road travel – 83 miles of project area plus 119 miles for the northern inbound haul route. **Phase I & II** Same as Alternative B1 but would vary temporally.	**Phase II** Impacts associated with building 70 wind turbines. Miles of road travel – 20 miles of project area plus 11 miles for the southern haul route. **Phase I & II** Impacts associated with building 170 wind turbines. Miles of road travel – 83 miles of project area plus 11 miles for the southern inbound haul route option 1. **Phase I & II** Same as Alternative B1 but would vary temporally.	**Phase II** Impacts associated with building 70 wind turbines. Miles of road travel – 20 miles of project area plus 13 miles for the southern haul route. **Phase I & II** Impacts associated with building 170 wind turbines. Miles of road travel – 83 miles of project area plus 13 miles for the southern inbound haul route option 2. **Phase I & II** Same as Alternative B1 but would vary temporally.
Alternative B2b	**Phase I** Impacts associated with building 100 wind turbines. Miles of road travel – 62 miles of project area plus 119 miles for the northern inbound haul route. **Phase II** Impacts associated with building 70 wind turbines. Miles of road travel – 21 miles of project area plus 119 miles for the northern inbound haul route. **Phase I & II** Same as Alternative B1 but would vary temporally.	**Phase I** Impacts associated with building 100 wind turbines. Miles of road travel – 62 miles of project area plus 11 miles for the southern inbound haul route option 1. **Phase II** Impacts associated with building 70 wind turbines. Miles of road travel – 21 miles of project area plus 11 miles for the southern haul route option 1. **Phase I & II** Same as Alternative B1 but would vary temporally.	**Phase I** Impacts associated with building 100 wind turbines. Miles of road travel – 62 miles of project area plus 13 miles for the southern inbound haul route option 2. **Phase II** Impacts associated with building 70 wind turbines. Miles of road travel – 21 miles of project area plus 13 miles for the southern haul route option 2. **Phase I & II** Same as Alternative B1 but would vary temporally.

Table 4.3.7-1. Impact Summary Table – Hazardous Materials and Petroleum Products (cont'd).

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Route – Option 1	Wind Energy Facility with the Southern Inbound Haul Route – Option 2
Alternative B2c	**Phase I** Impacts associated with building 100 wind turbines. Miles of road travel – 70 miles of project area plus 119 miles for the northern inbound haul route. **Phase II** Impacts associated with building 70 wind turbines. Miles of road travel – 13 miles of project area plus 119 miles for the northern inbound haul route. **Phase I & II** Same as Alternative B1 but would vary temporally.	**Phase I** Impacts associated with building 100 wind turbines. Miles of road travel – 70 miles of project area plus 11 miles for the southern haul route. **Phase II** Impacts associated with building 70 wind turbines. Miles of road travel – 13 miles of project area plus 11 miles for the southern inbound haul route option 1. **Phase I & II** Same as Alternative B1 but would vary temporally.	**Phase I** Hazardous materials and petroleum products use, storage, and disposal to place 100 wind turbines. Miles of road travel – 70 miles of project area plus 13 miles for the southern haul route. **Phase II** Impacts associated with building 70 wind turbines. Miles of road travel – 13 miles of project area plus 13 miles for the southern inbound haul route option 2. **Phase I & II** Same as Alternative B1 but would vary temporally.
Alternative C	Impacts associated with building 152 wind turbines. Miles of road travel – 80 miles of project area plus 119 miles for the northern inbound haul route.	Impacts associated with building 152 wind turbines. Miles of road travel – 80 miles of project area plus 11 miles for the southern inbound haul route option 1.	Impacts associated with building 152 wind turbines. Miles of road travel – 80 miles of project area plus 13 miles for the southern inbound haul route option 2.
Alternative D	Impacts associated with building 124 wind turbines. Miles of road travel – 72 miles of project area plus 119 miles for the northern inbound haul route.	Impacts associated with building 124 wind turbines. Miles of road travel – 72 miles of project area plus 11 miles for the southern inbound haul route option 1.	Impacts associated with building 124 wind turbines. Miles of road travel – 72 miles of project area plus 13 miles for the southern inbound haul route option 2.
Alternative E	Impacts associated with building 120 wind turbines. Miles of road travel – 76 miles of project area plus 119 miles for the northern inbound haul route.	Impacts associated with building 120 wind turbines. Miles of road travel – 76 miles of project area plus 11 miles for the southern inbound haul route option 1.	Impacts associated with building 120 wind turbines. Miles of road travel – 76 miles of project area plus 13 miles for the southern inbound haul route option 2.

Table 4.3.7-1. Impact Summary Table – Hazardous Materials and Petroleum Products (cont'd).

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Route – Option 1	Wind Energy Facility with the Southern Inbound Haul Route – Option 2
Alternative F	Impacts associated with building 105 wind turbines. Miles of road travel – 66 miles of project area plus 119 miles for the northern inbound haul route.	Impacts associated with building 105 wind turbines. Miles of road travel – 66 miles of project area plus 11 miles for the southern inbound haul route option 1.	Impacts associated with building 105 wind turbines. Miles of road travel – 66 miles of project area plus 13 miles for the southern inbound haul route option 2.

4.3.7.5 Cumulative Impacts

Cumulative impacts on hazardous materials consist of incremental effects of the alternatives when added to other past, present, and reasonably foreseeable future actions. The cumulative effects analysis area for hazardous materials is the project area and both options of the southern inbound haul route because direct and indirect impacts are not expected to extend beyond this area.

Alternative A (No Action Alternative)

The No Action Alternative in combination with the past and present actions could result in incremental increases in impacts associated with hazardous materials, petroleum products, and wastes.

All Action Alternatives

Project design features would serve to reduce the risk of potential release of hazardous materials and petroleum products. If appropriate management practices are implemented, the impacts associated with hazardous materials, petroleum products, and wastes are expected to be minimal to nonexistent (BLM, 2005). No direct or indirect cumulative impacts from the project are anticipated.

4.3.8 SPECIAL DESIGNATIONS

4.3.8.1 Analysis Methods

The following analysis considers the impacts of the project on special management areas. The special management areas categories include: Wilderness Study Areas (WSAs), Areas of Critical Environmental Concern, research natural areas, National Natural Landmarks, National Historic Trails, Back Country Byways, and Wild and Scenic Rivers. The only special designation in the project area is a segment of Rocky Canyon Creek that is eligible for inclusion in the Wild and Scenic River System.

An evaluation of Rocky Canyon Creek was conducted in 2009 by the BLM Jarbidge Field Office as part of the resource management planning process. That process determined that the Rocky Canyon Creek river segment was eligible for inclusion in the Wild and Scenic River System for its free-flowing condition and wildlife values (BLM, 2010). River segments that are determined to be eligible

are assigned a tentative classification as wild, scenic, or recreational. Rocky Canyon Creek has been classified as wild.

Indicators

The following indicators have been selected to analyze the effects of the alternatives on special designations:

- Impacts from surface disturbance and noise on the outstandingly remarkable values of Rocky Canyon Creek.
- The potential for surface disturbance to change the classification of Rocky Canyon Creek.

Methods and Assumptions

Impacts are assessed by determining the amount of surface disturbance from the construction and maintenance of project roads and facilities and the indirect impacts on special designations.

The following assumptions were used when analyzing effects of the project on special designations:

- The outstandingly remarkable values and the classification as wild and free flowing exist within the entire stream segment.
- For river segments that are eligible for congressional designation as Wild and Scenic Rivers, management would focus on protecting specific, identified, outstandingly remarkable values, and the tentative classification and free-flowing character.
- Any potential Wild and Scenic eligible river segments would be managed to regulate surface disturbance and protect the eligibility of the area.

4.3.8.2 Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

Special designations would not be impacted from project construction, O&M, or decommissioning because the project would not be built. Rocky Canyon Creek would continue to be eligible for inclusion in the Wild and Scenic River System for its free-flowing condition and wildlife values.

Impacts Common to All Action Alternatives

Construction

Surface disturbance associated with the construction of roads, transmission lines, substations, O&M facilities, meteorological towers, and concrete and aggregate facilities would indirectly result in short-term minor impacts on the primitive nature of Rocky Canyon Creek. The surface disturbance could indirectly change the wild character of the creek and impact the creek classification as a wild river, and its eligibility for inclusion as a Wild and Scenic River.

Surface disturbance associated with the construction of roads, transmission lines, substations, O&M facilities, meteorological towers, and concrete and aggregate facilities could transport sediments into Rocky Canyon Creek and indirectly result in sediment loading and contamination transported with the sediments. The excess sediment and contaminants in the creek would reduce water holding capacity and water quality and affect aquatic habitat. Sediment loading in aquatic ecosystems could result in the loss or impairment of fish and other aquatic organisms (Hargrove, Johnson, Snethen, & Middendorf, 2010). This would indirectly result in minor localized impacts on the outstandingly remarkable free-flowing value of the creek. Construction activities resulting in surface disturbance could also indirectly reduce access to habitat, degrade habitat quality, restrict wildlife movements, lead to behavior related avoidance of established use areas, and result in habitat fragmentation (Jackson, 2000). Surface disturbance associated with construction would indirectly result in minor impacts on the outstandingly remarkable wildlife value in the Rocky Canyon Creek corridor.

Design features would be applied during construction, which would minimize impacts on Rocky Canyon Creek. Design features such as using jute netting, silt fences, and check dams near disturbed areas and minimizing the number and size/length of roads, temporary fences, lay-down areas, and borrow areas would reduce sedimentation (Appendix 2A). Dust abatement and vegetation mitigation measures would also reduce sedimentation. Design features that protect wildlife habitat including locating individual project facilities to maintain existing stands of quality habitat and continuity between stands would help maintain the creeks outstandingly remarkable wildlife value (Appendix 2A). Design features applied to protect fish and wildlife habitat, vegetation, and to control noxious weeds and invasive plants could directly or indirectly reduce impacts on Rocky Canyon Creek.

Operation and Maintenance

Vehicle traffic associated with O&M activities would result in long-term indirect impacts on the wild and primitive nature of Rocky Canyon Creek, and could impact its classification as a wild river. This could impact its eligibility for inclusion in the Wild and Scenic River System. Noise associated with vehicle traffic would indirectly impact wildlife. The noise created by the wind turbines would indirectly impact wildlife. Rabin (2005) found that noise produced by wind turbines is likely to pose communicative challenges for ground squirrels attempting to communicate acoustically near turbines. The noise generated by the turbines could indirectly result in changes in wildlife behavior. This would result in minor indirect impacts on the outstanding remarkable wildlife value of Rocky Canyon Creek over the long term. Behavioral and physiological responses have the potential to cause injury, energy loss (from movement away from noise source), decrease in food intake, habitat avoidance and abandonment, and reproductive losses (Fletcher, 1980). This would result in minor indirect impacts on the outstandingly remarkable wildlife value of the creek.

Decommissioning

Decommissioning the project would have similar impacts as those described for construction. Decommissioning the project roads, wind turbine foundations, underground utilities, transmission lines, and substations would result in short-term minor impacts on Rocky Canyon Creek from surface disturbance. Surface disturbance would lead to sedimentation and decreased water quality in Rocky

Canyon Creek. This could change the creeks outstandingly remarkable free-flowing value. Wildlife and wildlife habitat would be indirectly impacted by the surface disturbance and the presence of vehicles and decommissioning equipment, which could change the creeks outstandingly remarkable wildlife value. Impacts would be minor and short-term and mitigation measures would be applied during decommissioning to minimize impacts on Rocky Canyon Creek.

Alternative B1 (Proposed Action)

Construction

Construction and reconstruction of 83 miles of project roads and 170 wind turbines would result in surface disturbance and would indirectly impact the primitive nature of Rocky Canyon Creek. The closest project road and wind turbine would be located approximately 0.4 mile from Rocky Canyon Creek. The surface disturbance would indirectly impact the creek classification as a wild river and could impact its eligibility for inclusion in the Wild and Scenic River System.

Surface disturbance associated with the construction and reconstruction of roads, turbines, and related facilities could transport sediments into Rocky Canyon Creek and indirectly result in sediment loading and contamination transported with the sediments. The excess sediment and contaminants in the creek would reduce water holding capacity and water quality. This would indirectly affect the outstandingly remarkable free-flowing value of the creek. Potential impacts from surface disturbance and sedimentation would be minor and highly localized.

Construction activities would also indirectly reduce the amount of forage, habitat, and cover available to wildlife where ground disturbance occurs. This would lead to avoidance of established habitat areas, or increased energy demands that could affect the fitness of wildlife populations. Surface disturbance associated with construction would indirectly result in minor short-term impacts on the outstandingly remarkable wildlife value of the Rocky Canyon Creek corridor.

Operation and Maintenance

Vehicle traffic associated with the regular maintenance of 83 miles of project roads and maintaining up to 170 wind turbines would result in long-term indirect impacts on the primitive nature of Rocky Canyon Creek and could impact its classification as wild.

Decommissioning

Decommissioning the project roads, wind turbine foundations, underground utilities, transmission lines, and substations would result in short-term minor impacts on Rocky Canyon Creek from surface disturbance. Surface disturbance would lead to sedimentation and decreased water quality, and indirectly result in minor and localized impacts on the outstandingly remarkable free-flowing value of Rocky Canyon Creek. Wildlife and wildlife habitat would be indirectly impacted by vehicle traffic and result in short-term minor impacts on the outstandingly remarkable wildlife value of the creek.

Alternative B2a

Construction

Construction or reconstruction of 63 miles of roads and up to 100 turbines would occur under Phase I. The proposed wind turbines and project roads constructed under Phase I would be located on the west side of the project area and would not result in any impacts on Rocky Canyon Creek. Nine years after initial construction, 20 additional miles of roads and up to 70 more turbines would be constructed as part of Phase II. Under Phase II, the wind turbines and project roads would be located closer to Rocky Canyon Creek than Phase I. The closest project road and wind turbine would be located approximately 0.4 miles from Rocky Canyon Creek. The construction of turbines and project roads would result in sedimentation and indirectly result in minor localized impacts on the outstandingly remarkable free-flowing value of the creek. Impacts from construction of Phase I and Phase II, would be the same as those described for Phase II because there would be no impacts from Phase I.

Construction activities would also indirectly reduce the amount of habitat and cover available to wildlife where ground disturbance occurs. This would indirectly impact wildlife by decreasing the quality of established habitat areas. Surface disturbance associated with construction would indirectly result in minor short-term impacts on the outstandingly remarkable wildlife value in the Rocky Canyon Creek corridor.

Operation and Maintenance

The O&M activities associated with Phase I of Alternative B2a would not affect Rocky Canyon Creek. Under Phase II, the noise associated with O&M vehicles would indirectly result in long-term effects on wildlife. Noise could result in habitat avoidance or abandonment. This would indirectly result in long-term minor impacts on the outstandingly remarkable wildlife value of the creek. The presence of vehicles and turbines would also change the primitive nature of the creek and could change its classification as wild.

Decommissioning

Impacts from decommissioning the project would be the same as described for *Construction* of Alternative B2a.

Alternative B2b

Construction

Construction or reconstruction of 62 miles of roads and up to 100 turbines would occur during Phase I; however, these project features would not be located near enough to Rocky Canyon Creek to result in any impacts. Nine years after initial construction, 21 additional miles of roads and up to 70 more turbines would be constructed as part of Phase II. Under Phase II, the wind turbines and project roads would be located closer to Rocky Canyon Creek than Phase I. The closest project road and wind turbine would be located approximately 0.4 mile from Rocky Canyon Creek. The construction of turbines and project roads would result in sedimentation and indirectly result in localized and minor impacts on the outstandingly remarkable free-flowing value of the creek. Impacts from construction

of Phase I and Phase II, would be the same as those described for Phase II because there would be no impacts from Phase I.

Operation and Maintenance

The O&M of 62 miles of project roads and 100 wind turbines under Phase I would not affect Rocky Canyon Creek. Under Phase II, the noise associated with O&M vehicles would indirectly result in long-term effects on wildlife. This could indirectly result in minor impacts on the outstandingly remarkable wildlife value of the creek. The presence of vehicles and turbines would also change the primitive nature of the creek and could change its classification as wild.

Decommissioning

Decommissioning the project would have the same impacts as described for *Construction* of Alternative B2b.

Alternative B2c

Construction

Construction or reconstruction of 70 miles of roads and up to 100 turbines would occur under Phase I. The closest turbine and project road would be located approximately 0.4 mile from Rocky Canyon Creek. The construction of turbines and project roads would result in sedimentation and indirectly result in localized and minor impacts on the outstandingly remarkable free-flowing value of the creek. Phase II proposes to construct or reconstruct an additional 13 miles of roads and construct 70 more wind turbines. The proposed wind turbines and project roads constructed under Phase II would be located in the northeast portion of the project area and would not result in any impacts on Rocky Canyon Creek. Impacts from construction of Phase I and Phase II would be the same as those described for Phase I because there would be no impacts from Phase II.

Construction activities would also indirectly reduce the amount of habitat and cover available to wildlife where ground disturbance occurs. This would indirectly impact wildlife by decreasing the quality of established habitat areas. Surface disturbance associated with construction would indirectly result in minor short-term impacts on the outstandingly remarkable wildlife value in the Rocky Canyon Creek corridor.

Operation and Maintenance

The O&M of 70 miles of project roads and 100 wind turbines under Phase I would result in indirect long-term impacts on wildlife from the noise associated with O&M activities. This would indirectly result in minor impacts on the outstandingly remarkable wildlife value of the creek. The presence of vehicles and turbines would also change the primitive nature of the creek and could change its classification as wild. The O&M of 13 miles of project roads and 70 wind turbines under Phase II would not affect Rocky Canyon Creek. The O&M of Alternative B2c, Phases I and II, would result in the same impacts as described for O&M under Phase I because there would be no impacts from Phase II.

Decommissioning

Decommissioning the project would have the same impacts as described for *Construction* of Alternative B2c.

Alternative C

Construction

Construction and reconstruction of 80 miles of project roads and 152 wind turbines would result in surface disturbance and indirectly impact the primitive nature of Rocky Canyon Creek. The closest turbine and project road would be located approximately 0.4 mile from Rocky Canyon Creek. Impacts would be similar to Alternative B1 except Alternative C proposes constructing 3 fewer miles of roads and decreasing the number of turbines from 170 to 152. Reducing the number of turbines would reduce the extent of surface disturbance over the short-term and long-term and could maintain the wild classification of Rocky Canyon Creek. Reducing surface disturbance would indirectly reduce sedimentation and could help to maintain the outstandingly remarkable free-flowing value of the creek.

Surface disturbance associated with the construction of roads, turbines, and related facilities could transport sediments into Rocky Canyon Creek and indirectly result in sediment loading and contamination transported with the sediments. The excess sediment and contaminants in the creek would reduce water holding capacity and water quality. This would indirectly affect the outstandingly remarkable free-flowing value of the creek. Impacts from surface disturbance and sedimentation would be minor and highly localized.

Construction activities would also indirectly reduce the amount of forage, habitat, and cover available to wildlife where ground disturbance occurs. This could lead to avoidance of established habitat areas, or increased energy demands that would affect the fitness of wildlife populations. Surface disturbance associated with construction would indirectly result in minor short-term impacts on the outstandingly remarkable wildlife value of the Rocky Canyon Creek corridor.

Operation and Maintenance

The O&M of 80 miles of project roads and 152 wind turbines would result in indirect long-term impacts on wildlife from the noise associated with O&M activities. O&M of fewer turbines than Alternative B1 would reduce the number of vehicles required to maintain the project. This would indirectly reduce disturbance to wildlife from vehicle traffic and turbine noise and maintain the outstandingly remarkable value of wildlife for Rocky Canyon Creek.

Decommissioning

Decommissioning the project would result in similar impacts as described in *Construction* above for Alternative C.

Alternative D

Construction

Construction and reconstruction of 72 miles of project roads and 124 wind turbines would result in surface disturbance and indirectly impact the primitive nature of Rocky Canyon Creek. The closest turbine and project road would be located approximately 0.4 mile from Rocky Canyon Creek. Impacts would be similar to Alternative B1, except Alternative D proposes constructing 11 fewer miles of roads and decreasing the number of turbines from 170 to 124. Reducing the number of turbines would reduce the extent of surface disturbance over the short-term and long-term and maintain the wild classification of Rocky Canyon Creek. Reducing surface disturbance would indirectly reduce sedimentation and maintain the outstandingly remarkable free-flowing value of the creek.

Surface disturbance associated with the construction of roads, turbines, and related facilities would transport sediments into Rocky Canyon Creek and indirectly result in sediment loading and contamination transported with the sediments. The excess sediment and contaminants in the creek would reduce water holding capacity and reduce water quality. This would indirectly affect the outstandingly remarkable free-flowing value of the creek. Impacts from surface disturbance and sedimentation would be minor and highly localized.

Construction activities could also indirectly reduce the amount of forage, habitat, and cover available to wildlife where ground disturbance occurs. This could lead to avoidance of established habitat areas, or increased energy demands that could affect the fitness of wildlife populations. Surface disturbance associated with construction could indirectly result in minor short-term impacts on the outstandingly remarkable wildlife value of the Rocky Canyon Creek corridor.

Operation and Maintenance

The O&M of 72 miles of project roads and 124 wind turbines could result in indirect long-term impacts on wildlife from the noise associated with O&M activities. O&M of fewer turbines than Alternative B1 (46 fewer turbines) could reduce the number of vehicles required to maintain the project. This could indirectly reduce disturbance to wildlife from vehicle traffic and turbine noise and maintain the outstandingly remarkable value of wildlife for Rocky Canyon Creek.

Decommissioning

Decommissioning the project would result in similar impacts as described in *Construction* above for Alternative D.

Alternative E

Construction

Construction and reconstruction of 76 miles of project roads and 120 wind turbines would result in surface disturbance and indirectly affect the primitive nature of Rocky Canyon Creek. The closest turbine and project road would be located approximately 0.4 mile from Rocky Canyon Creek.

Impacts would be similar to Alternative B1, except Alternative E proposes constructing 7 fewer miles of roads and decreasing the number of turbines from 170 to 120. Reducing the number of turbines could reduce the extent of surface disturbance over the short-term and long-term and maintain the wild classification of Rocky Canyon Creek. Reducing surface disturbance could indirectly reduce sedimentation and maintain the outstandingly remarkable free-flowing value of the creek.

Surface disturbance associated with the construction of roads, turbines, and related facilities could transport sediments into Rocky Canyon Creek and indirectly result in sediment loading and contamination transported with the sediments. The excess sediment and contaminants in the creek would reduce water holding capacity and water quality. This would indirectly affect the outstandingly remarkable free-flowing value of the creek. Impacts from surface disturbance and sedimentation would be minor and highly localized.

Construction activities would also indirectly reduce the amount of forage, habitat, and cover available to wildlife where ground disturbance occurs. This could lead to avoidance of established habitat areas, or increased energy demands that would affect the fitness of wildlife populations. Surface disturbance associated with construction would indirectly result in minor short-term impacts on the outstandingly remarkable wildlife value of the Rocky Canyon Creek corridor.

Operation and Maintenance

The O&M of 76 miles of project roads and 120 wind turbines would result in indirect long-term impacts on wildlife from the noise associated with O&M activities. O&M of fewer turbines than Alternative B1 (50 fewer turbines) would reduce the number of vehicles required to maintain the project. This would indirectly reduce disturbance to wildlife from vehicle traffic and turbine noise and maintain the outstandingly remarkable value of wildlife for Rocky Canyon Creek.

Decommissioning

Decommissioning the project would result in similar impacts as described in *Construction* above for Alternative E.

Alternative F

Construction

Construction and reconstruction of 66 miles of project roads and 105 wind turbines would result in surface disturbance and indirectly impact the primitive nature of Rocky Canyon Creek. The closest turbine and project road would be located approximately 0.4 mile from Rocky Canyon Creek. Impacts would be similar to Alternative B1, except Alternative F proposes constructing or reconstructing 17 fewer miles of roads and decreasing the number of turbines from 170 to 105. Reducing the number of turbines would reduce the extent of surface disturbance over the short-term and long-term and could help to maintain the wild classification of Rocky Canyon Creek. Reducing surface disturbance could indirectly reduce sedimentation and maintain the outstandingly remarkable free-flowing value of the creek.

Surface disturbance associated with the construction of roads, turbines, and related facilities could transport sediments into Rocky Canyon Creek and indirectly result in sediment loading and contamination transported with the sediments. The excess sediment and contaminants in the creek would reduce water holding capacity and reduce water quality. This would indirectly affect the outstandingly remarkable free-flowing value of the creek. Impacts from surface disturbance and sedimentation would be minor and highly localized.

Construction activities would also indirectly reduce the amount of forage, habitat, and cover available to wildlife where ground disturbance occurs. This would lead to avoidance of established habitat areas, or increased energy demands that could affect the fitness of wildlife populations. Surface disturbance associated with construction would indirectly result in minor short-term impacts on the outstandingly remarkable wildlife value of the Rocky Canyon Creek corridor.

Operation and Maintenance

The O&M of 66 miles of project roads and 105 wind turbines would result in indirect long-term impacts on wildlife from the noise associated with O&M activities. O&M of fewer turbines than Alternative B1 (65 fewer turbines) would reduce the number of vehicles required to maintain the project. This would indirectly reduce disturbance to wildlife from vehicle traffic and turbine noise and maintain the outstandingly remarkable value of wildlife for Rocky Canyon Creek.

Decommissioning

Decommissioning the project would result in similar impacts as described in *Construction* above for Alternative F.

4.3.8.3 Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

The northern inbound haul route would not result in impacts on special designations.

Southern Inbound Haul Route Option 1 and Option 2

Either option of the southern inbound haul route would not result in impacts on special designations.

Outbound Haul Route

The outbound haul route would not result in impacts on special designations.

4.3.8.4 Project as a Whole

Under all action alternatives, the closest turbine and project road would be located approximately 0.4 mile away from Rocky Canyon Creek. Under all action alternatives, the construction of the nearest turbine and project road would occur during initial construction of the project, except for the phased Alternatives B2a and B2b. Under these alternatives, construction of the closest turbine and project road would occur 9 years later, during Phase II construction. This would reduce the amount of time

the project features are in place and could reduce impacts on Rocky Canyon Creek through decreased sediment loading.

Under Alternative B1, surface disturbance associated with the construction, O&M, and decommissioning of the project could result in sediment loading. Sedimentation would indirectly impact the outstandingly remarkable free-flowing value of the creek compared to Alternative A. The noise created by vehicle traffic and the wind turbines would indirectly impact the outstandingly remarkable wildlife value of the creek compared to Alternative A.

Impacts on Rocky Canyon Creek from Alternative B2a would be similar to Alternative B1 except constructing the project in two phases would decrease the amount of initial short-term surface disturbance, especially near Rocky Canyon Creek. Long-term, impacts from the project would be similar to Alternative B1.

The impacts from the construction, O&M, and decommissioning of the project under Alternative B2b would be the same as Alternative B2a.

Impacts from Alternative B2c would be similar to Alternatives B2a and B2b, except that Phase I under Alternative B2c contains more turbines and project roads in the southern portion of the project area where Rocky Canyon Creek is located than Phase I of B2a and B2b. This would result in more surface disturbance and impacts on the outstandingly remarkable values of Rocky Canyon Creek than Alternatives B2a and B2b.

Under Alternative C, impacts from construction, O&M, and decommissioning of the project would increase compared to Alternative A. Reducing the number of turbines would reduce the extent of surface disturbance and potential for sedimentation and maintain the wild classification, and the outstandingly remarkable free-flowing value of Rocky Canyon Creek, compared to Alternatives B1, B2a, B2b, and B2c. Reducing the number of turbines would decrease the amount of noise produced by the turbines and maintain the outstandingly remarkable wildlife value of Rocky Canyon Creek compared to Alternatives B1, B2a, B2b, and B2c.

Under Alternative D, impacts from construction, O&M, and decommissioning of the project would increase compared to Alternative A. Reducing the number of turbines would reduce the extent of surface disturbance and potential for sedimentation and maintain the wild classification, and the outstandingly remarkable free-flowing value of Rocky Canyon Creek, compared to Alternatives B1, B2a, B2b, B2c, and C. Reducing the number of turbines would decrease the amount of noise produced by the turbines and maintain the outstandingly remarkable wildlife value of Rocky Canyon Creek compared to Alternatives B1, B2a, B2b, B2c, and C.

Impacts under Alternative E would be similar to Alternative D. Construction, O&M, and decommissioning of the project would result in fewer impacts than Alternatives B1, B2a, B2b, B2c, and C due to the decrease in the number of turbines and project roads.

Alternative F proposes the fewest turbines, which would result in the least amount of surface disturbance, vehicle traffic, and noise compared to all other action alternatives. Of the action alternatives, Alternative F would be the most likely to maintain Rocky Canyon Creek's classification and outstandingly remarkable values.

4.3.8.5 Cumulative Impacts

The cumulative impact analysis boundary is a 10-mile buffer around the project area including the haul routes.

Alternative A (No Action Alternative)

The No Action Alternative would not add cumulatively to existing impacts on Special Designations because the wind energy facility would not be built. Rocky Canyon Creek would continue to be eligible for inclusion in the Wild and Scenic River System for its free-flowing condition and wildlife values.

All Action Alternatives

Within the cumulative effects analysis area, past, present, and reasonably foreseeable future projects, in combination with the proposed project, would not result in any substantive, long-term cumulative impacts on existing eligible and suitable Wild and Scenic River segments under all alternatives.

4.3.9 LANDS WITH WILDERNESS CHARACTERISTICS

4.3.9.1 Analysis Methods

This section presents potential impacts on wilderness characteristics, which are features of land found outside of WSAs and identified by BLM as areas having the characteristics of naturalness and outstanding opportunities for primitive recreation or solitude. Two areas identified for wilderness characteristics overlap the project area: Black Canyon and Corral Creek (Figure 3.3.8-1). Impacts on wilderness characteristics could include actions that maintain, protect, or improve wilderness characteristics within these areas, or actions that result in the complete or partial loss of these characteristics.

Indicators

The indicators for wilderness characteristics include the following:

- The number of acres of surface disturbance in areas with wilderness characteristics.
- The number of turbines within areas with wilderness characteristics.
- The number of miles of roads in areas with wilderness characteristics.

Methods and Assumptions

Impacts on areas with wilderness characteristics are assessed by determining the number of acres of surface disturbance, miles of roads, and number of turbines in areas with wilderness characteristics, and by assessing the potential loss of opportunities for solitude, naturalness, or primitive types of

recreation from implementing the project components under each action alternative. For the purposes of this analysis, and for the comparison of alternatives, any change to individual wilderness characteristics that would result in the value being diminished or no longer present within an area is considered to decrease or remove wilderness character.

The analysis is based on the following assumption:

- The entire areas with wilderness characteristics (Black Canyon and Corral Creek) contain naturalness and outstanding opportunities for solitude or for primitive, unconfined types of recreation.

4.3.9.2 Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

There would be no loss of wilderness characteristics (e.g., naturalness, opportunities for solitude, or opportunities for primitive and unconfined recreation) within the Black Canyon and Corral Creek areas from the construction, O&M, and decommissioning of the project. The No Action Alternative would have no impacts on areas with wilderness characteristics.

Impacts Common to All Action Alternatives

Construction

Impacts on areas with wilderness characteristics from surface disturbance associated with the construction of turbines and project roads could result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation. Depending on the duration, type, and extent of disturbance, this would result in the wilderness character value being diminished or removed.

One of the reasons that Black Canyon and Corral Creek are considered areas with wilderness characteristics is because they are largely roadless areas. Typically, the areas evaluated for wilderness characteristics consist of roadless areas greater than 5,000 acres (Section 3.3.9). The creation of new roads within Black Canyon and Corral Creek could result in a long-term loss of wilderness characteristics, depending on the miles of new roads and the placement of roads within the area. If new roads are constructed throughout the area, then the wilderness characteristics would diminish more than if the roads are constructed in a localized portion of the area. Impacts from road construction would persist until project roads are reclaimed during decommissioning.

Operation and Maintenance

The presence of turbines, and the noise produced by the turbines, would result in long-term impacts in areas with wilderness characteristics through diminished naturalness of the area and a reduction in opportunities for primitive unconfined recreation. The presence of O&M vehicles could cause a loss in opportunities for solitude and primitive unconfined recreation, which would result in a long-term, although intermittent, impact on wilderness characteristics.

Decommissioning

Decommissioning of the project would result in similar impacts as construction. Surface disturbance and the presence of vehicles associated with decommissioning could result in a short-term loss of opportunities for solitude and primitive unconfined recreation, and would decrease the naturalness of the area. However, the project area would be reclaimed once decommissioning is complete, which could reestablish the naturalness of the area and wilderness characteristics.

Alternative B1 (Proposed Action)

Construction

Construction of 8 miles of new roads and installation of 37 turbines within the Black Canyon and Corral Creek areas would result in 101 acres of short-term and 28 acres of long-term surface disturbance (Table 4.3.9-1). Impacts on areas with wilderness characteristics from surface disturbance, and the presence of roads and turbines, would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation. Wilderness character value would diminish within a relatively small, localized portion of the Black Canyon area, whereas, wilderness character value would diminish throughout a large portion of the Corral Creek area.

Table 4.3.9-1. Project Disturbance Proposed within Areas with Wilderness Characteristics for Alternative B1.

Areas with Wilderness Characteristics	Miles of New Roads	Number of Turbines	Acres of Short-term Disturbance[1]	Acres of Long-term Disturbance[2]
Black Canyon	1	4	12	3
Corral Creek	7	33	89	25
Total	**8**	**37**	**101**	**28**

[1] Short-term disturbance = areas disturbed during project construction that would be revegetated.
[2] Long-term disturbance = areas disturbed during construction that would be reclaimed during project decommissioning.

Operation and Maintenance

The presence of 37 turbines, and the noise produced by the turbines, would result in a loss of naturalness and opportunities for primitive unconfined recreation in a small localized area in Black Canyon and throughout a large portion of the Corral Creek area. The presence and noise produced by the turbines would result in a long-term impact on wilderness characteristics. The presence of vehicles associated with the O&M of 8 miles of roads would result in a long-term, although intermittent, loss of opportunities for solitude and primitive unconfined recreation. The O&M of turbines and roads would result in a long-term loss of wilderness characteristics.

Decommissioning

Decommissioning the project would result in similar impacts as those described for construction. Decommissioning 8 miles of project roads and 37 wind turbine foundations would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation from surface disturbance and the presence of vehicles. This would result in a short-term impact on areas with wilderness characteristics. However, the project area would be reclaimed once decommissioning is

complete, which could potentially reestablish the naturalness of the area and wilderness characteristics.

Alternative B2a

Construction

During Phase I construction, 7 miles of new roads and the installation of 33 turbines within Corral Creek would result in 89 acres of short-term and 25 acres of long-term surface disturbance (Table 4.3.9-2). Surface disturbance, and the presence of roads and turbines, would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation within Corral Creek. Wilderness character value would diminish throughout a large portion of Corral Creek.

During Phase II construction, 1 mile of new roads and the installation of four turbines within Black Canyon would result in 12 acres of short-term and 3 acres of long-term surface disturbance (Table 4.3.9-2). Surface disturbance, and the presence of roads and turbines, would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation within a small, localized portion of Black Canyon. Wilderness character value would diminish within this portion of Black Canyon.

Construction of Phase I and Phase II would cause 101 acres of short-term and 28 acres of long-term disturbance from the creation of 8 miles of new roads and installation of 37 turbines (Table 4.3.9-2). Impacts on areas with wilderness characteristics from surface disturbance, and the presence of roads and turbines, would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation. Wilderness character value would diminish within a relatively small, localized portion of Black Canyon, whereas, wilderness character value would diminish throughout a large portion of Corral Creek.

Table 4.3.9-2. Project Disturbance Proposed within Areas with Wilderness Characteristics for Alternative B2a.

Areas with Wilderness Characteristics	Phases	Miles of New Roads	Number of Turbines	Acres of Short-term Disturbance[1]	Acres of Long-term Disturbance[2]
Black Canyon	Phase I	0	0	0	0
	Phase II	1	4	12	3
	Phase I & II	**1**	**4**	**12**	**3**
Corral Creek	Phase I	7	33	89	25
	Phase II	0	0	0	0
	Phase I & II	**7**	**33**	**89**	**25**
Total (Black Canyon and Corral Creek)	Phase I	7	33	89	25
	Phase II	1	4	12	3
	Phase I & II	**8**	**37**	**101**	**28**

[1] Short-term disturbance = areas disturbed during project construction that would be revegetated.
[2] Long-term disturbance = areas disturbed during construction that would be reclaimed during project decommissioning.

Operation and Maintenance

The presence of 33 turbines constructed in Phase I, and the noise produced by the turbines, would result in a loss of naturalness and opportunities for primitive unconfined recreation within Corral Creek. This would cause a long-term impact on wilderness characteristics. O&M activities associated with 7 miles of project roads and 33 turbines under Phase I would result in a long-term, although intermittent, loss of opportunities for solitude and primitive recreation. This would result in long-term impacts on wilderness characteristics within Corral Creek.

The presence of four turbines constructed in Phase II, and the noise produced by the turbines, would result in a loss of naturalness and opportunities for primitive unconfined recreation within a small portion of Black Canyon. This would cause a localized long-term impact on wilderness characteristics. O&M activities associated with 1 mile of project roads and four turbines under Phase II would result in a long-term, although intermittent, loss of opportunities for solitude and primitive recreation within a small portion of Black Canyon. This would result in long-term impacts on wilderness characteristics.

The presence of 37 turbines constructed during Phase I and Phase II, and the noise produced by the turbines, would result in a loss of naturalness and opportunities for primitive unconfined recreation throughout most of Corral Creek and within a small portion of Black Canyon. This would cause a long-term impact on wilderness characteristics within these areas. O&M activities associated with 8 miles of project roads and 37 turbines under Phase I and Phase II would result in a long-term, although intermittent, loss of opportunities for solitude and primitive recreation. This would result long-term impacts on wilderness characteristics.

Decommissioning

Decommissioning the project would result in similar impacts as those described for construction. Decommissioning 8 miles of project roads and 37 wind turbine foundations would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation from surface disturbance and the presence of vehicles. This would result in a short-term impact on areas with wilderness characteristics. However, the project area would be reclaimed once decommissioning is complete, which potentially reestablish the naturalness of the area and wilderness characteristics.

Alternative B2b

Construction

During Phase I construction, 8 miles of new roads and the installation of 37 turbines within Black Canyon and Corral Creek would result in 101 acres of short-term and 28 acres of long-term surface disturbance (Table 4.3.9-3). Surface disturbance, and the presence of roads and turbines, would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation. Wilderness character value would diminish within a relatively small, localized portion of the Black Canyon area, whereas, wilderness character value would diminish throughout a large portion of the Corral Creek area.

During Phase II construction, there would be no surface disturbance from road or turbine construction within Black Canyon and Corral Creek (Table 4.3.9-3). Construction of Phase II would not impact the wilderness characteristics of these areas.

Construction of Phase I and Phase II would cause 101 acres of short-term and 28 acres of long-term disturbance from the creation of 8 miles of new roads and installation of 37 turbines (Table 4.3.9-3). Impacts on areas with wilderness characteristics from surface disturbance, and the presence of roads and turbines, would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation. Wilderness character value would diminish within a relatively small, localized portion of Black Canyon; whereas, wilderness character value would diminish throughout a large portion of Corral Creek.

Table 4.3.9-3. Project Disturbance Proposed within Areas with Wilderness Characteristics for Alternative B2b.

Areas with Wilderness Characteristics	Phases	Miles of New Roads	Number of Turbines	Acres of Short-term Disturbance[1]	Acres of Long-term Disturbance[2]
Black Canyon	Phase I	1	4	12	3
	Phase II	0	0	0	0
	Phase I & II	**1**	**4**	**12**	**3**
Corral Creek	Phase I	7	33	89	25
	Phase II	0	0	0	0
	Phase I & II	**7**	**33**	**89**	**25**
Total (Black Canyon and Corral Creek)	Phase I	8	37	101	28
	Phase II	0	0	0	0
	Phase I & II	**8**	**37**	**101**	**28**

[1] Short-term disturbance = areas disturbed during project construction that would be revegetated.
[2] Long-term disturbance = areas disturbed during construction that would be reclaimed during project decommissioning.

Operation and Maintenance

The presence of 37 turbines constructed during Phase I, and the noise produced by the turbines, would result in a loss of naturalness and opportunities for primitive unconfined recreation within Black Canyon and Corral Creek. This would cause a long-term impact on wilderness characteristics. O&M of the 8 miles of project roads and 37 turbines constructed during Phase I would result in a long-term, although intermittent, loss of opportunities for solitude and primitive recreation. This would result in long-term impacts on wilderness characteristics.

Because there would be no construction of roads or turbines during Phase II within Black Canyon and Corral Creek, there would be no impacts on the wilderness characteristics of these areas from O&M.

The presence of 37 turbines constructed during Phase I and Phase II, and the noise produced by the turbines, would result in a loss of naturalness and opportunities for primitive unconfined recreation throughout most of Corral Creek and within a small portion of Black Canyon. This would cause a

long-term impact on wilderness characteristics. O&M activities associated with 8 miles of project roads and 37 turbines under Phase I and Phase II would result in a long-term, although intermittent, loss of opportunities for solitude and primitive recreation. This would result long-term impacts on wilderness characteristics.

Decommissioning

Decommissioning the project would result in similar impacts as those described for construction. Decommissioning 8 miles of project roads and 37 wind turbine foundations would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation from surface disturbance and the presence of vehicles. This would result in a short-term impact on areas with wilderness characteristics. However, the project area would be reclaimed once decommissioning is complete, which could reestablish the naturalness of the area and wilderness characteristics.

Alternative B2c

Construction

During Phase I construction, less than 1 mile of new roads within Black Canyon and Corral Creek would result in 2 acres of short-term and 1 acre of long-term surface disturbance (Table 4.3.9-4). Surface disturbance and the presence of roads would result in a negligible loss of naturalness and opportunities for solitude and unconfined primitive recreation. Wilderness character value would not diminish.

During Phase II construction, 7 miles of new roads and the installation of 37 turbines within Black Canyon and Corral Creek would result in 101 acres of short-term and 28 acres of long-term surface disturbance (Table 4.3.9-4). Surface disturbance, and the presence of roads and turbines, would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation. Wilderness character value would diminish within a relatively small, localized portion of the Black Canyon area, whereas, wilderness character value would diminish throughout a large portion of the Corral Creek area.

Construction of Phase I and Phase II would cause 101 acres of short-term and 28 acres of long-term disturbance from the creation of 8 miles of new roads and the installation of 37 turbines (Table 4.3.9-4). Impacts on areas with wilderness characteristics from surface disturbance, and the presence of roads and turbines, would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation. Wilderness character value would diminish within a relatively small, localized portion of Black Canyon; whereas, wilderness character value would diminish throughout a large portion of Corral Creek.

Table 4.3.9-4. Project Disturbance Proposed within Areas with Wilderness Characteristics for Alternative B2c.

Areas with Wilderness Characteristics	Phases	Miles of New Roads	Number of Turbines	Acres of Short-term Disturbance[1]	Acres of Long-term Disturbance[2]
Black Canyon	Phase I	0	0	1	0
	Phase II	1	4	11	3
	Phase I & II	**1**	**4**	**12**	**3**
Corral Creek	Phase I	<1	0	1	1
	Phase II	6	33	88	24
	Phase I & II	**7**	**33**	**89**	**25**
Total (Black Canyon and Corral Creek)	Phase I	1	0	2	1
	Phase II	7	37	99	27
	Phase I & II	**8**	**37**	**101**	**28**

[1] Short-term disturbance = areas disturbed during project construction that would be revegetated.
[2] Long-term disturbance = areas disturbed during construction that would be reclaimed during project decommissioning.

Operation and Maintenance

O&M of less than 1 mile of project roads during Phase I would not result in impacts on wilderness characteristics within the Black Canyon or Corral Creek areas.

The presence of 37 turbines constructed during Phase II, and the noise produced by the turbines, would result in a loss of naturalness and opportunities for primitive unconfined recreation throughout most of Corral Creek and within a small portion of Black Canyon. This would cause a long-term impact on wilderness characteristics within these areas. O&M activities associated with 7 miles of project roads and 37 turbines under Phase II would result in a long-term, although intermittent, loss of opportunities for solitude and primitive recreation. This would result long-term impacts on wilderness characteristics.

The presence of 37 turbines constructed during Phase I and Phase II, and the noise produced by the turbines, could result in a loss of naturalness and opportunities for primitive unconfined recreation throughout most of Corral Creek and within a small portion of Black Canyon. This would cause a long-term impact on wilderness characteristics within these areas. O&M activities associated with 8 miles of project roads and 37 turbines under Phase I and Phase II would result in a long-term, although intermittent, loss of opportunities for solitude and primitive recreation. This would result long-term impacts on wilderness characteristics.

Decommissioning

Decommissioning the project would result in similar impacts as those described for construction. Decommissioning 8 miles of project roads and 37 wind turbine foundations would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation from surface disturbance and the presence of vehicles. This would result in a short-term impact on areas with wilderness characteristics. However, the project area would be reclaimed once decommissioning is

complete, which could potentially reestablish the naturalness of the area and wilderness characteristics.

Alternative C

Construction

Construction of 5 miles of new roads and installation of 21 turbines within the Corral Creek area would result in 58 acres of short-term and 17 acres of long-term surface disturbance (Table 4.3.9-5). Impacts on areas with wilderness characteristics from surface disturbance, and the presence of roads and turbines, would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation. Wilderness character value would diminish throughout a large portion of the Corral Creek area. New road and turbine construction would not occur within the Black Canyon area.

Table 4.3.9-5. Project Disturbance Proposed within Areas with Wilderness Characteristics for Alternative C.

Areas with Wilderness Characteristics	Miles of New Roads	Number of Turbines	Acres of Short-term Disturbance[1]	Acres of Long-term Disturbance[2]
Black Canyon	0	0	0	0
Corral Creek	5	21	58	17
Total	**5**	**21**	**58**	**17**

[1] Short-term disturbance = areas disturbed during project construction that would be revegetated.
[2] Long-term disturbance = areas disturbed during construction that would be reclaimed during project decommissioning.

Operation and Maintenance

The presence of 21 turbines, and the noise produced by the turbines, would result in a loss of naturalness and opportunities for primitive unconfined recreation throughout a large portion of the Corral Creek area. The presence and noise produced by the turbines would result in a long-term impact on wilderness characteristics. The presence of vehicles associated with the O&M of 5 miles of roads would result in a long-term, although intermittent, loss of opportunities for solitude and primitive unconfined recreation. The O&M of turbines and roads would result in a long-term loss of wilderness characteristics.

Decommissioning

Decommissioning the project would result in similar impacts as those described for construction. Decommissioning 5 miles of project roads and 21 wind turbine foundations would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation from surface disturbance and the presence of vehicles. This would result in a short-term impact on areas with wilderness characteristics. However, the project area would be reclaimed once decommissioning is complete, which could potentially reestablish the naturalness of the area and wilderness characteristics.

Alternative D

Construction

Construction of 5 miles of new roads and installation of 21 turbines within the Corral Creek area would result in 58 acres of short-term and 17 acres of long-term surface disturbance (Table 4.3.9-6). Impacts on areas with wilderness characteristics from surface disturbance, and the presence of roads and turbines, would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation. Wilderness character value would diminish throughout a large portion of the Corral Creek area. New road and turbine construction would not occur within the Black Canyon area.

Table 4.3.9-6. Project Disturbance Proposed within Areas with Wilderness Characteristics for Alternative D.

Areas with Wilderness Characteristics	Miles of New Roads	Number of Turbines	Acres of Short-term Disturbance[1]	Acres of Long-term Disturbance[2]
Black Canyon	0	0	0	0
Corral Creek	5	21	58	17
Total	**5**	**21**	**58**	**17**

[1] Short-term disturbance = areas disturbed during project construction that would be revegetated.
[2] Long-term disturbance = areas disturbed during construction that would be reclaimed during project decommissioning.

Operation and Maintenance

The presence of 21 turbines, and the noise produced by the turbines, would result in a loss of naturalness and opportunities for primitive unconfined recreation throughout a large portion of the Corral Creek area. The presence and noise produced by the turbines would result in a long-term impact on wilderness characteristics. The presence of vehicles associated with the O&M of 5 miles of roads would result in a long-term, although intermittent, loss of opportunities for solitude and primitive unconfined recreation. The O&M of turbines and roads would result in a long-term loss of wilderness characteristics.

Decommissioning

Decommissioning the project would result in similar impacts as those described for construction. Decommissioning 5 miles of project roads and 21 wind turbine foundations would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation from surface disturbance and the presence of vehicles. This would result in a short-term impact on areas with wilderness characteristics. However, the project area would be reclaimed once decommissioning is complete, which could potentially reestablish the naturalness of the area and wilderness characteristics.

Alternative E

Construction

Construction of 3 miles of new roads and installation of 10 turbines within Black Canyon and Corral Creek would result in 22 acres of short-term and 10 acres of long-term surface disturbance (Table 4.3.9-7). Impacts on areas with wilderness characteristics from surface disturbance, and the presence of roads and turbines, would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation. Wilderness character value would diminish throughout small, localized portions of the Black Canyon and Corral Creek areas.

Table 4.3.9-7. Project Disturbance Proposed within Areas with Wilderness Characteristics for Alternative E.

Areas with Wilderness Characteristics	Miles of New Roads	Number of Turbines	Acres of Short-term Disturbance[1]	Acres of Long-term Disturbance[2]
Black Canyon	1	4	12	3
Corral Creek	2	6	20	7
Total	**3**	**10**	**32**	**10**

[1] Short-term disturbance = areas disturbed during project construction that would be revegetated.
[2] Long-term disturbance = areas disturbed during construction that would be reclaimed during project decommissioning.

Operation and Maintenance

The presence of 10 turbines, and the noise produced by the turbines, would result in a loss of naturalness and opportunities for primitive unconfined recreation throughout small, localized portions of Black Canyon and Corral Creek. The presence and noise produced by the turbines would result in a long-term impact on wilderness characteristics. The presence of vehicles associated with the O&M of 3 miles of roads would result in a long-term, although intermittent, loss of opportunities for solitude and primitive unconfined recreation. The O&M of turbines and roads would result in a long-term loss of wilderness characteristics.

Decommissioning

Decommissioning the project would result in similar impacts as those described for construction. Decommissioning 3 miles of project roads and 10 wind turbine foundations would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation from surface disturbance and the presence of vehicles. This would result in a short-term impact on areas with wilderness characteristics. However, the project area would be reclaimed once decommissioning is complete, which could reestablish the naturalness of the area and wilderness characteristics.

Alternative F

Construction

Construction of 5 miles of new roads and installation of 21 turbines within the Corral Creek area would result in 58 acres of short-term and 17 acres of long-term surface disturbance (Table 4.3.9-8).

Impacts on areas with wilderness characteristics from surface disturbance, and the presence of roads and turbines, would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation. Wilderness character value would diminish throughout a large portion of the Corral Creek area. New road and turbine construction would not occur within the Black Canyon area.

Table 4.3.9-8. Project Disturbance Proposed within Areas with Wilderness Characteristics for Alternative F.

Areas with Wilderness Characteristics	Miles of New Roads	Number of Turbines	Acres of Short-term Disturbance[1]	Acres of Long-term Disturbance[2]
Black Canyon	0	0	0	0
Corral Creek	5	21	58	17
Total	**5**	**21**	**58**	**17**

[1] Short-term disturbance = areas disturbed during project construction that would be revegetated.
[2] Long-term disturbance = areas disturbed during construction that would be reclaimed during project decommissioning.

Operation and Maintenance

The presence of 21 turbines, and the noise produced by the turbines, would result in a loss of naturalness and opportunities for primitive unconfined recreation throughout a large portion of the Corral Creek area. The presence and noise produced by the turbines would result in a long-term impact on wilderness characteristics. The presence of vehicles associated with the O&M of 5 miles of roads would result in a long-term, although intermittent, loss of opportunities for solitude and primitive unconfined recreation. The O&M of turbines and roads would result in a long-term loss of wilderness characteristics.

Decommissioning

Decommissioning the project would result in similar impacts as those described for construction. Decommissioning 5 miles of project roads and 21 wind turbine foundations would result in a loss of naturalness and opportunities for solitude and unconfined primitive recreation from surface disturbance and the presence of vehicles. This would result in a short-term impact on areas with wilderness characteristics. However, the project area would be reclaimed once decommissioning is complete, which could reestablish the naturalness of the area and wilderness characteristics.

4.3.9.3 Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

The northern inbound haul route would not result in impacts on wilderness characteristics.

Southern Inbound Haul Route Option 1 and Option 2

Either option of the southern inbound haul route would not result in impacts on wilderness characteristics.

Outbound Haul Route

The outbound haul route would not result in impacts on wilderness characteristics.

4.3.9.4 Project as a Whole

There are no impacts on areas with wilderness characteristics from construction or use of the haul routes; therefore, this section provides a side-by-side comparison of the primary analysis indicators for Black Canyon and Corral Creek areas for each alternative (Table 4.3.9-9).

The impacts on wilderness characteristics within the Black Canyon area from new roads, turbines, and surface disturbance would be similar under Alternatives B1, E, and the full-build of B2a, B2b, and B2c. These impacts would affect a small and localized portion of the Black Canyon area where wilderness characteristics of naturalness and outstanding opportunities for primitive recreation or solitude would diminish. Alternatives C, D, and F would not impact the Black Canyon area.

The impacts on wilderness characteristics within the Corral Creek area from new roads, turbines, and surface disturbance would be similar under Alternatives B1, and the full-build of B2a, B2b, and B2c. Impacts would be less under Alternatives C, D, and F. Alternative E would result in the fewest impacts on the Corral Creek area through diminished wilderness characteristics.

Table 4.3.9-9. Summary of Impacts on Wilderness Characteristics for each Alternative.

ALT		Miles of New Roads			Number of Turbines			Acres of Short-term Disturbance[1]			Acres of Long-term Disturbance[2]		
		Black Canyon	Corral Creek	Total	Black Canyon	Corral Creek	Total	Black Canyon	Corral Creek	Total	Black Canyon	Corral Creek	Total
B1		1	7	8	4	33	37	12	89	101	3	25	28
B2a	Phase I	0	7	7	0	33	33	0	89	89	0	25	25
	Phase II	1	0	1	4	0	4	12	0	12	3	0	3
	Phase I&II	1	7	8	4	33	37	12	89	101	3	25	28
B2b	Phase I	1	7	8	4	33	37	12	89	101	3	25	28
	Phase II	0	0	0	0	0	0	0	0	0	0	0	0
	Phase I&II	1	7	8	4	33	37	12	89	101	3	25	28
B2c	Phase I	0	<1	<1	0	0	0	1	1	2	0	1	1
	Phase II	1	6	7	4	33	37	11	88	99	3	24	27
	Phase I&II	1	7	8	4	33	37	12	89	101	3	25	28
C		0	5	5	0	21	21	0	58	58	0	17	17
D		0	5	5	0	21	21	0	58	58	0	17	17
E		1	2	3	4	6	10	12	20	32	3	7	10
F		0	5	5	0	21	21	0	58	58	0	17	17

[1] Short-term Disturbance = acres disturbed during construction that are revegetated shortly thereafter.
[2] Long-term Disturbance = acres disturbed during construction that are reclaimed after decommissioning.

4.3.9.5 Cumulative Impacts

The cumulative effects analysis area includes all lands identified as having wilderness characteristics within 50 miles of the project area. These areas include the two lands with wilderness characteristics that overlap the project area, Black Canyon (8,000 acres) and Corral Creek (6,000 acres), as well as five other areas identified as lands with wilderness characteristics: Columbet Table (4,000 acres), East Fork Jarbidge (6,000 acres), Hole in the Ground (7,000 acres), Long Draw (16,500 acres), and Salmon Falls Creek (5,000 acres). Three WSAs, Bad Lands WSA in Nevada (9,000 acres), Rough Hills WSA in Nevada (6,500 acres), and Lower Salmon Falls Creek WSA in Idaho (3,000 acres), are also within the cumulative effects analysis area. In addition, two designated Wilderness Areas fall within the analysis area, the Bruneau-Jarbidge Rivers Wilderness Area in Idaho (164,000 acres) and the Jarbidge Wilderness Area in Nevada (199,000 acres). Combined, these areas comprise 434,000 acres of land with wilderness characteristics within the region of the project area; lands identified for wilderness characteristics, excluding WSAs and Wilderness Areas, account for 52,500 acres of the total.

Alternative A (No Action Alternative)

The No Action Alternative, in combination with past, present, and reasonably foreseeable future actions listed in Table 4.0.2-1, would not result in a decrease in overall regional acreage that currently supports wilderness character.

All Action Alternatives

Past, present, and reasonably foreseeable future projects, in combination with all action alternatives, would result in a decrease in overall regional acreage that support wilderness character. A small portion of Black Canyon would no longer support wilderness character under most of the action alternatives; however, the area as a whole would still support wilderness character under all action alternatives. Under all action alternatives, Corral Creek (6,000 acres) would no longer support wilderness character. Therefore, the loss of wilderness character within Corral Creek would reduce the overall regional acreage of land, including all lands designated or identified for wilderness characteristics (i.e., WSAs, Wilderness Areas, and other identified lands with wilderness characteristics) by 1 to 2 percent. Areas identified as lands with wilderness characteristics, excluding WSAs and Wilderness Areas, would be reduced by 11 percent within the cumulative effects analysis area.

4.3.10 FIRE AND FUELS MANAGEMENT

This section discusses potential impacts on fire and fuels management that could result from implementing the Proposed Action or other action alternatives. The analysis area for fire and fuel management includes the project area and haul routes.

4.3.10.1 Analysis Methods

Impacts on fire and fuels management could occur during the construction, O&M, and decommissioning phases of the project. For purposes of this assessment, fire and fuels management

includes suppression, fuels management (vegetation removal or rehabilitation, prescribed fire), and fire rehabilitation projects. The analysis takes into account guidance provided in the 1987 Jarbidge RMP and the 1985 Wells RMPs, the South Central Idaho Fire Planning Unit Twin Falls District Fire Management Plan (BLM, 2005), the Elko and Wells RMPs approved Fire Management Amendment and Decision Record (BLM, 2004a), and the northeastern Nevada Fire Planning Unit Elko Field Office Fire Management Plan (BLM, 2004b).

Fire regime condition class is dependent on changes in fire return interval, fire severity, and vegetation. Changes are measured by the degree of departure from a historical reference condition (historical fire regime) as it pertains to both vegetation seral classes and fire frequency.

Indicators

The following indicators were used for the analysis of impacts on fire and fuels management:

- Fire Regime Condition Class – Any action which alters vegetation seral classes or fire frequency (i.e., increased access, transmission lines, construction, etc.), could change the fire regime condition class.
- Number of human-caused fires – This indicator is a measure of the actions that increase or reduce the potential for human-caused fires.
- Fire management – This indicator is a measure of the change in fire management response. What type of suppression activities would be available, or allowed in the area, response time, fire break usage, etc.
- Fire Size – This indicator measures the impacts of actions on the size and rate of spread of a fire. As fire size increase, so do costs associated with suppressing the fire.

In addition, the cost of wildland fire suppression indicator is discussed qualitatively. This indicator measures the total costs involved in suppressing a fire. Costs include travel costs, costs of suppression tactics, cost of suppression equipment, and cost of fire personnel (time).

Methods and Assumptions

Impacts on fire and fuels management are assessed by determining the potential for changes to fire regime condition class, fire management strategies, fire size, or a potential to change the number of human-caused wildland fires in the analysis area. The qualitative analysis discusses how fire management techniques (e.g., suppression, access) would potentially change as a result of the project. Quantitative data is be used where appropriate.

Impact intensities used in the analysis of fuels and fire management are provided below.

> **Minor** – The effect on the fire regime condition class or the potential for increased fire ignition sources is detectable, but does not change the fire regime condition class or wildland fire management techniques.

Moderate – The effect on the fire regime condition class or the potential for increased fire ignition sources is apparent and could change the fire regime condition class or could create a change in wildland fire management techniques.

Major – The effect on the fire regime condition class or the potential for increased fire ignition sources is large and highly noticeable and would change the fire regime condition class or would create a long-term change in wildland fire management techniques.

Assumptions:

- It is assumed that if the rate of response to a fire is increased (e.g., it takes longer to get fire crews to the fire), the fire could be larger than if response times were decreased.
- It is also assumed that at least one ground crew would be available for initial attack of a fire in the project area if one were to occur during construction, O&M, or decommissioning of the project.
- When a burned area is revegetated, the area would be classified within fire regime condition class 1. Over time, five years or more, the area would degrade back to fire regime condition class 2.
- In general, the fire season typically starts in May, ends in October, and peaks in late July to mid-August. It is assumed that most of the construction of the project would occur during the typical fire season. Since O&M would be an ongoing activity, it would also occur during the typical fire season.
- When there is an increased number of vehicles and people in the project area, there is an increased potential for human-caused fires.

4.3.10.2 Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

Alternative A would have no impact on the ability of the BLM to suppress wildland fire and manage surface fuels within the project area. There would be no change in fire management suppression tactics available for use in the area and there would be no increase in the potential for human-caused fire ignitions related to development of the project.

Impacts Common to All Action Alternatives

The impacts common to all action alternatives are discussed based on potential effects from construction, O&M, and decommissioning of the project. Following these discussions is the analyses of fire and fuels management impacts that are unique to each action alternative.

In general, by following the design features in Appendix 2A and mitigation recommended in Section 2.4.6, impacts on fire and fuels management from construction, O&M, and decommissioning activities would be minimized or eliminated. The design features and mitigation could reduce the number of human-caused (or vehicle-caused) ignitions and could reduce the spread of wildland fire.

Construction

The risk of human-caused ignitions in the project area could temporarily increase during construction activities. Operation of heavy machinery and work crews during periods of high fire danger (e.g., hot and windy summer days) would increase the potential for ignition. Welding, or other fabrication activities that produce sparks would pose the highest risk. Wildland fires could also be initiated by contact with hot engine parts during vehicle use, and careless cigarette disposal by construction workers in the project area.

In the event of an ignition within the project area, the presence of construction crews and equipment could delay suppression operations and pose a hazard to fire suppression crews. Limited access to the project area could cause traffic congestion that could increase safety hazards and delay suppression operations as construction crews evacuate the area, and suppression crews enter. Traffic congestion could lead to more acres burned from wildland fire. This impact should only be minor in nature and would only be temporary during construction periods. Construction, under most action alternatives, is expected to last for two years (three years for phased alternatives and four years for Alternative E), would be limited to daylight hours, and would not occur in all 12 months of the year. Additional hazards to suppression crews include any machinery or vehicles left behind by construction crews, overhead hazards (e.g. towers, transmission interconnect lines, substations), and hazardous materials (e.g., fuel storage tanks, blasting materials).

There would be minor temporary changes to fire management within the project area during construction activities. Several methods for suppressing a wildland fire, such as back burning, aerial retardants, or creating fire breaks near open trenches may not be available while construction crews and construction equipment are on site. Because some suppression methods may not be available, containment of a wildland fire could take longer; if containment or initial attack of the fire takes longer then the fire could be larger in size. This could be an indirect moderate short-term impact on fire management and potential increase in fire size could occur because of the limited wildland fire suppression tactics. Construction personnel and infrastructure would modify priorities for fires, fire management plans, and fire fighters. Protecting the people, equipment, and infrastructure would add complexity to the management of fires and would take priority over natural resources. Commitment of fire suppression resources for protection of life and property, or infrastructure, would leave fewer resources for containment and could lead to larger fires.

During construction, blasting operations could occur for roadway and foundation work. Sparks created during blasting could ignite vegetation causing a wildland fire. A Blasting Control Plan, including design features (Appendix 2A), would be followed and the likelihood of a wildland fire starting from blasting activities would be minor and only temporary in nature.

According to the Twin Falls Fire Management Plan (BLM, 2005), "Contractors conducting business on BLM-managed lands are subject to the Idaho Fire Restrictions Agreement." Information pertaining to fire restrictions would be included, and updated throughout the fire season, in the project Fire Prevention Plan. Similarly, the BLM and other agencies in Nevada will release fire restrictions for

specific areas when warranted. Restrictions in Idaho and Nevada are generally posted on several internet sites including the South Central Idaho Interagency Dispatch Center and the Nevada Division of Forestry. The project would have to comply with any fire restrictions developed for the project area. A Fire Prevention Plan would be developed by the proponent and would be reviewed and approved by the BLM before construction could begin. The Fire Prevention Plan would include design features that would reduce the risk of human-caused fires in the project area during construction (Appendix 2A). The Fire Prevention Plan would also include information on how construction crews should react if a fire is started in the project area by humans or by natural causes, such as lightning. The fire management plans used for lands within the project area would also have to be updated, by the BLM, to reevaluate response strategy and tactics during construction, O&M, and decommissioning activities by the Applicants.

Operation and Maintenance

Operation and maintenance of project roads could have long-term impacts on fire management. New and reconstructed roads would provide better access to the project area for firefighters. In the event of an ignition, project roads could decrease the response time by fire suppression crews, indirectly resulting in the potential for earlier containment of wildfire and a reduction in acres burned (rate of spread). New roads could benefit fire managers in the short- and long-term and indirectly by acting as potential fuel breaks in the event of fire suppression operations. Fuel breaks generally reduce the rate of spread of fire. Additional potential fuel breaks in the project area could increase the ability of firefighters to suppress wildfire safely. The combination of improved access for fire crews and the potential for these roads to provide fuel breaks could reduce fire size in the project area. Additional roads constructed within the project area and increased use on these and existing roads could increase the potential for the introduction and spread of cheatgrass, and other undesirable plants. Cheatgrass is highly flammable and densely growing populations provide ample fuels that increase fire intensity and often decrease the intervals between fires (Colorado State University, 2007). Revegetation and rehabilitation after the construction should minimize the introduction and spread of cheatgrass.

The project would increase the number of safety hazards that firefighters would have to negotiate in the event of wildfire suppression in the project area. Fire crews operating from both the ground and the air would encounter increased safety hazards from towers, turbines, substations, and transmission interconnect lines. The presence of these structures could limit fire suppression tactics in the event of wildfire in the project area. For example, the use of aerial retardant or water may be reduced or eliminated due to the presence of the wind turbines, transmission lines, or other tall structures. This could have a long-term minor effect on fire size. Safety hazards associated with the project could force fire management to use indirect suppression tactics when responding to fires in the project area if the safety risk is too great for direct suppression. A greater number of acres could burn within the project area where indirect suppression tactics replace direct suppression. This would be a long-term indirect effect. This impact could be mitigated by requiring the wind turbines to be shut down during fire events so that aerial vehicles could travel safely through the area (Section 2.4.6.2).

The presence of life and property within the project area would also increase the costs associated with firefighting. Because protection of life and property are the number one priorities of any fire management plan, they would have to protect people's lives or property within the project area before they could focus on direct suppression activities on a wildland fire in the area. This would lead to greater costs because the fire would likely take longer to extinguish and more equipment and/or personnel would be required to protect life and property. As equipment and personnel are pulled from directly fighting the fire, it is likely that the fire would take more time to contain and thus be a larger fire. The presence of operational wind turbines during a fire event could cause communication problems as well, if the turbines interfered with two-way handheld radios. The wind turbulence created by the turbine blades could also create unpredictable fire behavior and this could lead to an increase in the time it takes to contain a fire. Both of these impacts could be mitigated by requiring the wind turbines to be shut down during a fire event (Section 2.4.6.2).

Underground utilities could limit potential fuel break construction in site-specific areas depending on the depth of the cables in the trench. While the majority of the underground utilities would follow a potential fuel break associated with project roads, the ability to widen the potential fuel break may be limited due to the depth of underground utilities. Fuel breaks created by earth moving equipment such as bulldozers may not be appropriate where underground utilities would exist near the surface. Underground utilities could also limit post fire emergency stabilization and rehabilitation efforts. Emergency stabilization and rehabilitation practices often utilize rangeland drills, disks, or other heavy equipment that may not be appropriate near underground utilities depending on the depth of the utility. Depths of all utilities would be known based on information from the final design, and would be included in the Fire Prevention Plan.

The towers would effectively increase the lightning-attractive area at China Mountain. The probability of lightning striking an object is found by multiplying the lightning-attractive area of the object by the local ground-flash density (lightning strikes to ground per unit area; Hasbrouk, 2004). This could create an increase in the number of lightning caused fire starts in the area; however, the towers would be fully grounded. Because the towers would be grounded, the potential for a fire would only occur if the ground failed. This would be a minor long-term effect on fires.

The presence of towers, wind turbines, and substations along the ridgelines could have an impact on communication to the extent that they could scatter radio signals used by fire line personnel to communicate during fire management activities. This could create a long-term indirect impact on fire management and potentially increase the response time to a wildland fire in the area.

Dry vegetation and high winds could combine to cause a potential fire hazard around wind facilities. Under these conditions, fires could start for a variety of reasons, such as electrical shorts, insufficient equipment maintenance, contact with power lines, and lightning. The International Electrotechnical Commission requires that the design of the wind turbine generator electrical system comply with relevant International Electrotechnical Commission standards (1999). The wind turbine generator system would be designed to reduce the potential for fire ignition in the project area.

Herbicides could be used to control vegetation around facilities, road systems, and disturbed areas to reduce the potential for ignition sources (Appendix 2A). Operators shall develop a Fire Prevention Plan to implement measures to minimize the potential for a human-caused fire. Information pertaining to fire restrictions and closures would be included, and updated throughout the fire season and throughout the life of the project, in the project Fire Prevention Plan.

Decommissioning

Impacts on fire and fuels management during decommissioning would be similar to construction. However, blasting would not be present during decommissioning activities. A truck mounted jack hammer and cutting torch would be used to remove the top three feet of the tower foundations. All action alternatives would be decommissioned after 30 years of operation, from the beginning of the project. The use of a cutting torch would create a short-term minor impact by creating the potential for human-caused fires during its use.

Once the project is decommissioned, the newly constructed roads for the project area would be reclaimed. When the roadways are reclaimed and revegetated, they would no longer be available for public use and there would be a minor decrease in the potential for human-caused fires in the project area because no vehicles would be allowed on the reclaimed roads. This would decrease the area that would be potentially impacted by a human-caused fire.

Alternative B1 (Proposed Action)

Construction

The project would disturb approximately 812 acres; 585 during the short-term, 202 acres over the long term, and 25 acres permanently. There would be 62 miles of roads constructed and 21 miles of roads reconstructed for this alternative. The potential impacts on the fire regime condition classes within the project area from the construction disturbance would be minor and much of the area (short-term disturbance) should return to current conditions (Alternative A) within five years. Trenching would disturb 84 acres in the short-term and would be reclaimed once the underground utilities have been constructed. During construction, additional impacts on fire regime condition class could occur if cheatgrass is introduced. This would decrease the fire return interval and could create an opportunity for larger fires. Once cheatgrass has been introduced, it is relatively hard to remove and could create the need for additional fuels management activities in the project area over the long term.

The number of truck trips necessary to construct B1 would be approximately 15,130. This would temporarily increase the potential of a human-caused wildland fire in the project area from possible sparks, from construction vehicles, igniting dry vegetation. Two substations, electrical transmission lines, four laydown yards, and other facilities would also be constructed. This would temporarily increase the potential of a human-caused wildland fire in the project area from possible sparks from construction equipment igniting dry vegetation. In Alternative A (No Action), there would not be an increase in use of the project area from construction activities and so the potential to ignite a human-caused fire is greater for Alternative B1. The presence of construction crews, heavy equipment, and

hazardous materials in the event of a wildfire would have the same impacts on mobilization and operation of fire suppression crews as described under *Impacts Common to All Action Alternatives.*

Operation and Maintenance

There would be 170 wind turbines and 83 miles of roads to maintain during O&M of the wind energy facility. Traffic on the roadways from O&M crews would be low and visitors to the area on the new roads could increase somewhat over current levels, but would probably not increase enough to cause more than a minor impact on the potential for human-caused fires in the project area. Over the long term, protection of people and infrastructure at the facility would affect fire management decisions. Operation and maintenance personnel and infrastructure would modify fire management plan priorities and would add complexity to management of fires. The project area (personnel and structures) would take priority over natural resource values during wildland fire suppression efforts.

Decommissioning

Decommissioning impacts would be the same as those described in the *Impacts Common to All Action Alternatives*. Decommissioning 62 miles of project roads and 170 turbines could increase the potential for human-caused ignitions on a temporary basis. Reclamation would reduce changes to the fuels and in turn the fire regime condition class.

Alternative B2a

Construction

Phase I would disturb approximately 536 acres; 370 acres being disturbed during the short-term, 149 acres in the long-term, and 17 acres on a permanent basis. During Phase I of Alternative B2a, 49 miles of new roadway would be constructed and 14 miles of roadway would be reconstructed. This would have a minor short-term impact on the potential for human-caused fires from the roadway use during construction. The potential impacts on the fire regime condition classes within the project area from the construction disturbance would be minor and much of the area (short-term disturbance) should return to current conditions (Alternative A) within five years. Trenching activities would disturb 51 acres in the short-term during Phase I, and would be reclaimed once the underground utilities have been constructed. During construction, additional impacts on fire regime condition class could occur if cheatgrass is introduced. This would decrease the fire return interval and could create an opportunity for larger fires. Once cheatgrass has been introduced, it is relatively hard to remove and could create the need for additional fuels management activities in the project area over the long term.

The number of truck trips necessary to construct Phase I would be approximately 8,900. This could cause a minor temporary increase in the potential of a human-caused wildland fire, from construction vehicles, in the project area from possible sparks igniting dry vegetation. This would be 6,230 trips less than Alternative B1, but would only include the truck trips necessary to construct Phase I. The presence of construction crews, equipment, and hazardous materials in the event of a wildfire would

have the same impacts on mobilization and operation of fire suppression crews as described under *Impacts Common to All Action Alternatives.*

Phase II would disturb another 301 acres, with 232 acres being disturbed in the short-term, 60 acres in the long-term, and 9 acres on a permanent basis for a total of approximately 837 acres for Phase I and Phase II. An additional 13 miles of roadway would be constructed and 7 miles would be reconstructed during Phase II. Trenching activities would disturb 33 additional acres in the short-term during Phase II construction, and would be reclaimed once the underground utilities have been constructed. There would be an additional 6,230 truck trips required to construct Phase II. This would, again, create a minor temporary increase in the potential of a human-caused wildland fire in the short-term in the project area from possible sparks igniting dry vegetation.

From Phase I and Phase II combined, there would be a total of 62 miles of roadway constructed and 21 miles reconstructed that could potentially be used during construction activities. This would create a large area with the potential for human-caused fires. The impact would be minor and short-term during construction activities. The total trenching for Phase I and Phase II would be 84 acres, which is the same as Alternative B1, but it would be split into two phases and the Phase I trenching areas would be reclaimed in between construction of Phase I and Phase II. The total number of truck trips for Phase I and Phase II would equal the number of trips required for Alternative B1. The presence of construction crews, equipment, and hazardous materials in the event of a wildfire would have the same impacts on mobilization and operation of fire suppression crews as described under *Impacts Common to All Action Alternatives.*

Operation and Maintenance

There would be 100 wind turbines and 63 miles of roads to maintain during Phase I O&M of the wind energy facility. Traffic on the roadways from O&M crews would be low and visitors to the area on the new roads could increase some of the current levels, but would not increase enough to cause more than a minor impact on the potential for human-caused fires in the project area. Over the long term, protection of people and infrastructure at the facility would affect fire management decisions. Operation and maintenance personnel and infrastructure would modify fire management plan priorities and would add complexity to management of fires. The project area (personnel and structures) would take priority over natural resource values during wildland fire suppression efforts.

There would be an additional 70 wind turbines and 20 more miles of roads to maintain during Phase II O&M of the wind energy facility. The impacts from the additional turbine O&M and roadway use would still be low and visitors to the area on the new roads could increase slightly over Phase I, but would still not increase enough to cause more than a minor increase to the potential for human-caused fires in the project area. Over the long term, protection of people and infrastructure at the facility would affect fire management decisions greater than just the O&M of Phase I because of the additional roadway, personnel, and facilities in the project area. Operation and maintenance personnel and infrastucture would modify fire management plan priorities and would add complexity to management of fires and the project area (personnel and structures) would take priority over natural

resource values during wildland fire suppression efforts. The impact from O&M of both Phase I and Phase II would be the same as Alternative B1.

Decommissioning

These impacts would be the same as Alternative B1.

Alternative B2b

Construction

Phase I would disturb approximately 523 acres, with 367 acres being disturbed during the short-term, 131 acres in the long-term, and 25 on a permanent basis. During Phase I of Alternative B2b, 41 miles of new roadway would be constructed and 21 miles would be reconstructed. This would have minor short-term impacts on the potential for human-caused fires from the roadway construction and use. The potential impacts on the fire regime condition classes within the project area from the construction disturbance would be minor and much of the area (short-term disturbance) should return to current conditions (Alternative A) within five years. Trenching activities would disturb 48 acres in the short-term during Phase I, and would be reclaimed once the underground utilities have been constructed. During construction, additional impacts on fire regime condition class could occur if cheatgrass is introduced. This would decrease the fire return interval and could create an opportunity for larger fires. Once cheatgrass has been introduced, it is relatively hard to remove and could create the need for additional fuels management activities in the project area over the long term.

The number of truck trips necessary to construct Phase I would be approximately 8,900. The truck trips into the project area would temporarily increase the potential of human-caused wildland fires. This would be 6,230 trips less than Alternative B1, but would only include the truck trips necessary to construct Phase I. The presence of construction crews, equipment, and hazardous materials in the event of a wildfire would have the same impacts on mobilization and operation of fire suppression crews as described under *Impacts Common to All Action Alternatives*.

Phase II would disturb another 313 acres with 235 acres being disturbed in the short-term, 78 acres in the long-term, and no additional permanent impacts would occur. An additional 21 miles of roadway would be constructed and no additional roadway would be reconstructed during Phase II of this alternative. Trenching activities would disturb 32 acres in the short-term during Phase II construction, and would be reclaimed once the underground utilities have been constructed.

The total disturbance of both phases of construction would be 836, which is 1 acre less than Alternative B2a. From Phase I and Phase II combined, there would be a total of 83 miles of roadway that could potentially be used during construction activities. This would create a larger area than Phase I that would have the potential for human-caused fires from sparks or other hot parts of vehicles igniting vegetation. The impact would be minor and temporary during construction activities. The total trenching for Phase I and Phase II would be 84 acres, which is the same as Alternative B1, but it would be split into two phases and the Phase I trenching areas would be reclaimed in between construction of Phase I and Phase II.

There would be an additional 6,230 truck trips required for construction of Phase II. This would temporarily increase the potential for human-caused wildland fires in the project area from possible sparks igniting dry vegetation. The total number of truck trips for Phase I and Phase II would equal the number of trips required for Alternative B1. The presence of construction crews, equipment, and hazardous materials in the event of a wildfire would have the same impacts on mobilization and operation of fire suppression crews as described under *Impacts Common to All Action Alternatives.*

Operation and Maintenance

There would be 100 wind turbines and 62 miles of roads to maintain during Phase I O&M of the wind energy facility. Traffic on the roadways from O&M crews would be low and visitors to the area on the new roads could increase some, but would not increase enough to cause more than a minor impact on the potential for human-caused fires in the project area. Over the long term, protection of people and infrastructure at the facility would affect fire management decisions. Operation and maintenance personnel and infrastructure would modify fire management plan priorities and would add complexity to management of fires. The project area (personnel and structures) would take priority over natural resource values during wildland fire suppression efforts.

There would be an additional 70 wind turbines and 21 more miles of roads to maintain during Phase II O&M of the wind energy facility. The impacts from the additional turbine O&M and roadway use would still be low and visitors to the area on the new roads could increase slightly over Phase I, but would still not increase enough to cause more than a minor impact on the potential for human-caused fires in the project area. Over the long term, protection of people and infrastructure at the facility would affect fire management decisions greater than just the O&M of Phase I because of the additional roadway, personnel, and facilities in the project area. Operation and maintenance personnel and infrastructure would modify fire management plan priorities and would add complexity to management of fires. The project area (personnel and structures) would take priority over natural resource values during wildland fire suppression efforts. The impact from O&M of both Phase I and Phase II would be the same as Alternative B1.

Decommissioning

These impacts would be the same as Alternative B1.

Alternative B2c

Construction

Phase I would disturb approximately 564 acres with 386 acres being disturbed in the short-term, 153 acres in the long-term, and 25 acres on a permanent basis. During Phase I of Alternative B2c, 50 miles of roadway would be constructed and 20 miles would be reconstructed. This would have a minor temporary impact on the potential for human-caused fires from the roadway use during construction. The potential impacts on the fire regime condition classes within the project area from the construction disturbance would be minor and much of the area (short-term disturbance) should return to current conditions (Alternative A) within five years of construction of Phase I. Trenching

activities would disturb 50 acres in the short-term during Phase I, and would be reclaimed once the underground utilities have been constructed. During construction, additional impacts on fire regime condition class could occur if cheatgrass is introduced. This would decrease the fire return interval and could also create an opportunity for larger fires. Once cheatgrass has been introduced, it is relatively hard to remove and could create the need for additional fuels management activities in the project area over the long term.

The number of truck trips necessary to construct Phase I would be approximately 6,230. This would temporarily increase the potential for human-caused wildland fires in the project area from possible sparks igniting dry vegetation. This would be 8,900 trips less than Alternative B1. The presence of construction crews, equipment, and hazardous materials in the event of a wildfire would have the same impacts on mobilization and operation of fire suppression crews as described under *Impacts Common to All Action Alternatives*.

Phase II would disturb another 267 acres with 209 acres being disturbed in the short-term, 57 acres in the long-term, and 1 additional acre on a permanent basis. This would bring the total for Phase I and Phase II to 831 acres. An additional 12 miles of roadway would be constructed and an additional 1 mile would be reconstructed during Phase II of this alternative. From Phase I and Phase II combined, there would be a total of 83 miles of roadway that could potentially be used during construction activities. This would create a larger area than Phase I that would have the potential for human-caused fires. The impact would be minor and temporary during construction activities. Trenching activities would disturb 35 acres in the short-term during Phase II construction, and would be reclaimed once the underground utilities have been constructed. The total trenching for Phase I and Phase II would be 84 acres, which is the same as Alternative B1, but it would be split into two phases and the Phase I trenching areas would be reclaimed in between construction of Phase I and Phase II.

There would be an additional 6,230 truck trips required for construction of Phase II. This would temporarily increase the potential for human-caused wildland fire in the project area from possible sparks igniting dry vegetation. The total number of truck trips for Phase I and Phase II would equal the number of trips required for Alternative B1. The presence of construction crews, equipment, and hazardous materials in the event of a wildfire would have the same impacts on mobilization and operation of fire suppression crews as described under *Impacts Common to All Action Alternatives*.

Operation and Maintenance

There would be 100 wind turbines and 70 miles of roads to maintain during Phase I O&M of the wind energy facility. Traffic on the roadways from O&M crews would be low and visitors to the area on the new roads could increase some, but would probably not increase enough to cause more than a minor impact on the potential for human-caused fires in the project area. Over the long term, protection of people and infrastructure at the facility would affect fire management decisions. Operation and maintenance personnel and infrastructure would modify fire management plan priorities and would add complexity to management of fires. The project area (personnel and structures) would take priority over natural resource values during wildland fire suppression efforts.

There would be an additional 70 wind turbines and 13 more miles of roads to maintain during Phase II O&M of the wind energy facility. The impacts from the additional turbine O&M and roadway use would still be low and visitors to the area on the new roads could increase slightly over Phase I, but would still not increase enough to cause more than a minor impact on the potential for human-caused fires in the project area. Over the long term, protection of people and infrastructure at the facility would affect fire management decisions greater than just the O&M of Phase I because of the additional roadway, personnel, and facilities at the project area. Operation and maintenance personnel and infrastructure would modify fire management plan priorities and would add complexity to management of fires. The project area (personnel and structures) would take priority over natural resource values during wildland fire suppression efforts. The impact from O&M of both Phase I and Phase II would be the same as Alternative B1.

Decommissioning

These impacts would be the same as Alternative B1.

Alternative C

Construction

Alternative C would disturb approximately 745 acres with 531 acres being disturbed in the short-term, 189 acres in the long-term, and 25 acres on a permanent basis. There would be 59 miles of roads constructed and 20 miles of roads reconstructed for this alternative. This is 4 miles less than Alternative B1. The potential impacts on the fire regime condition class within the project area from the construction disturbance would be minor and much of the area should return to current conditions within five years. Trenching would disturb 72 acres in the short-term and would be reclaimed once the underground utilities have been constructed. This is 12 acres less than Alternative B1. During construction, additional impacts on fire regime condition class could occur if cheatgrass is introduced. This would decrease the fire return interval and could also create an opportunity for larger fires. Once cheatgrass has been introduced, it is relatively hard to remove and could create the need for additional fuels management activities in the project area over the long term.

It would require approximately 13,528 truck trips to bring in all the equipment and components necessary to construct turbines, substations, and other facilities. This would temporarily increase the potential of a human-caused wildland fire in the project area from possible sparks igniting dry vegetation. The number of truck trips to construct Alternative C would be 1,602 trips less than Alternative B1. The presence of construction crews, equipment, and hazardous materials in the event of a wildfire would have the same impacts on mobilization and operation of fire suppression crews as described under *Impacts Common to All Action Alternatives.*

Operation and Maintenance

There would be 152 wind turbines and 79 miles of roads to maintain during the O&M of the wind energy facility. Traffic on the roadways from O&M crews would be low and visitors to the area on the new roads could increase, but would probably not increase enough to cause more than a minor

impact on the potential for human-caused fires in the project area. Over the long term, protection of people and infrastructure at the facility would affect fire management decisions. Operation and maintenance personnel and infrastructure would modify fire management plan priorities and would add complexity to management of fires. The project area (personnel and structures) would take priority over natural resource values during wildland fire suppression efforts. This impact would be slightly less than that under Alternative B1 because there would be 18 fewer turbines and 4 miles less roadways.

Decommissioning

Decommissioning 59 miles of project roads and 152 turbines could increase the potential for human-caused ignitions on a temporary basis. Reclamation would reduce changes to the fuels and in turn the fire regime condition class. Decommissioning Alternative C would require the removal of 18 less turbines than Alternative B1 and 4 miles less road would need to be reclaimed.

Alternative D

Construction

This alternative would disturb approximately 631 acres with 443 acres being disturbed on a short-term basis, 163 acres on a long-term basis, and 25 acres on a permanent basis. There would be 51 miles of roads constructed and 20 miles reconstructed for this alternative. This is 11 miles less than Alternatives B1. The potential impacts on the fire regime condition classes within the project area from the construction disturbance would be minor and much of the area should return to current conditions within five years. Trenching would disturb 59 acres in the short-term and would be reclaimed once the underground utilities have been constructed. This is 25 acres less than Alternative B1. During construction, additional impacts on fire regime condition class could occur if cheatgrass is introduced. This would decrease the fire return interval and could also create an opportunity for larger fires. Once cheatgrass has been introduced, it is relatively hard to remove and could create the need for additional fuels management activities in the project area over the long term.

It would require approximately 11,036 truck trips to bring in all the equipment and components necessary to construct turbines, substations, and other facilities. This would temporarily increase the potential of a human-caused wildland fire in the project area from possible sparks igniting dry vegetation. The number of truck trips to construct Alternative D would be 4,094 trips less than Alternative B1. The presence of construction crews, equipment, and hazardous materials in the event of a wildfire would have the same impacts on mobilization and operation of fire suppression crews as described under *Impacts Common to All Action Alternatives*.

Operation and Maintenance

There would be 124 wind turbines and 72 miles of roads to maintain during the O&M of the wind energy facility. Traffic on the roadways from O&M crews would be low and visitors to the area on the new roads could increase some, but would probably not increase enough to cause more than a minor impact on the potential for human-caused fires in the project area. Over the long term,

protection of people and infrastructure at the facility would affect fire management decisions. Operation and maintenance personnel and infrastructure would modify fire management plan priorities and would add complexity to management of fires. The project area (personnel and structures) would take priority over natural resource values during wildland fire suppression efforts. This impact would be smaller than that under Alternative B1 because there would be 46 fewer turbines and 11 miles less roadways.

Decommissioning

Decommissioning 51 miles of project roads and 124 turbines could increase the potential for human-caused ignitions on a temporary basis. Reclamation would reduce changes to the fuels and in turn the fire regime condition class. Decommissioning Alternative D would require the removal of 46 less turbines than Alternative B1 and 11 miles less road would need to be reclaimed.

Alternative E

Construction

This alternative would disturb approximately 656 acres with 461 acres being disturbed in the short-term, 170 acres in the long-term, and 25 acres on a permanent basis. There would be 55 miles of roads constructed and 21 miles reconstructed for this alternative. This is 7 miles less than Alternatives B1 and B2. The potential impacts on the fire regime condition classes within the project area from the construction disturbance would be minor and much of the area (temporarily disturbed) should return to current conditions within five years. Trenching would disturb 71 acres in the short-term and would be reclaimed once the underground utilities have been constructed. This is 13 acres less than Alternative B1. During construction, additional impacts on fire regime condition class could occur if cheatgrass is introduced. This would decrease the fire return interval and could also create an opportunity for larger fires. Once cheatgrass has been introduced, it is relatively hard to remove and could create the need for additional fuels management activities in the project area over the long term.

It would require approximately 10,680 truck trips to bring in all the equipment and components necessary to construct turbines, substations, and other facilities. This would temporarily increase the potential of a human-caused wildland fire in the project area from possible sparks igniting dry vegetation. The number of truck trips to construct Alternative E would be 4,450 trips less than Alternative B1. The presence of construction crews, equipment, and hazardous materials in the event of a wildfire would have the same impacts on mobilization and operation of fire suppression crews as described under *Impacts Common to All Action Alternatives*.

Operation and Maintenance

There would be 120 wind turbines and 76 miles of roads to maintain during the O&M of the wind energy facility. Traffic on the roadways from O&M crews would be low and visitors to the area on the new roads could increase, but would probably not increase enough to cause more than a minor impact on the potential for human-caused fires in the project area. Over the long term, protection of people and infrastructure at the facility would affect fire management decisions. Operation and

maintenance personnel and infrastructure would modify fire management plan priorities and would add complexity to management of fires. The project area (personnel and structures) would take priority over natural resource values during wildland fire suppression efforts. This impact would be smaller than that under Alternative B1 because there would be 50 fewer turbines and 7 miles less roadways.

Decommissioning

Decommissioning 55 miles of project roads and 120 turbines could increase the potential for human-caused ignitions on a temporary basis. Reclamation would reduce changes to the fuels and in turn the fire regime condition class. Decommissioning Alternative E would require the removal of 50 less turbines than Alternative B1 and 7 miles less project roads would need to be reclaimed.

Alternative F

Construction

This alternative would disturb the least amount of total acres of all action alternatives, which would be approximately 544 acres, with 375 acres being disturbed in the short-term, 144 acres in the long-term, and 25 acres on a permanent basis. There would be 46 miles of roads constructed and 20 miles of roads reconstructed for this alternative. This is 17 miles less than Alternatives B1. The potential impacts on the fire regime condition classes within the project area from the construction disturbance would be minor and much of the area (short-term disturbance) should return to current conditions within five years. Trenching would disturb 41 acres in the short-term and would be reclaimed once the underground utilities have been constructed. This is 43 acres less than Alternative B1. During construction, additional impacts on fire regime condition class could occur if cheatgrass is introduced. This would decrease the fire return interval and could also create an opportunity for larger fires. Once cheatgrass has been introduced, it is relatively hard to remove and could create the need for additional fuels management activities in the project area over the long term.

It would require approximately 9,345 truck trips to bring in all the equipment and components necessary to construct turbines, substations, and other facilities. This would temporarily increase the potential of a human-caused wildland fire in the project area from possible sparks igniting dry vegetation. The number of truck trips to construct Alternative F would be 5,785 trips less than Alternative B1. The presence of construction crews, equipment, and hazardous materials in the event of a wildfire would have the same impacts on mobilization and operation of fire suppression crews as described under *Impacts Common to All Action Alternatives*.

Operation and Maintenance

There would be 105 wind turbines and 66 miles of roads to maintain during the O&M of the wind energy facility. Traffic on the roadways from O&M crews would be low and visitors to the area on the new roads could increase, but would probably not increase enough to cause more than a minor impact on the potential for human-caused fires in the project area. Over the long term, protection of people and infrastructure at the facility would affect fire management decisions. Operation and

maintenance personnel and infrastructure would modify fire management plan priorities and would add complexity to management of fires. The project area (personnel and structures) would take priority over natural resource values during wildland fire suppression efforts. This impact would be noticeably smaller than that under Alternative B1 because there would be 65 fewer turbines and 17 miles less roadways.

Decommissioning

Decommissioning 46 miles of project roads and 105 turbines could increase the potential for human-caused ignitions on a temporary basis. Reclamation would reduce changes to the fuels and in turn the fire regime condition class. Decommissioning Alternative F would require the removal of 65 less turbines than Alternative B1 and 17 miles less project roads would need to be reclaimed.

4.3.10.3 Direct and Indirect Impacts of the Haul Routes

The direct and indirect impacts on fire and fuels management from the construction and use of the haul routes would be similar to those impacts listed under *Impacts Common to All Action Alternatives*. Below is a discussion of impacts that would vary by haul route.

Northern Inbound Haul Route

Construction

This haul route would be approximately 119 miles in length and would require roadway reconstruction. A direct impact from the reconstruction of this road could be human-caused fires created from construction vehicles working on the road or other heavy machinery using the road to access the project area during construction. There could be up to 15,130 truck trips on this haul route during construction activities. The risk of human-caused wildland fires from construction activities, along this haul route, would be minor and temporary in duration. An indirect impact from the reconstruction along this haul route could be an increase in traffic on the road from the general public. The increased public traffic could also create a potential for human-caused fires along the haul route, especially if a car were to pull off the road to park in an area that is still vegetated. These impacts would also be minor, but could be more long-term in duration because the public would continue to use the road after construction activities are completed for the project. The potential impacts on the fire regime condition classes within the project area from the construction disturbance and haul route use would be minor and would not likely change the current fire regime condition class in the area. During construction, additional impacts on fire regime condition class could occur if cheatgrass is introduced. This would decrease the fire return interval and could also create an opportunity for larger fires. Once cheatgrass has been introduced, it is relatively hard to remove and could create the need for additional fuels management activities in the project area over the long term.

Operation and Maintenance

The haul route could potentially be used once each year during O&M to conduct major maintenance activities. This could present a minor direct, but temporary, potential impact for human-caused fires. An indirect impact of the haul route on fire management could be its potential to be used as a fuel

break, though it is already an established roadway. Impacts from the general public using the haul route would be the same as those listed under construction impacts above. Over the long term, protection of people and infrastructure at the facility would affect fire management decisions. Operation and maintenance personnel and infrastructure would modify fire management plan priorities and would add complexity to management of fires. The project area (personnel and structures) would take priority over natural resource values during wildland fire suppression efforts.

Decommissioning

The potential impacts on fire and fuels management from the use of the northern inbound haul route during decommissioning activities would be similar to those listed under *Construction*. This is an existing route on public lands and the route would not be decommissioned after the completion of the project. It could continue to serve as a potential fuel break if needed during a wildland fire in the area.

Southern Inbound Haul Route Option 1

Construction

Construction of this haul route would require 6 miles of roadway reconstruction and construction of 5 miles of new roadway. A direct impact from roadway reconstruction and new construction of this road could be increased potential for human-caused fires when construction vehicles are working on the haul route or other vehicles or heavy machinery are using the haul route to access the project area. There could be up to 15,130 truck trips on this haul route during construction activities. The risk of a human-caused fire from construction activities along this road would be minor and temporary in duration. An indirect impact caused by the reconstruction and construction of new road could be an increase in general public traffic in the area. The increased public traffic could also create a potential for human-caused fires along the haul route, especially if a car were to pull off the road to park in an area that is still vegetated. These impacts would also be minor, but could be more long-term in duration because the public would continue to use the roads after construction activities are completed for the project. The potential impacts on the fire regime condition classes within the project area from the construction disturbance and haul route use would be minor and would not likely change the current fire regime condition class in the area. During construction, additional impacts on fire regime condition class could occur if cheatgrass is introduced. This would decrease the fire return interval and could also create an opportunity for larger fires. Once cheatgrass has been introduced, it is relatively hard to remove and could create the need for additional fuels management activities in the project area over the long term.

Helper trucks would be required to help delivery trucks access portions of this inbound haul route. Use of these helper trucks would require a staging area that would disturb approximately 23 acres of vegetation. This area would be reclaimed after construction of the project. The use of helper trucks could temporarily increase the potential for human-caused fires from sparks or hot parts on the vehicles parked in or near dry flammable vegetation. Because the staging area for helper trucks would be cleared and graded and then covered with gravel, the likelihood of an ignition from one of these trucks is low. The construction of the helper truck area should not impact fire management activities including suppression activities.

Operation and Maintenance

The haul route could potentially be used once each year during operation to conduct major maintenance activities. This could present a minor direct, but temporary, potential impact for human-caused fires. An indirect impact of the haul route on fire management could be its potential to be used as a fuel break if a wildland fire starts in the area. Impacts from the general public using the haul route would be the same as those listed under *Construction*. Over the long term, protection of people and infrastructure at the facility would affect fire management decisions. Operation and maintenance personnel and infrastructure would modify fire management plan priorities and would add complexity to management of fires. The project area (personnel and structures) would take priority over natural resource values during wildland fire suppression efforts.

Decommissioning

The potential impacts on fire and fuels management from the use of this haul route would be similar to those listed under *Construction* and it could also serve as a potential fuel break if needed during a wildland fire in the area. The BLM could continue to use the already existing portions of this route as potential fuel breaks after the project is decommissioned.

Southern Inbound Haul Route Option 2

Construction, O&M, and decommissioning impacts of option 2 of the southern inbound haul route would be similar those described for option 1, but with slightly more impact.

Outbound Haul Route

Construction

There could be up to 15,130 trucks travelling on the outbound haul route over the construction period of the project. The large increase in vehicular traffic on this route could increase the potential for a human-caused fire from sparks or other hot material coming off of the trucks. The potential for a human-caused fire would be minor and temporary in nature. During construction, additional impacts on fire regime condition class could occur if cheatgrass is introduced. This would decrease the fire return interval and could also create an opportunity for larger fires. Once cheatgrass has been introduced, it is relatively hard to remove and could create the need for additional fuels management activities in the project area over the long term.

Operation and Maintenance

This route would be used for general O&M at the facility averaging once each year of operation. Impacts on fire and fuels management from use of the outbound haul route are expected to be minor and short-term. Component trucks leaving the site could start a fire from exhaust systems coming into contact with dry grass. However, the number of trucks would be few and would occur over a short period of time.

Decommissioning

The outbound haul route is an existing road that would not be decommissioned. Use of this road would not result in impacts to the analysis indicators for Fire and Fuels Management.

4.3.10.4 Project as a Whole

Construction

In general, the construction impacts related to each of the action alternatives are very similar. The construction impacts of the phased alternatives (Alternatives B2a, B2b, and B2c) would occur twice in a ten-year period because of the two separate construction phases. This could create a long-term potential for human-caused wildland fires in the project area. Alternatives that would impact less area (acreage) because fewer turbines and project roads would be constructed or reconstructed (Alternatives C, D, E, and F), could have a lower chance of human-caused wildland fires because less equipment and smaller construction crews could indirectly reduce the ignition sources. During construction, additional impacts on fire regime condition class could occur if cheatgrass is introduced. This would decrease the fire return interval and could also create an opportunity for larger fires. Once cheatgrass has been introduced, it is relatively hard to remove and could create the need for additional fuels management activities in the project area over the long term. Because Alternative F would impact the smallest amount of acres during construction, it would likely have the smallest potential for the introduction of cheatgrass in the project area. Note, however, that all action alternatives would have almost exactly the same permanent impact (25 acres for Alternatives B1, B2b, C, D, E, and F, or 26 acres for Alternatives B2a and B2c).

The northern inbound haul route would be much longer (119 miles) than either of the southern inbound haul Routes (option 1 = 11 miles and option 2 = 13 miles) and therefore the area potentially affected by a human-caused wildland fire along the northern inbound haul route would also be larger. However, the permanent impacts from option 1 of the southern inbound haul route (63 acres) and option 2 of the southern inbound haul route (67 acres) would be much larger than the anticipated 39 acres of permanent disturbance for the northern inbound haul route. This would create a smaller area along the northern inbound haul route for the opportunity for a cheatgrass invasion and thus create a smaller change that the fire regime condition class would be impacted by cheatgrass invasion and would require less fuels management activities.

Table 4.3.10-1. Summary of Impact Table for Project as a Whole – Fire and Fuels Management (Long-term and Permanent Impacts).

	Alt A	Alt B1	Alt B2a PI/PII (I + II)	Alt B2b PI/PII (I + II)	Alt B2c PI/PII (I + II)	Alt C	Alt D	Alt E	Alt F
Project Area[1]									
Acres Impacted	None	202	149/60 (209)	131/78 (209)	153/57 (210)	189	163	170	144
Project with Northern Inbound Haul Route[2]									
Acres Impacted	None	241	188/60 (248)	170/78 (248)	192/57 (249)	228	202	209	183
Project with Southern Inbound Haul Route Option I[2]									
Acres Impacted	None	265	212/60 (272)	194/78 (272)	216/57 (273)	252	226	233	207
Project with Southern Inbound Haul Route Option II[2]									
Acres Impacted	None	269	216/60 (276)	198/78 (276)	220/57 (277)	256	230	237	211

[1] Long-term impacts.
[2] Lont-term impacts from project area. Permanent impacts from haul route.

Operation and Maintenance

The miles of project roads and the number of turbines between the action alternatives do not result in a detectable difference in the potential for ignitions. Indirectly this would result in the same potential for fire size and intensity between the action alternatives.

Decommissioning

In general, the decommissioning impacts related to each of the action alternatives are very similar. Alternatives that could impact less area because fewer turbines and roads would be constructed (Alternatives C, D, E, and F) could also have a lower potential of a human-caused wildland fire during decommissioning. Alternative B1, B2a, B2b, and B2c would result in the same effects on fire and fuels management.

4.3.10.5 Cumulative Impacts

The cumulative impacts analysis area for fire and fuels management is the area within both the Jarbidge Foothills Fire Management Unit and the Delano-Toano Fire Management Unit. This area was selected because the project would be within these two Fire Management Units and so it could, along with other past, present, or future projects, have a cumulative impact on fire and fuels management within these Fire Management Units.

Alternative A (No Action Alternative)

According the Twin Falls Fire Management Plan (BLM, 2005), wildland fire activity in the Jarbidge Foothills Fire Management Unit currently mimics historic fire regimes; however, past resource use

has had some impact. Public land within this Fire Management Unit falls within two fire regime condition classes, 92 percent is rated as fire regime condition class 2 and the remaining 8 percent is either within fire regime condition class 3 (approximately 6 percent), or it is not rated (i.e., barren rock, water). The Delano-Toano Fire Management Unit falls within Fire Management Category C, which means that it is managed as a moderate suppression area. The area is managed within this category because fire would be desirable to manage ecosystems, but various factors place constraints on fire use for resource benefit (BLM, 2004a). Within this category, the area is mainly within the C-4 designation, intermixed woodlands, and a small portion is within B-8, which is considered early seral sagebrush grasslands. Like the Jarbidge Foothills Fire Management Unit, historic resource use has had some impact.

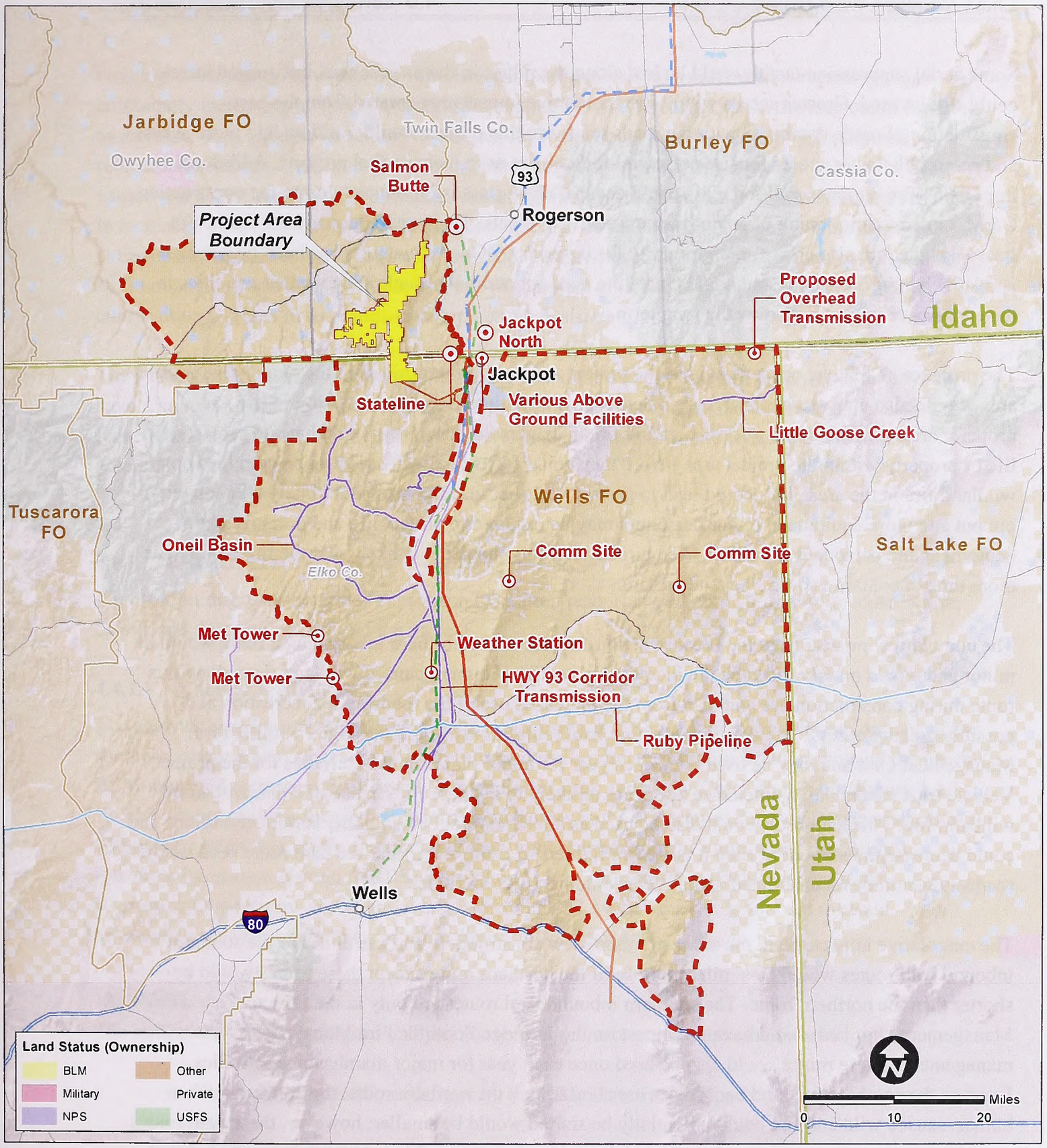
Of the past, current, or future projects (Table 4.0.2-1), many fall within the boundary of the fire and fuels management cumulative impacts analysis area including overhead transmission lines and portions of a natural gas pipeline. These projects and the fire and fuels cumulative impacts analysis area are shown on Figure 4.3.10-1.

In general, these projects have had, and would have, minor cumulative impacts on fire and fuels management within the Jarbidge Foothills and the Delano-Toano Fire Management Units. Communication towers, meteorological towers, and transmission lines could pose a threat to fire fighters working in the area and would potentially pull firefighting resources from directly fighting the fire to protecting human life and structures. This would likely increase the cost of firefighting and also create opportunities for wildland fire to be larger in size than they would be if resources were just used directly on the wildland fire instead of protecting people or structures. When towers or other structures are present in an area where a wildland fire occurs, suppression tactics may be limited and some aerial suppression methods may not be available. Because suppression activities could be limited, wildland fires could be larger in size and take longer to contain.

Roads that have been constructed for transmission line projects in the cumulative impacts analysis area could be used as potential fuel breaks, although they may have to be widened, and could also provide quicker access to a wildland fire for fire crews.

All Action Alternatives

Cumulative impacts for all action alternatives would be very similar because the acres disturbed under each action alternative would essentially be the same as far as fire management within both Fire Management Units would be concerned. The suggested mitigation measures and other design features would also be the same, and any action alternative would be decommissioned at the end of a 30-year ROW grant.



Nearby Project Location
Cumulative Impacts Boundary
Project Area Boundary
Interstate Highway
Major Roads
Overhead Transmission/Telephone Line
Salmon Falls Dam to Wells 138kV Transmission Line
Preliminary SWIP 500kV Transmission Line
State Boundary
Name — County Boundary
Name — BLM Field Office District Boundary
Pipeline
Midpoint to Humbolt 345kV Transmission Line

Figure 4.3.10-1. Fire Cumulative Impacts Area (Current and Future Projects)

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Some aerial suppression tactics could be lost along the ridges in the project area, but ground attack could still be used. Greater access within the cumulative impact area created from the past construction of roads combined with the roads related to this project would translate into more access and potentially faster access for fire personnel to fight fire or to manage fuel projects. Additional impacts on fire regime condition class could occur if cheatgrass is introduced during the construction, O&M, or decommissioning of any of the cumulative projects. This would decrease the fire return interval and could also create an opportunity for larger fires. Once cheatgrass has been introduced, it is relatively hard to remove and could create the need for additional fuels management activities in the cumulative impact area over the long term.

The presence of life and property within the project area, and other projects in the cumulative impact area, would also increase the costs associated with firefighting. Because protection of life and property are the number one priorities of any fire management plan, they would have to protect any life or property within the project area before they could focus on direct suppression activities on a wildland fire in the area. This could lead to greater costs because the fire would likely take longer to put out and more equipment and/or personnel may be required to protect life and property. As equipment and personnel are pulled from directly fighting the fire it is likely that the fire would take more time to contain and thus be a larger fire.

The cumulative impacts from the reconstruction and use of the northern inbound haul route would be minor and would mainly focus on the increased potential of human-caused wildland fires along this route during construction use and also from the increased use of the roadway for recreation and possibly grazing access. The northern inbound haul route is only in the Jarbidge Foothills Fire Management Unit and may be used once each year for major maintenance activities for the project. Vehicle trips for annual maintenance needs are unlikely to increase the chance of a human-caused wildland fire. This haul route could also be used as a potential fuel break under certain conditions and could decrease the amount of time it takes fire fighters to get to a fire near the haul route because the roadway would be reconstructed and travel should be faster and safer.

The cumulative impacts from the reconstruction, new construction, and use either of the southern inbound haul routes would be similar to those of the northern route except these routes would be shorter than the northern route. The southern inbound haul routes are only in the Delano-Toano Fire Management Unit and would have no impact on the Jarbidge Foothills Fire Management Unit management. These routes could also be used once each year for major maintenance activities. Because the southern inbound haul routes are shorter than the northern route, the area in which a human-caused wildland fire could potentially be started would be smaller; however, these haul routes would have as much use. The two southern inbound haul routes could also be used as potential fuel breaks under certain conditions and could decrease the amount of time it takes fire fighters to get to a fire near the haul routes because the roadway would be reconstructed and travel should be faster and safer. Only one inbound haul route would be selected for this project.

Grazing would continue within the cumulative impact analysis area and outdoor recreation has been continually increasing in Twin Falls and surrounding areas. Recreation use in the area could continue to increase. This increase in visitors to the area for recreational purposes and for job purposes (construction of communication towers and other projects) would create a greater chance for human-caused wildland fires. The risk of human-caused ignition would increase if improved access resulted in increased public visitation. Wildland fires could also be initiated by (1) poorly maintained and extinguished campfires associated with recreational activities in or near the project area, (2) contact with hot engine parts during vehicle use, and (3) careless cigarette disposal by the public and construction workers in the cumulative impacts analysis area.

The addition of the project combined with other cumulative impacts within the analysis area would have a minor cumulative impact because the project should not change the overall management of the Fire Management Units to a great extent. There would be a minor to moderate increase in the potential for human-caused fires in the long-term.

4.4 LAND USE

4.4.1 RECREATION

This section discusses potential impacts on recreation resources that could result from construction, O&M, and decommissioning of the project.

4.4.1.1 Analysis Methods

The analysis area for recreation includes the project area, a 0.5-mile buffer around both options of the southern inbound haul route, the northern inbound haul route, the outbound haul route, and the nearby BLM-managed recreation facilities of Salmon Falls Creek and Cedar Creek Reservoir (Figure 3.4.1-1). The impact analysis focused on identifying changes in the Recreation Setting Characteristic (RSC) within the project area and both options of the southern inbound haul route, using the Natural Resource Recreation Setting (NRRS) matrix (Appendix 3H). This approach is rooted in the Recreation Opportunity Spectrum widely used by the BLM; however, it is adapted to retain information about changes in each of the three RSC components.

Indicators

The indicators used in the impact analysis for recreation resources include the following:

- Changes to the RSC, as defined by the NRRS matrix (acres), would result from two factors:
  - Physical RSC, determined by the extent and type of roads; and
  - Social RSC, determined by the amount and type of use.
- Change in the number or type of access points (including gates).

Additional qualitative indicators include changes to the hunting experience, including access, and the number of encounters with other hunters. Potential impacts to neighboring recreation facilities and the northern inbound haul route and outbound haul route are also assessed qualitatively.

Methods and Assumptions

The expected change in the RSC of the project area and both options of the southern inbound haul route were measured in terms of the physical and social attributes of the project area. The RSCs provide a metric to evaluate the potential impacts of the project during, or resulting from, construction, O&M, and/or decommissioning of the project. The RSC criteria are summarized in Section 3.4.1. The NRRS are classified by the following categories: primitive, backcountry, middle county, front country, rural, and urban. The RSC and NRRS matrix is detailed in Appendix 3H.

Impact determinations were based on the parameters listed below.

- Effect would be considered major where a change in NRRS classification occurs in at least two RSCs as a result of the project.
- Effect would be considered moderate where change in NRRS classification of one RSC as a result of the project.
- Effect would be considered minor where no long-term change in NRRS classification would occur; however, short-term changes in certain RSC could result from the project.
- No Effect would occur where no change in NRRS classification would result.

The following assumptions were used when analyzing effects of the project on recreation resources:

- Construction of all action alternatives would result in an incremental increase in road density, and a consequent shift in the physical RSC from a predominantly middle country NRRS to a front country setting.
- Change measured against the social RSC was established for the non-hunting season.
- The construction stage would result in the presence of up to 239 people in the project area on a daily basis.
- The O&M stage would result in the presence of up to 34 people in the project area on a daily basis.
- No NRRS analysis was completed for the northern inbound or outbound haul routes because the physical and social setting are not expected to change.
- No administrative controls have been defined for the action alternatives and no quantitative analysis could be completed for the administrative RSC.
- Based on proximity to US-93, 279 acres of the project area and both options of the southern inbound haul route are classified as rural setting for both the physical and social RSC. Because these acres do not change classification from any of proposed action alternatives or from either option of the southern inbound haul route, and no impact would result on recreation resources. The 279 acres were included in the tables for

clarity, but not discussed further. The 279 acres were not included in the Project as a Whole summary table because no impact would result on recreation resources.

4.4.1.2 Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

Under the No Action Alternative, changes to social and administrative RSCs may occur due to increased use and potential need for recreation management. The physical RSC is not expected to change, as widespread proliferation of OHV roads is not expected due to existing administrative controls.

Impacts Common to All Action Alternatives

Direct and indirect impacts resulting from construction, O&M, and decommissioning of the project are discussed below. Expected changes in the physical, social, and administrative RSCs are illustrated in the NRRS matrix that is presented in Appendix 3H.

Construction

Construction of the project could result in a change in perception of recreation opportunities in the project area. Hunters, campers, and roadway travelers may choose to avoid the project area, knowing that their experience would be influenced by increased people, traffic, and noise expected to be present in the area. Game animals located within the project area would avoid construction activities, which could temporarily change use levels within established seasonal ranges. Such change in pattern of use by game animals would reduce the value of this area to hunters.

All action alternatives would result in a quantifiable shift of the social RSC from a predominantly primitive (non-hunting season), to more of a rural setting. The shift in the social RSC is expected to result from the increase in construction workers within the project area. Areas are expected to incur vegetation damage and soil compaction. Noise would be detected frequently during project activities. The increase in people and activity within the project area could move recreation activities, such as hunting, camping, and OHV use to adjacent areas, thereby increasing recreation-related pressure on more distant lands outside the project area. Consequently, construction activities of the project could result in major direct and indirect short-term impacts on recreation resources.

Operation and Maintenance

Operation and maintenance of the project could result in indirect impacts on recreation through a shift in the social RSC from a predominantly primitive, to more of a middle country setting, and a shift in the physical RSC from a predominantly middle country to more of a front country setting. Increase in road density and improvement in road conditions could indirectly increase use of the area, thereby resulting in a greater number of encounters (approximately 15 encounters per day). The increase in encounters is expected to result from both the road reconstruction and daily O&M of the project. The increase in use could result in elevated noise level, litter, vehicle tracks, vegetation damage, and soil compaction. It is possible that improved access and increased use of the area could result in an

increase in administrative controls in the area. Such controls are expected to be characteristic of the administrative RSC in a middle country setting.

The shift in the physical RSC to a predominantly front country setting is expected to alter the primary recreational use within the project area. The predominantly front country setting of the physical RSC and the middle country setting of the social RSC could reduce the amount of area deemed acceptable to hunters looking to enjoy their sport in a low use area. Likewise, the proximity to project roads and turbines and the constant motion of turbine blades could reduce the aesthetic appeal of the area to those seeking the experience of a more remote, dispersed camping experience. Such impacts could extend beyond the project area, resulting in a diminished experience among recreators located at nearby Salmon Falls Creek Reservoir. The decrease in suitability of the recreation setting for hunting could result in a change in the type of recreational use occurring in the area.

Due to both widespread roadway reconstruction, and the desire by some recreators to see the project in operation, pleasure driving could become an increasingly popular recreational use of the area. Recreational use by roadway travelers is expected to persist throughout the year due to winter-plowing and on-going maintenance of the project roads. Increased access during winter months may result in new use of the area for winter recreation, such as snowmobiling or cross-country skiing.

The majority of lands within the project area would be located on or near reconstructed roads, thus increasing access within the project area and surrounding locations. The landscape could appear partially modified by roads but it is expected that the project roads would not overwhelm the existing landscape due to the natural topography. However, the presence of project roads, turbines, and other project components could collectively result in decreased naturalness in aesthetics more accurately described by a rural setting prior to the project.

Operation and maintenance of the project would not diminish the opportunity for premier fishing at Salmon Falls Creek Reservoir. It is possible, however, that views of the turbines could reduce the overall naturalness of the area, thereby resulting in a diminished experience for campers or fisherman.

Although views of the project from Salmon Falls Creek Reservoir are expected to result in impacts on the visual resources, O&M of the project is not expected to detract from recreation opportunities in this area.

Due to the anticipated change in physical, social, and administrative RSCs, O&M of the project could result in major long-term indirect impacts on recreation resources.

Decommissioning

Decommissioning of the project would result in similar change in perception of recreation opportunities that would be caused during construction activities for the project. Hunters, campers, and roadway travelers may choose to avoid the project area, knowing that their experience would be influenced by increased people, traffic, and noise expected to be present in the area. Game animals

located within the project area may scatter due to decommissioning activities, or may choose alternative migratory routes. Such change in pattern of use by game animals would reduce the value of this area to hunters.

The increase in people and activity within the project area could move recreation activities, such as hunting, camping, and OHV use to adjacent areas, thereby increasing recreation-related pressure on more distant lands outside the project area. Consequently, decommissioning activities of the project could result in major direct and indirect short-term impacts on recreation resources.

Alternative B1 (Proposed Action)

Construction, Operation and Maintenance, and Decommissioning

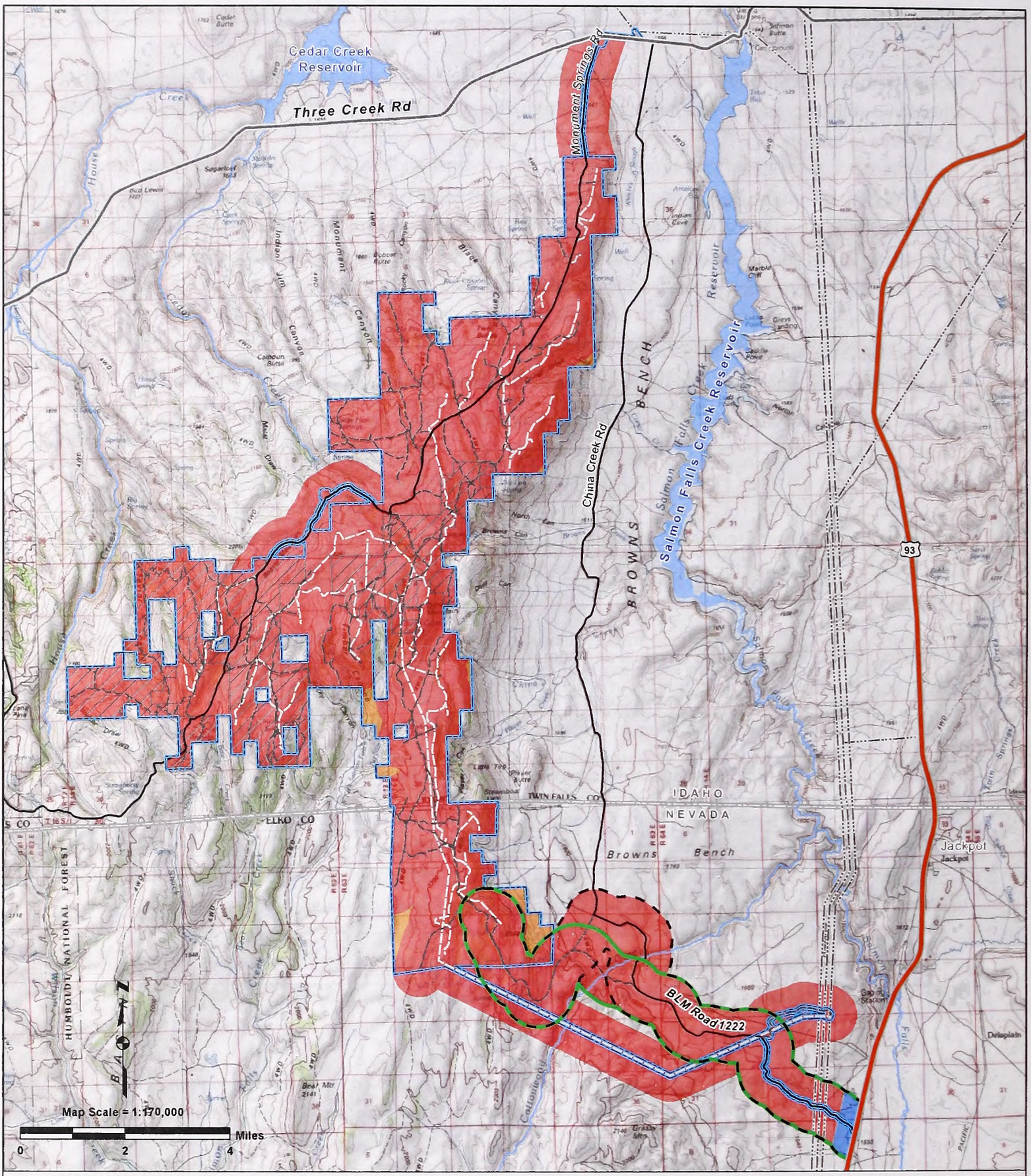
Impacts from construction, O&M, and decommissioning activities for the project under Alternative B1 are expected to be the same as those described above in *Impacts Common to All Action Alternatives*. The extent of land expected to be impacted by changes in the NRRS classifications is presented in Table 4.4.1-1. Expected change in the distribution of physical and social RSCs within the project area is shown in Figures 4.4.1-1 and 4.4.1-2, respectively. Because administrative controls have not been defined for the action alternatives, no quantitative analysis could be completed for the administrative RSC.

Due to localized changes to the physical and social RSCs within the project area, the construction, O&M, and decommissioning activities of Alternative B1 could result in major short- and long-term indirect impacts on recreation resources within the project area.

Table 4.4.1-1. Physical and Social Recreation Settings: Alternative B1 (Acres).

NRRS		Primitive	Back Country	Middle Country	Front Country	Rural
Physical RSC	E*	----	1,690	21,029	10,970	279
	O	----	----	634	37,873	279
Social RSC	E*	22,719	10,970	----	----	279
	E**	----	22,719	10,970	----	279
	C	----	----	----	634	38,152
	O	----	634	37,873	----	279

E* = Existing (non-hunting season), E** = Existing (during hunting season), C = Construction, O = O&M.



LEGEND

- Project Area Boundary
- Private Land

Project Area Roads

- Road
- Primitive Road
- Proposed Road
- Existing Transmission Line

Recreation Setting

- Middle Country
- Front Country
- Rural
- Southern Haul Route Option 1 (half-mile buffer)
- Southern Haul Route Option 2 (half-mile buffer)

Figure 4.4.1-1. Physical Recreation Setting Characteristics: Operational Stage Alternative B1

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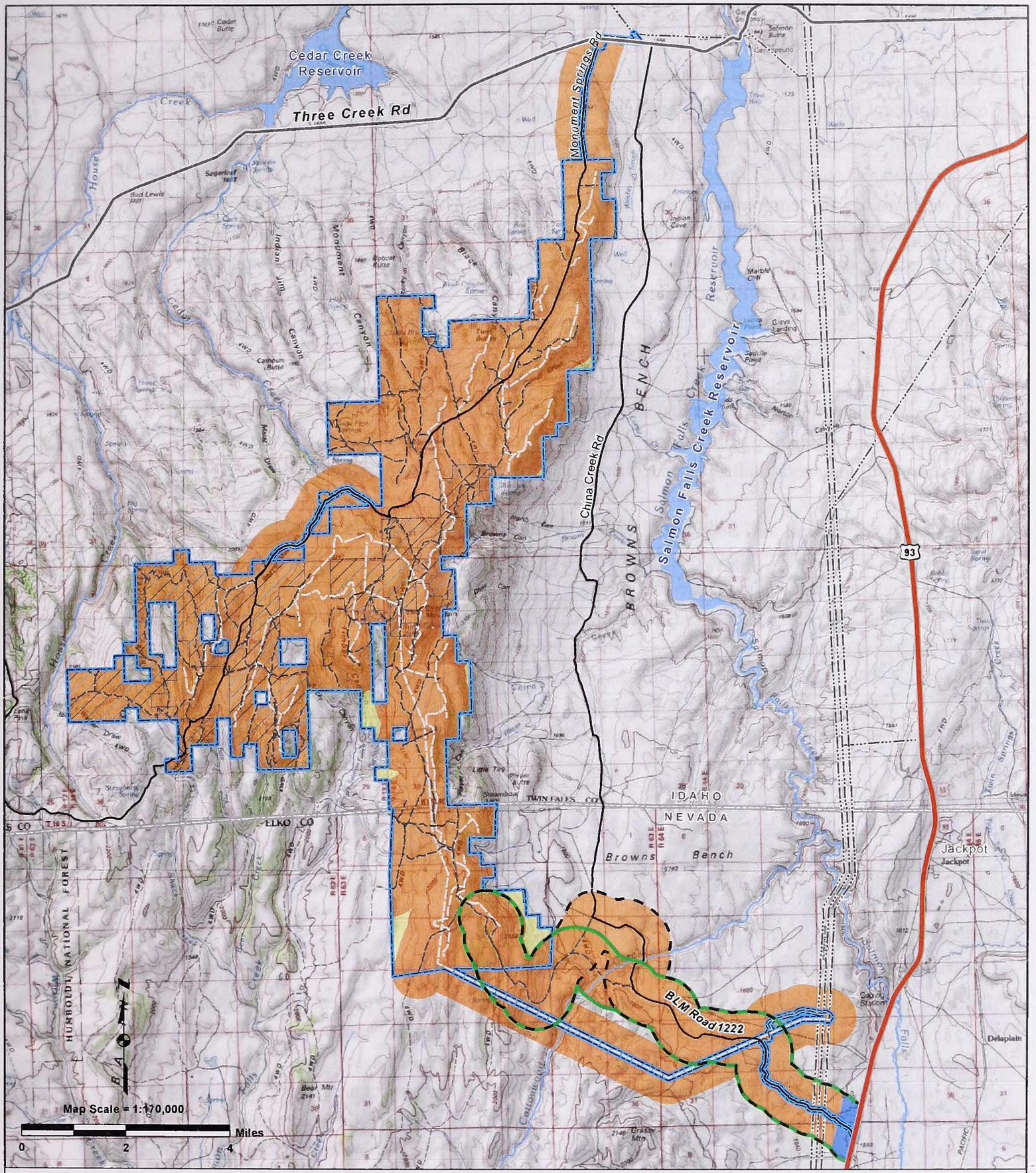

LEGEND

- Project Area Boundary
- Private Land

Project Area Roads

- Road
- Primitive Road
- Proposed Road
- Existing Transmission Line

Recreation Setting

- Back Country
- Middle Country
- Rural
- Southern Haul Route Option 1 (half-mile buffer)
- Southern Haul Route Option 2 (half-mile buffer)

Figure 4.4.1-2. Social Recreation Setting Characteristics: Operational Stage Alternative B1

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Alternative B2a

Construction, Operation and Maintenance, and Decommissioning

Impacts from construction, O&M, and decommissioning activities are expected to be the same as those previously described in *Impacts Common to All Action Alternatives*; however, the spatial extent of impacts would vary temporally. Construction and O&M impacts of Phase I would be localized direct, indirect, short- and long-term on the eastern portion of the project area, thereby reducing the extent of impacts as compared to the full-build out of Phase II. The extent of land that could be impacted by changes in the NRRS classifications during Phase I is presented below in Table 4.4.1-2. Following construction and O&M of Phase II, impacts are expected to be the same as those described in Alternative B1.

Due to localized changes to the physical and social RSCs within the project area, the construction, O&M, and decommissioning activities of Phase I and Phase II of Alternative B2a could result in major short- and long-term indirect impacts on recreation resources within the project area.

Table 4.4.1-2. Physical and Social Recreation Settings: Alternative B2a (Acres).

NRRS		Primitive	Back Country	Middle Country	Front Country	Rural
Physical RSC	E*	----	1,690	21,029	10,970	279
	O, P1	----	----	634	29,197	279
	O, P2	----	----	----	8,677	279
	O, P1 + P2	----	----	634	37,873	279
Social RSC	E*	22,719	10,970	----	----	279
	E**	----	22,719	10,970	----	279
	C, P1	----	----	----	634	25,641
	C, P2	----	----	----	634	8,955
	O, P1	----	634	29,197	----	279
	O, P2	----	----	8,677	----	279
	O, P1+ P2	----	634	37,873	----	279

E* = Existing (non-hunting season), E** = Existing (during hunting season), C = Construction, O = O&M, P1 = Phase I, P2 = Phase II.

Alternative B2b

Construction, Operation and Maintenance, and Decommissioning

Impacts from construction, O&M, and decommissioning activities are expected to be the same as those previously described in *Impacts Common to All Action Alternatives*; however, the spatial extent of impacts would vary temporally. Construction and O&M impacts of Phase I would be localized direct, indirect, short- and long-term on the northern portion of the project area, thereby reducing the extent of impacts during Phase I. The extent of land that would be impacted by changes in the NRRS classifications during Phase I is presented below in Table 4.4.1-3. Following construction and O&M of Phase II, impacts are expected to be the same as those described under Alternative B1.

Due to localized changes to the physical and social RSCs within the project area, the construction, O&M, and decommissioning activities of Phase I and Phase II of Alternative B2b could result in major short- and long-term indirect impacts on recreation resources within the project area.

Table 4.4.1-3. Physical and Social Recreation Settings: Alternative B2b (Acres).

NRRS		Primitive	Back Country	Middle Country	Front Country	Rural
Physical RSC	E*	----	1,690	21,029	10,970	279
	O, P1	----	----	634	32,773	279
	O, P2	----	----	----	5,100	279
	O, P1 + P2	----	----	634	37,873	279
Social RSC	E*	22,719	10,970	----	----	279
	E**	----	22,719	10,970	----	279
	C, P1	----	----	----	634	29,217
	C, P2	----	----	----	634	5,379
	O, P1	----	634	32,773	----	279
	O, P2	----	----	5,100	----	279
	O, P1 + P2	----	634	37,873	----	279

E* = Existing (non-hunting season), E** = Existing (during hunting season), C = Construction, O = O&M, P1 = Phase I, P2 = Phase II.

Alternative B2c

Construction, Operation and Maintenance, and Decommissioning

Impacts from construction, O&M, and decommissioning activities are expected to be the same as those described previously in *Impacts Common to All Action Alternatives*; however, the spatial extent and timing of impacts would vary temporally. Construction and O&M impacts of Phase I would be localized direct, indirect, short- and long-term on the southern portion of the project area, thereby reducing the extent of impacts during Phase I. The extent of land that would be impacted by changes in the NRRS classifications during Phase I is presented below in Table 4.4.1-4. Following construction and O&M of Phase II, impacts are expected to be the same as those described under Alternative B1.

Due to localized changes to the physical and social RSCs within the project area, the construction, O&M, and decommissioning activities of Phase I and Phase II of Alternative B2c could result in major short- and long-term indirect impacts on recreation resources within the project area.

Table 4.4.1-4. Physical and Social Recreation Settings: Alternative B2c (Acres).

NRRS		Primitive	Back Country	Middle Country	Front Country	Rural
Physical RSC	E*	----	1,690	21,029	10,970	279
	O, P1	----	----	634	35,191	279
	O, P2	----	----	----	2,682	279
	O, P1 + P2	----	----	634	37,873	279
Social RSC	E*	22,719	10,970	----	----	279
	E**	----	22,719	10,970	----	279
	C, P1	----	----	----	634	31,635
	C, P2	----	----	----	634	2,961
	O, P1	----	634	35,191	----	279
	O, P2	----	----	2,682	----	279
	O, P1 + P2	----	634	37,873	----	279

E* = Existing (non-hunting season), E** = Existing (during hunting season), C = Construction, O = O&M, P1 = Phase I, P2 = Phase II.

Alternative C

Construction, Operation and Maintenance, and Decommissioning

Impacts from construction, O&M, and decommissioning activities for the project under Alternative C are expected to be similar to those described previously in *Impacts Common to All Action Alternatives*. The extent of land that could be impacted by changes in the NRRS classifications is presented below in Table 4.4.1-5.

Table 4.4.1-5. Physical and Social Recreation Settings: Alternative C (Acres).

NRRS		Primitive	Back Country	Middle Country	Front Country	Rural
Physical RSC	E*	----	1,690	21,029	10,970	279
	O	----	----	637	37,869	279
Social RSC	E*	22,719	10,970	----	----	279
	E**	----	22,719	10,970	----	279
	C	----	----	----	637	38,148
	O	----	637	37,869	----	279

E* = Existing (non-hunting season), E** = Existing (during hunting season), C = Construction, O = O&M.

Due to localized changes to the physical and social RSCs within the project area, construction, O&M, and decommissioning activities of Alternative C would result in major short- and long-term indirect impacts on recreation resources within the project area.

Alternative D

Construction, Operation and Maintenance, and Decommissioning

Impacts from construction, O&M, and decommissioning activities are expected to be similar to those described previously in *Impacts Common to All Action Alternatives*. Changes in the physical and Social RSC would not affect the portion of the project that is currently administered by the BLM Wells Field Office in the state of Nevada, and in land located in the northern portion of the project

area. The extent of land that would be impacted by changes in NRRS classifications is presented below in Table 4.4.1-6.

Due to localized changes to the physical and social RSCs within the project area, construction, O&M, and decommissioning activities of Alternative D could result in major short- and long-term indirect impacts on recreation resources within the project area.

Table 4.4.1-6. Physical and Social Recreation Settings: Alternative D (Acres).

NRRS		Primitive	Back Country	Middle Country	Front Country	Rural
Physical RSC	E*	----	1,690	21,029	10,970	279
	O	----	----	835	37,672	279
Social RSC	E*	22,719	10,970	----	----	279
	E**	----	22,719	10,970	----	279
	C	----	----	----	835	37,951
	O	----	835	37,672	----	279

E* = Existing (non-hunting season), E** = Existing (during hunting season), C = Construction, O = O&M.

Alternative E

Construction, Operation and Maintenance, and Decommissioning

Impacts from construction, O&M, and decommissioning activities are expected to be similar to those described previously in *Impacts Common to All Action Alternatives*. The extent of land that would be impacted by changes in NRRS classifications is presented below in Table 4.4.1-7.

Due to localized changes to the physical and social RSCs within the project area, construction, O&M, and decommissioning activities of Alternative E could result in major short- and long-term indirect impacts on recreation resources within the project area.

Table 4.4.1-7. Physical and Social Recreation Settings: Alternative E (Acres).

NRRS		Primitive	Back Country	Middle Country	Front Country	Rural
Physical RSC	E*	----	1,690	21,029	10,970	279
	O	----	----	853	37,654	279
Social RSC	E*	22,719	10,970	----	----	279
	E**	----	22,719	10,970	----	279
	C	----	----	----	853	37,933
	O	----	853	37,654	----	279

E* = Existing (non-hunting season), E** = Existing (during hunting season), C = Construction, O = O&M.

Alternative F

Construction, Operation and Maintenance, and Decommissioning

Impacts from construction, O&M, and decommissioning activities are expected to be similar to those described previously in *Impacts Common to All Action Alternatives*. Changes in the physical and social RSC would not affect the portion of the project that is currently administered by the BLM

Wells Field Office in the state of Nevada, and in land located in the northern portion of the project area. The extent of land that would be impacted by changes in NRRS classifications is presented below in Table 4.4.1-8.

Due to localized changes to the physical and social RSCs within the project area, construction, O&M, and decommissioning activities of Alternative F could result in major short- and long-term indirect impacts on recreation resources within the project area.

Table 4.4.1-8. Physical and Social Recreation Settings: Alternative F (Acres).

NRRS		Primitive	Back Country	Middle Country	Front Country	Rural
Physical RSC	E*	----	1,690	21,029	10,970	279
	O	----	----	921	37,586	279
Social RSC	E*	22,719	10,970	----	----	279
	E**	----	22,719	10,970	----	279
	C	----	----	----	921	37,865
	O	----	921	37,586	----	279

E* = Existing (non-hunting season), E** = Existing (during hunting season), C = Construction, O = O&M.

4.4.1.3 Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Reconstruction of portions of the northern inbound haul route, minimal use of the road for O&M, and use during decommissioning activities could result in a change in perception of recreation opportunities within the vicinity of Three Creek Road. Recreators could choose to avoid using nearby areas, such as Cedar Creek Reservoir, realizing that their experience may be influenced by increased traffic and noise characteristic of construction activities.

The increased noise and traffic expected to result from construction-related activities could impact recreators located on Cedar Creek Reservoir. Likewise, frequent use of this route for turbine delivery would result in the greatest impacts on recreation when passing Cedar Creek Reservoir. Because the haul road itself is an existing road, the deviation in the level of use is temporary, and actions would be proximate to Cedar Creek Reservoir for only a short time period. Construction and use of the northern inbound haul route is expected to result in minor short-term impacts on recreation in the area.

Southern Inbound Haul Route Option 1

Construction and reconstruction of the southern inbound haul route and its use during the construction, O&M, and decommissioning of the project could result in a change in perception of recreation opportunities in this area over time. Recreationists may choose to avoid recreation areas located in the vicinity of southern inbound haul route, realizing that construction-related noise and traffic could negatively influence their experience. Conversely, upon completion, this haul route option may result in an incremental increase in access to public lands in the vicinity of the haul route. Road reconstruction is expected to increase access to the area to a larger user group, as use of the

roadway would no longer require high clearance vehicles. Increased access provided by option 1 of the southern inbound haul route could also increase accessibility to the more remote areas outside the project area, resulting in increased OHV pressure on these areas. Change in access to the areas surrounding this haul route option could result in moderate short-term impacts on recreation.

Construction and O&M of this haul route would result in conversion of lands in the physical RSC from a combined middle country and front country setting to a front country setting and the social RSC from a primitive setting to a middle country setting (Table 4.4.1-9). During construction, access to surrounding areas could be reduced or limited. Recreators may choose not to use this area during construction or use of the route. It is expected that most recreators would move through the area to access more remote locations outside the project area. The temporary and localized changes in access to areas surrounding option 1 of the southern haul route could result in minor short-term direct impacts on recreation.

Southern Inbound Haul Route Option 2

Direct and indirect impacts on recreation from the construction and use of option 2 of the southern inbound haul route are expected to be the similar as those described for option 1. Construction and use of this route would result in conversion of lands in the physical RSC from a combined middle country and front country setting to a front country setting and lands in the social RSC from a primitive setting to a middle country setting (Table 4.4.1-9).

Table 4.4.1-9. Physical and Social Recreation Setting: Southern Inbound Haul Route Option 1 and Option 2 (Acres).

NRRS			Primitive	Back Country	Middle Country	Front Country	Rural
Physical RSC	Existing Conditions	Option 1	----	----	2,989	3,638	279
		Option 2	----	----	3,943	3,637	279
	O&M	Option 1	----	----	----	6,627	279
		Option 2	----	----	----	7,580	279
Social RSC	Existing Conditions (Non-Hunting Season)	Option 1	6,627	----	----	----	279
		Option 2	7,580	----	----	----	279
	Existing Conditions (Hunting Season)	Option 1	----	6,627	----	----	279
		Option 2	----	7,580	----	----	279
	O&M	Option 1	----	----	6,627	----	279
		Option 2	----	----	7,580	----	279

Outbound Haul Route

This haul route is an existing roadway that would not be modified or decommissioned for the project. No direct or indirect impacts on recreation resources are expected to result from construction, O&M, or decommissioning of the project from use of the outbound haul route.

4.4.1.4 Project as a Whole

Construction, O&M, and decommissioning of the project under all action alternatives could result in major short- and long-term direct and indirect impacts on recreation resources (Table 4.4.1-10). Each alternative, including both options of the southern inbound haul route, would result in a predominant reclassification of lands that is summarized as follows:

- Physical RSC would be reclassified from a backcountry setting to a front country setting.
- Social RSC would be reclassified from a primitive setting to a middle country setting.
- Administrative RSC would be reclassified from a backcountry setting to a middle country setting.

Because the northern inbound haul route and outbound haul route are existing roads, no long-term direct impacts on recreation are expected to result from construction and use of these routes.

The retention of middle country setting varies across all alternatives, with the greatest amount resulting from Alternatives D and F (954 and 1,040 acres, respectively). Due to similar turbine configurations defined in Alternatives D and F, these alternatives could result in similar impacts on the recreation resources of Salmon Falls Creek Reservoir.

Table 4.4.1-10. Impact Summary Table – Recreation Resources[1].

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Route Option 1	Wind Energy Facility with the Southern Inbound Haul Route Option 2
Alternative A	10,970 acres classified as physical RSC in a front country setting. 21,029 acres classified as physical RSC in a middle country setting. 1,690 acres classified as physical RSC in a backcountry setting. 10,970 acres classified as social RSC in a backcountry setting. 22,719 acres classified as social RSC in a primitive setting.	14,608 acres classified as physical RSC in a front country setting. 24,018acres classified as physical RSC in a middle country setting. 1,690 acres classified as physical RSC in a backcountry setting. 22,713 acres classified as social RSC in a primitive setting. 10,970 acres classified as social in a backcountry setting.	18,550 acres classified as physical RSC in a front country setting. 21,029 acres classified as physical in a middle country setting. 1,690 acres classified as physical RSC in a backcountry setting. 18,550 acres classified as social RSC in a backcountry setting. 22,719 acres classified as social RSC in a primitive setting.

Table 4.4.1-10. Impact Summary Table – Recreation Resources[1] (continued).

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Route Option 1	Wind Energy Facility with the Southern Inbound Haul Route Option 2
Alternative B1	37,873 acres classified as physical RSC in a front country setting. 634 acres classified as physical RSC in a middle country setting. 37,873 acres classified social RSC in a middle country setting. 634 acres classified as social RSC in a backcountry setting. Potential change in amount, type, and seasonality of recreational use in and around the project area.	44,500 acres classified as physical RSC in a front country setting. 634 acres classified as physical RSC in a middle country setting. 44,500 acres classified as social RSC in a middle country setting. 634 acres classified as social RSC in a backcountry setting. Potential change in amount, type, and seasonality of recreational use in and around the project area and option 1 of the southern inbound haul route.	45,453 acres classified as physical RSC in a front country setting. 634 acres classified as physical RSC in a middle country setting. 45,453 acres classified as social RSC in a front country setting. 634 acres classified as social RSC in a middle country setting. Potential change in amount, type, and seasonality of recreational use in and around the project area and option 2 of the southern inbound haul route.
Alternative B2a	**Phase I** 29,197 acres classified as a physical RSC in a front country setting. 634 acres classified as a physical RSC middle country setting. 29,197 acres classified as social RSC in a middle country setting. 634 acres classified as social RSC in a backcountry setting. 8,677 acres classified as physical RSC in a front country setting. 8,677 acres classified as social RSC in a middle country setting.	**Phase I** 35,824 acres classified as physical RSC in a front country setting. 634 acres classified as physical RSC in a middle country setting. 35,824 acres classified as social RSC in a middle country setting. 634 acres classified as social RSC in a backcountry setting.	**Phase I** 36,777 acres classified as physical RSC in a front country setting. 634 acres classified as physical RSC in a middle country setting. 36,777 acres classified as social RSC in a middle country setting. 634 acres classified as social RSC in a backcountry setting.

Table 4.4.1-10. Impact Summary Table – Recreation Resources[1] (continued).

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Route Option 1	Wind Energy Facility with the Southern Inbound Haul Route Option 2
Alternative B2a (cont'd)	**Phase I + Phase II** Same as Alternative B1.	**Phase II** Same as wind energy facility with the northern inbound haul route. **Phase I + Phase II** Same as Alternative B1.	**Phase II** Same as wind energy facility with the northern inbound haul route. **Phase I + Phase II** Same as Alternative B1.
Alternative B2b	**Phase I** 32,773 acres classified as physical RSC in a front country setting. 634 acres classified as physical RSC in a middle country setting. 32,773 acres classified as social RSC in a middle country setting 634 acres classified as social RSC in a backcountry setting. **Phase II** 5,100 acres classified as physical RSC in a front country setting. 5,100 acres classified as social RSC in a middle country setting. **Phase I + Phase II** Same as Alternative B1.	**Phase I** 39,400 acres classified as physical RSC in a front country setting. 634 acres classified as physical RSC in a middle country setting. 39,400 acres classified as social RSC in a middle country setting. 634 acres classified as social RSC in a backcountry setting. **Phase II** Same as wind energy facility with the northern inbound haul route. **Phase I + Phase II** Same as Alternative B1.	**Phase I** 40,353 acres classified as physical RSC in a front country setting. 634 acres classified as physical RSC in a middle country setting. 40,353 acres classified as social RSC in a middle country setting. 634 acres classified as social RSC in a backcountry setting. **Phase II** Same as wind energy facility with the northern inbound haul route. **Phase I + Phase II** Same as Alternative B1.
Alternative B2c	**Phase I** 35,191 acres classified as physical RSC in a front country setting. 634 acres classified as physical RSC in a middle country setting. 35,191 acres classified as social RSC in a middle country setting.	**Phase I** 41,818 acres classified as physical RSC in a front country setting. 634 acres classified as physical RSC in a middle country setting. 41,818 acres classified as social RSC in a middle country setting.	**Phase I** 42,771 acres classified as physical RSC in a front country setting. 634 acres classified as physical RSC in a middle country setting. 42,771 acres classified as social RSC in a middle country setting.

Table 4.4.1-10. Impact Summary Table – Recreation Resources[1] (continued).

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Route Option 1	Wind Energy Facility with the Southern Inbound Haul Route Option 2
Alternative B2c (cont'd)	634 acres classified as social RSC in a backcountry setting. **Phase II** 2,682 acres classified as physical RSC in a front country setting. 2,682 acres classified as social RSC in a middle country setting. **Phase I + Phase II** Same as Alternative B1.	634 acres classified as social RSC in a backcountry setting. **Phase II** Same as wind energy facility with the northern inbound haul route. **Phase I + Phase II** Same as Alternative B1.	634 acres classified as social RSC in a backcountry setting. **Phase II** Same as wind energy facility with the northern inbound haul route. **Phase I + Phase II** Same as Alternative B1.
Alternative C	37,869 acres classified as physical RSC in a front country setting. 637 acres classified as physical RSC in a middle country setting. 37,869 acres classified as social RSC in a middle country setting. 637 acres classified as social RSC in a backcountry setting. Potential change in amount, type, and seasonality of recreational use in and around the project area.	44,496 acres classified as physical RSC in a front country setting. 637 acres classified as physical RSC in a middle country setting. 44,496 acres classified as social RSC in a middle country setting. 637 acres classified as social RSC in a backcountry setting. Potential change in amount, type, and seasonality of recreational use in and around the project area and option 1 of the southern inbound haul route.	45,449 acres classified as physical RSC in a front country setting. 637 acres classified as physical RSC in a middle country setting. 45,449 acres classified as social RSC in a middle country setting. 637 acres classified as social RSC in a backcountry setting. Potential change in amount, type, and seasonality of recreational use in and around the project area and option 2 of the southern inbound haul route.
Alternative D	37,672 acres classified as physical RSC in a front country setting. 835 acres classified as physical RSC in a middle country setting.	44,299 acres classified as physical RSC in a front country setting. 835 acres classified as physical RSC in a middle country setting.	45,252 acres classified as physical in a front country setting. 835 acres classified as physical RSC in a middle country setting.

Table 4.4.1-10. Impact Summary Table – Recreation Resources[1] (continued).

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Route Option 1	Wind Energy Facility with the Southern Inbound Haul Route Option 2
Alternative D (cont'd)	37,671 acres classified as social RSC in a middle country setting. 835 acres classified as physical and social RSCs in a backcountry setting. Potential change in amount, type, and seasonality of recreational use in and around the project area.	44,298 acres classified as social RSC in a middle country setting. 835 acres classified as physical and social RSCs in a backcountry setting. Potential change in amount, type, and seasonality of recreational use in and around the project area and option 1 of the southern inbound haul route.	45,252 acres classified as social RSC in a middle country setting. 835 acres classified as physical and social RSCs in a backcountry setting. Potential change in amount, type, and seasonality of recreational use in and around the project area and option 2 of the southern inbound haul route.
Alternative E	37,654 acres classified as physical RSC in front country setting. 853 acres classified as physical RSC in middle country setting. 37,654 acres classified as social RSC in middle country setting. 853 acres classified as social RSC in backcountry setting. Potential change in amount, type, and seasonality of recreational use in and around the project area.	44,281 acres classified as physical RSC in a front country setting. 853 acres classified as physical RSC in a middle country setting. 44,281 acres classified as social RSC in a middle country setting. 853 acres classified as social RSC in a backcountry setting. Potential change in amount, type, and seasonality of recreational use in and around the project area and option 1 of the southern inbound haul route.	45,234 acres classified as physical RSC in a front country setting. 853 acres classified as physical RSC in a middle country setting. 45,234 acres classified as social RSC in a middle country setting. 853 acres classified as social RSC in a backcountry setting. Potential change in amount, type, and seasonality of recreational use in and around the project area and option 2 of the southern inbound haul route.
Alternative F	37,586 acres classified as physical RSC in a front country setting. 921 acres classified as physical RSC in a middle country setting. 37,586 acres classified as social RSC in a middle country setting.	44,213 acres classified as physical RSC in a front country setting. 921 acres classified as physical RSC in a middle country setting. 42,213 acres classified as social RSC in a middle country setting.	45,166 acres classified as physical RSC in a front country setting. 921 acres classified as physical RSC in a middle country setting. 45,166 acres classified as social RSC in a middle country setting.

Table 4.4.1-10. Impact Summary Table – Recreation Resources[1] (continued).

Alternative	Wind Energy Facility with the Northern Inbound Haul Route	Wind Energy Facility with the Southern Inbound Haul Route Option 1	Wind Energy Facility with the Southern Inbound Haul Route Option 2
Alternative F (cont'd)	921 acres classified as physical and social RSCs in a backcountry setting. Potential change in amount, type, and seasonality of recreational use in and around the project area.	921 acres classified as physical and social RSCs in a backcountry setting. Potential change in amount, type, and seasonality of recreational use in and around the project area and option 1 of the southern inbound haul route.	921 acres classified as physical and social RSCs in a backcountry setting. Potential change in amount, type, and seasonality of recreational use in and around the project area and option 2 of the southern inbound haul route.

[1] Changes in physical and social RSC that are listed in the table are based on O&M.

4.4.1.5 Cumulative Impacts

The analysis area for cumulative impacts on recreation resources includes the project area and the inbound haul routes. The rational for selecting this area was based on the unique geographical setting of the project area and its specific recreational use by hunters, dispersed campers, and pleasure drivers. Reasonably foreseeable future actions would need to occur within close proximity to the project, or influence access to the project, in order to contribute to cumulative impacts.

Alternative A (No Action Alternative)

The increase in development of communication towers and transmission lines could diminish the aesthetic quality of recreation areas located south of the city of Twin Falls, thereby indirectly affecting the quality of the physical recreation setting.

All Action Alternatives

No contribution to identified reasonably foreseeable future actions and cumulative impacts would be made by the action alternatives. As stated above, the proposed project is situated in a unique geographic setting. Recreators use the area as a destination for specific recreation activities. Reasonably foreseeable future actions would need to occur within close proximity to the project, or influence access to the project, in order to contribute to cumulative impacts.

4.4.2 LIVESTOCK GRAZING

This section presents potential impacts on livestock grazing that could result from implementing the proposed alternatives for the project. The analysis areas for livestock grazing are the boundaries of the combined allotments that overlap the project area, northern inbound haul route, and both options of the southern inbound haul route.

4.4.2.1 Analysis Methods

Indicators

Potential effects on livestock grazing are described for each alternative in the context of relevant indicators. The indicators for livestock grazing include:

- Reduction in Animal Unit Month (AUMs) due to loss of forage from project disturbance; and
- Changes to livestock grazing management or operation.

Methods and Assumptions

Impacts on livestock grazing are evaluated based on the number of acres of project disturbance that could result in the loss of available forage. Short-term surface disturbance occurs in areas that are disturbed during construction but are revegetated shortly thereafter, resulting in a short-term loss of available forage. Long-term surface disturbance occurs in areas that are disturbed for the life of the project until they are reclaimed during decommissioning, resulting in a long-term loss of available forage. Permanent surface disturbance occurs in areas that are not reclaimed or decommissioned, resulting in a permanent loss of available forage.

For analysis purposes, the availability of forage is given in AUMs. To analyze the potential impacts on livestock grazing in terms of a reduction in AUMs, stocking ratios were calculated for the project area, northern inbound haul route, and both options of the southern inbound haul route (Section 3.4.2). These stocking ratios are used for analysis purposes only, and should not be used as a determination of forage production.

A total of 22,491 AUMs are currently permitted for the 10 allotments overlapping the project area (Table 3.4.3-1). When averaged across the 212,900 total acres of the combined allotments, the current permitted 22,491 AUMs allow for an assumed stocking ratio of about 9.5 acres per AUM for the project area (Section 3.4.2). There are 23 allotments in Idaho that overlap or share a boundary with the northern inbound haul route. These allotments combined have a total land surface area of about 543,000 acres. A total of 62,689 AUMs are currently permitted for the 23 allotments. When averaged across the total land surface of the combined allotments, the current permitted 62,689 AUMs allow for an assumed stocking ratio of about 8.7 acres per AUM for the northern inbound haul route (Section 3.4.2). The Jackpot Allotment in Nevada is the only allotment that overlaps both options of the southern inbound haul route. It has a total land surface area of about 74,300 acres. Based on the total land surface and the current permitted 4,551 AUMs, the assumed stocking ratio is 16.3 acres per AUM for either option of the southern inbound haul route (Section 3.4.2). The potential impacts on livestock are based on a comparison of potential changes to the availability of forage (in AUMs) based on this stocking ratio.

Changes to livestock grazing management or operation are assessed by overlaying the existing infrastructure (e.g., troughs, tanks, springs, reservoirs, ponds, and pipelines) with proposed project

disturbance to determine whether or not the project would impact existing livestock grazing infrastructure. In addition, impacts on livestock grazing from increased use of the area are discussed.

Assumptions:

- Project disturbance would result in the loss of forage availability.
- The quality and quantity of forage is consistent throughout the analysis area.
- Livestock would be kept off of revegetated and reclaimed areas until revegetation is deemed successful.

4.4.2.2 Direct and Indirect Impacts of the Wind Energy Facility

Alternative A (No Action Alternative)

Livestock grazing would be not be impacted from project construction, O&M, or decommissioning activities under the No Action Alternative. Livestock grazing in the analysis area would remain in existing conditions (Section 3.4.2).

Impacts Common to All Action Alternatives

Construction

Most of the impacts on livestock grazing would occur as a result of project construction. Construction activities that result in surface disturbance would remove vegetation and impact forage availability in localized areas. Short-term surface disturbance would result in the loss of available forage during construction until revegetation efforts have succeeded. Long-term surface disturbance would result in the loss of forage production until decommissioning. Permanent surface disturbance would result in the permanent loss of forage. The majority of surface disturbance would result from the construction of turbines and either newly constructed or reconstructed roads. Overall, surface disturbance would have a major impact on forage availability in localized areas; however, forage loss due to project disturbance would have a minor impact on available forage for livestock use at the area-wide level.

Changes to livestock grazing infrastructure as a result of project construction could impact livestock grazing management and operation. Administering livestock grazing could require additional effort if conflicts arise between livestock grazing and construction activities. Construction and reconstruction of roads would create more opportunities for gates to be left open by the public land users which could result in non-compliance or trespass by the livestock permittee. This could indirectly result in an increase in the cost of livestock management and operation. Non-compliance could also result in non-attainment of resource objectives and fundamentals of rangeland health when livestock are inadvertently allowed to graze in the wrong place. Cattle guards would be installed where project roads intersect a fence line, which would reduce these impacts on livestock grazing management and operation. The Applicants would be responsible for the maintenance of the cattle guards. The construction and reconstruction of project roads could also provide better access for livestock permittees to manage their livestock.

Long-term fencing would be added around substations and O&M facilities; however, there would be no additional miles of long-term fencing for the project. Temporary fencing would be placed around open trenches, foundations, and other active construction sites. Overall, the impacts on livestock from the installation of cattle guards and temporary and long-term fencing would result in minor impacts on livestock grazing.

Increased vehicle traffic on project roads during construction could result in livestock displacement or potential fatality. Designating maximum speed limits of 20 miles per hour (mph) on all project roads would help reduce potential impacts on livestock.

Under all alternatives, proposed project disturbance would not overlap with existing livestock grazing infrastructure, including troughs, water storage tanks, springs, or reservoirs, and impacts on livestock management and operation would be minor. If the Applicants damage any portion of the water development while livestock are on the project site, the system would be repaired as soon as possible, or supplemental water would be provided by the Applicants until repairs are completed.

The project area would not be closed to livestock grazing permit holders, and the Applicants would work with the BLM and livestock grazing permittees to coordinate use of the project area during construction. Any livestock-related incidences would be reported to the BLM and the livestock grazing permittee immediately. Construction staff would be asked to report any incidents of interaction with livestock, or livestock found close to the construction areas, to BLM and the livestock grazing permittee.

Implementing design features to ensure revegetation efforts are successful and by revegetating all disturbed sites as soon as possible would reduce impacts on livestock grazing (Appendix 2A). Refer to the tables in the Project as a Whole section for a summary of the impacts on livestock grazing for each indicator by alternative.

Operation and Maintenance

General impacts from increased vehicle traffic on project roads would be the same as construction although less vehicle traffic would occur during O&M. The impacts on livestock grazing from potential livestock displacement or livestock fatality would be minor.

Decommissioning

Decommissioning the project would have similar impacts as described for construction. Long-term disturbance acres would be reclaimed and forage production would resume within these areas. Some areas that were revegetated after construction would be redisturbed during decommissioning, resulting in a short-term loss of available forage. These areas would then be reclaimed after decommissioning and forage production would resume.

Alternative B1 (Proposed Action)

Construction

Construction activities would result in 812 acres of surface disturbance, which would reduce livestock forage availability in localized areas. Surface disturbance would be short-term, long-term, or permanent across 585, 202, and 25 acres, respectively. Using the 9.5 acres per AUM stocking ratio previously discussed, short-term surface disturbance would result in a potential loss of 62 AUMs (585/9.5), long-term disturbance would result in a loss of 21 AUMs (202/9.5), and permanent disturbance would result in a loss of about 3 AUMs (25/9.5).

Construction would impact four permittees and six allotments (Table 4.4.2-2). Construction of turbines and project roads would occur within all of the allotments affected by the project.

Operation and Maintenance

The impacts on livestock grazing from potential livestock displacement or livestock fatality from vehicle traffic on 83 miles of project roads during O&M would be minor.

Decommissioning

Decommissioning the project would have similar impacts as described for construction. Approximately 202 acres of long-term disturbance would be reclaimed and forage production would resume within those areas. About 84 acres that were revegetated after construction would be redisturbed during decommissioning, resulting in a short-term loss of available forage. These areas would then be reclaimed after decommissioning and forage production would resume.

Alternative B2a

Construction

Phase I

Construction activities would result in 536 acres of surface disturbance, which would reduce livestock forage availability in localized areas. Surface disturbance would be short-term, long-term, or permanent across 370, 149, and 17 acres, respectively. Using the 9.5 acres per AUM stocking ratio previously discussed, short-term surface disturbance would result in a potential loss of 39 AUMs (370/9.5), long-term disturbance would result in a loss of 16 AUMs (149/9.5), and permanent disturbance would result in a loss of about 2 AUMs (17/9.5).

Construction of Phase I would impact four permittees and five allotments. Construction of turbines and project roads would occur within all five of the allotments affected by the project (Table 4.4.2-2).

Phase II

Construction activities would result in 301 acres of surface disturbance, which would reduce livestock forage availability in localized areas. Surface disturbance would be short-term, long-term, or permanent across 232, 60, and 9 acres, respectively. Using the 9.5 acres per AUM stocking ratio previously discussed, short-term surface disturbance would result in a potential loss of 24 AUMs

(232/9.5), long-term disturbance would result in a loss of 6 AUMs (60/9.5), and permanent disturbance would result in a loss of almost 1 AUM (9/9.5).

Construction of Phase II would impact three permittees and four allotments. Construction of turbines and project roads would occur within all four of the allotments affected by the project (Table 4.4.2-2).

Phase I and Phase II

Construction activities would result in 837 acres of surface disturbance, which would reduce livestock forage availability in localized areas. Surface disturbance would be short-term, long-term, or permanent across 602, 209, and 26 acres, respectively. Using the 9.5 acres per AUM stocking ratio previously discussed, short-term surface disturbance would result in a potential loss of 63 AUMs (602/9.5), long-term disturbance would result in a loss of 22 AUMs (209/9.5), and permanent disturbance would result in a loss of almost 3 AUMs (26/9.5).

Construction of Phase I and Phase II would impact four permittees and six allotments. Construction of turbines and project roads would occur within all six of the allotments affected by the project (Table 4.4.2-2).

Operation and Maintenance

General impacts from increased vehicle traffic on project roads would be the same as construction although less traffic would occur during O&M. During Phase I, vehicle traffic would occur on approximately 63 miles of project roads during O&M activities resulting in minor impacts on livestock grazing from potential displacement or increased fatality of livestock. During Phase II, vehicle traffic would occur on an additional 20 miles of project roads during O&M activities, resulting in minor impacts on livestock grazing. During Phase I and Phase II, vehicle traffic would occur on approximately 83 miles of project roads during O&M activities, resulting in minor impacts on livestock grazing.

Decommissioning

Decommissioning the project would have similar impacts as described for construction. Approximately 209 acres of long-term disturbance would be reclaimed and forage production would resume within those areas. About 84 acres that were revegetated after construction would be redisturbed during decommissioning, resulting in a short-term loss of available forage. These areas would then be reclaimed after decommissioning and forage production would resume.

Alternative B2b

Construction

Phase I

Construction activities would result in 523 acres of surface disturbance, which would reduce livestock forage availability in localized areas. Surface disturbance would be short-term, long-term, or permanent across 367, 131, and 25 acres, respectively. Using the 9.5 acres per AUM stocking ratio

previously discussed, short-term surface disturbance would result in a potential loss of 38 AUMs (367/9.5), long-term disturbance would result in a loss of 14 AUMs (131/9.5), and permanent disturbance would result in a loss of about 3 AUMs (25/9.5).

Construction of Phase I would impact four permittees and six allotments. Construction of turbines and project roads would occur within all of the affected allotments except Player Canyon and Jackpot allotments; within these allotments the transmission line and associated road would be the only project features constructed (Table 4.4.2-2).

Phase II

Construction activities would result in 313 acres of surface disturbance, which would reduce livestock forage availability in localized areas. Surface disturbance would be short-term or long-term across 235 and 78 acres, respectively. There would be no permanent disturbance. Using the 9.5 acres per AUM stocking ratio previously discussed, short-term surface disturbance would result in a potential loss of 25 AUMs (235/9.5), long-term disturbance would result in a loss of 8 AUMs (78/9.5), and permanent disturbance would not result in a loss of AUMs (0/9.5).

Construction of Phase II would impact four permittees and five allotments. Construction of turbines and project roads would occur within all five of the allotments affected by the project (Table 4.4.2-2).

Phase I and Phase II

Construction activities would result in 836 acres of surface disturbance, which would reduce livestock forage availability in localized areas. Surface disturbance would be short-term, long-term, or permanent across 602, 209, and 25 acres, respectively. Using the 9.5 acres per AUM stocking ratio previously discussed, short-term surface disturbance would result in a potential loss of 63 AUMs (602/9.5), long-term disturbance would result in a loss of 22 AUMs (209/9.5), and permanent disturbance would result in a loss of almost 3 AUMs (25/9.5).

Construction of Phase I and Phase II would impact four permittees and six allotments. Construction of turbines and project roads would occur within all six of the allotments affected by the project (Table 4.4.2-2).

Operation and Maintenance

General impacts from increased vehicle traffic on project roads would be the same as construction although less traffic would occur during O&M. During Phase I, vehicle traffic would occur on approximately 62 miles of project roads during O&M activities resulting in minor impacts on livestock grazing from potential displacement or increased fatality of livestock. During Phase II, vehicle traffic would occur on an additional 21 miles of project roads during O&M activities resulting in minor impacts on livestock grazing. During Phase I and Phase II, vehicle traffic would occur on approximately 83 miles of project roads during O&M activities resulting in minor impacts on livestock grazing.

Decommissioning

Decommissioning the project would have similar impacts as described for construction. Approximately 209 acres of long-term disturbance would be reclaimed and forage production would resume within those areas. About 84 acres that were revegetated after construction would be redisturbed during decommissioning resulting in a short-term loss of available forage. These areas would then be reclaimed after decommissioning and forage production would resume.

Alternative B2c

Construction

Phase I

Construction activities would result in 564 acres of surface disturbance, which would reduce livestock forage availability in localized areas. Surface disturbance would be short-term, long-term, or permanent across 386, 153, and 25 acres, respectively. Using the 9.5 acres per AUM stocking ratio previously discussed, short-term surface disturbance would result in a potential loss of 41 AUMs (386/9.5), long-term disturbance would result in a loss of 16 AUMs (153/9.5), and permanent disturbance would result in a loss of almost 3 AUMs (25/9.5).

Construction of Phase I would impact four permittees and six allotments. Construction of turbines and project roads would occur within all six of the allotments affected by the project (Table 4.4.2-2).

Phase II

Construction activities would result in 267 acres of surface disturbance, which would reduce livestock forage availability in localized areas. Surface disturbance would be short-term, long-term, or permanent across 209 acres, 57 acres, and 1 acre, respectively. Using the 9.5 acres per AUM stocking ratio previously discussed, short-term surface disturbance would result in a potential loss of 22 AUMs (209/9.5), long-term disturbance would result in a loss of 6 AUMs (57/9.5), and permanent disturbance would not result in a loss of AUMs (1/9.5).

Construction of Phase II would impact three permittees and two allotments. Construction of turbines and project roads would occur within both of the allotments affected by the project (Table 4.4.2-2).

Phase I and Phase II

Construction activities would result in 831 acres of surface disturbance, which would reduce livestock forage availability in localized areas. Surface disturbance would be short-term, long-term, or permanent across 595, 210, and 26 acres, respectively. Using the 9.5 acres per AUM stocking ratio previously discussed, short-term surface disturbance would result in a potential loss of 63 AUMs (595/9.5), long-term disturbance would result in a loss of 22 AUMs (210/9.5), and permanent disturbance would result in a loss of almost 3 AUMs (26/9.5).

Construction of Phase I and Phase II of Alternative B2c would impact four permittees and six allotments. Construction of turbines and project roads would occur within all six of the allotments affected by the project (Table 4.4.2-2).

Operation and Maintenance

General impacts from increased vehicle traffic on project roads would be the same as construction although less traffic would occur during O&M. During Phase I, vehicle traffic would occur on approximately 70 miles of project roads during O&M activities resulting in minor impacts on livestock grazing from potential displacement or increased fatality of livestock. During Phase II, vehicle traffic would occur on an additional 13 miles of project roads during O&M activities resulting in minor impacts on livestock grazing. During Phase I and Phase II, vehicle traffic would occur on approximately 83 miles of project roads during O&M activities resulting in minor impacts on livestock grazing.

Decommissioning

Decommissioning the project would have similar impacts as described for construction. Approximately 210 acres of long-term disturbance would be reclaimed and forage production would resume within those areas. About 84 acres that were revegetated after construction would be redisturbed during decommissioning resulting in a short-term loss of available forage. These areas would then be reclaimed after decommissioning and forage production would resume.

Alternative C

Construction

Construction activities would result in 745 acres of surface disturbance, which would reduce livestock forage availability in localized areas. Surface disturbance would be short-term, long-term, or permanent across 531, 189, and 25 acres, respectively. Using the 9.5 acres per AUM stocking ratio previously discussed, short-term surface disturbance would result in a potential loss of 56 AUMs (531/9.5), long-term disturbance would result in a loss of 20 AUMs (189/9.5), and permanent disturbance would result in a loss of almost 3 AUMs (25/9.5).

Construction would impact four permittees and six allotments. Construction of turbines and project roads would occur within all six of the allotments affected by the project (Table 4.4.2-2).

Operation and Maintenance

The impacts on livestock grazing from potential livestock displacement or livestock fatality from vehicle traffic on 80 miles of project roads during O&M would be minor.

Decommissioning

Decommissioning the project would have similar impacts as described for construction. Approximately 189 acres of long-term disturbance would be reclaimed and forage production would resume within those areas. About 72 acres that were revegetated after construction would be

redisturbed during decommissioning resulting in a short-term loss of available forage. These areas would then be reclaimed after decommissioning and forage production would resume.

Alternative D

Construction

Construction activities would result in 631 acres of surface disturbance, which would reduce livestock forage availability in localized areas. Surface disturbance would be short-term, long-term, or permanent across 443, 163, and 25 acres, respectively. Using the 9.5 acres per AUM stocking ratio previously discussed, short-term surface disturbance would result in a potential loss of 47 AUMs (443/9.5), long-term disturbance would result in a loss of 17 AUMs (163/9.5), and permanent disturbance would result in a loss of almost 3 AUMs (25/9.5).

Construction would impact four permittees and six allotments. Construction of turbines and project roads would occur within all of the affected allotments except the Jackpot Allotment (Table 4.4.2-2); within this allotment, the transmission line and associated road would be the only project features constructed.

Operation and Maintenance

The impacts on livestock grazing from potential livestock displacement or livestock fatality from vehicle traffic on 72 miles of project roads during O&M would be minor.

Decommissioning

Decommissioning the project would have similar impacts as described for construction. Approximately 163 acres of long-term disturbance would be reclaimed and forage production would resume within those areas. About 59 acres that were revegetated after construction would be redisturbed during decommissioning resulting in a short-term loss of available forage. These areas would then be reclaimed after decommissioning and forage production would resume.

Alternative E

Construction

Construction activities would result in 656 acres of surface disturbance, which would reduce livestock forage availability in localized areas. Surface disturbance would be short-term, long-term, or permanent across 461, 170, and 25 acres, respectively. Using the 9.5 acres per AUM stocking ratio previously discussed, short-term surface disturbance would result in a potential loss of 49 AUMs (461/9.5), long-term disturbance would result in a loss of 18 AUMs (170/9.5), and permanent disturbance would result in a loss of almost 3 AUMs (25/9.5).

Construction would impact four permittees and six allotments. Construction of turbines and project roads would occur within all six of the allotments affected by the project (Table 4.4.2-2).

Operation and Maintenance

The impacts on livestock grazing from potential livestock displacement or livestock fatality from vehicle traffic on 76 miles of project roads during O&M would be minor.

Decommissioning

Decommissioning the project would have similar impacts as described for construction. Approximately 170 acres of long-term disturbance would be reclaimed and forage production would resume within those areas. About 71 acres that were revegetated after construction would be redisturbed during decommissioning resulting in a short-term loss of available forage. These areas would then be reclaimed after decommissioning and forage production would resume.

Alternative F

Construction

Construction activities would result in 544 acres of surface disturbance, which would reduce livestock forage availability in localized areas. Surface disturbance would be short-term, long-term, or permanent across 375, 144, and 25 acres, respectively. Using the 9.5 acres per AUM stocking ratio previously discussed, short-term surface disturbance would result in a potential loss of 39 AUMs (375/9.5), long-term disturbance would result in a loss of 15 AUMs (144/9.5), and permanent disturbance would result in a loss of almost 3 AUMs (25/9.5).

Construction would impact four permittees and six allotments. Construction of turbines and project roads would occur within three of the affected allotments; however, only the transmission line and associated road would be constructed in Player Canyon and Jackpot allotments and only one partial turbine pad would be constructed within the North Fork Field Allotment (Table 4.4.2-2).

Operation and Maintenance

The impacts on livestock grazing from potential livestock displacement or livestock fatality from vehicle traffic on 66 miles of project roads during O&M would be minor.

Decommissioning

Decommissioning the project would have similar impacts as described for construction. Approximately 144 acres of long-term disturbance would be reclaimed and forage production would resume within these areas. About 41 acres that were revegetated after construction would be redisturbed during decommissioning resulting in a short-term loss of available forage. These areas would be reclaimed after decommissioning and forage production would resume.

4.4.2.3 Direct and Indirect Impacts of the Haul Routes

Northern Inbound Haul Route

Construction

Reconstruction of portions of the 119-mile northern inbound haul route would result in 39 acres of surface disturbance, which would reduce forage availability in localized areas. Surface disturbance would be permanent. Using the 8.7 acres per AUM stocking ratio previously discussed for the northern inbound haul route, permanent disturbance would result in a potential loss of about 4 AUMs (39/8.7).

As this haul route is an already established roadway, reconstruction along portions of the route would likely not impact livestock management or operation through improved access. The installation of cattle guards where project roads intersect a fence line would help livestock operators keep their livestock in the correct allotment and circumvent the problem of gates being left open by road users. The Applicants would be responsible for the maintenance of the cattle guards. Use of this route would increase for 2 years during the time of project construction (3 years for the phased alternatives and 4 years for Alternative E). Increased use of this route would have the potential to increase livestock displacement or livestock fatality.

Operation and Maintenance

As the northern inbound haul route would be used approximately once per year for major maintenance of the wind energy facility, maintenance of this haul route is expected to have negligible impact on livestock grazing.

Decommissioning

This haul route is an already established roadway and would not be decommissioned; therefore, there would be no impacts on livestock grazing from decommissioning.

Southern Inbound Haul Route Option 1

Construction

The reconstruction of existing roads and construction of new roads would result in 86 acres of surface disturbance along 11 miles of option 1 of the southern inbound haul route. This would reduce available forage on 23 acres over the short-term and 63 acres permanently. Using the 16.3 acres per AUM stocking ratio previously discussed, short-term surface disturbance would result in a potential loss of between 1 and 2 AUMs (23/16.3) and permanent disturbance would result in a loss of almost 4 AUMs (63/16.3).

The 23-acre staging area would be revegetated after construction is complete. However, during the construction of Phase II, for Alternatives B2a, B2b, and B2c, this area would be redisturbed, resulting in a short-term loss of available forage.

As new road construction would be required to establish this route as a roadway, reconstruction and construction of this route would likely impact livestock grazing management and operation through improved access to the area. This route could improve access for livestock managers and operators and could indirectly reduce costs for them to maintain livestock infrastructure developments. The installation of cattle guards where project roads intersect a fence line would help livestock operators keep their livestock in the correct allotment and circumvent the problem of gates being left open by road users. The Applicants would be responsible for the maintenance of the cattle guards. Use of this route would increase for 2 years during the time of project construction (3 years for the phased alternatives and 4 years for Alternative E). Increased use of this route would have the potential to increase livestock displacement or livestock fatality.

Operation and Maintenance

As this route would be used approximately once per year for major maintenance of the wind energy facility, maintenance of this haul route is expected to have negligible impact on livestock grazing.

Decommissioning

This haul route would not be decommissioned; therefore, there would be no impacts on livestock grazing from decommissioning.

Southern Inbound Haul Route Option 2

Construction

The reconstruction of existing roads and construction of new roads would result in 90 acres of surface disturbance along 13 miles of option 2 of the southern inbound haul route. This would reduce available forage on 23 acres over the short-term and 67 acres permanently. Using the 16.3 acres per AUM stocking ratio previously discussed, short-term surface disturbance would result in a potential loss of between 1 and 2 AUMs (23/16.3) and permanent disturbance would result in a loss of just over 4 AUMs (67/16.3).

The 23-acre staging area would be revegetated after construction is complete. However, during the construction of Phase II for Alternatives B2a, B2b, and B2c, this area would be redisturbed, resulting in a short-term loss of available forage.

As new road construction would be required to establish this route as a roadway, reconstruction and construction of this route would likely impact livestock grazing management and operation through improved access to the area. This route could improve access for livestock managers and operators and could indirectly reduce costs for them to maintain livestock infrastructure developments. The installation of cattle guards where project roads intersect a fence line would help livestock operators keep their livestock in the correct allotment and circumvent the problem of gates being left open by road users. The Applicants would be responsible for the maintenance of the cattle guards. Use of this route would increase for 2 years during the time of project construction (3 years for the phased

alternatives and 4 years for Alternative E). Increased use of this route would have the potential to increase livestock displacement or livestock fatality.

Operation and Maintenance

As this route would be used approximately once per year for major maintenance of the wind energy facility, maintenance of this haul route is expected to have negligible impact on livestock grazing.

Decommissioning

This haul route would not be decommissioned; therefore, there would be no impacts on livestock grazing from decommissioning.

Outbound Haul Route

No construction would take place along the outbound haul route. Therefore, no surface disturbing activities would affect livestock grazing and use of this route would result in negligible impacts on livestock grazing.

4.4.2.4 Project as a Whole

The project as a whole includes the project disturbance area and haul routes. Potential impacts on livestock grazing that could result from implementing the project as a whole are decreased forage availability (Table 4.4.2-1) and changes to livestock management and operation (Table 4.4.2-2). The project is not expected to disturb the existing range infrastructure for livestock grazing. Project roads could improve access to existing range infrastructure by livestock and livestock managers and operators. Potential conflicts between livestock grazing and other resource uses, increased vehicle traffic on project roads for example, could impact livestock grazing.

Short-term surface disturbance would result in a loss of between 39 and 63 AUMs depending on alternative (Table 4.4.2-1). Alternative B1 and the phased alternatives (B2a, B2b, and B2c) would result in the most short-term surface disturbance and highest loss of AUMs, followed by Alternatives C, E, and D. Alternative F would result in the fewest AUMs lost as a result of short-term surface disturbance. In addition to the loss of AUMs as a result of project disturbance, both options of the southern inbound haul route would result in a loss of between 1 and 2 AUMs because of short-term surface disturbance associated with the construction of the staging area. For the phased alternatives (B2a, B2b, and B2c), the staging area would be redisturbed during Phase II construction resulting in an additional loss of between 1 and 2 AUMs. There is no short-term disturbance associated with the proposed reconstruction of the northern inbound haul route.

Long-term surface disturbance would result in a loss of between 15 and 22 AUMs depending on alternative (Table 4.4.2-1). Alternative B1 and the phased alternatives (B2a, B2b, and B2c) would result in the most long-term surface disturbance and highest loss of AUMs, followed by alternatives C, E, and D. Alternative F would result in the fewest AUMs lost as a result of long-term surface

disturbance. Long-term surface disturbance would not result from the construction of either options of the southern inbound haul route, or reconstruction to the northern inbound haul route.

Permanent surface disturbance would result in a loss of 3 AUMs for all action alternatives (Table 4.4.2-1). In addition to the loss of AUMs as a result of project disturbance, both options of the southern inbound haul route would result in a permanent loss of 4 AUMs. Permanent disturbance associated with the northern inbound haul route would also result in a loss of 4 AUMs.

Project disturbance would occur within six allotments and affect four permittees under all alternatives. However, some of the alternatives vary in the types of project features, such as project roads or turbines, constructed within the affected allotments (Table 4.4.2-2). Alternatives B1, C, E, and the full build of the phased alternatives (B2a, B2b, and B2c) would impact the same number of allotments, and project roads and turbines would be constructed in all of the affected allotments. Alternative D would impact the same number of allotments as the other alternatives; however, project roads and turbines would not be constructed in the Jackpot Allotment. Likewise, Alternative F would impact the same number of allotments; however, project roads and turbines would not be constructed in the North Fork Field and Player Canyon allotments in Idaho, and the Jackpot Allotment in Nevada.

Table 4.4.2-1. Potential Loss of Forage Availability (in AUMs)[1] to Livestock Grazing from the Project as a Whole.

Alternatives		Short-term loss of AUMs[2]				Long-term loss of AUMs[3]				Permanent loss of AUMs[4]			
		PA	NHR	SHR1	SHR2	PA	NHR	SHR1	SHR2	PA	NHR	SHR1	SHR2
B1		62	62	63	63	21	21	21	21	3	7	7	7
B2a	Phase I	39	39	40	40	16	16	16	16	2	6	6	6
	Phase II	24	24	25	25	6	6	6	6	1	1	1	1
	Phase I&II	63	63	65	65	22	22	22	22	3	7	7	7
B2b	Phase I	38	38	39	39	14	14	14	14	3	7	7	7
	Phase II	25	25	26	26	8	8	8	8	0	0	0	0
	Phase I&II	63	63	65	65	22	22	22	22	3	7	7	7
B2c	Phase I	41	41	42	42	16	16	16	16	3	7	7	7
	Phase II	22	22	23	23	6	6	6	6	0	0	0	0
	Phase I&II	63	63	65	65	22	22	22	22	3	7	7	7
C		56	56	57	57	20	20	20	20	3	7	7	7
D		47	47	48	48	17	17	17	17	3	7	7	7
E		49	49	50	50	18	18	18	18	3	7	7	7
F		39	39	40	40	15	15	15	15	3	7	7	7

[1] Loss of available forage is given in AUMs based on the stocking ratios calculated for the project area (PA) (9.5 acres per AUM), northern inbound haul route (NHR) (8.7 acres per AUM), and option 1 (SHR1) and option 2 (SHR2) of the southern inbound haul route (16.3 acres per AUM). Totals may not add up due to rounding.

[2] Short-term loss of AUMs = forage availability is lost until revegetation is completed after construction.

[3] Long-term loss of AUMs = forage availability is lost until project decommissioning and reclamation.

[4] Permanent loss of AUMs = forage availability is lost permanently; no reclamation or decommissioning.

Table 4.4.2-2. Project Roads and Turbine Construction Proposed within Grazing Allotments Affected by Wind Energy Facility.[1]

Alternatives		Idaho Allotments					Nevada Allotment
		Antelope Springs	Brackett Bench	Cedar Butte 10	North Fork Field	Player Canyon	Jackpot
B1		YES	YES	YES	YES	YES	YES
B2a	Phase I	YES	YES	NO	YES	YES	YES
	Phase II	YES	YES	YES	YES	NO	NO
	Phase I&II	YES	YES	YES	YES	YES	YES
B2b	Phase I	YES	YES	YES	YES	NO	NO
	Phase II	YES	YES	NO	YES	YES	YES
	Phase I&II	YES	YES	YES	YES	YES	YES
B2c	Phase I	YES	YES	YES	YES	YES	YES
	Phase II	YES	YES	NO	NO	NO	NO
	Phase I&II	YES	YES	YES	YES	YES	YES
C		YES	YES	YES	YES	YES	YES
D		YES	YES	YES	YES	YES	NO
E		YES	YES	YES	YES	YES	YES
F		YES	YES	YES	NO	NO	NO

[1] YES = project roads and/or turbines are proposed; NO = there are no project roads or turbines proposed.

4.4.2.5 Cumulative Impacts

Cumulative impacts on livestock grazing consist of incremental effects of the alternatives when added to other past, present, and reasonably foreseeable future actions. These effects can occur over a long period of time, resulting in gradual changes in forage availability and livestock operation and management. Livestock operations depending on forage produced within the project area also depend on forage produced adjacent to the project area. In addition, livestock grazing is managed and operated at the allotment level. Because of this, the cumulative effects analysis area for the proposed alternatives and the haul routes is the boundary of all allotments overlapping these areas (Figures 3.4.2-1 and 3.4.2-2).

Alternative A (No Action Alternative)

The No Action Alternative would not add cumulatively to existing impacts on livestock grazing because the wind energy facility would not be built.

All Action Alternatives

Past, present, and reasonably foreseeable future actions have impacted livestock grazing within and near the analysis area at differing levels of intensity and scale. Wildfire is expected to continue to play a major role in forage availability within the cumulative effects analysis area as fire frequencies throughout the region are increasing. When towers or other structures are present in an area where a wildland fire occurs, suppression tactics could be limited and some aerial suppression methods would not be available. Because suppression activities could be limited, wildland fires could be larger in size and take longer to contain. Limited fire-fighting capabilities could lead to an increased loss of forage for livestock due to larger fires.

Direct and indirect impacts from this and other projects have and would continue to have localized, major impacts on livestock forage availability in areas of concentrated activities such as roads, fence lines, and other areas of high intensity disturbance. Some of these areas have and would be reclaimed and forage production would return. Some areas would remain disturbed indefinitely. On a larger scale such as within the cumulative effects analysis area, forage availability is incrementally affected by a variety of land uses. An area adjacent to project disturbance for example, may receive wildfire impacts, recreational use, road proliferation, and a variety of other cumulative impacts which could impact livestock grazing and forage production.

Several allotments within the analysis area are subject to a 2009 court decision directing the BLM to adjust livestock grazing to maintain and enhance special status species habitat, particularly for sage-grouse (Section 3.4.2). Construction of the wind energy facility would lead to direct loss of habitat and fragmentation of habitat, along with the potential degradation of habitat through the spread of non-native and invasive plants. Construction would also lead to changes in behavior and potential avoidance of otherwise suitable habitat. Therefore, construction of the project may place more importance on sage-grouse habitat outside of the project area. This could lead to increased restrictions on grazing in those areas.

The allotments that overlap the project area comprise over 200,000 acres of rangeland. The majority of this land is utilized for livestock grazing. Less than 300 acres of long-term and permanent surface disturbance is proposed under all action alternatives, including the inbound haul route options. This surface disturbance would result in a reduction of about 30 AUMs as a result of the construction of the project and any of the inbound haul route options (Table 4.4.2-1). Considering the 22,491 AUMs currently permitted within the allotments overlapping the project area, this would result in a reduction of less than 0.2 percent of permitted AUMs. On a landscape level, forage availability would remain similar to current levels because long-term disturbance associated with the proposed project, in combination with existing projects, is extremely small. Because of the small level of impacts from past, present, and reasonably foreseeable future actions, in connection with the action alternatives, substantive large-scale, long-term impacts on livestock grazing are not expected within the cumulative effects analysis area.

4.5 UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse impacts are impacts that would remain following the implementation of design features, RMP stipulations, and proposed mitigation measures, or impacts for which there are no mitigation measures. Effects are long-term, and in some instances, permanent. Despite the attempt of the Applicants to reduce potential impacts through project design, design features, and mitigation, some unavoidable adverse impacts would occur as a result of implementing the project.

Surface disturbing activities would cause localized unavoidable impacts on soils by increasing the potential for wind and water erosion before the land is revegetated. Permanent loss of soils and vegetation would unavoidably occur along the haul routes and throughout the project area where decommissioning would not occur. Increased access to the area would unavoidably create road proliferation by the public.

Construction and decommissioning of the project would temporarily raise outdoor noise levels above current ambient environmental sound levels, and operation of the wind turbines would raise the outdoor noise levels above current ambient environmental sound levels within a range or distance from wind turbine locations for 30 years. This increase in noise, and the potential impacts that it could have on wildlife or people in the area, would be unavoidable.

Construction and operation of the project under all action alternatives would lead to the unavoidable loss of upland, wetland, and riparian vegetation communities, and potential habitat for special status species. Existing vegetation would be removed and replaced with project facilities, wind turbine foundations, and project roads for the 30-year project time span. Therefore, the impact would be long-term. Once the wind energy facility and associated infrastructure is decommissioned and the vegetation successfully revegetated and returned to its pre-construction condition, the impact would no longer exist. In small, localized areas, some vegetation removal would be permanent.

The loss of shrubland vegetation communities from the siting of project features and construction of project roads would result in an unavoidable loss of habitat for wildlife species dependent upon

mature shrublands. Construction of project roads would unavoidably result in habitat fragmentation. It would take over 20 years for the sagebrush shrubland communities to return to a mature seral condition following decommissioning of the project. Therefore, if the project were permitted, the majority of these lands would not be returned to their pre-construction functional state for at least 50 years.

The proposed project would result in unavoidable adverse impacts on sage-grouse. Given the importance and quality of the habitat in and in the vicinity of the project area to sage-grouse, avoidance of habitat could have a major long-term adverse effect on the sage-grouse population, contributing to further population declines.

The potential mortality of fish and wildlife species associated with the project, particularly to birds and bats from operation of wind turbines, would be an unavoidable adverse impact, occurring through the 30-year term of the project.

The project would cause an unavoidable visual intrusion effect to the potential traditional cultural properties that the project would be visible from. Alternatives that affect the viewshed of traditional cultural properties potentially present in or near the project area, add new facilities, or add loud and sustained noise could result in an unavoidable impact on the attributes of a place of traditional cultural importance to Native American Tribes that give it value.

Implementation of the project would result in unavoidable adverse impacts on visual resources through the changes to visual contrasts in the different viewsheds. Application of design features and mitigation could reduce visual contrast; however, no mitigation has been identified that would result in weak visual contrast of project components when viewed from the immediate foreground or middleground distance zones.

Unavoidable adverse impacts on wilderness characteristics would occur as a result of the wind turbines and project roads. These features would decrease the naturalness of the area and result in a long-term impact on areas with wilderness characteristics.

There would be unavoidable adverse effects on fire and fuels management under any of the action alternatives. Aerial firefighting options may not be available along the ridges in the project area where wind turbines are present. The loss of aerial options could lead to an increase in fire size because the fire may take longer to contain using ground suppression activities only. Firefighting personnel would be required to protect life and property first if a fire were to occur in the project area. This would create an unavoidable impact on fire management. Because firefighting personnel would be needed to protect people and property in the project area, they may not be available to fight a fire directly. This may lead to the fire burning longer and burning larger areas because less people and equipment may be available to directly fight the fire. This could also lead to an unavoidable increase in the cost of suppressing fires within or near the project area.

The project would result in an unavoidable loss of productivity (livestock forage AUMs) for the duration of the ROW grant from the removal of grass and forb vegetation. Once the wind energy facility and associated infrastructure is decommissioned and the vegetation successfully revegetated and returned to its pre-construction condition, the impact would no longer exist.

4.6 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

An irreversible and irretrievable commitment of a resource is defined as a permanent reduction or loss of a resource that once lost, cannot be regained. Most energy development projects, such as gas, oil, or coal fire plants result in an irreversible and irretrievable commitment of the power generating resources (fuel). Wind is a renewable resource that would not be depleted or altered by the project. However, the project, under any of the action alternatives, would result in an irreversible and irretrievable commitment of some resources.

Impacts on geological resources could result from surface and subsurface disturbing activities. Both surface and subsurface geology could be damaged (fractured) or destroyed during project construction activities that disturb bedrock such as blasting, coring, trenching, and grading to place roads, wind turbine pads, underground collection systems, substations, transmission lines, meteorological towers, and O&M facilities. Blasting, coring, and trenching would fracture and permanently alter bedrock resulting in irreversible and irretrievable impacts on geology. The type of bedrock disturbance would be different for each of the project features. Each action alternative would have the potential to impact geology on all, or portions of areas associated with each project feature.

Surface water, groundwater, and springs could be impacted during project construction activities that disturb soil and bedrock such as blasting, coring, trenching, and grading to place roads, wind turbine pads, underground collection facilities, substations, transmission lines, meteorological towers, and O&M facilities. Blasting, coring, and trenching could alter the natural flow of water by fracturing bedrock and redirecting the flow path of the water resulting in irreversible and irretrievable impacts on hydrology. Each action alternative would have the potential to impact hydrology on all, or portions of areas associated with each project feature.

The permanent loss of soil and vegetation within small and highly localized areas that would not be reclaimed, would result in irreversible and irretrievable impacts on soils and vegetation.

Archaeological sites are a finite resource and cannot be replaced once damaged or destroyed. Consequently, while they cannot be specified at this time, the project would result in irreversible and irretrievable impacts on cultural resources.

4.7 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

This section describes the relationship between the short-term use of the local environment associated with the project and the anticipated effects on long-term productivity, as required by Section 102 of

the National Environmental Policy Act. The relationship between short-term uses of land in the project area and long-term productivity would not differ appreciably between alternatives.

The project would require commitments of resources such as soil, water, vegetation, wildlife habitats, and grazing allotments for the life of the project through the conversion of undeveloped land to a wind energy facility. Productivity loss for soils would be limited to the areas disturbed by land clearing, grading, and construction. Short- and long-term impacts on water quality and hydrology could lead to long-term loss of stream productivity, and associated aquatic biota.

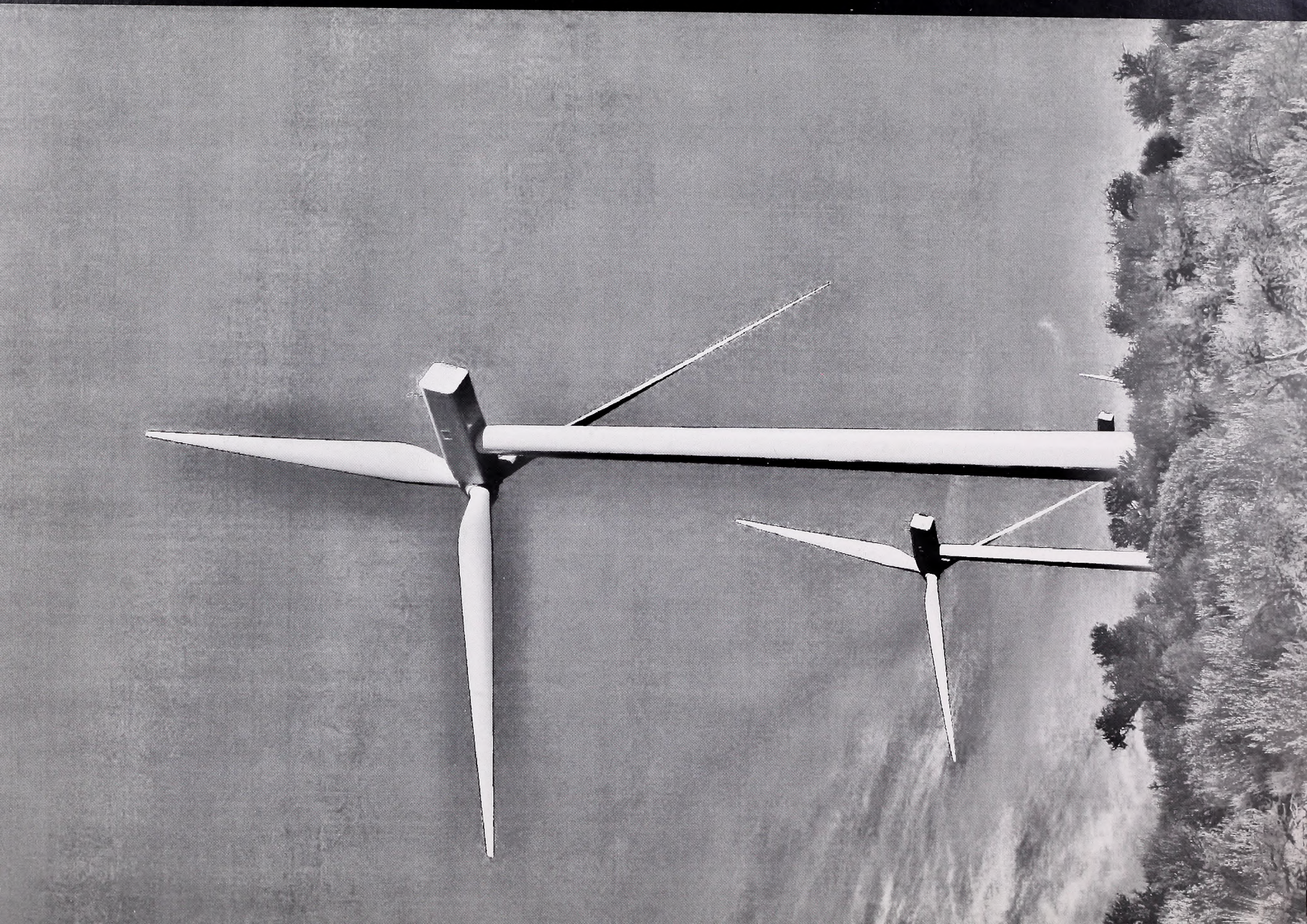
Impacts on transportation and access and economics would occur primarily during construction and decommissioning; although economic benefits, to a lesser extent, could extend throughout operation of the project. Boosts to the local economy would be realized through labor, purchase of supplies, and through the needs of workers associated with constructing and decommissioning the project.

Although the project would not require a large amount of land to be taken out of production, losses of vegetation, animals, and habitats from natural productivity to accommodate project infrastructure and temporary disturbances during construction would occur. Land-clearing and construction activities, including personnel and equipment moving about a localized area, could temporarily disperse wildlife, eliminate habitats, and lead to habitat avoidance. Constructing the project would result in short-term and long-term disturbances of biological habitats and could cause long-term reductions in the biological productivity in localized areas near facilities. Long-term impacts on wildlife productivity would equate to impacts on populations. The impacts on mature shrubland communities and associated wildlife habitat would last a minimum of 50 years, until the vegetation was reestablished to current conditions (20 or more years after reclamation associated with decommissioning).

The only production in the project area is related to livestock forage production. The project would remove up to 88 AUMs, which is less than 1 percent of the AUMs in the project area. Livestock grazing would continue to occur in the project area for the life of the project.

When the project is decommissioned, the facilities would be removed, the majority of the area of disturbance would be reclaimed, and the vegetation would be reestablished. This action would restore the long-term productivity to the area; however, it could take 20 or more years for the vegetation communities to reestablish to their existing vegetation communities and seral condition.

CHAPTER 5 – CONSULTATION AND COORDINATION



5.1 INTRODUCTION

The Bureau of Land Management (BLM) analysis process for the proposed China Mountain Wind Project (the project) Environmental Impact Statement (EIS) is being conducted in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA), Council on Environmental Quality regulations, and Department of the Interior and BLM policies and regulations. NEPA and associated regulations require Federal agencies to involve interested parties in their decision-making processes. Title II, Section 202 of the Federal Land Policy and Management Act of 1976 directs BLM to coordinate with American Indian Tribes, other Federal agencies, and state and local governments as part of its environmental analysis process. The following sections document the consultation and coordination efforts taken by the BLM throughout the development of the China Mountain Wind Project EIS.

5.2 COORDINATION AND CONSULTATION ACTIONS

5.2.1 COORDINATION AND GOVERNMENT-TO-GOVERNMENT CONSULTATION WITH TRIBES

5.2.1.1 Shoshone-Paiute Tribes

Formal government-to-government consultation with the Shoshone-Paiute Tribes occurs through the Twin Falls District's established government-to-government consultation process, the Wings and Roots Native American Campfire. Consultation for this project started in 2002 with the initial wind testing and preference ROW application and continued sporadically through 2006 with project updates and a new wind testing application. Formal consultation on this EIS with the Shoshone-Paiute Tribes began in 2007 upon receipt of the formal project application, and has and will continue on a monthly basis and at other appropriate times throughout the environmental process.

5.2.1.2 Shoshone-Bannock Tribes

Formal government-to-government consultation with the Shoshone-Bannock Tribes is between the Fort Hall Business Council and BLM District Management. It is coordinated through the Shoshone-Bannock environmental staff. In 2008, representatives of the Jarbidge Field Office began staff-to-staff coordination with the Shoshone-Bannock Tribal Environmental Staff regarding the proposed China Mountain Wind Project. Since that time, several meetings/briefings have taken place on a staff-to-staff basis including a field tour of the proposed project area that included tribal staff and elders and BLM management and staff. Recent staff-to-staff briefings in May and August of 2010 have indicated that formal government-to-government consultation should occur after the Council has had an opportunity to view the Draft EIS.

5.2.1.3 Te-Moak Tribe of the Western Shoshone

In July of 2009, BLM staff and management from the Jarbidge Field Office and the Elko District, met with staff representatives of the Wells Band of the Te-Moak Tribe of the Western Shoshone, in accordance with Elko District Tribal consultation procedures established by Instruction Memorandum NV-010-2010-006, to share information regarding the proposed China Mountain Wind Project and to participate in a field tour of the proposed site. Following that meeting, in September of 2009, a request was delivered by mail to the Chairmen of the Te-Moak Tribal Council and the Wells Band

Council, to initiate formal government-to-government consultation. In October of 2009, the Jarbidge Field Office Manager received a phone call from the Chairman of the Wells Band Council acknowledging receipt of the request to initiate consultation. In September of 2010, another letter was sent to the Chairperson of the Wells Band Council, to update her on the status of the proposed project, the schedule for release of the Draft EIS, and to request formal consultation. Government to government consultation will proceed at the discretion of the Tribal councils.

5.2.2 COORDINATION WITH FEDERAL, STATE, AND LOCAL GOVERNMENT AGENCIES

Numerous Federal, state, and local government agencies were invited to participate in the analysis process as cooperating agencies. The following agencies declined the invitation: Federal Energy Regulatory Commission, Idaho Department of Parks and Recreation, Natural Resources Conservation Service, Idaho Department of Water Resources, Nevada State Historic Preservation Office, Federal Highway Administration, Idaho Department of Transportation, and the United States Fish and Wildlife Service.

Memorandums of Understanding for Cooperating Agencies for the project were developed and officially signed between the Twin Falls District and the Twin Falls County Board of Commissioners, Idaho; the Elko County Board of Commissioners, Nevada; the Nevada Department of Wildlife; and the state of Idaho (with the Office of Energy Resources, the Idaho Department of Fish and Game, the Idaho Office of Species Conservation, the Idaho State Historical Preservation Office, Idaho Department of Lands, Idaho Department of Agriculture, Idaho Department of Commerce, and the Idaho Office of Environmental Quality participating).

5.2.3 PROJECT COORDINATION WITH RESOURCE ADVISORY COUNCIL

The Twin Falls Resource Advisory Council received an initial briefing on the project in February 2008 and members visited the project area in a field tour in June 2008. The Twin Falls Resource Advisory Council receives regular updates on the status of the environmental analysis for the China Mountain Wind Project.

5.2.4 COORDINATION WITH CONGRESSIONAL STAFFS

Congressional officials received an initial briefing on the project in February 2008 and have been updated throughout the analysis process at regularly scheduled quarterly briefings given by the Twin Falls District managers.

5.2.5 SECTION 106-NHPA CONSULTATION WITH STATE HISTORIC PRESERVATION OFFICER AND THE ADVISORY COUNCIL ON HISTORIC PRESERVATION

Under Section 106 of the National Historic Preservation Act of 1966, the State Historic Preservation Officer (SHPO) must be consulted concerning any resource management proposal that might affect a cultural property listed on or eligible for the National Register of Historic Places. Both the Idaho and Nevada SHPOs were contacted in 2008 during scoping for the project. Consultation with both SHPOs

continued in 2009 with conference calls and field tours of the project area. Formal consultation with the Advisory Council on Historic Preservation and the Idaho and Nevada SHPOs on the Programmatic Agreement will commence after completion of the archaeological inventory and related documentation.

5.2.6 SECTION 7-ESA CONSULTATION WITH THE U.S. FISH AND WILDLIFE SERVICE

The Endangered Species Act of 1973, as amended, directs Federal agencies to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the existence of any federally-listed species or destroy or adversely modify critical habitat (50 CFR 400). The Endangered Species Act of 1973 authorizes Federal agencies to enter into early consultation with the U.S. Fish and Wildlife Service to make those determinations. A U.S. Fish and Wildlife Service biologist serves as a member of the Wildlife Working Group. Formal consultation will be initiated during the environmental analysis process if needed.

5.2.7 PROJECT COORDINATION WITH THE WILDLIFE WORKING GROUP

The Wildlife Working Group was formed in 2007 to share and evaluate information relative to wildlife populations and habitat which could potentially be affected by the project. The group is comprised of professional biologists from the BLM, Idaho Department of Fish and Game, Nevada Department of Wildlife, and the U.S. Fish and Wildlife Service. The group meets as needed to incorporate collective agency expertise and scientific experience regarding appropriate scientific methods for data collection, mitigation, and evaluation of studies.

5.3 PUBLIC INVOLVEMENT AND SCOPING

Public involvement and scoping were conducted to help identify issues to be considered in alternative development for the China Mountain Wind Project EIS. Scoping is the early and open process for determining the scope of issues to be addressed during the environmental analysis process. Two scoping periods were identified for this project. The first, from April 21, 2008 through July 21, 2008, requested comments relative to the project. The second scoping period from October 15, 2009 to November 16, 2009, was held to gather public comments on a possible land use plan amendment to the 1987 Jarbidge Resource Management Plan (RMP).

Newsletters were prepared throughout the environmental analysis process and mailed to Federal, state and local agencies, organizations, and other interested parties who requested to be on the mailing list. The first newsletter, distributed on June 5, 2008, invited public comment on the project as well as information about three scoping meetings scheduled in June. Newsletter #2, sent out on March 12, 2009, included an update on project status and a summary of public comments received during the 90-day scoping period in 2008. The third newsletter, distributed on December 23, 2009, announced the BLM's intent to prepare an EIS for a possible Land Use Plan Amendment to the 1987 Jarbidge RMP, and an update on the wind project EIS.

The entire Scoping Report for the China Mountain Wind Project EIS, published in May 2010, is available in the decision file for the project and on the project website at http://www.blm.gov/id/st/en/prog/planning/china_mountain_wind.html.

5.3.1 PUBLIC SCOPING MEETINGS

Local media outlets were used to communicate information about the scoping process. Legal notices and news releases appeared in local newspapers announcing the dates, times and locations of open house meetings, in addition to providing contact information for the BLM project manager and links to the project webpage. Public scoping meetings were held in Elko, Nevada, in Jackpot, Nevada, and in Twin Falls, Idaho in June 2008. A total of 45 attendees registered at the three meetings.

5.3.2 PUBLIC COMMENTS

During the 90-day public scoping period in 2008, 23 comment letters were received. A total of 161 unique comments were identified in the letters. The majority of comments concerned fish and wildlife, special status species (primarily Greater sage-grouse), and cumulative impacts.

During the 30-day comment period in November 2009 for the possible land use plan amendment to the 1987 Jarbidge RMP, 11 letters were received. The majority of comments focused on the possible RMP amendment. Other comments addressed resource issues similar to comments received during the initial 2008 scoping period.

5.3.3 LIST OF AGENCIES, ORGANIZATIONS, AND PEOPLE WHO RECEIVED THE EIS

Shown below is a list of the agencies, organizations, and individuals who expressed interest in the China Mountain Wind Project. These names and contact information were added to the project mailing list. Each contact was mailed a hard copy or CD of the Draft EIS or notified where the document could be viewed on a website.

Native American Tribes
Shoshone Bannock Tribes
Shoshone Paiute Tribes
Te-Moak Tribe

Government Agencies, Elected Officials and Representatives
Advisory Council on Historic Preservation
Elko County Board of Commissioners, Nevada
Elko County Chamber of Commerce, Nevada
Elko County Cooperative Extension Office
Elko County Economic Diversification Authority
Elko County Highway Department
Elko County Planning Commission, Nevada
Environmental Protection Agency, Region 9

Environmental Protection Agency, Region 10
Federal Aviation Administration, Northwest Mountain Region
Federal Energy Regulatory Commission
Federal Highway Administration
Governor, State of Idaho
Governor, State of Nevada
Idaho Archaeological Society
Idaho Department of Commerce
Idaho Department of Education
Idaho Department of Environmental Quality
Idaho Department of Fish and Game
Idaho Department of Lands
Idaho Department of Parks and Recreation
Idaho Department of Water Resources
Idaho Fish and Game Commission
Idaho Office of Energy Resources
Idaho State Department of Agriculture
Idaho State Historic Preservation Office
Idaho State Representative Jim Patrick
Idaho State Representative Leon Smith
Idaho State Representative Sharon Block
Idaho State Representative Stephen Hartgen
Idaho State Senator Bert Brackett
Idaho State Senator Charles Coiner
Idaho Transportation Department
National Marine Fisheries Service
National Trust for Historic Preservation
Natural Resources Conservation Service
NRCS, Elko Service Center
NRCS, Twin Falls Service Center
Nevada Department of Agriculture
Nevada Department of Transportation
Nevada Department of Wildlife
Nevada Division of Environmental Protection
Nevada Division of Forestry
Nevada Division of State Lands
Nevada State Assemblyman John Carpenter
Nevada State Assemblyman William Horne
Nevada State Clearinghouse Department of Administration
Nevada State Historic Preservation Office
Nevada State Senator Dean Rhoads
National Oceanic and Atmospheric Administration, Fisheries Division
Northwest Power Planning Council

Snake River Soil Conservation District
Three Creek Highway District
Twin Falls Chamber of Commerce, Idaho
Twin Falls County Board of Commissioners, Idaho
Twin Falls County Highway District
Twin Falls County Planning and Zoning
Twin Falls County Weed Control
Twin Falls Research and Extension Center
Twin Falls Soil & Water Conservation District
U.S. Army Engineers, Northwestern Division
U.S. Coast Guard Environmental Management
U.S. Department of Energy, Office of NEPA Policy and Compliance
U.S. Fish and Wildlife Service
U.S. Forest Service Mountain City Ranger District
U.S. Forest Service Ruby Mountains Ranger District
U.S. Representative Dean Heller, Nevada
U.S. Representative Dina Titus, Nevada
U.S. Representative Mike Simpson, Idaho
U.S. Representative Shelley Berkley, Nevada
U.S. Representative Raul Labrador, Idaho
U.S. Senator Harry Reid, Nevada
U.S. Senator James Risch, Idaho
U.S. Senator John Ensign, Nevada
U.S. Senator Mike Crapo, Idaho
USDA, National Agricultural Library
USDA/APHIS Wildlife Services
USGS, Water Resources Division

Organizations and Individuals
A Leon Hanson
Antelope Springs Ranch, Marc Brackett
APHIS Wildlife Services, Chuck Carpenter
Balanced Rock Soil Conservation District
Barbara Bremers
Blue Ribbon Coalition
Bobbi Royle
Brackett Ranches LTD, Bert Brackett
Brackett Ranches, Ira Brackett
Bjork Lindley Little
Cari Kaster
C E Brackett Cattle Company, Chet Brackett
Cedar Creek Cattle Company, Chuck Jones
Chris Mahannah

Chuck Lehrman
Clare Mahanna
Committee for the High Desert, Steve Jakubowics
Ed Murray
Editor, Ag Weekly
Elko County Public Land Use Advisory Committee
Elko Daily Free Press
George Anthony
Guerry, Inc, Michael Guerry
House Creek Grazing Association, Steve Aslett
IASCD, Alan Monek
Idaho Bird Hunters, Inc.
Idaho Cattlemans Association
Idaho Conservation Data Center
Idaho Environmental Council
Idaho Fish and Wildlife Foundation
Idaho Native Plant Society
Idaho Office of Species Conservation
Idaho Rangeland Resource Commission
Idaho Rural Partnership
Idaho Soil Conservation Commission
Idaho State Historical Society
JBR Environmental Consultants
Jackpot Advisory Board
Jarbidge Advisory Board
Jarbidge Sage-Grouse Local Working Group
John Eade
Karen Klitz
Kent Womack
KENV, Channel 10
Kevin Lenane
KLIX/KEZJ Radio
KMVT TV, Channel 11
KSAW/KTFT
Little PC, Bjork Lindley
Magic Valley Cattlemen's Association
Mandy McNitt
NAACP
National Audubon Society, Prairie Falcon Chapter
Nevada Cattlemen's Association
Nevada Natural Heritage Program
Nevada Rangeland Resources Commission
Northeast Elko Conservation District

NPL News
Resource Concepts, Inc, John McLain
Russ Billings
Sage Ecosystem Science, Cindy Salo
Salmon River Canal Company
Society for Range Management, Idaho Section
SPF Water Engineering
Stan Albee
Terri Kaminski
The Idaho Statesman
The Times News
Tom Maresca
Tracy Woolman
Twin Falls County Farm Bureau
Western Watersheds Project, Jon Marvel
Western Watersheds Project, Katie Fite
Y-3 II Ranch, Travis Gavid

5.4 LIST OF PREPARERS

Tables 5.4-1 and 5.4-2 contain lists of the individuals who participated in the preparation of the China Mountain Wind Project EIS.

Table 5.4-1. BLM Interdisciplinary Team.

Name	Education/Experience	EIS Responsibility
Aoi, Michael (Mike)	BS Computer Science	Fire Planner
Barker, Scott	BS Forest Management 28 years experience in Lands & Realty	Project Manager BLM Realty Specialist Rights-of-Way
Bassler, Barbara	BA Political Science 22 years experience in public affairs and planning	Planning & Environmental Coordinator
Burton, Nycole	BS Zoology MS Natural Resources 10 years experience	Wildlife Biologist
Coffin, Patrick (Pat)	BS Wildlife Biology	Fisheries/Riparian Biologist
Dean, Mark	BS Watershed and Earth Systems	Project Manager for Nevada BLM Hydrologist
Farrell, Katherine	20 years experience in NEPA and planning	Planning & Environmental Coordinator
Forster, Katharine (Kate)	BS Aquatic Resources	Fisheries Biologist
Giustino, Joey James	BS Range Management MS Agricultural Systems Management	Lands and Realty Specialist

Table 5.4-1. BLM Interdisciplinary Team (continued).

Name	Education/Experience	EIS Responsibility
Hawthorne, Tamara	BS Environmental Planning	Outdoor Recreation Planner
Hilty, Julienne (Julie)	BS Biology MS Plant Ecology and Soil Science	Botanist
Hockett, Bryan	PhD Anthropology 20 years experience	Project Manager for Nevada BLM (2 years)
Holdstock, Derrick	BS Environmental & Forest Biology MS Wildlife Science	Wildlife Biologist
Jensen, Jill	MA Anthropology	Archaeologist
Jewell, Donna	BS Renewable Natural Resources, Range	Rangeland Management Specialist
Laird, Kirk	BS Oceanography BS Geology, MBA 19 years experience	Planning & Environmental Coordinator
McCullough, Ester	BS Animal Science 20 years experience in NEPA wildlife and natural resources management	Project Manager (18 months)
Makela, Paul	BS Natural Resources MS Wildlife Biology	Wildlife Biologist
Pence, Fred	BS Industrial Technology	Realty Specialist
Ross, Jeffrey (Jeff)	BA Anthropology	Archaeologist
Sanchez, Hugo (Eddie)	BS Civil Engineering	Civil Engineer
Strickler, Daniel (Dan)	BS Rangeland Resources BS Crop and Soil Science	Rangeland Management Specialist
Willard, Janice	BS Rangeland Ecology and Management	Rangeland Management Specialist
Wirthlin, Whitney	BS Geology	Geologist

Table 5.4-2. Consultants and Other Preparers.

Name	Education/Experience	EIS Responsibility
Batts, David EMPSI	BA International Development MS Resource Management	Quality Assurance Technical Editing
Baum, Ryan URS Corporation	BS Biology MS GIS 10 Years Experience	GIS
Blades, Jarod URS Corporation	MS Environmental Science 10 Years Experience	Fish and Wildlife
Cambier, Matt URS Corporation	BS Environmental Science 10 Years Experience	Fish and Wildlife
Cavanagh, Suzy URS Corporation	MS Geology 15 Years Experience	Geology, Soils Water Resources Public Health and Safety
Cook, Forrest URS Corporation	BS Atmospheric Science 5 Years Experience	Air Quality
English, Aaron URS Corporation	BS Wildlife Biology 18 Years Experience	Project Manager Transportation and Access
Gardner, Richard	PhD. Natural Resource and Agricultural Economics 35 Years Experience	Economic Conditions
Gates, Lisa URS Corporation	BS Geographic Information Management 15 Years Experience	Air Quality Hazardous Materials
Getty, Allison URS Corporation	MA Natural Resources and Environmental Management 6 Years Experience	Non-WSA Lands with Wilderness Characteristics, Special Designations
Harloe, Lisa URS Corporation	BS Biology and Public Administration and Policy Analysis 10 Years Experience	Vegetation and Special Status Plants
Hodges, Scott URS Corporation	Engineering Studies 9 Years Experience	Transportation and Access
Kelly, Mike URS Corporation	BA/MA Anthropology 26 Years Experience	Historic and Cultural Resources, Tribal Treaty Rights and Interests
Kling, Louise URS Corporation	BS Biology 16 Years Experience	Recreation Visual Resources
Porter, Valerie URS Corporation	MBA Business Administration BS Biology 15 Years Experience	Fire and Fuels Management

Table 5.4-2. Consultants and Other Preparers (continued).

Name	Education/Experience	EIS Responsibility
Schwarz, Dave URS Corporation	PhD. Geology 18 Years Experience	Water Resources
Sours, Erin	BA Geography 1 Year Experience	GIS
Steele, Sandra URS Corporation	BBA Management 20 Years Experience	Document Production Quality Assurance
Storm, Mark URS Corporation	BS Aeronautics & Astronautics 17 Years Experience	Noise
Sutter, Lynell URS Corporation	MS Biology 14 Years Experience	Soils Livestock Grazing
Thompson, Rebecca URS Corporation	BS Botany MS Wildlife Biology 15 Years Experience	Assistant Project Manager Fish and Wildlife
Watson, Leslie URS Corporation	BA Zoology 18 Years Experience	Vegetation

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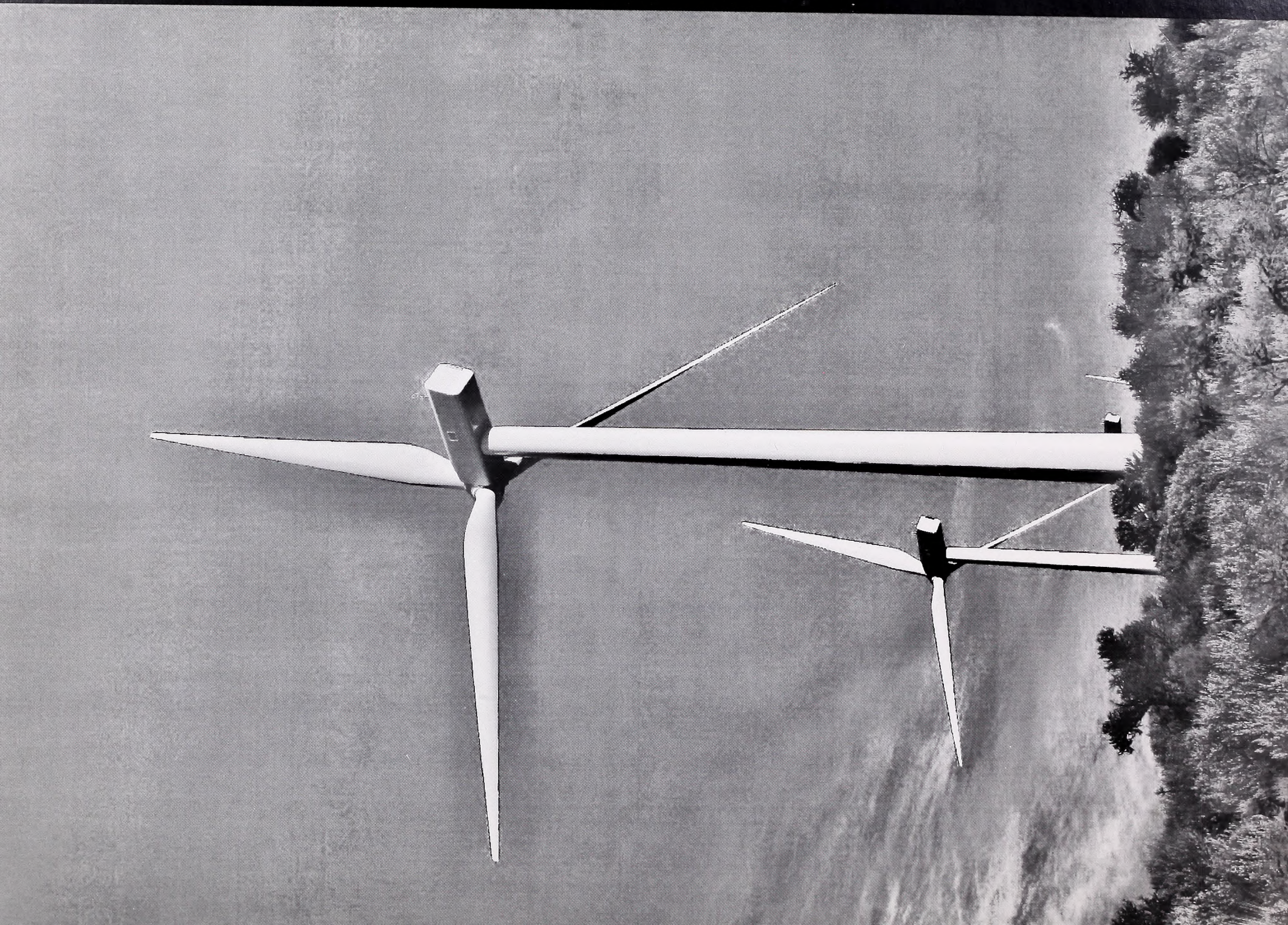
CHAPTER 6 – REFERENCES



CHAPTER 1 – PURPOSE AND NEED

Bureau of Land Management [BLM]. (1985). *Wells resource management plan, record of decision.* Elko District, NV, 1985, amended in 1993.

Bureau of Land Management. (1987). *Jarbidge resource management plan, record of decision.* Boise District, ID: March 1987, updated in 1993.

Bureau of Land Management. (2005a). *FES 05-11; Final programmatic environmental impact statement on wind energy development on BLM-administered lands in the western United States.* Washington, D.C.: United States Department of the Interior, June.

Bureau of Land Management. (2005b). *Record of decision – Implementation of a wind energy development program and associated land use plan amendments.* United States Department of the Interior. Washington, D.C. December.

Bureau of Land Management. (2005c). *Land use planning handbook: BLM handbook H-1601-1.* Release Number 1-1693, March 3, 2005.

Bureau of Land Management. (2008a). *Instruction memorandum no. 2009-043, wind energy development policy.* Issued by the Director of the Bureau of Land Management. Washington, D.C., December 19, 2008.

Bureau of Land Management. (2008b). *BLM handbook H-1790-1. National environmental policy act.* January.

Department of Energy. (2002). *Idaho wind resource map.* April 12, 2002 version 3.1.2. National Renewable Energy Laboratory. Retrieved April 20, 2009, from http://www.windpoweringamerica.gov/maps_template.asp?stateab=id

National Energy Policy Development Group. (2001). *National energy policy, reliable, affordable, and environmentally sound energy for America's future.* Washington, D.C., May 2001.

CHAPTER 2 – ALTERNATIVES INCLUDING THE PROPOSED ACTION

Avian Power Line Interaction Committee. (2006). *Suggested practices for raptor protection on power lines: The state of the art in 1996.* Edison Electric Institute and the Raptor Research Foundation, Washington D.C.

Arnett, E. B., Erickson, W. P., Kerns, J. J., & Horn, J. W. (2005). Relationships between bats and wind turbines in Pennsylvania and West Virginia. An assessment of fatality search protocols, patterns of fatality and behavioral interactions with wind turbines. Bats and Wind Energy Cooperative. Retrieved at http://www.batcon.org/wind/BWEC2004finalreport.pdf

BLM Gold Book United States Department of the Interior and United States Department of Agriculture. (2007). *Surface operating standards and guidelines for oil and gas exploration and development.* BLM/WO/ST-06/021+3071/REV 07. Denver, CO.: Bureau of Land Management, 84 pp.

Bureau of Land Management [BLM]. (2005a). *Record of decision – Implementation of wind energy development program and associated land use plan amendments.* Washington, D.C.: United States Department of the Interior. December.

Bureau of Land Management. (2005b). *FES 05-11; Final programmatic environmental impact statement on wind energy development on BLM-administered lands in the western United States and record of decision.* Washington, D.C.: United States Department of the Interior, June.

Connelly, J. W., Musil, D. D., & Cross, L. R. (2009). Draft. Greater sage-grouse, movements, nesting, and habitats on Browns Bench: an assessment of sage-grouse populations prior to development of a wind energy facility. Progress Report, Idaho Fish and Game. Jerome, ID.

Herron, G. B., Mortimore, C. A, and Rawlings, M. S. (1985). Nevada raptors: Their biology and management. *Biology Bulletin No. 8.* Reno, NV,: Nevada Department of Wildlife.

Idaho Sage-grouse Advisory Committee. (2006). *Conservation plan for the Greater Sage-grouse in Idaho.* Idaho Fish and Game. Boise, ID.

Klott, J. H., Smith, R. B. and Vullo, C. (1993). Sage-grouse habitat use in the Browns Bench Area of South-Central Idaho. Bureau of Land Management Denver Service Center, prepared in cooperation with Idaho Department of Fish and Game, Jerome, ID.

Romin, L. A. and Muck, J. A. (2002). *Utah Field Office guidelines for raptor protection from human and land use disturbances.* U.S. Fish and Wildlife Service, Utah Field Office, Salt Lake City. January 2002 update.

Strickland, M. D., Erickson, W. P and McDonald, L. L. (1996). Final draft, avian monitoring studies, Buffalo Ridge Wind Resource Area, Minnesota. Study protocol prepared for Northern States Power by Western EcoSystems Technology, Inc., Cheyenne, WY. 27pp.

Tetra Tech. (2010). Draft Greater sage-grouse conservation plan for the China Mountain Wind Project. Draft Report prepared for Renewable Energy Systems Americas Incorporated. Portland Oregon. November.

Walker, B. L., Naugle, D. E., & Doherty, K. E. (2007). Greater Sage-Grouse population response to energy development and habitat loss. *Journal of Wildlife Management, 71,* 2644-2654.

Whittington, D. M. and G. T. Allen. (2008). *Draft guidelines for raptor conservation in the western United States*. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Washington, D.C.

Wright, J.L. (1988). Daily and Seasonal Evapotranspiration and Yield of Irrigated Alfalfa in Southern Idaho. *Agronomy Journal, 80*: 662-669.

Young, D. P., Hallingstad, E., Poulton, V. & Bay, B. (2009). *Draft wildlife baseline studies for the China Mountain Wind Resource Area, Twin Falls County, Idaho & Elko County, Nevada.* Final Report: January 2008 – January 2009. Western Ecosystems Technology, Inc. Cheyenne, WY.

CHAPTER 3 – AFFECTED ENVIRONMENT

3.1.1 AIR QUALITY

Bureau of Land Management [BLM]. (2007). *Analysis of the management situation for the Jarbidge resource management plan.* Twin Falls District, ID: BLM Jarbidge Field Office.

Environmental Protection Agency [EPA]. (2009). *Guide to the clean air act.* Environmental Protection Agency website. Retrieved from http://www.repp.org/repp_pubs/articles/issuebr15/02intCAA.htm

Idaho Department of Environmental Quality [IDEQ]. (2007). *Idaho Department of Environmental Quality 2007 air quality monitoring data summary.* Retrieved from http://www.deq.state.id.us/air/data_reports/monitoring/07_aq_monitoring_report.pdf

Idaho Department of Environmental Quality. (2009). IDAPA 58, Title 01, Chapter 01, *IDAPA 58 – Department of Environmental Quality, 58.01.01 – Rules for the control of air pollution in Idaho.* Retrieved from http://adm.idaho.gov/adminrules/rules/idapa58/0101.pdf

Nevada Division of Environmental Protection [NDEP]. (2003). *2003 Trend Report.* Nevada Department of Conservation and Natural Resources, Bureau of Air Quality Planning website. Retrieved from http://ndep.nv.gov/BAQP/monitoring/trend/report.html

Nevada Division of Environmental Protection. (2009). *Planning and modeling branch – Regulations and SIP Development.* Bureau of Air Quality Planning website. Retrieved from http://ndep.nv.gov/baqp/planmodeling/techregsip.html

3.1.2 GEOLOGY

Andrews, G. D. M., Branney, M. J., Bonnichsen, B., & McCurry, M. (2007). Rhyolitic ignimbrites in the Rogerson Graben, southern Snake River Plain volcanic province: volcanic stratigraphy, eruption history and basin evolution. *Bulletin of Volcanology 70*, p. 269-291.

Bonnichsen, B., Leeman, W. P., Honjo, N., McIntosh, W. C., & Godchaux, M. M. (2008). Miocene silicic volcanism in southwestern Idaho: geochronology, geochemistry, and evolution of the central Snake River Plain. *Bulletin of Volcanology 70*, p. 315-342.

Breckenridge, R. M., Lewis, R. S., Adema, G. W., & Weisz, D. W. (2003a). *Miocene and Younger Faults in Idaho. Idaho Geological Survey.* Retrieved January 2009, from http://www.idahogeology.org/livemaps/IdahoFaults/index.html

Breckenridge, R. M., Lewis, R. S., Adema, G. W., & Weisz, D. W. (2003b). *Earthquakes in Idaho 1872 - 2000.* Idaho Geological Survey. Retrieved January, 2009, from http://www.idahogeology.org/livemaps/IdahoEpicenters/index.html

Coats, R. R. (1987). Geology of Elko County, Nevada. *Nevada Bureau of Mines and Geology Bulletin 101*, 112 pp. Scale 1:250,000.

Hughes, C. (2009). Personal communication, telephone conversation from Mark Cecchini, Geologist, URS, to Clinton Hughes, Geologist, BLM, Four Rivers Field Office, January 21, 2009.

Idaho Geologic Survey. (2003). Uniform building code seismic code map of Idaho. Retrieved January 2009 from http://www.idahogeology.org/Services/GeologicHazards/Earthquakes/eqrisk.html

Pierce, K. L. & Morgan, L. A. (1992). Track of the Yellowstone Hotspot: Volcanism, faulting, and uplift, In Link, PK, Kuntz, MA, and Platt, LB (Eds.), *Regional Geology of Eastern Idaho and Western Wyoming.* Geological Society of America Memoir 179.

United States Geological Survey [USGS]. (2008). Mineral resources spatial data [Data file]. Retrieved from http://mrdata.usgs.gov/website/MRData-US/viewer.htm

3.1.3 SOILS

Adams, J. A., Stolzy, L. H., Enso, A. S., Rowlands, P. G., & Johnson, H. B. (1982). Desert soil compaction reduces annual plant cover. *California Agriculture, September/October, 0,* 67.

Belnap, J. (2003). The world at your feet: Desert biological soil crusts. *Frontiers in Ecology and the Environment, 1*(4), 181-189.

Blackburn, W. H. (1984). Impacts of grazing intensity and specialized grazing systems on watershed characteristics and responses. In Nat. Res. Counc./Nat. Acad of Sci., *Developing strategies for rangeland management*, (pp. 927-1000). Boulder, Colorado and London, England: Westview Press.

Blake, G. R. & Hartage, K. H.. (1986). Bulk Density. In: A. Klute (Ed.) *Methods of soil analysis. Part 1. Physical and mineralogical methods—Agronomy monograph #9 (2nd Edition)* (pp. 363–367).

Brockway, D. G., Gatewood, R. G., & Paris, R. B. (2002). Restoring grassland savannas from degraded pinyon-juniper woodlands: effects of mechanical overstory reduction and slash treatment alternatives. *Journal of Environmental Management, 64*, 179-197.

Chambers, J. C., McArthur, E. D., Monson, S. B., Meyer, S. E., Shaw, N. L., Tausch, R. J., et al. (2005). *Sagebrush steppe and pinyon-juniper ecosystems: Effects of changing fire regimes, increased fuel loads, and invasive species (*Project #00-1-1-03, 66 pp). Joint Fire Sciences Report.

DeBano, L. F., Neary, D. G., & Folliott, P. F. (1998). *Fire's effects on ecosystems*. New York, NY: John Wiley and Sons Inc.

Dormaar, J. F., & W. D. Williams. (1990). Sustainable production from the rough fescue prairie. *Journal of Soil and Water Conservation, 45*, 137-140.

Liddle, M. J. (1997) *Recreation ecology—The ecological impact of outdoor recreation and ecotourism*. London: Chapman and Hall.

Lull, H. W. (1959). Soil compaction on forest and range lands. *Misc. Publ. 768*. U.S. Department of Agriculture. 33 pp.

Munshower, F. E. (1994). *Practical Handbook of Disturbed Land Revegetation*. Bacon Raton: Lewis Publishers.

Natural Resources Conservation Service [NRCS]. (2007). *Soil survey geographic (SSURGO) database for Elko County, Nevada, Northeast Part.* Retrieved February 27, 2010 from http://soildatamart.nrcs.usda.gov

Natural Resources Conservation Service. (2008). *Soil survey geographic (SSURGO) database for Jerome County and part of Twin Falls County, Idaho*. Retrieved February 27, 2010 from http://soildatamart.nrcs.usda.gov

Ouren, D. S., Haas, C., Melcher, C. P., Stewart, S. C., Ponds, P. D., Sexton, N. R., et al. (2007). *Environmental effects of off-highway vehicles on Bureau of Land Management lands: A literature synthesis, annotated bibliographies, extensive bibliographies, and internet resources* (Open-File Report 2007-1353). U.S. Geological Survey.

Pierson, F. B., Bates, J. D., Svejcar, T. J., & Hardegree, S. P. (2007). Runoff and erosion after cutting western juniper. *Rangeland Ecology and Management, 60*(3), 285-292.

Ripplinger, J. (2010). Quantifying the effects of managed disturbance on sagebrush steppe resilience and diversity (Master's thesis, Utah State University, Logan, UT). 56 pp.

Tate K. W., Dudley, D. M., McDougald, N. K., & George, M. R. (2004). Effect of canopy cover and grazing on soil bulk density. *Journal of Range Management, 57*, 411-417.

Webb, R. H., Ragland, H. C., Godwin, W. H., & Jenkins, D. (1978). *Environmental effects of soil property changes with off road vehicle use: Environmental Management, 2*, (3), 219–233.

3.1.4 WATER RESOURCES

Bureau of Land Management [BLM]. (1998). A user guide to assessing proper functioning condition and the supporting science for lotic areas (Tech. Ref.-1737-15, 125 pp). Denver, CO: National Applied Resource Sciences Center.

Bureau of Land Management. (1999). A user guide to assessing proper functioning condition and the supporting science for lentic areas. (Tech. Ref.-1737-16, 109 pp). Denver, CO: National Applied Resource Sciences Center.

Bureau of Land Management. (2006a). *Proper Functioning Condition Assessments* [GIS Data]. Twin Falls, ID: Jarbidge Field Office.

Bureau of Land Management. (2006b). *Proper Functioning Condition Assessments* [GIS Data]. Elko, NV: Elko District.

Bureau of Land Management. (2009). *Jarbidge Resource Area lotic proper functioning condition ratings [GIS data].* Twin Falls, ID.

Bureau of Land Management. (2010). *Jarbidge draft resource management plan and environmental impact statement.* (BLM/ID/PT - 10/003+1610). Jarbidge Field Office, ID: August.

Crosthwaite, E. G. (1969). Water resources of the Salmon Falls Creek Basin, Idaho-Nevada. *U.S. Geological Survey Water Supply Paper No. 1879-D.* 33pp.

Congressional Research Service (2005). Recreation on Federal Lands. *Congressional Research Service issue brief for congress, The Library of Congress*, (Order Code IB10141) updated April 25, 2005. Retrieved from http://www.policyarchive.org/handle/10207/bitstreams/810.pdf

Furniss, M., Flanagan, S., & McFadin, B. (2000). *Hydrologically-connected roads: An indicator of the influence of roads on chronic sedimentation, surface water hydrology, and exposure to toxic chemicals*. US Department of Agriculture Forest Service, Stream Systems Technology Center, Fort Collins, CO. Stream Notes 2000:5–8. Retrieved October 10, 2010 from www.stream.fs.fed.us/news/streamnt/jul00/jul00_2.htm

Haupt, H. F. (1959). Road and slope characteristics affecting sediment movement from logging roads. *Journal of Forestry*, 57(5): 329-339.

Idaho Department of Environmental Quality [IDEQ]. (2000). *Bruneau River Subbasin Assessment and Total Maximum Daily Loads of the §303(d) Water Bodies* [Data file]. Idaho Department of Environmental Quality, 142 pages. Retrieved from http://www.epa.gov/waters/tmdldocs/1998_bruneau_river_entire.pdf

Idaho Department of Environmental Quality. (2007). *Salmon Falls Creek subbasin assessment and total maximum daily loads* [Data file]. 413 pages. Retrieved from http://www.deq.idaho.gov/water/data_reports/surface_water/tmdls/salmon_falls_creek/salmon_falls_creek.cfm.

Idaho Department of Environmental Quality. (2009). *Integrated (303[d]/305[b]) water quality monitoring and assessment report for 2008*: Idaho Department of Water Quality, approved by USEPA May 22, 2009, 608 pages. Retrieved from http://www.deq.idaho.gov/water/data_reports/surface_water/monitoring/2008.cfm#_2008final

Idaho Department of Water Resources. (2009). *Idaho Department of Water Resources on-line database search of water wells in the project area by township and range* [Data File]. Retrieved from http://www.idwr.idaho.gov/apps/appswell/searchWC.asp

Jones, J. A., Swanson, F. J., Wemple, B. C., & Snyder, K. U. (2000). Effects of roads on hydrology, geomorphology, and disturbance patches in stream networks. *Conservation Biology, 14*. 76-85.

Megahan, W. F., & Kidd, W. J. (1972). Effects of logging and logging roads on erosion and sediment deposition from steep terrain. *Journal of Forestry, 70* (3), 136-141.

Megahan, W. F,. & Ketcheson, G. (1996). Predicting downslope travel of granitic sediments from forest roads in Idaho. *Water Resources Bulletin, 32* (2), 371-382.

Megahan, W. F., Wilson, M. D., & Monsen, S. B. (1991). Probability of sediment yields from surface erosion on granitic roadfills in Idaho. *Journal of Environmental Quality,* 20(1), 53-60.

Megahan, W. F., Wilson, M. D., &Monsen, S. B. (2001). Sediment production from granitic cutslopes on forest roads in Idaho, USA. *Earth Surface Processes and Landforms* 26(1): 1-11.

Montgomery, D. R. (1994). Road surface drainage, channel initiation, and slope instability. *Water Resources Research* 30:1925-1932.

Natural Resources Conservation Service [NRCS]. (2010). *RCA III Riparian Areas: Reservoirs of Diversity Working Paper No. 13.* Retrieved on December 1, 2010, from http://www.nrcs.usda.gov/technical/NRI/pubs/wp13text.html.

Natural Resource Conservation Service. (2007). Technical Resources. What Is A Riparian Area? Retrieved February 5, 2009 at http://www.mt.nrcs.usda.gov/technical/ecs/water/setbacks/riparian.html.

Nevada Department of Environmental Protection [NDEP]. (2009). *2006 Assessed rivers and streams identified by NDEP Bureau of Water Quality Planning*, Standards Branch [GIS data]. Carson City, NV.

Parsons, D.A. (1963). Vegetative control of streambank erosion. In *Proceedings of the Federal inter-agency sedimentation conference.* U.S.D.A. Misc. Pub. No. 970.

United States Army Corps of Engineers [USACE]. (1987). *Corps of Engineers Wetlands Delineation Manual.* Environmental Laboratory of the U.S. Army Engineer Waterways Experiment Station, Technical Report Y-87-1 (on-line edition). Retrieved at http://el.erdc.usace.army.mil/wetlands/pdfs/wlman87.pdf

United States Forest Service [USFS]. (1995). *Decision notice and finding of no significant impact for the inland native fish strategy environmental assessment.* Interim strategies for managing fish-producing watersheds in Eastern Oregon and Washington, Idaho, Western Montana and Portions of Nevada.

URS Corporation [URS]. (2010a). *Summary of desktop wetland and waterway reconnaissance to support the China Mountain Wind Energy Project EIS.* August 27, 2010. Portland, OR.

URS Corporation. (2010b). *Results of hydrology assessment for proposed China Mountain Wind Energy Project.* September 25, 2010. Portland, OR.

Van Meter, P. C., Mahler, B. J., & Furlong, E. T. (2000). Urban sprawl leaves it's PAH signature. *Environmental Science and Technology.* 34, 4064-4070. DOI 10.1021/es991007n.

Western EcoSystems Technology, Inc [WEST]. (2010). *Wetland delineation report cottonwood creek crossings China Mountain Wind Project Elko County, Nevada.* November 2010.

3.1.5 NOISE

Beranek, L. L. & Ver, I. L. (Eds.). (1992). *Noise and vibration control engineering.* New York, NY: John Wiley & Sons, Inc.

Bies, D. & Hansen, C. (2003). *Engineering noise control: theory and practice.* Third Edition. New York, NY: E & FN Spon Press, Table 4-10, p. 125.

Bowles, A. (1995). Responses of Wildlife to Noise. In R. L. Knight and K. J. Gutzwiller (Eds). *Wildlife and Recreationalists* (pp. 109-156). Island Press.

Federal Transit Administration [FTA]. (2006). *Federal transit administration transit noise and vibration impact assessment.* FTA-VA-90-1003-06. National Technical Information Service, Springfield VA.

Harmon, D. (Ed.). (2005). *Proceedings of the 2005 George Wright Society Conference on parks, protected areas, and cultural sites: People, Places, and Parks.* Hancock, Michigan: The George Wright Society, Table 1.

National Interagency Airspace. (2009). Retrieved from http://airspace.nifc.gov/temp/ip7qwdkxr_.gif.

3.2.1 VEGETATION

Brooks, M. L., Lair, B. (2005). *Ecological effects of vehicular routes in a desert ecosystem.* Report prepared for the U.S. Geological Survey, Recoverability and Vulnerability of Desert Ecosystems Program. Retrieved from http://geography.wr.usgs.gov/mojave/rvde

Brown, C. S. & Rowe, H. (no date). The unwelcome arrival of Bromus tectorum to high elevations. Fort Collins, CO: Department of Bioagricultural Sciences and Pest Management. 12 pp.

Bureau of Land Management [BLM]. (no date). *Resource staff incidental observations of special status plants* [GIS data]. Twin Falls, ID: Jarbidge Field Office.

Bureau of Land Management. (2000). *Field guide to the special status plants of the Bureau of Land Management Lower Snake River District.*

Bureau of Land Management. (2001). Ecological site inventory (Tech Ref. – 1734-7. 74 pp. plus appendices). Denver, CO: National Science and Technology Center.

Bureau of Land Management. (2002). *Noxious weed locations for the Elko Field Office* [GIS data]. Elko, NV: Elko Field Office.

Bureau of Land Management. (2003). *Lepidium papilliferum potential habitat for the Jarbidge Field Office* [GIS data]. Twin Falls, ID: Jarbidge Field Office.

Bureau of Land Management. (2005). *Noxious weed treatment projects from 1999-2006 for the Twin Falls District Operations Weed Control* [GIS data]. Shoshone, ID: Shoshone Field Office Operations Weed Control.

Bureau of Land Management. (2006). Field guide to the special status plants of the Bureau of Land Management Twin Falls District, Jarbidge Field Office Area. *Idaho Technical Bulletin 2006-01. 70 pp.*

Bureau of Land Management. (2007). *Analysis of the management situation for the Jarbidge resource management plan*. Twin Falls, ID: Twin Falls District, Jarbidge Field Office.

Bureau of Land Management. (2010a). *Existing vegetation communities in the Jarbidge Resource Area* [GIS data]. Twin Falls, ID: Twin Falls District, Jarbidge Field Office.

Bureau of Land Management. (2010b). China Mountain fire boundary [GIS data]. Twin Falls, ID: Southern Idaho Interagency Fire Center.

Bureau of Land Management. (2010c). *Idaho BLM special status plant list*, updated August 2010. Retrieved on October 8, 2010 at http://www.blm.gov/pgdata/etc/medialib/blm/id/publications.Par.18638.File.dat/Special_StatusPlants2010_508.pdf

Bureau of Land Management. (2010d). *Jarbidge draft resource management plan and environmental impact statement*. (BLM/ID/PT - 10/003+1610). Jarbidge Field Office, ID: August.

Clifford, H. T. (1959). Seed Dispersal by Motor Vehicles. *Journal of Ecology, 47*, 311-315.

Colket, B. (2009). *2004-2008 Rangewide habitat integrity and population monitoring of slickspot peppergrass (Lepidium papilliferum)*. Boise, ID: Idaho Department of Fish and Game. 410 pp. plus appendices.

Driesche, F. V.; Blossey, B.; Hoodle, M.; Lyon, S.; & Reardon, R. (2002). *Biological control of invasive plants in the eastern United States*. United States Department of Agriculture Forest Service. Forest Health Technology Enterprise Team. Morgantown, West Virginia. FHTET-2002-04. August 2002. 413 pp.

Flora of North America Editorial Committee (Eds.). (1993+). *Flora of North America North of Mexico*. 16+ vols. New York and Oxford.

Gelbard, J. L., & Belnap, J. (2003). Roads as Conduits for Exotic Plant Invasions in a Semiarid Landscape. *Conservation Biology, 17* (2), 420–432.

Greenberg, C. H., Crownover, S. H., & Gordon, D. R. (1997). Roadside soils: A corridor for invasion of xeric scrub by nonindigenous plants. *Natural Areas Journal, 17*, 99-109.

Grossman, D. H., Faber-Langendoen, D., Weakly, A. S., Anderson, M., Bourgeron, P., Crawford, R., et al. (1998). The national vegetation classification system: Development, status, and applications, international classification of ecological communities: terrestrial vegetation of the United States. *(Vol. 1). Arlington, VA: The Nature Conservancy.*

Hickman, J. C. (1993). *The Jepson manual: Higher plants of California.* Retrieved on October 6, 2010 from http://ucjeps.berkeley.edu/interchange/I_treat_indexes.html

Idaho Department of Fish and Game. (2009). Vascular and non-vascular plants and lichens tracked in the Idaho Fish and Game Biotics Database (February 6, 2009). Boise, ID. 12 pp.

Idaho Fish and Wildlife Information System [IFWIS]. (2010*). Plant observations database [GIS data]*. Boise, ID: Idaho Department of Fish and Game. Retrieved February 2010.

Johnson, R. L. (2008). *Impacts of habitat alterations and predispersal seed predation on the reproductive success of Great Basin forbs* (Dissertation, Brigham Young University, Provo, UT). 102 pp.

Keane, R. & Crawley, M. J. (2002). Exotic plant invasions and the enemy release hypothesis. Trends in Ecology & Evolution 17 (4) 164-170. April 2002.

Kiemnec, G. L. and McInnis, M. L. (2009). Sulfur cinquefoil (*Potentilla recta*) seed ecology: Seed bank survival and water and salt stresses on germination. *Invasive Plant Science and Management 2*(1): 22-27.

National Invasive Species Information Center. (2010). *Noxious weeds.* Retrieved on October 9, 2010 from http://www.invasivespeciesinfo.gov/plants/main.shtml

National Park Service. (2010). *Exotic Weeds I (Saltcedar) - Integrated Pest Management Manual.* Retrieved from http://www.nature.nps.gov/biology/ipm/manual/exweeds1.cfm

NatureServe. (2010). *NatureServe Explorer: An online encyclopedia of life* [web application]. Version 7.1. Arlington, VA. Retrieved on October 11, 2010 from http://www.natureserve.org/explorer

Nevada Natural Heritage Program. (2004). *Elko County rare species list*, March 18, 2004. Department of Conservation and Natural Resources. Carson City, NV.

Nevada Natural Heritage Program. (2008). *Official data request response*, December 2, 2008. Carson City, NV.

Nevada Natural Heritage Program. (2009). *Animal and plant at-risk tracking list*, September 2009. Carson City, NV: Department of Conservation and Natural Resources.

Ouren, D. S., Haas, C., Melcher, C. P., Stewart, S. C., Ponds, P. D., Sexton, N. R., et al. (2007). *Environmental effects of off-highway vehicles on Bureau of Land Management lands: A literature synthesis, annotated bibliographies, extensive bibliographies, and internet resources* (Open-File Report 2007-1353). U.S. Geological Survey.

Parendes, L. A., & Jones, J. A. (2000). Role of light availability and dispersal in exotic plant invasion along roads and streams in the H.J. Andrews Experimental Forest, Oregon. *Conservation Biology, 14*(1), 64-75.

Pellant, M. (1996). *Cheatgrass: The invader that won the west. Interior Columbia Basin Ecosystem Management Project*. Boise, ID: BLM Idaho State Office.

Peters, E. F., & Bunting, S. C. (1994). Fire conditions and pre- and post-occurrence of annual grasses on the Snake River Plain. In: Monsen, Stephen B.; Kitchen, Stanley G., (Comps.) 1994. Proceedings-ecology and management of annual rangelands; 1992, May 18-22; Boise ID, (Gen. Tech. Rep. INT-GTR-313). Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 31-36 pp.

United States Department of Agriculture [USDA]. (2004). *National Agriculture Inventory Program* [GIS Data]. Aerial Photography Field Office, Farm Service Agency.

United States Department of Agriculture. (2009). *National Agriculture Inventory Program* [GIS Data]. Aerial Photography Field Office, Farm Service Agency.

United States Department of Agriculture, Natural Resources Conservation Service [USDA, NRCS]. (2010). *The PLANTS database*. Baton Rouge: LA: National Plant Data Center. Retrieved from http://plants.usda.gov

United States Forest Service [USFS]. (2009). *Scott Creek Fire Burn Severity* [GIS data].

United States Fish and Wildlife Service [USFWS]. (2009). *Endangered and threatened wildlife and plants; Listing Lepidium papilliferum (slickspot peppergrass) as a threatened species throughout its range* (50 CFR Part 17. Federal Register Vol. 74, No 194).

URS Corporation [URS]. (2010a). *Rare plant observation report form for Astragalus newberryi var. castoreus.* Boise, ID.

URS Corporation. (2010b). *Rare plant observation report form for Dimeresia howellii.* Boise, ID.

Western EcoSystems Technology, Inc [WEST]. (2010). *Slickspot peppergrass survey for the northern outbound haul road China Mountain Wind Project Twin Falls County, Idaho.* Prepared for BLM Jarbidge Field Office and RES North America, LLC. Cheyenne, WY. 13 pp. plus appendices.

Washington State Weed Board. (2010). *Written findings of the State Noxious Weed Control Board.* Retrieved on October 9 2010 from http://www.nwcb.wa.gov/weed_info/Written_findings/Isatis_tinctoria.html

Wichmann, M. C., Alexander, M. J., Soons, M. B., Galsworthy, S., Dunne, L., Gould, R., et al. (2009). Human-mediated dispersal of seeds over long distances. *Proceedings of the Royal Botany Society, 276*, 523–532

Wilson, L. M. & Randall, C. B. (2003). *Biology and biological control of knapweed.* USDA-Forest Service (FHTET-2001-07). 2nd Edition. Retrieved on October 9, 2010 from http://wiki.bugwood.org/Archive:Knapweed

Wisdom, M. J., Holthausen, R. S., Wales, B. C., Hargis, C. D., Saab, V. A., Lee, D. C., et al. (2000). *Source habitat for terrestrial vertebrates of focus in the Interior Columbia Basin: Broad-scale trends and management implications.* Volume 2: Group Level Results (General Technical Report No. PNW-GTR-485): USDA Forest Service, Pacific Northwest Research Station.

Young, J. A. & Clements, C. D. (2005). Exotic and invasive herbaceous range weeds. *Rangelands.* October 2005. p 10-16.

Zouhar, Kris. (2003). *Bromus tectorum. In: Fire effects information system* [online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Retrieved from http://www.fs.fed.us/database/feis/plants/graminoid/brotec/introductory.html

3.2.2 FISH AND WILDLIFE

Brown, C. G. (1992). Movement and migration patterns of mule deer in southeastern Idaho. *Journal. Wildlife Management, 56*, 246-253.

Bureau of Land Management [BLM]. (2004). BLM national sage-grouse habitat conservation strategy. Washington, D.C.: BLM Sage-Grouse Team.

Bureau of Land Management. (2006). *Stream reaches within the Elko BLM district that contain Redband Trout, Lahontan Cutthroat Trout, and Yellowstone Cutthroat Trout* [GIS Data]. Reno, NV. Created by Elko BLM Fisheries Biologists Patrick Coffin and Carol Evans. July 31.

Bureau of Land Management. (2007a). 2006-2007 Wildlife inventory in the Jarbidge Field Office. *Technical Bulletin 2007-03*. December 05, 2007. Twin Falls, ID.

Bureau of Land Management. (2007b). *Analysis of the management situation for the Jarbidge resource management plan.* Twin Falls District, ID: BLM Jarbidge Field Office.

Bureau of Land Management. (2007c). *Historical Fires in the state of Nevada* [GIS Data]. Reno, NV: Nevada State Office Geographic Sciences.

Bureau of Land Management. (2008a). Sage-grouse habitat in Idaho [GIS data]. Boise, ID: BLM, Idaho State Office, Branch of Resources and Science. March 1, 2008.

Bureau of Land Management. (2008b). *Wildland fires of the BLM Twin Falls District. Southern Idaho Interagency Fire Center* [GIS Data]. Shoshone, ID.

Bureau of Land Management. (2010). *Jarbidge draft resource management plan and environmental impact statement.* (BLM/ID/PT - 10/003+1610). Jarbidge Field Office, ID: August. Volume 1: Chapter 3, Section 3.2.7.3 Special Status Wildlife, pages 3-43 through 3-49.

Connelly, J. W., Knick, S. T., Schroeder, M. A., & Stiver, S. J. (2004). *Conservation Assessment of Greater Sage-grouse and sagebrush habitats.* Western Association of Fish and Wildlife Agencies. Cheyenne, WY: Unpublished Report. Cheyenne, Wyoming.

Connelly, J. W. & Musil, D. (2007). *Study I: Greater sage-grouse (Centrocercus urophasianus) habitat and population trends in Southern Idaho (*Project W-160-R-34, Progress Report). Boise, ID: Upland Game Bird Ecology, Idaho Department of Fish and Game.

Connelly, J.W., Musil, D.D., & Cross, L.R. (2009). *Greater sage-grouse, movements, nesting, and habitats on Browns Bench: an assessment of sage-grouse populations prior to development of a wind energy facility.* Progress Report, Idaho Fish and Game. Jerome, ID. December.

Connelly, J. W., Rinkes, E. T., & Braun, C. E. (In press). Characteristics of greater sage-grouse habitats, Chapter 4. In Knick S. T. and Connelly J. W. (Eds.), *Greater sage-grouse: Ecology and conservation of a landscape species and its habitats*. Studies in Avian Biology Series (vol. 38). A release of a scientific monograph with permission of the authors, the Cooper Ornithological Society, and the University of California Press.

Connelly, J. W., Schroeder, M. W., Sands, A. R., & Braun, C. E. (2000). Guidelines to manage sage-grouse populations and their habitats. *Wildlife Society Bulletin, 28*, 967-85.

Cox, M., Lutz, D. W., Wasley, T., Fleming, M., Compton, B. B., Keegan, T., et al. (2009*). Habitat guidelines for mule deer: Intermountain West Ecoregion.* Mule Deer Working Group, Western Association of Fish and Wildlife Agencies.

Currens, K. P., Schreck, C. B., & Li, H. W. (2009). Evolutionary ecology of redband trout. *Transactions of the American Fisheries Society, 138* (4), 797-817.

Doherty, K.E., Tack, J. D., Evans, J. S., & Naugle, D. E. (2010). *Mapping breeding densities of greater sage-grouse: A tool for range-wide conservation planning.* Prepared for BLM Washington Office. 16 September.

Farmer, C. J., Goodrich, L. J., Ruelas Inzunza, E., & Smith, J. P. (2007). *Conservation status report: Golden Eagle.* Kempton, PA: Hawk Mountain Sanctuary, USA. Retrieved in December 2008 from http://hawkmountain.org/media/GoldeneagleCSR_June07.pdf

Garton, E. O., Connelly, J. W., Horne, J. S., Hagen, C. A., Moser, A., & Schroeder M. (In press). Greater sage-grouse population dynamics and probability of persistence. In S. T. Knick & J. W. Connelly (Eds), *Greater Sage-Grouse: Ecology and conservation of a landscape species and its habitats.* Studies in Avian Biology Series (vol. 38). A release of a scientific monograph with permission of the authors, the Cooper Ornithological Society, and the University of California Press.

Good, R. E., Nielson, R. M., Sawyer, H. H., & McDonald, L. L. (2004). *Population Level survey of golden eagles (Aquila chrysaetos) in the Western United States.* Cheyenne, WY: Western EcoSystems Technology, Inc. [WEST] for U. S. Fish and Wildlife Service, Arlington, VA.

Haak, B. A. & Oelrich K. (2008). *Autumn movements of radio-marked raptors in southwest Idaho.* Nampa, ID: Idaho Department of Fish and Game, Southwest Region.

Idaho Department of Fish and Game [IDFG]. (2005a). *Idaho comprehensive wildlife conservation strategy.* Boise, ID: Idaho Conservation Data Center, Idaho Department of Fish and Game. Retrieved from http://fishandgame.idaho.gov/cms/tech/CDC/cwcs.cfm

Idaho Department of Fish and Game. (2005b). *Population studies of Redband Trout: Genetic investigation of population structure* (IDFG Report Number 05-46). Boise, ID: Idaho Department of Fish and Game, November 2005.

Idaho Department of Fish and Game. (2009a). 2009 Metadata on sage grouse leks.

Idaho Department of Fish and Game. (2009b). Progress report: mule deer (Study I, job 2, Project W-170-R-32). Boise, ID.

Idaho Department of Fish and Game. (2009c). Progress report: elk (Study I, job 1, Project W-170-R-32). Boise, ID.

Idaho Department of Fish and Game. (2009d). Progress report: pronghorn (Study I, job 7, Project W-170-R-32). Boise, ID.

Idaho Department of Fish and Game. (2010a). *Progress report – surveys and inventories: upland game and waterfowl population status and trends, July 1, 2008 to June 30, 2009* (Idaho Fish and Game Project W-170-R-32).

Idaho Department of Fish and Game. (2010b). *Sage-grouse lek route data for the Jarbidge area.* Provided by M. McDonald, Idaho Department of Fish and Game. October 13, 2010.

Idaho Department of Fish and Game. (2010c). *Sharp-tailed grouse cumulative impact area for the China Mountain Wind Power Project* [GIS Data]. Jerome, ID: Idaho Department of Fish and Game, Magic Valley Regional Office.

Idaho Department of Fish and Game. (2010d). *Mule deer cumulative impact area for the China Mountain Wind Power Project* [GIS Data]. Jerome, ID: Idaho Department of Fish and Game, Magic Valley Regional Office.

Idaho Department of Fish and Game. (2010e). *Rocky mountain elk cumulative impact area for the China Mountain Wind Power Project* [GIS Data]. Jerome, ID: Magic Valley Regional Office.

Idaho Department of Fish and Game. (2010f). *American pronghorn cumulative impact area for the China Mountain Wind Power Project* [GIS Data]. Idaho Department of Fish and Game, Magic Valley Regional Office. Jerome, ID.

Idaho Department of Fish and Game. (Unpublished). Comment from the IDFG on the administrative draft of the EIS on sage-grouse movements through the China Mountain ROW preference area. November 10. 2010.

Idaho Fish and Wildlife Information System [IFWIS]. (2010). *Animal conservation database.* Boise, ID: Idaho Department of Fish and Game.

Idaho Sage-grouse Advisory Committee. (2006). Conservation plan for the Greater sage-grouse in Idaho. Idaho Fish and Game. Boise, ID.

Idaho Vertebrate Modeling Database [IDVMD]. (2009). *Landscape Dynamics Lab, Idaho Cooperative Fish and Wildlife Research Unit*, University of Idaho [Data file]. Moscow, ID. Retrieved February 2009 from http://www.wildlife.uidaho.edu/idvmd/index.asp

Knick, S. T., Dobkin, D. S., Rotenberry, J. T., Schroeder M. A., et al. (2003). Teetering on the edge or too late? Conservation and research issues for avifauna of sagebrush habitats. Condor, 105, 611-634.

Knick, S. T. & Hanser, S. E. (In press). Connecting pattern and process in greater sage-grouse populations and sagebrush landscapes. In Knick S. T. and Connelly J. W. (Eds), *Greater Sage-Grouse: Ecology and conservation of a landscape species and its habitats*. Studies in Avian Biology Series (vol. 38). A release of a scientific monograph with permission of the authors, the Cooper Ornithological Society, and the University of California Press.

Kochert, M. N., Steenhoff, K., McIntyre, C. L., & Craig, E. H. (2002). Golden eagle (*Aquila chyrsaetos*). In Poole, A., Gill, F., (Eds.) *The birds of North America*, No. 684. Philadelphia, PA: The Birds of North America, Inc.

LeBeau, C., & Young, D. P. (2010). *Raptor nest survey for the China Mountain wind project southern haul route and transmission line Twin Falls County, Idaho and Elko County, Nevada.* Cheyenne, WY: Western EcoSystems Technology, Inc.

LeBeau, C., Young, D., & Hallingstad, E. (2010). Memo to A. English, URS from Chad LeBeau, WEST Inc. with an attached greater sage-grouse progress report for the China Mountain Wind Project. 15 September.

Leonard, K. M., Reese, K. P., & Connelly, J. W. (2000). Distribution, movements and habitats of Sage Grouse *Centrocercus urophasianus* on the Upper Snake River Plain of Idaho: Changes from the 1950s to the 1990s. *Wildlife Biology, 6*, 265-270.

Mack, C., Rachael, J., Holyan, J., Husseman, J., Lucid, M. & Thomas, B. (2010). *Wolf conservation and management in Idaho; progress report 2009.* Lapwai, ID: Nez Perce Tribe Wolf Recovery Project, Boise, ID: Idaho Department of Fish and Game. 67 pp.

Motychak, J. E., & Barrett, J. S. (2006). A survey for Columbia spotted frogs (*Rana Luteiventris*) and incidental herptofauna of the Browns Bench and Salmon Creek Falls Reservoir Area of southern Idaho (BLM Task Order No. DLF050575): Idaho Department of Fish and Game. Boise, ID.

Muhlfled, C. (2002). *Spawning characteristics of redband trout in a headwater stream in Montana. North American Journal of Fisheries Management, 22,* 1314-1320.

Munger, J. C., Gerber, M., Madrid, K., Carroll, M., Petersen, W., & Heberger, L. (1998). U.S. National Wetland Inventory Classifications as Predictors of the Occurrence of Columbia Spotted Frogs (*Rana luteiventris*) and Pacific Treefrogs (*Hyla regilla*). *Conservation Biology, 12*(2), 320-330.

NatureServe. (2010). *NatureServe Explorer: An online encyclopedia of life* [web application]. Version 7.1. Arlington, VA. Retrieved on October 11, 2010 at http://www.natureserve.org/explorer

Nevada Department of Wildlife. (2010a). *Species Information: Columbian Sharp-Tailed Grouse Fact Sheet*. Retrieved from http://www.ndow.org/hunt/seasons/upland/info/cst_fact_sheet.pdf

Nevada Department of Wildlife. (2010b). *2009- 2010 Big game status report*. Reno, NV: Department of Wildlife, Game Division.

Nevada Department of Wildlife. (2010c). *Redband trout survey data for Cottonwood Creek*. Email from Katie Miller, NDOW to Rebecca Thompson, URS on November 19, 2010, with 2010 fish survey data for Cottonwood Creek in northern Nevada. Original data source – Gregory Johnson, Fishery Biologist, Nevada Department of Wildlife.

Natural Resource Conservation Service. (2005). *Fish and wildlife habitat management leaflet: mourning dove (Zenaida macroura)*. Wildlife Habitat Council, Wildlife Habitat Management Institute. Number 31.

O'Gara, B. W., & Yoakum, J. D. (2004). *Pronghorn ecology and management*. Wildlife Management Institute, Washington DC. 903 pp.

Patla, D. A., & Keinath, D. (2005). *Species Assessment for Columbia Spotted Frog (Rana luteiventris) in Wyoming*. Cheyenne, WY: Prepared for the United States Department of Interior by the Bureau of Land Management, Wyoming State Office. 124 pp.

Reynolds, T. D. (1979). Response of reptile populations to different land management practices on the Idaho National Engineering Laboratory site. *Great Basin Naturalist*, 39(3), 255-262.

Schroeder, M. A., Aldridge, C. L., Apa, A. D., Bohne, J. R., Braun, C. E., Bunnell, S. D., et al., (2004). *Distribution of sage grouse in North America*. Condor 106:363-376.

Smith, B. E., & Keinath, D. A. (2007). *Northern leopard frog (Rana pipiens): A technical conservation assessment*. [Online]. USDA Forest Service, Rocky Mountain Region. Retrieved January 2010 at http://www.fs.fed.us/r2/projects/scp/assessments/northernleopardfrog.pdf

Streubel, J. (2000). Digital atlas of Idaho: Mammals. [Data file] Retrieved February 2009 at http://imnh.isu.edu/digitalatlas/bio/mammal/mamfram.html

Stiver, S. J., Apa, A. D., Bohne, J. R., Bunnell, S. D., Deibert, P. A., Gardner, S., et al. (2006). *Greater sage-grouse comprehensive conservation strategy.* Unpublished Report. Cheyenne, WY: Western Association of Fish and Wildlife Agencies.

Squires, J. R. & Reynolds, R. T. (1997). Northern goshawk (*Accipiter gentilis*). In Poole, A.; Gill, F., (Eds.), *The birds of North America*, No. 298. Philadelphia, PA: Academy of Natural Sciences; Washington, DC: American Ornithologists' Union. 32 pp.

Swenson, J. E. Simmons, C. A., & Eustace. C. D. (1987). Decrease of sage grouse *Centrocerus urophasianus* after ploughing of sagebrush steppe. *Biological Conservation, 41,* 125-132.

United States Forest Service [USFS]. (1995). *Decision notice and finding of no significant impact for the inland native fish strategy environmental assessment.* Interim strategies for managing fish-producing watersheds in Eastern Oregon and Washington, Idaho, Western Montana and Portions of Nevada.

United States Fish and Wildlife Service [USFWS]. (2008). *Birds of conservation concern 2008.* Arlington, VA: United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management. 85 pp.

United States Fish and Wildlife Service. (2010a). *Game birds below desired condition.* Retrieved October, 2010 from http://library.fws.gov/bird_publications/gamebirds_conditions.pdf

United States Fish and Wildlife Service. (2010b). Federal Register/Vol. 75, No. 55. Endangered and Threatened Wildlife and Plants; 12-Month Findings for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered; Proposed Rule. March 23. Pages 13910-14014.

United States Fish and Wildlife Service. (2010c). Columbia spotted frog (*Rana luteiventris*). U.S. Fish and Wildlife Service, Species Profile, Environmental Conservation Online System. Retrieved November, 2010 from http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=D027

Western Ecosystems Technology, Inc. [WEST]. (2010). Memo from C. LeBeau, D. Young, and E. Hallingstad, WEST, Inc. Contents of the memo included a greater sage-grouse progress report for the China Mountain Wind Project. July 16, 2010.

Wisdom, M. J., Meinke, C. W., Knick, S. T., & Schroeder, M. A. (In press). *Factors associated with extirpation of sage-grouse.* In Knick S. T. and Connelly J. W. (Eds), *Greater sage-grouse: ecology and conservation of a landscape species and its habitats.* Studies in Avian Biology Series (vol. 38). A release of a scientific monograph with permission of the authors, the Cooper Ornithological Society, and the University of California Press.

Worton, B. J. (1989). Kernel methods for estimating the utilization distribution in home-range studies. *Ecology, 70,* 164-168.

Young, D. P., Hallingstad, E., Poulton, V. & Bay, B. (2009). *Draft wildlife baseline studies for the China Mountain Wind Resource Area.* Final Report January 2008 – January 2009 and Addendums A, B, & C, 2010. Twin Falls County, Idaho and Elko County, Nevada. Western Ecosystems Technology, Inc. Cheyenne, WY.

3.3.1 HISTORIC AND CULTURAL RESOURCES

Alt, D. D., & Hyndman, D. W. (1989). *Roadside Geology of Idaho.* Missoula, MT: Mountain Press Publishing Company.

Arkush, B. S. (2002). Archaeology of the Rock Springs site: A multi-component bison kill and processing camp in Curlew Valley, southeastern Idaho. *Boise State University Monographs in Archaeology, No. 1.* Boise, ID.

Beal, M. D. & Wells, M. W. (1959). *History of Idaho, Volume 1.* New York, NY: Lewis Historical Publishing Company, Inc.

Bowers, A. W., & Savage, C. N. (1962). Primitive Man on Brown's Bench – His Environment and His Record. *Idaho Bureau of Mines and Geology Information Circular No. 14*, Moscow, ID.

Brown, J. B. (1932). *Fort Hall on the Oregon Trail.* Caldwell, ID: The Caxton Printers.

Butler, B. R. (1986). Prehistory of the Snake and Salmon River Area. In W. L. d'Azevedo (Ed.), *Handbook of North American Indians Volume 11: Great Basin* (pp. 127-134). Washington, D.C.: Smithsonian Institution.

Cressman, L. S. (1943). Results of Recent Archaeological Research in the Northern Great Basin Region of South Central Oregon. In *Proceedings of American Philosophical Society, 86* (2), 236-246. Philadelphia, PA.

Davis, O. K., Sheppard, J. C., & Robertson, S. (1986). Contrasting Climatic Histories for the Snake River Plain, Idaho, Resulting from Multiple Thermal Maxima. *Quaternary Research, 26*,321-339.

Dicken, S. N. & Dicken, E. F. (1979). *The making of Oregon: A study in historical geography.* Portland, OR: Oregon Historical Society.

Dort, W., Jr. (1968). Paleoclimatic implications of soil structures at the Wasden Site (Owl Cave). *Tebiwa, 11, (1), 31-38.*

Franzen, J. G. (1981). Southeastern Idaho cultural resources overview, Burley and Idaho Districts. U.S. Department of Interior, Bureau of Land Management. Jackson, MI: Commonwealth Associates, Inc.

Golder Associates, Ltd. (2008) *Final report on Jarbidge Foothills Class II Archaeological Inventory, Owyhee and Twin Falls Counties, Idaho.* Calgary, Alberta: submitted to USDI, Bureau of Land Management, Twin Falls District.

Gray, D. M. (2003). *Toana Trail cultural resource inventory and assessment.* Submitted to Twin Falls County Historic Preservation Committee and Idaho State Historical Society. Frontier Historical Consultants, Grand View.

Grayson, D. K. (1993). *The desert's past.* Washington, D.C. and London, U.K.: Smithsonian Institution Press.

Helfrich, D., Helfrich, H., & Hunt, T. (1984). *Emigrant Trails West: A Guide to Trail Markers Placed by Trails West, Inc. Along the California, Applegate, Lassen, and Nobles' Emigrant Trails in Idaho, Nevada, and California.* Trails WEST, Inc.

Idaho State Historical Society. (1981). Site Report – Salmon Falls Creek and South Hills. *Idaho State Historical Society Reference Series No. 620.*

Jennings, J. D. (1964). The Desert West. In Jennings, J. D., & Norbeck, E. (Eds.) *Prehistoric Man in the New World* (pp. 149-174). Chicago, IL: University of Chicago Press.

Jennings, J. D. (1986). Prehistory: Introduction. In W. L. d'Azevedo, *Handbook of North American Indians, Volume 11: Great Basin* (pp. 113-119). Washington D.C.: Smithsonian Institution.

Konoske, A. A. (2007). *A cultural resources inventory of three meteorological tower locations near China Mountain, Elko County, Nevada.* Carson City, NV: Summit Envirosolutions submitted to Bureau of Land Management, Elko Field Office, Elko, NV.

Link, P. K. (2002). *Digital Atlas of Idaho.* Idaho State University, Geosciences Department.

Madsen, B. D. (1980). *The Northern Shoshoni.* Caldwell, ID: The Caxton Printers.

Murphy, T. (1989). *Cultural resources report for south salmon seeding well.* Bureau of Land Management, Elko District, Wells Resource Area.

Murphy, R. F. & Murphy, Y. (1986). Northern Shoshone and Bannock. In Warren L. D'Azevedo (Ed.), *Handbook of North American Indians Volume 11: Great Basin.* Washington, D.C.: Smithsonian Institution.

Randolph, R. L. (1975). *Salmon Falls Pipeline, CR Report: BLM 1-43 (D).* On file, USDI, Bureau of Land Management, Elko District.

Ranere, A. J. (1972). Stratigraphy and stone tools from Meadow Canyon, Eastern Idaho. *Occasional Papers of the Idaho State University Museum No. 27.*

Ross, C. P., & Forrester, J. D. (1958). Outline of the geology of Idaho. *Bulletin No. 15.* Moscow, ID: Idaho Bureau of Mines and Geology.

Ross, J. W. (2003). *Archaeological and historic survey report, Idaho Archaeological Survey, RES Wind Energy Project: Class III Inventory* (CRM# ID-9-02-J-24). USDI, Bureau of Land Management, Twin Falls District, Jarbidge Field Office.

Ross, J. W. (2009). *Archaeological and historic survey report, Idaho Archaeological Survey, China Mountain Met Towers M010, M011, and M012: Class III Inventory.* (CRM# ID-210-08-15). USDI, Bureau of Land Management, Twin Falls District, Jarbidge Field Office. (Revised Report).

Sanger, F., Parker, M., & Woods, J. (1984a). *IMACS Form for 10TF831, Young Man Quarry.* Twin Falls, ID: Bureau of Land Management, Twin Falls District.

Sanger, F., Parker, M., & Woods, J. (1984b). *IMACS Form for 10TF830, Old Man Quarry.* Twin Falls, ID: Bureau of Land Management, Jarbidge Field Office.

Schilling, J. H. (1976). *Metal mining districts of Nevada.* Third edition. Reno, NV: Nevada Bureau of Mines and Geology, University of Nevada.

Schwantes, C. A. (1991). *In Mountain Shadows: A History of Idaho.* Lincoln, NB: University of Nebraska Press.

Simms, S. R. (2008). Ancient peoples of the Great Basin and Colorado Plateau. Walnut Creek, CA: Left Coast Press.

Swanson, E. H., Jr. (1965). Archaeological Explorations in Southwestern Idaho. *American Antiquity, 31*(1), 24-37.

Swanson, E. H. Jr. (1972). *Birch Creek: Human ecology in the cool desert of the Northern Rocky Mountains 9000 BC- AD 1850*. Pocatello, ID: The Idaho State University Press.

Swanson, E. H. Jr. (1974). The Snake River Plain. *Idaho Yesterdays, 18*(2), 2-12.

Swanson, E. H., Jr., Powers, R., & Bryan, A. L. (1964). The Material Culture of the 1959 Southwestern Idaho Survey. *Tebiwa, 7*(2), 1-27.

Young, J. M. (1987). *Corral Creek Pipeline 8281, CR Report*. Boise, ID: Bureau of Land Management, Boise District.

3.3.2 TRIBAL TREATY RIGHTS AND INTERESTS

Butler, B. R.(1986). Prehistory of the Snake and Salmon River area. In W. L. d'Azevedo (Ed.), *Handbook of North American Indians, Volume 11: Great Basin* (pp. 127-134). Washington, D.C.: Smithsonian Institution.

Eggan, F., et al. (Eds.). (1955). *Social anthropology of North American tribes*. Chicago, IL: University of Chicago Press.

Fowler, D. D., & Koch, D. (1982). The Great Basin. In G. L. Bender (Ed.), *Reference Handbook on the Deserts of North America* (pp. 7-66). Westport, CT: Greenwood Press.

Grayson, D. K. (1993). *The Desert's Past*. Washington and London: Smithsonian Institution Press.

Kroeber, A. L. (1925). *Handbook of the Indians of California*. Bureau of American Ethnology, Bulletin 78. Washington, D.C.: Smithsonian Institution.

Miller, W. R. (1986). Numic languages. In W. L. d'Azevedo (Ed.), *Handbook of North American Indians, Volume 11: Great Basin* (pp. 98-106). Washington, D. C.: Smithsonian Institution.

Murphy, R., & Murphy, Y. (1986). Northern Shoshone and Bannock. In W. L. D'Azevedo (Ed.), *Handbook of North American Indians, Volume 11: Great Basin* (pp. 287-307). Washington, D. C.: Smithsonian Institution.

Shimkin, D. B. (1986). Eastern Shoshone. In W. L. d'Azevedo (Ed.) *Handbook of North American Indians, Volume 11: Great Basin* (pp. 308-335). Washington D.C.: Smithsonian Institution.

Steward, J. H. (1933). Early Inhabitants of Western Utah, Pt. 1: Mounds and House Types. *University of Utah Bulletin, 23* (7), 1-34.

Steward, J. H. (1938). *Basin-plateau aboriginal sociopolitical groups*. Bureau of American Ethnology Bulletin No. 120. Washington, D. C. Reprinted 1970. Salt Lake City, UT: University of Utah Press.

Stewart, O. C. (1959). Shoshone history and social organization. In *Proceedings of the 33rd International Congress of Americanists, 2*, 132-142. Costa Rica.

Stewart, O. C. (1965). The Shoshoni: Their history and social Organization. *Idaho Yesterdays, 9*(3), 2-5, 28.

Stewart, O. C. (1966). Tribal distributions and boundaries in the Great Basin. In W. L. d'Azevedo et al. (Eds.), *The Current Status of Anthropological Research in the Great Basin, 1964* (pp. 167-238). Reno, NV: University of Nevada, Desert Research Institute Social Sciences and Humanities Publications 1.

Stewart, O. C. (1970). The question of Bannock Territory. In E. H. Swanson, Jr. (Ed.), *Languages and Cultures of Western North America: Essays in Honor of Sven S. Liljeblad*, (pp. 201-231). Pocatello, ID: Idaho State University Press.

Stewart, O. C. (1978). The Western Shoshone of Nevada and the U.S. Government, 1863-1900. In D. R. Tuohy (Ed.), *Selected Papers from the 14th Great Basin Anthropological Conference* (pp. 77-114). Ramona, CA: Ballena Press Publications in Archaeology, Ethnology and History 4.

Thomas, D. H. (1983). The archaeology of monitor valley 1: Epistemology. Anthropological Papers of the American Museum of Natural History 58.

Thomas, D. H., Pendleton, L. S. A., & Cappannari, S. C. (1986). Western Shoshone. In W. L. d'Azevedo (Ed.), *Handbook of North American Indians, Volume 11: Great Basin* (pp. 262-283). Washington, D. C.: Smithsonian Institution.

Walker, D. E., Jr. (1973). American Indians of Idaho. *Anthropological Monographs of the University of Idaho*, No. 2. Moscow, ID: University of Idaho Press.

Walker, D. E., Jr. (1980). *Myths of Idaho Indians*. Moscow, ID: University of Idaho Press.

Walker, D. E., Jr. (1982). *Indians of Idaho*. Reprint. Moscow, ID: University of Idaho Press.

Walker, D. E., Jr. (1993a). Lemhi Shoshone-Bannock reliance on anadromous and other fish resources. *Northwest Anthropological Research Notes, 27*(2).

Walker, D. E., Jr. (1993b). The Shoshone-Bannock: An anthropological reassessment. *Northwest Anthropological Research Notes, 27* (2).

Walker, D. E., Jr. (2002). *An ethnographic assessment of Shoshone-Paiute views and uses of their environment and its natural resources in relation to the Rio Tinto Project, Duck Valley Indian Reservation*. Report 1: Rio Tinto Project.

Walker, D. E., Jr. (2003). Western Shoshone Culture, Religion and Nature. *Encyclopedia of Religion and Nature.*

3.3.3 ECONOMIC CONDITIONS

Claritas. (2008). Claritas Update demographics TM. April 2008. The Nielsen Company. Retrieved from http://www.claritas.com/target-marketing/market-research-services/marketing-data/demographic-data/update-demographics/update-demographics-resources.jsp

Headwaters Economic Profiling System. (2008). Model Run July 8, 2008 for Twin Falls and Elko counties in aggregate.

3.3.4 VISUAL RESOURCES

Bureau of Land Management [BLM]. (1986*). BLM visual resource management system* (Manual H-8410-1).

URS Corporation [URS]. (2010) Access to the project area during winter months, meeting conversation with Max Yingst, Recreation Planner, Jarbidge Field Office, Twin Falls, Idaho, (personal communication, September 24, 2010).

3.3.5 TRANSPORTATION AND ACCESS

Idaho Transportation Department. (2009). *Online Automatic Traffic Counter #29: Rogerson* [Data file]. Retrieved from http://itd.idaho.gov/planning/roadwaydata/counters/029/index.html

3.3.7 HAZARDOUS MATERIALS AND PETROLEUM PRODUCTS

American Society of Testing and Materials [ASTM]. (2008). Standard E 2247-08, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process for Forestland or Rural Property.

Fuller, T. (2009). Telephone conversation from Lisa Gates, Environmental Scientist, URS, to Tim Fuller, Hazardous Material Specialist, BLM, Jarbidge Field Office, (personal communication, February 12, 2009).

URS Corporation [URS]. (2009). *Federal and State Regulatory Agency Database Report generated for the Hazardous Material Analysis Area.* Prepared by URS Corporation, Boise ID, May 2009.

3.3.8 SPECIAL DESINGATIONS

Bureau of Land Management [BLM]. (2009). *Wild and Scenic River Eligibility Determination* (Report). Twin Falls District, ID: Bureau of Land Management, Jarbidge Field Office.

3.3.9 NON-WSA LANDS WITH WILDERNESS CHARACTERISTICS

Bureau of Land Management [BLM]. (2008). *Wilderness Characteristics Technical Report* (Technical Report). Twin Falls District, ID: Bureau of Land Management, Jarbidge Field Office.

Bureau of Land Management. (2010). Summary of Findings and Conclusion: Inventory Finding on Wilderness Characteristics for NV-EK-03-884, China Mountain Unit, Wells Field Office, NV.

3.3.10 FIRE AND FUELS MANAGEMENT

Bureau of Land Management [BLM]. (1987). *Jarbidge resource management plan, record of decision*. Boise District, ID: March 1987, updated in 1993.

Bureau of Land Management. (2004). *Elko and Wells resource management plans approved fire management amendment and decision record* (BLM/EK/PL-2003/026-1610/9211). Elko, NV: BLM Elko Field Office.

Bureau of Land Management. (2005*). South Central Idaho Fire Planning Unit Fire Management Plan Twin Falls District* (NW-ID-2005-094). Twin Falls, ID.

Bureau of Land Management. (2010). *Jarbidge Draft Resource Management Plan and Environmental Impact Statement* (BLM/ID/PT - 10/003+1610). Jarbidge Field Office, ID: August 2010.

Brown, J. K., & Smith, J. K., (Eds.). (2000). *Wildland fire in ecosystems: effects of fire on flora* (Gen. Tech. Rep. RMRS-GTR-42-vol. 2.) Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 257.

Department of Interior and Department of Agriculture. (1995). *Federal Wildland Fire Management Policy and Program Review.* Final Report. December 18, 1995.

3.4.1 RECREATION

Bureau of Land Management [BLM]. (1985). *Wells resource management plan, record of decision.* Elko District, NV.

Bureau of Land Management. (1987). *Jarbidge resource management plan, record of decision.* Boise District, ID, March 1987, updated in 1993.

Bureau of Land Management. (2001). National management strategy for motorized off-highway vehicle use on public lands (pp. 48). Washington, DC: Government Printing Office.

Bureau of Land Management (2010). Salmon Falls Creek Reservoir Recreation Information. Retrieved on October 2, 2010 from http://www.blm.gov/id/st/en/fo/burley/recreation_sites_/salmon_falls_creek.html

Idaho Department of Fish and Game. (2008a). *Big Game Species Information*. Retrieved October 1, 2008 from http://www.fishandgame.idaho.gov/cms/hunt/misc/species.cfm#biggame

Idaho Department of Fish and Game. (2008b). *IDFG big game seasons and rules* [Data file]. Retrieved from http://fishandgame.idaho.gov/cms/hunt/rules/bg

Idaho Department of Fish and Game. (2010). *All-terrain vehicles and hunting*. Retrieved October 2, 2010 from http://fishandgame.idaho.gov/cms/hunt/atv/

Public Policy Center. (2008). *Annual Public Policy Surveys, State of Idaho*. Retrieved from http://sspa.boisestate.edu/publicpolicycenter/publications.shtml

Responsive Management & National Shooting Sports Foundation. (2009). Issues Related to Hunting Access in the United States: Idaho Results: U.S. Fish and Wildlife Service.

Sanyal, N., Krumpe, E., & Coombs, D. (2007). *2007 Idaho Mule Deer Hunter Study Final Report*. Idaho Department of Fish and Game.

URS Corporation [URS]. (2010a). Recreational activities in the northern portion of the project area. Personal Communication, field visit conversation with Max Yingst, Recreation Planner, Jarbidge Field Office, Twin Fall, ID, July 21, 2010.

URS Corporation. (2010b). Recreational activities in the southern portion of the project area. Personal Communication, meeting conversation with Tamara Hawthorne, Recreation Planner, Wells Field Office, Elko, NV, July 22, 2010.

URS Corporation. (2010c). Access to the project area during winter months. Personal Communication, meeting conversation with Max Yingst, Recreation Planner, Jarbidge Field Office, Twin Fall, ID, September 24, 2010.

3.4.2 LIVESTOCK GRAZING

Blossom, H., Blossom, L., Brackett, N., Brackett, F., Clark, M., Clark, R., et al. (1988). *"71" Livestock Association: Seventy One Years*. Buhl, ID.

Valentine, J. F. (1989). *Range Development and Improvements (3rd ed.)*. San Diego, CA: Academic Press.

CHAPTER 4.0 ENVIRONMENTAL CONSEQUENCES

4.1.1 AIR QUALITY

Bureau of Land Management [BLM]. (2005). *FES 05-11; Final programmatic environmental impact statement on wind energy development on BLM-administered lands in the western United States and record of decision*. Washington, D.C.: United States Department of the Interior, June.

Bureau of Land Management. (2008). *Instruction memorandum no. 2009-043, wind energy development policy*. Issued by the Director of the Bureau of Land Management. Washington, D.C. December 19, 2008.

Bureau of Land Management. (2010). *Jarbidge Draft Resource Management Plan / Environmental Impact Statement*. BLM Jarbidge Field Office.

Environmental Protection Agency [EPA]. (2010). *Nevada background PM10 concentrations data for 2008 for monitor ID 320070004 (Elko)* [Data file]. Retrieved on October 1, 2010 from http://www.epa.gov/air/data/geosel.html.

Energy Information Administration. (2007). *Emissions of Greenhouse Gases in the United States 2006* (DOE/EIA-0573[2006]). Washington, D.C.: Energy Information Administration Office of Integrated Analysis and Forecasting, U.S. Department of Energy.

Idaho Department of Environmental Quality. (2010). *Idaho background PM2.5 concentrations data for 2009 for monitor AQS ID 16-083-0010 (Twin Falls)* [Data file]. Retrieved on October 1, 2010 from http://airquality.deq.idaho.gov/

URS Corporation [URS]. (2010). *China Mountain Wind Project EIS supplemental air quality modeling report*. Denver, CO.

4.1.2 GEOLOGY

Hungr O., Evans S. G., Bovis M., & Hutchinson, J. N. (2001). Review of the classification of landslides of the flow type. *Environmental and Engineering Geoscience*, VII, 221-238.

4.1.3 SOILS

Adams, J. A., Stolzy, L. H., Enso, A. S., Rowlands, P. G., & Johnson, H. B. (1982). Desert soil compaction reduces annual plant cover. *California Agriculture, September/October 0*, 67.

Alessa, L., & Earnhart, C. G. (2000). Effects of soil compaction on root and root hair morphology: implications for campsite rehabilitation. In Cole, N. David, S. F. McCool, W. T. Borrie, J. O'Loughlin, (Comps.), Proceedings RMRS-P-15-VOL-5. Missoula, MT, May 23-27, 1999. *Wilderness science in a time of change conference-Volume 5: Wilderness ecosystems, threats, and management* (pp. 99-104). Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Brockway, D. G., Gatewood, R. G., & Paris, R. B. (2002). Restoring grassland savannas from degraded pinyon-juniper woodlands: Effects of mechanical overstory reduction and slash treatment alternatives. *Journal of Environmental Management 64,* 179-197.

Chambers, J. C., McArthur, E. D., Monson, S. B., Meyer, S. E., Shaw, N. L., Tausch, R. J., et al. (2005). *Sagebrush steppe and pinyon-juniper ecosystems: Effects of changing fire regimes, increased fuel loads, and invasive species (*Project #00-1-1-03, 66 pp). Joint Fire Sciences Report.

Cline, N. L. (2008). Post-treatment hydrologic response to mechanical shedding in a juniper woodland (Master's Thesis, Brigham Young University, Provo, UT). 43 pp.

Liddle, M. J. (1997) *Recreation ecology—The ecological impact of outdoor recreation and ecotourism.* London: Chapman and Hall.

Luce, C. H., & Black, T. A. (1999). Sediment production from forest roads in western Oregon. Water Resources Research 35(8): 2561-2570.

Lull, H. W. (1959). Soil compaction on forest and range lands. *Misc. Publ. 768.* U.S. Department of Agriculture. 33 p.

Megahan, W. F. (1974). Erosion over time on severely disturbed granitic soils: A model. In U.S. Department of Agriculture, Intermountain Forest and Range Experiment Station, *Research Paper INT-156* (14 pp). Retrieved from http://www.treesearch.fs.fed.us/pubs/29649

Megahan, W. F., Wilson, M. D., & Monson, S. B. (2001). Sediment from granite cutslopes on forest roads in Idaho. USA. *Earth Surface Processes and Landforms, 26,* 153-163.

Munshower, F. E. (1994). *Practical Handbook of Disturbed Land Revegetation.* Boca Raton: Lewis Publishers.

Ripplinger, J. (2010). Quantifying the effects of managed disturbance on sagebrush steppe resilience and diversity (Master's thesis, Utah State University, Logan, UT). 56 pp.

Stevens, R., & Monsen, S. B. (2004). Guidelines for Restoration and Rehabilitation of Principal Plant Communities. In S. B. Monsen, R. Stevens, N. L. Shaw, (Comps.), *Restoring western ranges and wildlands* (Gen. Tech. Rep. RMRS-GTR-136-vol-1, Chapter 17, pp. 1-294 plus index). Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Switalski, T. A., Bissonette J.A., DeLuca T. H., Luce C. H., & Madej M. A. (2004). Benefits and impacts of road removal. *Frontiers in Ecology and the Environment, 2* (1), 21-28.

Tate, K. W., Dudley, D. M., McDougald, N. K., & George, M. R. (2004). Effect of canopy cover and grazing on soil bulk density. *Journal of Range Management,* 57,411-417.

Tiedemann, A. R., & Lopez, C. F. (2004). Assessing Soil Factors in Wildland Improvement Programs. In S. B. Monsen, R. Stevens, N. L. Shaw, (Comps.), Gen. Tech. Rep. RMRS-GTR-136-vol-1. *Restoring western ranges and wildlands* (Chapter 7, pp. 39-56). Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Wilshire, H. G., Nakata, J. K., Shipley, S., & Prestegaard, K. (1978). Impacts of vehicles on natural terrain at seven sites in the San Francisco Bay area. *Environmental Geology*, *2*, 295–319.

4.1.4 WATER RESOURCES

Bureau of Land Management [BLM]. (2005). *FES 05-11; Final programmatic environmental impact statement on wind energy development on BLM-administered lands in the western United States and record of decision*. United States Department of the Interior, Washington, D.C. June.

Chambers, J. C. (2000). Great Basin Research and Management Project: Restoring and maintaining riparian ecosystem integrity. In Smith & Y. Helen, (Eds.), Symposium proceedings May 18-20, 1999, Missoula, MT. Proc. RMRS-P-17. *The Bitterroot Ecosystem Management Research Project: What we have learned* (p. 110-113). Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Clinton, B.D., Voss, J.M. (2003). Differences in Surface Water Quality Draining Four Road Surface Types in the Southern Appalachians. Southern Journal of Applied Forestry, Vol. 27, No. 2, p. 100-106. Retrieved from http://cwt33.ecology.uga.edu/publications/clinton_2003_difference.pdf

Dwire, K. A., Rhoades, C. C., & Young, M. K. (2010). Potential effects of fuel management activities on riparian areas. In W. J. Elliot, I. S. Miller, & L. Audin (Eds.), Gen. Tech. Rep. RMRS-GTR-231. *Cumulative watershed effects of fuel management in the western United States* (pp. 175-205). Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Foltz, R. B; Yanosek, K. A.; and Brown, T. M. (2008). Sediment concentration and turbidity changes during culvert removals. *Journal of Environmental Management, 87*, 329-340.

Foreman, R. T. & Alexander, L. E. (1998). Roads and their major ecological effects. *Annual Review, Ecological Systems, 29*, 207-232.

Furniss, M., Flanagan, S., & McFadin, B. (2010). Hydrologically-connected roads: An indicator of the influence of roads on chronic sedimentation, surface water hydrology, and exposure to toxic chemicals. *US Department of Agriculture Forest Service, Stream Systems Technology Center, Fort Collins, CO. Stream Notes 2000*:5–8. Retrieved from www.stream.fs.fed.us/news/streamnt/jul00/jul00_2.htm.

Jones, J. A., Swanson, F. J., Wemple, B. C., & Snyder, K. U. (2000). Effects of roads on hydrology, geomorphology, and disturbance patches in stream networks. *Conservation Biology, 14*(1), 76-85.

Megahan, W.F. & Ketcheson, G.L. (1996). Predicting downslope travel of granitic sediments from forest roads in Idaho. *Water Resources Bulletin. 32*: 371-382.

Luce, C. & Black, T. (1999). Sediment production from forest roads in western Oregon. *Water Resources Research. 35*(8) 2561-2570.

Madej, M. A. (2001). Erosion and sediment delivery following removal of forest roads. *Earth Surface Processes and Landforms*. 26: 175-190.

Megahan, W. F. (1974). Erosion over time on severely disturbed granitic soils: a model. *U.S. Department of Agriculture, Intermountain Forest and Range Experiment Station Research Paper INT-156*, 14 p., Retrieved from http://www.treesearch.fs.fed.us/pubs/29649.

Megahan, W. F., Wilson, M. D., & Monson S. B. (2001). Sediment from granite cutslopes on forest roads in Idaho, USA. *Earth Surface Processes and Landforms, 26*, 153-163.

Shaw, N. L., & Clary, W. P. (1996). Willow establishment in relation to cattle grazing on an eastern Oregon stream. In D. W. Shaw, D. M. Finch, (Technical Coordinators), *Desired future conditions for Southwestern riparian ecosystems: Bringing interests and concerns together* (General Technical Report RM-GTR-272, Sept. 18-22, 1995, pp. 148-153). Albuquerque, NM. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station.

Stevens, R., & Monsen, S. B. (2004). Guidelines for Restoration and Rehabilitation of Principal Plant Communities. In S. B. Monsen, R. Stevens, N. L. Shaw, (Comps.), *Restoring western ranges and wildlands* (Gen. Tech. Rep. RMRS-GTR-136-vol-1, Chapter 17, pp. 1-294 plus index).

Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Stohlgren, T. J., Bull, K. A., Otsuki, Y., Villa, C. A., & Lee, M. (1998). Riparian zones as havens for exotic plant species in the central grasslands. *Plant Ecology, 138*, 113-125.

Turaski, M. (2004). Spencer Creek Sediment Study Status Report. U.S. Bureau of Land Management, Klamath Falls Resource Area, Lakeview District, 38 pages. Available online from http://www.fs.fed.us/GRAIP/downloads/Spencer%20Creek%20Sediment%20Report.pdf

URS Corporation [URS]. (2010). *Results of hydrology assessment for proposed China Mountain Wind Power Project.*

Wemple, B. C., Jones, J. A., & Grant, G. E. (1996). Channel network extension by logging roads in two basins, Western Cascades, Oregon. *Water Resources Bulletin, 32*(6), 1195-1207.

Wright, J.L. (1988). Daily and seasonal evapotranspiration and yield of irrigated alfalfa in southern Idaho. *Agronomy Journal, 80*: 662-669.

4.1.5 NOISE

Barber, Fristrup, Brown, Hardy, Angeloni, and Crooks. (2009). "Conserving the wild life therein—Protecting park fauna from anthropogenic noise." PARKScience, v. 26, no. 3, Winter 2009-2010.Bies, D. & Hansen, C. (2003). *Engineering noise control: theory and practice*. Third Edition. New York, NY: E & FN Spon Press, Table 4-10, p. 125.

Bies, D. and Hansen, C. 2003. *Engineering Noise Control: Theory and Practice.* Third Edition. New York, NY: E & FN Spon Press.

Blickley, Jessica. (2010). *Status on current study of sage-grouse lek impacts from reproduced oil and gas extraction facility operation and traffic noises*. Personal communication, telephone conversation between Mark Storm, INCE Bd.Cert., Senior Project Engineer, URS, San Diego, CA, and Jessica Blickley, Graduate Group in Biology, University of California, Davis, CA, December 7, 2010.

Elko County Planning Department. (2009). *Telephone conversation with John Kingwell* (Elko County Planning Department, 775-738-6816), Feb. 11, 2009.

Environmental Protection Agency. (1974). *Information on levels of environmental noise requisite to protect public health and welfare with an adequate margin of safety*. Office of Noise Abatement and Control.

Federal Highway Administration. (1998). *Traffic noise model look-up tables.* FHWA-PD-98-047. Final Report. July 1998, Table 6.

Idaho Department of Fish and Game [IDFG]. (2010). *Sage-grouse seasons and rules 2010.* Retrieved on December 10, 2010 from http://fishandgame.idaho.gov/cms/hunt/rules/ug/10sage.pdf

Larkin, Ronald P. (1997). *Effects of military noise on wildlife: a literature review.* Urbana/Champaign, IL: Illinois natural history survey, University of Illinois. 36 pp.

Rabin, Coss, and Owings. (2006). "The effects of wind turbines on antipredator behavior in California ground squirrels (Spermophilus beecheyi)." *Biological Conservation*, v. 131, 2006, p. 410-420.State of Nevada. (2010). http://www.leg.state.nv.us/nrs/NRS-244.html#NRS244Sec363, last accessed October 15, 2010.

Twin Falls County Comprehensive Plan. (2008). p. 12-18.

4.2.1 VEGETATION

Allen, E. B. (1995). Restoration ecology: Limits and possibilities in arid and semiarid lands. In B. A. Roundy, E. D. MeArthur, J. S. Haley & D. K. Mann, (Eds.), General Technical Report INT-315, *Proceedings of the Wildland Shrub and Arid Land Restoration Symposium* (pp. 7-15). Ogden, UT: USDA Forest Service Intermountain Research Station.

Bureau of Land Management [BLM]. (2000). *Field Guide to the Special Status Plants of the Bureau of Land Management Lower Snake River District.*

Bureau of Land Management. (2003). *Lepidium papilliferum potential habitat for the Jarbidge Field Office* [GIS data]. Twin Falls, ID.

Bureau of Land Management. (2006). Field Guide to the Special Status Plants of the Bureau of Land Management Twin Falls District, Jarbidge Field Office Area. *Idaho Technical Bulletin 2006-01*, 70 pp.

Bureau of Land Management. (2007a). *Record of Decision: Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States, Programmatic Environmental Impact Statement.* Washington, DC.

Bureau of Land Management. (2007b). *Noxious and Invasive Weed Treatment for the Boise District and Jarbidge Field Offices* (Environmental Assessment No. ID100-2005-EA-265). Boise, ID: Boise District.

Bureau of Land Management. (2007c). *Analysis of the management situation for the Jarbidge resource management plan.* Twin Falls District, ID: BLM Jarbidge Field Office.

Bureau of Land Management. (2010). *Jarbidge Draft Resource Management Plan and Environmental Impact Statement* (BLM/ID/PT - 10/003+1610). Twin Falls, ID: Jarbidge Field Office.

Brockway, D. G., Gatewood, R. G., & Paris, R. B. (2002). Restoring grassland savannas from degraded pinyon-juniper woodlands: Effects of mechanical overstory reduction and slash treatment alternatives. *Journal of Environmental Management, 64,* 179-197.

Byler, J. W., Harvey, A. E., Hessburg, P. F., Hann, W. J., & Long, D. G. (1994). *Development of vegetation dynamics pathways.* 64 pp.

Chambers, J. C., McArthur, E. D., Monson, S. B., Meyer, S. E., Shaw, N. L., Tausch, R. J., et al. (2005). *Sagebrush steppe and pinyon-juniper ecosystems: Effects of changing fire regimes, increased fuel loads, and invasive species (*Project #00-1-1-03, 66 pp). Joint Fire Sciences Report.

Clifford, H. T. (1959). Seed Dispersal by Motor Vehicles. *Journal of Ecology, 47,* 311-315.

Cline, N. L. (2008). *Post-treatment hydrologic response to mechanical shredding in a juniper woodland* (Master's Thesis, Brigham Young University, Provo, UT). 43 pp.

Davies, K. W. (2008). Medusahead Dispersal and Establishment in Sagebrush Steppe Plant Communities. *Rangeland Ecology & Management, January 2008, 61*(1), 110-115.

Downs, J. L., Rickard, W. H, & Cadwell, L. L. (1995). Restoration of big sagebrush habitat in southeastern Washington. In B. A. Roundy, E. D. McArthur, J. S. Haley and D.K. Mann (Comps.), General Technical Report (GTR) 315. *Proceedings – Wildland shrub and arid land restoration symposium* (pp. 74-77). Ogden, Utah: USDA Forest Service, Intermountain Research Station.

Farmer, A. M. (1993). The effects of dust on vegetation - a review. *Environmental Pollution, 79,* 63-75.

Flora of North America Editorial Committee (Eds.) (1993+). *Flora of North America north of Mexico.* 16+ vols. New York and Oxford.

Hann, W. J., Wisdom, M. J., & Rowland, M. M. (2003). *Disturbance departure and fragmentation of natural systems in the interior Columbia basin* (Res. Pap. PNW-RP-545, 19 pp). Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Harrison, R. D., Chatterton, N. J., Page, R., Asay, K. H., Jensen, K. B., & Curto,. M. (1994). *Introduced Forage Grasses.* 76 pp.

Hickman, J. C. (1993). *The Jepson Manual: Higher Plants of California.* Retrieved on October 6, 2010 from http://ucjeps.berkeley.edu/interchange/I_treat_indexes.html

Idaho Fish and Wildlife Information System [IFWIS]. (2010). Plant observations database [GIS data]. Boise, ID: Idaho Department of Fish and Game. Retrieved on February 2010.

Landsberg, J. D., Miller, R. E., Anderson, H. W., & Tepp, J. S. (2003). *Bulk density and soil resistance to penetration as affected by commercial thinning in northeastern Washington* (Res. Pap. PNW-RP-551, 35 pp). Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Lei, S. A. (2007). Soil Responses to human recreational activities in a blackbrush (Coleogyne ramosissima Torr.) Shrubland. In R. E. Sosebee, D. B. Wester, C. M. Britton, E.D. McArthur & S.G. Kitchen, (Comp), Proceedings RMRS-P-47, August 10-12, 2004, Lubbock, TX. *Proceedings: Shrubland dynamics—fire and water* (173 pp). Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Lesica, P., Cooper, S. V, & Kudray, G. (2007). Recovery of Big Sagebrush following fire in Southwestern Montana. *Rangeland Ecology & Management, 60*(3), 261-269.

Mortensen, D. A., Rauschert E. S., Nord, A. N., & Jones, B. P. (2009). Forest Roads Facilitate the Spread of Invasive Plants. *Invasive Plant Science and Management, 2*, 191-199.

NatureServe. (2010). *NatureServe Explorer: An online encyclopedia of life* [web application]. Version 7.1. Arlington, VA: NatureServe Retrieved on October 11, 2010, from http://www.natureserve.org/explorer

Pellant, M. (1996). *Cheatgrass: The Invader That Won the West.* Interior Columbia Basin Ecosystem Management Project. Boise, ID: BLM Idaho State Office.

Prater, M. R., & DeLucia, E. H. (2006). Non-native grasses alter evapotranspiration and energy balance in Great Basin sagebrush communities. *Agricultural and Forest Meteorology 139*, 154–163.

Ripplinger, J. (2010). Quantifying the effects of managed disturbance on sagebrush steppe resilience and diversity (Master's thesis, Utah State University, Logan, UT). 56 pp.

Spellerberg, I. F. 1998. Ecological effects of roads and traffic: A literature review. *Global Ecology and Biogeography Letters, 7*, 317-333.

Stevens, R., & Monsen, S. B. (2004). Guidelines for Restoration and Rehabilitation of Principal Plant Communities. In S. B. Monsen, R. Stevens, N. L. Shaw, (Comps.), *Restoring western ranges and wildlands* (Gen. Tech. Rep. RMRS-GTR-136-vol-1, Chapter 17, pp. 1-294 plus index). Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Trombulak, S. C., & Frissell, C. A. (2000). Review of ecological effects of roads on terrestrial and aquatic communities. *Conservation Biology, 14*, 18-30.

United States Fish and Wildlife Service [USFWS]. (2009a). *Biological Opinion for the Jarbidge Resource Management Plan, Kuna Management Framework Plan, Cascade Management Plan, and Snake River Birds of Prey National Conservation Area Resource Management Plan for the Bureau of Land Management, Idaho.* (14420-2010-F-0019). Boise, ID.

United States Fish and Wildlife Service [USFWS]. (2009b). *Endangered and threatened wildlife and plants; Listing Lepidium papilliferum (slickspot peppergrass) as a threatened species throughout its range* (50 CFR Part 17. Federal Register Vol. 74, No 194).

United States Geological Survey. (2010). *Hydrologic unit boundaries and codes for the United States* [GIS data].

URS Corporation [URS]. (2010). *Rare plant observation report form for Astragalus newberryi var. castoreus*. Boise, ID.

Western EcoSystems Technology, Inc. [West]. (2010). *Field surveys for slickspot peppergrass along the China Mountain proposed Outbound Haul Route* [GIS data].

Young, J. A. & Clements, C. D. (2005). Exotic and invasive herbaceous range weeds. *Rangelands, October 2005*, 10-16.

Zouhar, Kris. (2003). Bromus tectorum. In *Fire Effects Information System*. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. Retrieved July 14, 2010 from http://www.fs.fed.us/database/feis/plants/graminoid/brotec/introductory.html

4.2.2 FISH AND WILDLIFE

Aldridge, C. L., and Boyce, M. S. (2007). Linking occurrence and fitness to persistence: habitat-based approach for endangered greater sage-grouse. *Ecological Applications, 17*, 508–526.

American Bird Conservancy. (2010). *Birds and Collisions*. Retrieved on October 13, 2010 from http://www.abcbirds.org/abcprograms/policy/collisions/index.html

Andrews, K. M., Gibbons, J. W., & Jochimsen, D. M. (2008). Ecological effects of roads on amphibians and reptiles: A literature review. *Herpetological Conservation, 3,* 121-143.

Arnett, E. B., Brown, W. K., Erickson, W. P., Fiedler, J. K., Hamilton, B. L., Henry, T. H., et al. (2008). Patterns of bat fatalities at wind energy facilities in North America. *Journal of Wildlife Management, 72*(1), 61-78.

Arnett, E. B., Schirmacher, M., Huso, M. M. P., & Hayes, J. P. (2009). *Effectiveness of changing wind turbine cut-in speed to reduce bat fatalities at wind facilities.* An annual report submitted to the Bats and Wind Energy Cooperative. Texas, USA: Bat Conservation International.

Baerwald, E. F., Edworthy, J., Holder, M., & Barclay, R. M. R. (2009). A large-scale mitigation experiment to reduce bat fatalities at wind energy facilities. *Journal of Wildlife Management, 73*(7), 1077-1081.

Barclay, R. M. R., Baerwald, E. F., & Gruver, J.C. (2007). Variation in bat and bird fatalities at wind energy facilities: Assessing the effects of rotor size and tower height. *Canadian Journal of Zoology, 85,* 381-387.

Beckmann, J. P., and Seidler, R. G. (2009). Wildlife and energy development: Pronghorn of the Upper Green River Basin – Year 4 summary. *Wildlife Conservation Society*, Bronx, NY

Bevanger, K. (1994). Bird interactions with utility structures: Collision and electrocution, causes and mitigating measures. *Ibis, 136,* 412-425.

Bjornn, T. C., Brusven, M. A, Molnau, M. P., et al. (1977). Transport of granitic sediment in streams and its effects on insects and fish. *Wildlife and Range Sciences, Bulletin 17.* 43pp. Moscow, ID: University of Idaho, College of Forestry.

Bloomberg, E. & Sedinger, J. (2009). *Dynamics of greater sage-grouse (Centrocercus urophasianus) populations in response to transmission lines in central Nevada.* Progress Report: Year 7. December.

Braun, C. E. (1998). Proceedings of the Western Association of State Fish and Wildlife Agencies 67 (pp. 134–44): Sage-Grouse declines in Western North America: What are the problems?

Bull, E. L. (2005). *Ecology of the Columbia spotted frog in northeastern Oregon* (Gen. Tech. Rep. PNW-GTR-640, 46 pp). Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Bureau of Land Management [BLM]. (2005). *FES 05-11; Final programmatic environmental impact statement on wind energy development on BLM-administered lands in the western United States and record of decision.* United States Department of the Interior, Washington, D.C. June.

Bureau of Land Management. (2007). *Analysis of the management situation for the Jarbidge resource management plan.* Twin Falls District, ID: BLM Jarbidge Field Office.

Bureau of Land Management. (2008). *Sage-grouse habitat in Idaho* [GIS data]. Boise, ID: BLM, Idaho State Office, Branch of Resources and Science. March 1, 2008.

Bureau of Land Management. (2010). *Seasonal wildlife restrictions and procedures for processing Requests for Exceptions on Public Lands in Idaho* (BLM Information Bulletin No. ID-2010-39, July 2010). Boise, ID.

Cederholm, C. J., & Reid, L. M. (1987). Impact of Forest Management on Coho Salmon (*Oncorhynchus kisutch*) Populations of the Clearwater River, Washington: A Project Summary. In Salo, E.O. and T.W. Cundy (Eds.), *Streamside Management: Forestry and Fishery Interactions* (Chapter 13). Seattle, Washington: College of Forest Resources, University of Washington.

Coates, P. S. (2007). *Greater sage-grouse (Centrocercus urophasianus) nest predation and incubation behavior.* Dissertation. Pocatello, ID: Idaho State University.

Coates, P. S., & Delehanty, D. J. (2010). Nest predation of greater sage-grouse in relation to microhabitat factors and predators. *Journal of Wildlife Management, 74*, 240-248.

Connelly, J. W., Knick, S. T., Schroeder, M. A., & Stiver, S. J. (2004). *Conservation Assessment of Greater Sage-grouse and sagebrush habitats.* Western Association of Fish and Wildlife Agencies. Cheyenne, WY: Unpublished Report. Cheyenne, Wyoming.

Cooper, S.V., Lesica, P., & Kudray, G. M. (2007). Post-fire Recovery of Wyoming big sagebrush shrub-steppe in Central and Southeast Montana. Montana Natural Heritage Program, a cooperative program of the Montana State Library and the University of Montana.

Cryan, P.M., & Barclay, R. M. R. (2009). Causes of bat fatalities at wind turbines: Hypotheses and predictions. *Journal of Mammalogy, 90*(6), 1330-1340.

Doherty, K. E., Naugle, D. E., Walker, B. L. & Graham, J. M. (2008). Greater Sage-Grouse winter habitat selection and energy development. *Journal of Wildlife Management, 72*, 187–195.

Doherty, K. E., Naugle, D. E., Copeland, H., Pocewicz, A., & Kiesecke, J. (In press). Energy development and conservation tradeoffs: Systematic planning for sage-grouse in their eastern range. In S. T. Knick & J. W. Connelly (Eds), *Greater Sage-Grouse: Ecology and conservation of a landscape species and its habitats.* Studies in Avian Biology Series (vol. 38). A release of a scientific monograph with permission of the authors, the Cooper Ornithological Society, and the University of California Press.

Ellis, K. L. (1984). Behavior of lekking sage grouse in response to a perched Golden Eagle. *Western Birds 15*, 37–38. In D.E Naugle, K.E. Doherty, B.L. Walker, M.J. Holloran, & H.E. Copeland. 2010. *Energy development and Greater Sage-Grouse* In: Knick S. T. & J. W. Connelly (Eds), Greater Sage-Grouse: Ecology and conservation of a landscape species and its habitats. Studies in Avian Biology Series (vol. 38). A release of a scientific monograph with permission of the authors, the Cooper Ornithological Society, and the University of California Press.

Erickson, W. P., Johnson, G. D., Strickland, M. D., Young Jr., D. P., Sernka, K. J., & Good. R. E. (2001). *Avian collisions with wind turbines: A summary of existing studies and comparisons to other sources of avian collision mortality in the United States* (62 pp). Washington D.C.: National Wind Coordinating Committee Resource Document. National Wind Coordinating Committee.

Gavin, S. D., and Komers, P. E. (2006). Do pronghorn (*Antilocapra americana*) perceive roads as a predation risk? *Canadian Journal of Zoology, 84*, 1775–1780.

Gossett, D. N. (2008). West Nile Virus in Sage-grouse. *Idaho Sage-grouse Advisory Committee Newsletter, Quarterly Update*, winter 2008.

Griffith, J. S., & Smith, R. W. (1993). Use of winter concealment cover by juvenile cutthroat and brown trout in the south fork of the Snake River, Idaho. *North American Journal of Fisheries Management, 13*, 823-830.

Hagen, C. A. (2003). A demographic analysis of Lesser Prairie-chicken populations in southwestern Kansas: Survival, population viability, and habitat use. Ph.D. dissertation, Kansas State University, Manhattan, USA. In: D.E Naugle, K.E. Doherty, B.L. Walker, M.J. Holloran, & H.E. Copeland. (In press). *Energy development and Greater Sage-Grouse* In Knick S. T. and Connelly J. W. (Eds), Greater Sage-Grouse: Ecology and conservation of a landscape species and its habitats. Studies in Avian Biology Series (vol. 38). A release of a scientific monograph with permission of the authors, the Cooper Ornithological Society, and the University of California Press.

Hagen, C. A. (In press). Predation on greater sage-grouse: Facts, process, and effects. In S. T. Knick & J. W. Connelly (Eds), *Greater Sage-Grouse: Ecology and conservation of a landscape species and its habitats*. Studies in Avian Biology Series (vol. 38). A release of a scientific monograph with permission of the authors, the Cooper Ornithological Society, and the University of California Press.

Harju, S. M., Dzialak, M. R., Taylor, R. C., Hayden-Wing, L. D., & Winstead, J. B. (2010). Thresholds and time lags in effects of energy development on greater sage-grouse populations (DOI: 10.2193/2008-289). *Journal of Wildlife Management, 74*(3), 437–448.

Hayden-Wing Associates. (1990). *Response of Elk to Exxon's Field Development in the Riley Ridge Area of Western Wyoming 1979-1990.* Final report prepared for Exxon Company, USA and Wyoming Game and Fish Department. 33 pp.

Higgins, K. F., Osborn, R. G., & Naugle, D. E. (2007). Effects of wind turbines on birds and bats in southwestern Minnesota, U. S. A. In M. de Lucas, G. F. E. Janss, & M. Ferrer (Eds), *Birds and wind farms: Risk assessment* (Chapter 8. Pages 153-175) and In Ambientales/Quercus Publishing, Madrid, Spain, *Mitigation Servicios Informativos* (275 pp).

Holechek, J. L., Pieper, R. D., & Herbel, C. H. (2001). *Range management: Principles and practices*. 4th ed. Upper Saddle River, NI: Prentice-Hall.

Holloran, M. J. (2005). Greater sage-grouse (*Centrocercus urophasianus*) population response to natural gas field development in western Wyoming. (Ph.D. dissertation, University of Wyoming, Laramie, WY.) In: D.E Naugle, K.E. Doherty, B.L. Walker, M.J. Holloran, & H.E. Copeland. (In press). *Energy development and Greater Sage-Grouse* In: Knick S. T. and Connelly J. W. (Eds), Greater Sage-Grouse: Ecology and conservation of a landscape species and its habitats. Studies in Avian Biology Series (vol. 38). A release of a scientific monograph with permission of the authors, the Cooper Ornithological Society, and the University of California Press.

Horn, J. W., Arnett, E. B., & Kunz, T. H. (2008). Behavioral responses of bats to operating wind turbines. *Journal of Wildlife Management, 72*(1), 123-132.

Huso, M. M. P. (2010). *An estimator of wildlife fatality from observed carcasses*. Environmetrics.

Idaho Department of Fish and Game [IDFG]. (2009). Comment letter on the Draft China Mountain Meteorological Tower Environmental Assessment received by the BLM and signed by Sharon W. Kiefer, Assistant Director-Policy, IDFG. April 22.

Idaho Fish and Wildlife Information System [IFWIS]. (2010). *Animal conservation database*. Boise, ID: Idaho Department of Fish and Game.

Idaho Sage-grouse Advisory Committee [ISAC]. (2006). Conservation Plan for the Greater Sage-grouse in Idaho. Boise, ID: Idaho Fish and Game.

Ingelfinger, F., & Anderson, S. (2004). Passerine response to roads associated with natural gas extraction in a sagebrush steppe habitat. *Western North American Naturalist, 64*(3), 385-395.

Jochimsen, D.M., Peterson, C.R. Andres, K.M., & Gibbons, J.W. (2004). *A literature review of the effects of roads on amphibians and reptiles and the measures used to minimize those effects.* Idaho State University, Pocatello, ID and University of Georgia, Aiken, SC. Prepared for Idaho Department of Fish and Game and USDA Forest Service.

Johnson, G. D., & Erickson, W.P. (2008). Final report, avian and bat cumulative impacts associated with wind energy development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon. Prepared For: Klickitat County Planning Department. Western EcoSystems Technology, Inc., Cheyenne, Wyoming. October 30, 2008.

Johnson, G. D. & Erickson, W. P. (2010). *Avian, bat and habitat cumulative impacts associated with wind energy development in the Columbia Plateau Ecoregion of eastern Washington and Oregon.* Western EcoSystems Technology, Inc.

Johnson, D. H., Holloran, M.J., Connelly, J. W., Hanser, S. E., Amundson, C. L., & Knick, S. T. (In press). Influences of environmental and anthropogenic features on greater sage-grouse populations, 1997-2007. In: Knick S. T. and Connelly J. W. (Eds), *Greater Sage-Grouse: Ecology and conservation of a landscape species and its habitats*. Studies in Avian Biology Series (vol. 38). A release of a scientific monograph with permission of the authors, the Cooper Ornithological Society, and the University of California Press.

Kerns, J., Erickson, W.P., & Arnett, E. B. (2005). Bat and bird fatality at wind energy facilities in Pennsylvania and West Virginia. In E. B. Arnett, (Ed.), Relationships between bats and wind turbines in Pennsylvania and West Virginia. Final Report, February 15, 2007 (pp. 24-95). Bats and Wind Energy Cooperative.

Knick, S. T., & S. E. Hanser. (In press). *Connecting pattern and process in greater sage-grouse populations and sagebrush landscapes.* In Knick S. T. and Connelly J. W. (Eds), *Greater Sage-Grouse: Ecology and conservation of a landscape species and its habitats*. Studies in Avian Biology Series (vol. 38). A release of a scientific monograph with permission of the authors, the Cooper Ornithological Society, and the University of California Press.

Krausman, P. R., Avey, J., Brown, C. F., Devers, P. K., Tull, J. C., Jansen, B. D., & Cain, J. W. III. (2006). Distances moved by startled desert mule deer. *The Southwestern Naturalist, 51*(3), 436-439.

Kunz, T.H., Arnett, E.B., Cooper, B.M., Erickson, W.P., Larkin, R.P., Mabee, T., Morrison, M.L., Strickland, M.D., & Szewczak, J.M. (2007). Assessing impacts of wind-energy development on nocturnally active birds and bats: A guidance document. *Journal of Wildlife Management, 71*(8), 2449-2486.

Kurta. A., & Baker, R. H. (1990). Mammalian species: *Eptesicus fuscus. American Society of Mammalogists, 356,* 1-10.

Kuvlesky, W. P., Brennan, L. A., Morrison, M. L., Boydston, K. K., Ballard, B. M., & Bryant, F. C. (2007). Wind energy development and wildlife conservation: Challenges and opportunities. *Journal of Wildlife Management, 71*(8), 2487-2498.

Leddy, K. L., Higgins, K. F., Naugle, D. E. (1999). Effects of wind turbines on upland nesting birds in conservation reserve program grasslands. *The Wilson Bulletin, 111*(1), 100-104.

Leonard, K. M., Reese, K. P. & Connelly, J. W. (2000). Distribution, movements and habitats of sage-Grouse *Centrocercus urophasianus* on the Upper Snake River Plain of Idaho: Changes from the 1950s to the 1990s. *Wildlife Biology, 6*, 265-270.

Lyon, L. J. (1979). Habitat effectiveness for elk as Influenced by roads and cover. *Journal of Forestry*, Volume 77, Number 10, 1 October 1979, pp. 658-660(3)

Lyon, A. G., & Anderson, S. H. (2003). Potential gas development impacts on sage grouse nest initiation and movement. Wildlife Society Bulletin 31, 486-491. In U.S. Fish and Wildlife Service (USFWS), *Greater Sage-Grouse Interim Status Update.* U.S. Fish and Wildlife Service. Mountain-Prairie Region Wyoming Ecological Services Office. October 31, 2008.

Mckee, J. E., & Wolf, H. W. (1963). *Water Quality Criteria* (Publication No. 3-A). Sacramento, CA: The Resources Agency of California. State Water Resources Control Board. 548 pp.

Manville, A. M., II. (2004). Prairie grouse leks and wind turbines: U.S. Fish and Wildlife Service justification for a 5-mile buffer from leks; additional grassland songbird recommendations. Division of Migratory Bird Management, USFWS, Arlington, VA, peer-reviewed briefing paper. 17 pp.

Naugle, D. E., Aldridge, C. L., Walker, B. L., et al. (2004). West Nile Virus: pending crisis for greater sage-grouse. *Ecology Letters, 7*, 704-13.

Naugle, D. E., Doherty, K. E., Walker, B. L., Holloran, M. J., & Copeland, H. E. (In press). *Energy development and greater sage-grouse.* In: Knick S. T. and Connelly J. W. (Eds), Greater Sage-Grouse: Ecology and conservation of a landscape species and its habitats. Studies in

Avian Biology Series (vol. 38). A release of a scientific monograph with permission of the authors, the Cooper Ornithological Society, and the University of California Press.

Nevada Department of Wildlife [NDOW]. (2008a). *Effects of wildfire (1999–2007) on greater sage-grouse (Centrocercus urophasianus) and key ecological sagebrush systems that they depend on in Nevada.* Reno, NV: Shawn Espinosa and Ralph Phenix.

Nevada Department of Wildlife. (2008b). *Nevada Sage-grouse Conservation Project* (W-64-R-8). September.

Patla, D. A., & Keinath, D. (2005). Columbia Spotted Frog (Rana luteiventris formerly R. pretiosa): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Retrieved on October 10, 2010 from http://www.fs.fed.us/r2/projects/scp/assessments/columbiaspottedfrog.pdf.

Popper, A. N., & Clarke, N. L. (1976). The auditory system of the goldfish (*Carassius auratus*): Effects of intense acoustic stimulation. *Comp. Biochem. Physiol. 53A*, 11-18. In K. M. Manci, D. N. Gladwin, R. Villella, & M. G. Cavendish. (1988). Effects of aircraft noise and sonic booms on domestic animals and wildlife: A literature synthesis (NERC-88/29, pp. 63 and 85). Fort Collins, CO: U.S. Fish and Wildlife Service, National Ecology Research Center.

Pruett, C.L., Patten, M.A., Wolfe, D.H. (2009). Avoidance behavior by prairie grouse: Implications for wind energy development. *Conservation Biology, 23*(5), 1253-1259.

Rieser, D. W., & White, R. G. (1988). Effects of two sediment size-classes on survival of steelhead and Chinook salmon eggs. *North American Journal of Fisheries Management, 8*, 432-437.

Romin, L. A. and Muck, J. A. 2002. *Utah Field Office guidelines for raptor protection from human and land use disturbances.* U.S. Fish and Wildlife Service, Utah Field Office, Salt Lake City. January 2002 update.

Rost, G. R. and Bailey, J. A. (1979). Distribution of mule deer and elk in relation to roads. *The Journal of Wildlife Management.*43 (3):634-641.

Saha, M. K., & Konar, S. K. (1986). Chronic effects of crude petroleum on aquatic ecosystem. *Environmental Ecology, 4*, 506-510.

Sawyer, H., Nielson, R. M., Lindzey, F., & McDonald, L. L. (2006). *Winter habitat selection of mule deer before and during development of a natural gas field.*

Smallwood, K. S. (2007). Estimating wind turbine-caused bird mortality. *Journal of Wildlife Management, 71*(8), 2781-2791.

Steenhof, K., Kochert, M. N. & Roppe, J. A. (1993). Nesting by raptors and common ravens on electrical transmission line towers. *Journal of Wildlife Management, 57* (1993), 272-81.

Stevens, R. & Monsen, R. S. (2004). *Guidelines for restoration and rehabilitation of principal plant communities* (Gen. Tech. Rep. RMRS-GTR-136). USDA Forest Service.

Suttle, K. B., Power, M. E. Levine, J. M., et al. (2004). How fine sediment in riverbeds impairs growth and survival of juvenile salmonids. *Ecological Applications, 14*(4), 969-974.

Swenson, J. E., Simmons, C. A., & Eistace, C. D. (1987). Decrease of sage-grouse *Centrocercus urophasianus* after plowing of sagebrush steppe. *Biological Conservation, 41*, 125–132.

Tetra Tech. (2010). *Draft Greater sage-grouse conservation plan for the China Mountain Wind Project*. Draft Report prepared for Renewable Energy Systems Americas Incorporated. Portland Oregon. November.

United States Forest Service. (2002). Programmatic biological assessment for road maintenance on public lands administered by the Salmon-Challis National Forest and Bureau of Land Management Salmon, Challis and Idaho Falls Field Offices In the Upper Salmon River Basin and Lost River Subbasin. May 24, 2002. For Snake River Summer Steelhead, spring/summer Chinook Salmon, Sockeye Salmon and Bull Trout.

United States Fish and Wildlife Service [USFWS], Wyoming Field Office. (2005). Endangered and threatened wildlife and plants; 12-month finding for petitions to list the greater sage-grouse as threatened or endangered. January 12, 2005, *Federal Register, 70*(8), 2244-2249.

United States Fish and Wildlife Service. (2006). *Programmatic concurrence and biological opinion for stream crossing structure replacement and removal program in Idaho National Forests: Payette, Boise, Sawtooth, Salmon-Challis, Nez Perce and Idaho/Nevada Bureau of Land Management: Challis, Cottonwood, Coeur d'Alene, Four Rivers, Jarbidge, and Upper Snake Field Offices* (2006-F-0206, August). Boise, Idaho: Snake River Fish and Wildlife Office.

United States Fish and Wildlife Service. (2008). *Greater sage-grouse interim status update.* Mountain-Prairie Region Wyoming Ecological Services Office. October 31, 2008

United States Fish and Wildlife Service. (2010a). Memorandum from the Bend Field Office, US Fish and Wildlife Service, Bend, Oregon to the Prineville Field Office, Bureau of Land Management, Prineville, Oregon dated September 15, 2010 regarding the West Butte Wind Power Project Golden Eagle Protection Plan. Jim Watson, Washington Department of Fish and Wildlife, unpublished data.

United States Fish and Wildlife Service. (2010b). Federal Register/Vol. 75, No. 55. Endangered and Threatened Wildlife and Plants; 12-Month Findings for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered; Proposed Rule. March 23. Pages 13910-14014.

United States Forest Service. (2002). *Programmatic biological assessment for road maintenance on public lands administered by the Salmon-Challis National Forest and Bureau of Land Management Salmon, Challis and Idaho Falls Field Offices In the Upper Salmon River Basin and Lost River Subbasin.* May 24, 2002. For Snake River Summer Steelhead, spring/summer Chinook Salmon, Sockeye Salmon and Bull Trout.

Walker, B. L., Naugle, D. E., & Doherty, K. E. (2007). Greater sage-grouse population response to energy development and habitat loss. *Journal of Wildlife Management, 71*, 2644-2654.

Walter, D. L., Leslie, D. M. Jr., Jenks, J.A. (2006). *Response of Rocky Mountain elk (Cervus elaphus) to wind-power development.* American Midland Naturalist, *156*, 363-375.

Western EcoSystems Technology, Inc. (2010). *Draft big game monitoring study report, Elkhorn Valley Wind Project.* Cheyenne, WY. September, 2010.

Winegrad, G. (2004). Why avian impacts are a concern in wind energy development. In S. S. Schwartz, (Ed.), Proceedings of the wind energy and birds/bats workshop: understanding and resolving bird and bat impacts (Washington, D.C., May 18-19, 2004, pp 22-24). Washington, D.C.: RESOLVE, Inc.

Wisdom, M. J., Meinke, C. W., Knick, S. T., & Schroeder, M. A. (In press). *Factors associated with extirpation of sage-grouse.* In Knick S. T. and Connelly J. W. (Eds), *Greater sage-grouse: ecology and conservation of a landscape species and its habitats.* Studies in Avian Biology Series (vol. 38). A release of a scientific monograph with permission of the authors, the Cooper Ornithological Society, and the University of California Press.

Wright, D. G. (1982). *A discussion paper on the effects of explosives on fish and marine mammals in the waters of the Northwest Territories* (Canadian Technical Report of Fisheries and Aquatic Sciences. No. 1052. February 1982). Winnipeg, Manitoba: Western Region Department of Fisheries and Oceans.

Wright, D. G., & Hopky. G. E. (1998). Guidelines for the use of explosives in or near Canadian fisheries waters. *Canadian Technical Report of Fisheries and Aquatic Sciences, 2107* (iv +), 34 pp.

Wyoming Game and Fish Department [WGFD]. (2010). *Wildlife protection recommendations for wind energy development in Wyoming.*

Young, D. P., Hallingstad, E., Poulton, V., & Bay, B. (2009). Draft wildlife baseline studies for the China Mountain Wind Resource Area. Twin Falls County, Idaho and Elko County, Nevada. Western Ecosystems Technology, Inc. Cheyenne, WY.

4.3.1 HISTORIC AND CULTURAL RESOURCES

Gassaway, L. (2009). *Appendix K Cultural Resources. In Rube & Powder Magazine Grazing Environmental Assessment.* Western Divide Ranger District, Sequoia National Forest, Tulare County, California. USDA, Forest Service, Sequoia National Forest.

U.S. Department of the Interior [USDI]. (1998) How to Apply the National Register Criteria for Evaluation. *National Register Bulletin No. 15.* Washington, D.C.: National Park Service.

4.3.3 ECONOMIC CONDITIONS

Ayee, G., Lowe, M., & Gereffi, G. (2009). *Manufacturing climate solutions: Carbon-reducing technologies and U.S. jobs,* Chapter 11: "Wind power: Generating electricity and employment." Center on Globalization, Governance, and Competitiveness, Duke University. Retrieved on September 22, 2009 from www.cggc.duke.edu/environment/climatesolutions

Bureau of Land Management. (2008). *Wind energy development policy* (Instruction Memorandum No. 2009-043). December 19, 2008.

Entrix, Inc. (2009). Economic impacts of wind energy projects in southeast Washington, Prepared for Southeast Washington Economic Development Association. Prepared by Economics Group of ENTRIX, Inc., 12009 N.E. 99th Street, Suite 1410, Vancouver, WA 98682-2497, March 6, 2009.

Ferguson, M. (2009). "Idaho tax revenues as percentage of personal income" personal correspondence with Michael Ferguson, State Economist, Division of Financial Management, State of Idaho, October 1, 2009 and various dates.

Gardner, R., Zelus, P. (2010). *Economic impacts of China Mountain Wind Project, final review draft.* Prepared for RES Americas, Inc., Bootstrap Solutions, April 2010.

Hoen, B., Wiser, R., et al. (2009.) "The impact of wind power projects on residential property values in the United States: A multi-site hedonic analysis." Berkeley, CA: Lawrence Berkeley National Laboratory, December 2009.

Minnesota IMPLAN Group. (2006). *IMPLAN® (IMpact analysis for PLANning) economic impact modeling software.* Elko County, NV and Twin Falls County, ID: 2006 data matrix.

Reading, D., (2008 & 2009). Ben Johnson Associates, Tallahassee, Florida, personal communication, various dates.

4.3.4 VISUAL RESOURCES

Bureau of Land Management [BLM]. (1986). *Visual resource contrast rating* (Manual 8431).

Bureau of Land Management. (2005). *FES 05-11; Final programmatic environmental impact statement on wind energy development on BLM-administered lands in the western United States and record of decision*. Washington, D.C.: United States Department of the Interior, June.

4.3.5 TRANSPORTATION AND ACCESS

URS Corporation [URS]. (2010). *China Mountain traffic safety analysis memorandum*. Boise, ID. November 2010.

4.3.6 PUBLIC SAFETY

American Wind Energy Association. (2004). Wind energy and the environment, wind web tutorial. Retrieved on October 19, 2010 at http://awea.org/faq/wwt_environment.html

Bureau of Land Management [BLM]. (2005). *FES 05-11; Final programmatic environmental impact statement on wind energy development on BLM-administered lands in the western United States and record of decision*. Washington, D.C.: United States Department of the Interior, June.

Department of Trade and Industry [DTI]. (2002). *Wind energy and aviation interests interim guidelines*, ETSU W/14/00626/REP. Wind Energy, Defense & Civil Aviation Interests Working Group.

Federal Aviation Administration. (2005). *Developing obstruction lighting standards for wind turbine farms* (Technical note). November.

Hau, E. (2000). *Windturbines: Fundamentals, technologies, application, economics*. Springer-Verlag. Berlin, Germany.

Idaho Division of Building Safety. (1997). *Idaho general health and safety standards*. Retrieved on September 24, 2010 from http://dbs.idaho.gov/safety_code/index.html

International Electrotechnical Commission. (1999). *Wind turbine generator systems part 1: safety requirements*. International Standard IEC 61400-1, 2nd ed. 1999̃02.

Jahn, O. (2000). Electromagnetic fields: Low dose exposure, current update, *International Archives of Occupational and Environmental Health* 73 (Suppl):S1–S3.

Kling, L. (2010a). "Recreational activities in the northern portion of the project area." Personal Communication, field visit conversation with Max Yingst, Recreation Planner, Jarbidge Field Office, Twin Fall, ID: July 21, 2010.

Kling, L. (2010b). "Recreational activities in the southern portion of the project area." Personal Communication, meeting conversation with Tamara Hawthorne, Recreation Planner, Wells Field Office, Elko, NV: July 22, 2010.

Manwell, J. F., et al. (2002). *Wind energy explained: Theory, design, and application*. United Kingdom: John Wiley & Sons, Ltd. Chichester.

Nevada Legislature. (2010). Nevada revised statutes chapter 618 – Occupation safety and health. Retrieved on September 24, 2010 from http://www.leg.state.nv.us/nrs/NRS-618.html

4.3.7 HAZARDOUS MATERIALS AND PETROLEUM PRODUCTS

Bureau of Land Management [BLM]. (2005). *FES 05-11; Final programmatic environmental impact statement on wind energy development on BLM-administered lands in the western United States and record of decision*. United States Department of the Interior, Washington, D.C. June.

4.3.8 SPECIAL DESIGNATIONS

Bureau of Land Management [BLM]. (2010). Draft resource management plan and environmental impact statement. Retrieved October 13, 2010 at http://www.blm.gov/id/st/en/prog/planning/jarbidge_resource/Documents/draft_rmp_eis.html

Fletcher, F. L. (1980). *Effects of noise on wildlife: a review of relevant literature 1971-1978*. Pages 611-620 in J. V. Tobias, G. Jansen, and W. D. Ward, (Eds.). Proceedings of the Third International Congress on Noise as a Public Health Problem. Am. Speech-Language-Hearing Assoc., Rockville, MD.

Hargrove, William L., Dewayne Johnson, Don Snethen, and Jan Middendorf. (2010). From dust bowl to mud bowl: Sedimentation, conservation measures, and the future of reservoirs. *Journal of Soil and Water Conservation, 65*, (1).

Jackson, Scott D. (2000). *Overview of transportation impacts on wildlife movement populations*. Department of Natural Resources Conservation, University of Massachusetts. Retrieved October 19, 2010 from http://www.umassextension.org/NREC/images/stories/linked_content/pdf_files/tws_overview_ms.pdf

Rabin, Lawrence A. (2005). *The effects of wind turbines on California ground squirrel (spermophilus beecheyi) behavior: Successfully integrating conservation and animal behavior research*. University of California.

4.3.10 FIRE AND FUELS MANAGEMENT

Bureau of Land Management [BLM]. (2004a). *Elko and Wells resource management plans approved fire management amendment and decision record.* Elko, NV: Elko Field Office, September 2004.

Bureau of Land Management. (2004b). *Northeastern Nevada Fire Planning Unit Elko Field Office Fire Management Plan.* Elko, NV.

Bureau of Land Management. (2005). *South central Idaho fire planning unit fire management plan Twin Falls District* (NW-ID-2005-094). Twin Falls, ID.

Colorado State University. (2007). Natural Resource Series: Forestry: *Cheatgrass and Wildfire – A Dangerous Combination* (no. 6.310). Adapted with permission from University of Nevada Cooperative Extension publications FS-05-29 and SP-05-08. Colorado State University Extension. May 2007.

Hasbrouk, R. T. (2004). *Determining the probability of lightning striking a facility. National Lightning Safety Institute.* Retrieved on October 6, 2010 from http://www.lightningsafety.com/nlsi_lhm/prbshort.html

International Electrotechnical Commission. (1999). *Wind turbine generator systems part 1: Safety requirements.* International Standard IEC 61400-1, 2nd ed.

APPENDICES

APPENDIX 2A DESIGN FEATURES COMMON TO ALL ACTION ALTERNATIVES

American Fisheries Society--Western Division. (1982). *The best management practices for the management and protection of western riparian streaun ecosystems.* Am. Fish. Soc., Western Div., Orem, UT. 45 pp.

Autenrieth, R., Molini, W. L. and Bram, C. E. (1982). Sage-grouse management practices. *Western States Sage Grouse Committee Tech. Bull. No. 1.* Twin Falls, ID. 42 pp.

Avian Power Line Interaction Committee (APLIC). (1994). *Mitigating bird collisions with power lines: The state of the art in 1994.* Edison Electric Institute. Washington D.C.

Braun, C. E., Britt, J. and Wallestad, R. O. (1977). Guidelines for maintenance of sage grouse habitats. *Wildl. Soc. Bull,* 5(3), 99-106.

Connelly, J. W., Schroeder, M. W., Sands, A. R., & Braun, C. E. (2000). Guidelines to manage sage-grouse populations and their habitats. *Wildlife Society Bulletin, 28*, 967-85.

Eaton, S. (2000). *Construction noise*. Workers' Compensation Board of BC, Engineering Section Report, ARCS Reference No. 0135-20, Feb. 2000.

United States Fish and Wildlife Service [USFWS]. (2004). Biological opinion for the Bureau of Land Management's ongoing activities in the Jarbidge River Watershed in Owyhee County, Idaho and Elko County, Nevada.

United States Fish and Wildlife Service. (2005). Programmatic biological assessment for stream crossing construction, replacement, and or removal.

United States Fish and Wildlife Service. (2006). *Programmatic concurrence and biological opinion for stream crossing structure replacement and removal program in Idaho National Forests: Payette, Boise, Sawtooth, Salmon-Challis, Nez Perce and Idaho/Nevada Bureau of Land Management: Challis, Cottonwood, Coeur d'Alene, Four Rivers, Jarbidge, and Upper Snake Field Offices* (2006-F-0206, August). Boise, ID: Snake River Fish and Wildlife Office.

APPENDIX 2B APPLICANTS PROPOSED BEST MANAGEMENT PRACTICES, MITIGATION, AND MONITORING (FROM THE APPLICANTS PLAN OF DEVELOPMENT) – APPLICABLE TO ALTERNATIVES B1 AND B2A ONLY

Bureau of Land Management. (1985). BLM Manual, Section 9113.

Tetra Tech. (2010). *Draft Greater sage-grouse conservation plan for the China Mountain Wind Project.* Draft Report prepared for Renewable Energy Systems Americas Incorporated. Portland OR. November.

APPENDIX 3A PROPER FUNCTIONING CONDITION ASSESSED STREAMS WITHIN AND NEAR THE PROJECT AREA

Bureau of Land Management [BLM]. (1998). *A user guide to assessing proper functioning condition and the supporting science for lotic areas* (Tech. Ref.-1737-15, 125 pp). Denver, CO: National Applied Resource Sciences Center.

Bureau of Land Management. (2006). *Proper functioning condition ratings for some fish-bearing streams in Elko BLM District* [GIS data]. Elko, NV:. July 31, 2006.

Bureau of Land Management. (2009). *Jarbidge Resource Area lotic proper functioning condition ratings* [GIS data]. Twin Falls, ID.

APPENDIX 3B ACOUSTICS FUNDAMENTALS

Hendriks, Rudy. (1998). *Technical noise supplement.* California Department of Transportation, Table N-2136.2.

APPENDIX 3C BIRD SURVEY DATA FOR THE CHINA MOUNTAIN WIND POWER PROJECT AREA

Young, D. P., Hallingstad, E., Poulton, V., & Bay, B. (2009). *Draft wildlife baseline studies for the China Mountain Wind Resource Area.* Twin Falls County, Idaho and Elko County, Nevada. Cheyenne, WY: Western Ecosystems Technology, Inc.

APPENDIX 3D FLIGHT HEIGHT CHARACTERISTICS OF BIRDS IN THE CHINA MOUNTAIN PROJECT AREA

Young, D. P., Hallingstad, E., Poulton, V. & Bay, B. (2009). Draft wildlife baseline studies for the China Mountain Wind Resource Area. Twin Falls County, Idaho and Elko County, Nevada. Cheyenne, WY: Western Ecosystems Technology, Inc.

APPENDIX 3E SPECIAL STATUS ANIMALS IN THE CHINA MOUNTAIN PROJECT AREA AND ALONG THE HAUL ROUTES

Alaska Natural Heritage Program [ANHP]. (2010). *Western toad taxonomy description.* Retrieved January, 2010 from http://aknhp.uaa.alaska.edu/zoology/pdfs/amphibs/Western_toad_AKNHP_04_final.pdf

Alsop, Fred J. III. (2001). *Smithsonian birds of North America life histories of more than 930 species.* New York, NY: DK Publishing Inc.

Bureau of Land Management [BLM]. (1996). *Sensitive animals of the Jarbidge Resource Area* (Technical Bulletin 96-10, June 1996). ID.

Bureau of Land Management. (1997*). Sensitive animals of the Jarbidge Resource Area, Idaho-additions* (Technical Bulletin 97-5, March 1997) ID.

Bureau of Land Management. (2007). 2006-2007 Wildlife inventory in the Jarbidge Field Office. *Technical Bulletin 2007-03*. December 05, 2007. Twin Falls, ID.

Bureau of Land Management. (2008). *Analysis of the management situation for the Four Rivers Field Office resource management plan and environmental impact statement*, Boise, ID, pp 47-61.

Bureau of Land Management. (2009). Dalton Allotment. Draft Northeastern Great Basin Standards and Guidelines for Rangeland Health Assessment. Elko, NV: Elko District, Wells Field Office.

Bureau of Land Management. (2010a). Prairie Falcon (*Falco mexicanus*). *Morley Nelson Snake River Birds of Prey NCA Raptor Species*. Retrieved on October, 2010 from http://www.blm.gov/pgdata/etc/medialib/blm/id/special_areas/birds_of_prey_nca.Par.30806.File.dat/PrarieFalcon.pdf

Bureau of Land Management. (2010b). *Jarbidge Draft Resource Management Plan and Environmental Impact Statement.* (BLM/ID/PT - 10/003+1610). Jarbidge Field Office, ID: August.

Dechant, J. A., Dinkins, M. F., Johnson, D. H., Igl, L. D., Goldade, C. M. & Euliss, B. R. (2000, revised 2002). *Effects of management practices on grassland birds: Vesper Sparrow.* Northern Prairie Wildlife Research Center, Jamestown, ND. 41 pages.

Idaho Department of Fish and Game [IDFG]. (2005a). *Idaho comprehensive wildlife conservation strategy.* Boise, ID: Idaho Conservation Data Center, Idaho Department of Fish and Game. Retrieved from http://fishandgame.idaho.gov/cms/tech/CDC/cwcs.cfm

Idaho Department of Fish and Game. (2005b). *Population studies of Redband Trout: Genetic investigation of population structure* (IDFG Report Number 05-46, November, 2005). Boise, ID: Idaho Department of Fish and Game.

Idaho Department of Fish and Game. (2008). *Bald eagles in Idaho.* Boise, ID.

Idaho Fish and Wildlife Information System. (2010). *Animal conservation database.* Boise, ID: Idaho Department of Fish and Game.

Idaho Vertebrate Modeling Database [IDVMD]. (2009). Landscape Dynamics Lab, Idaho Cooperative Fish and Wildlife Research Unit, University of Idaho. [Data file] Moscow, ID. Retrieved on February 2009 from http://www.wildlife.uidaho.edu/idvmd/index.asp

Linzey, A.V. & Hammerson, G. (2008). Microtus montanus. In *IUCN Red List of Threatened Species.* IUCN 2010. Version 2010.3 Retrieved on October 8, 2010, from http://www.iucnredlist.org

NatureServe. (2010). NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. Arlington, VA. Retrieved on October 11, 2010 at http://www.natureserve.org/explorer

Neel, L. A. (1999). Nevada Bird Conservation Plan. *Nevada Partners in Flight.* 260 pp.

Oliver, G. V. (2000). *The bats of Utah a literature review* (Publication Number 00-14). Utah Department of Natural Resources, Division of Wildlife Resources.

Parrish, J. R., Howe, F. P., & Norvell, R. E. (2002). Utah Partners in Flight Avian Conservation Strategy Version 2.0 (UDWR Publication No. 02-27. I-xiv +302pp. 145-150, 157-160pp). Salt Lake City, UT: Utah Partners in Flight Program, Utah Division of Wildlife Resources.

Pruitt, L. (2000). *Loggerhead Shrike Status Assessment*. Bloomington, IN: U.S. Fish and Wildlife Service. 169 pp.

Shuford, W. D., & Gardali, T., (Eds). (2008). California bird species of special concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Wildlife Action Plan Team. (2006). *Nevada Wildlife Action Plan*. Nevada Department of Wildlife, Reno.

Woods, C. P., & Cade, T. J. (1996). Nesting Habits of the Loggerhead Shrike in Sagebrush. The Cooper Ornithological Society. *The Condor 98*, 75-81.

Wyoming Game and Fish Department. (2005). *A Comprehensive Wildlife Conservation Strategy for Wyoming*. Cheyenne, WY.

APPENDIX 3G VISUAL RESOURCES ASSESSMENT AND CONTRAST RATING

Bureau of Land Management. (1986). *Visual resource contrast rating* (Manual 8431).

APPENDIX 4A CONSTRUCTION AND OPERATION NOISE PREDICTION DETAILS

Bureau of Land Management. (2005). FES 05-11; *Final programmatic environmental impact statement on wind energy development on BLM-administered lands in the western United States and record of decision.* United States Department of the Interior, Washington, D.C. June.

Federal Highway Administration. (2006). *Roadway construction noise model* (FHWA-HEP-05-054). Final Report. January.

International Organization for Standardization. (1996). *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation* (ISO 9613-2:1996[E]).

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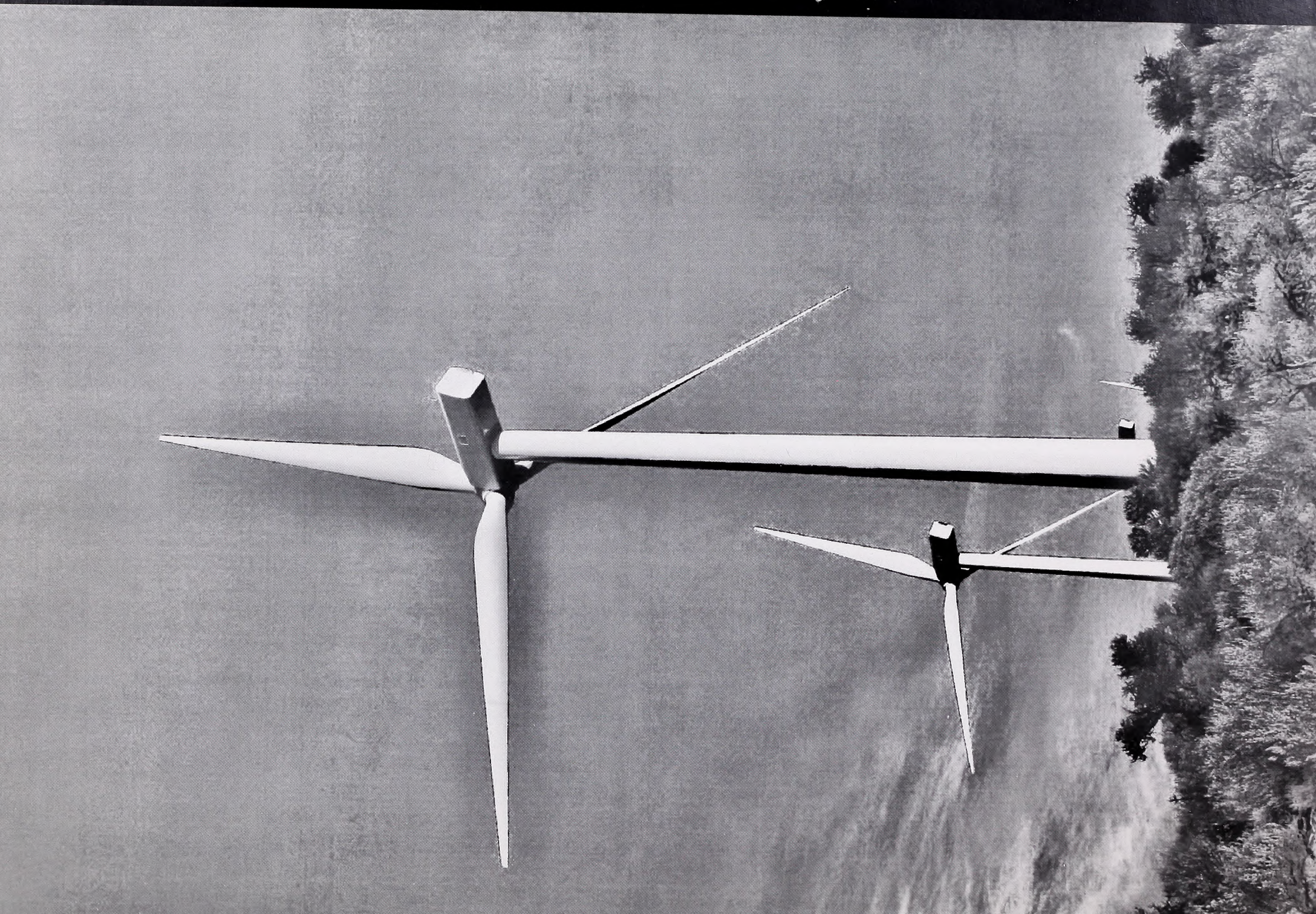
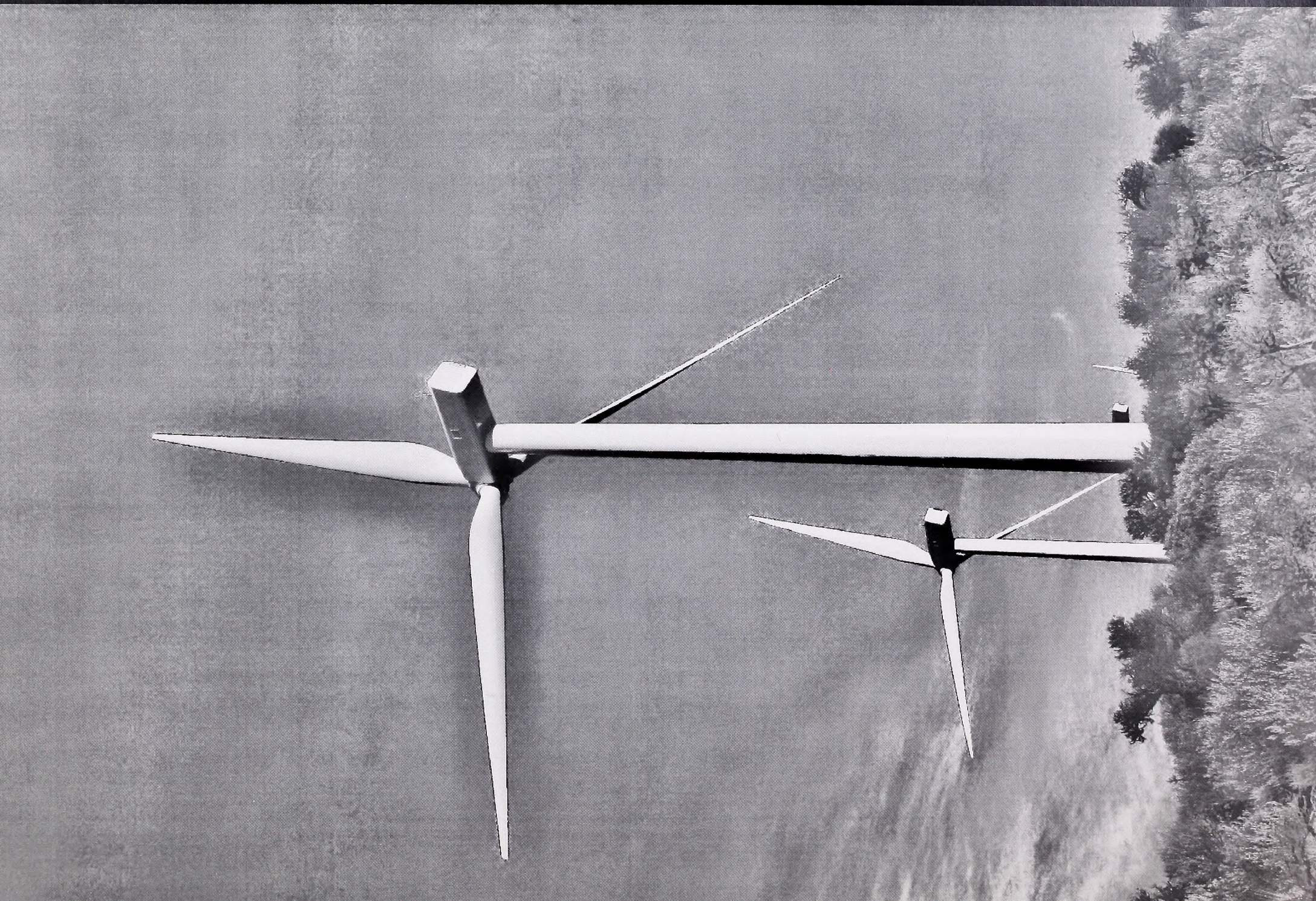
APPENDICES



Appendix 2A – Design Features Common to All Action Alternatives



DESIGN FEATURES COMMON TO ALL ACTION ALTERNATIVES

This appendix contains design features that are common to all action alternatives. These design features have been gathered from a variety of sources. The Record of Decision (ROD) for the 2005 National Programmatic Wind Environmental Impact Statement (EIS) as augmented by the Bureau of Land Management's (BLM's) Wind Energy Development Policy, Instruction Memorandum 2009-043 provided many of these features as did BLM's right-of-way handbook (H-2801-1). Another prominent source of design features included in this appendix are the ROD's from the 1987 Jarbidge and 1985 Wells Resource Management Plans (RMP). These documents include a variety of differing RMP decisions including differences in restrictions for protection of wildlife. Because the China Mountain Wind Project spans both field offices, an attempt has been made to establish consistent seasonal restrictions and spatial buffers for wildlife. Differences in stipulations, however, are unavoidable due to the separate land use plans. Additional design features that are included in this appendix were gleaned from the China Mountain Wind Project Interdisciplinary Team.

GENERAL

1. The holder of this right-of-way grant or the holder's successor in interest shall comply with VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d *et seq.*) and the regulations of the Secretary of Interior issued pursuant thereto. (BLM Handbook H-2801-1)

2. The holder shall protect all survey monuments found within the right-of-way. Survey monuments include, but are not limited to, General Land Office and Bureau of Land Management Cadastral Survey Corners, reference corners, witness points, U.S. Coastal and Geodetic benchmarks and triangulation stations, military control monuments, and recognizable civil (both public and private) survey monuments. In the event of obliteration or disturbance of any of the above, the holder shall immediately report the incident, in writing, to the authorized officer and the respective installing authority if known. Where General Land Office or Bureau of Land Management right-of-way monuments or references are obliterated during operations, the holder shall secure the services of a registered land surveyor or a Bureau cadastral surveyor to restore the disturbed monuments and references using surveying procedures found in the Manual of Surveying Instructions for the Survey of the Public Lands in the United States, latest edition. The holder shall record such survey in the appropriate county and send a copy to the authorized officer. If the Bureau cadastral surveyors or other Federal surveyors are used to restore the disturbed survey monument, the holder shall be responsible for the survey cost. (BLM Handbook H-2801-1)

PROJECT PLANNING, DESIGN, MONITORING AND COMPLIANCE

1. The holder shall construct, operate, and maintain the facilities, improvements, and structures within this right-of-way in strict conformity with the plan(s) of development, which was (were) approved and made part of the grant on (date of grant). Any relocation, additional construction, or use that is not in accord with the approved plan(s) of development, shall not be initiated without the prior written approval of the authorized officer. A copy of the complete right-of-

way grant, including all stipulations and approved plan(s) of development, shall be made available on the right-of-way area during construction, operation, and termination to the authorized officer. Noncompliance with the above will be grounds for an immediate temporary suspension of activities if it constitutes a threat to public health and safety or the environment. (BLM Handbook H-2801-1)

2. The holder shall submit a plan or plans of development that describe in detail the construction, operation, maintenance, and termination of the right-of-way and its associated improvements and/or facilities. The degree and scope of these plans will vary depending upon (1) the complexity of the right-of-way or its associated improvements and/or facilities, (2) the anticipated conflicts that require mitigation, and (3) additional technical information required by the authorized officer. The plans will be reviewed, and if appropriate, modified and approved by the authorized officer. An approved plan of development shall be made a part of the right-of-way grant. (BLM Handbook H-2801-1)

3. The holder shall contact the authorized officer at least 14 days prior to the anticipated start of construction and/or any surface disturbing activities. The authorized officer may require and schedule a preconstruction conference with the holder prior to the holder's commencing construction and/or surface disturbing activities on the right-of-way. The holder and/or his representative shall attend this conference. The holder's contractor, or agents involved with construction and/or any surface disturbing activities associated with the right-of-way, shall also attend this conference to review the stipulations of the grant including the plans(s) of development. (BLM Handbook H-2801-1)

4. The holder shall designate a representative(s) who shall have the authority to act upon and to implement instructions from the authorized officer. The holder's representative shall be available for communication with the authorized officer within a reasonable time when construction or other surface disturbing activities are underway. (BLM Handbook H-2801-1)

5. The holder shall not initiate any construction or other surface disturbing activities on the right-of-way without the prior written authorization of the authorized officer. Such authorization shall be a written notice to proceed issued by the authorized officer. Any notice to proceed shall authorize construction or use only as therein expressly stated and only for the particular location or use therein described. (BLM Handbook H-2801-1)

6. The authorized officer may suspend or terminate in whole, or in part, any notice to proceed which has been issued when, in his judgment, unforeseen conditions arise which result in the approved terms and conditions being inadequate to protect the public health and safety or to protect the environment. (BLM Handbook H-2801-1)

7. All control and mitigation measures established for the project in the POD and the resource-specific management plans that are part of the POD shall be maintained and implemented throughout the construction phase, as appropriate. (Wind PEIS ROD)

8. A monitoring program shall be developed to ensure that environmental conditions are monitored during the construction, operation, and decommissioning phases. The monitoring program requirements, including adaptive management strategies, shall be established at the project level to ensure that potential adverse impacts of wind energy development are mitigated. The monitoring program shall identify the monitoring requirements for each environmental resource present at the site, establish metrics against which monitoring observations can be measured, identify potential mitigation measures, and establish protocols for incorporating monitoring observations and additional mitigation measures into standard operating procedures and Best Management Practices (BMPs). (Wind PEIS ROD)

9. All control and mitigation measures established for the project in the POD and the resource-specific management plans that are part of the POD shall be maintained and implemented throughout the operational phase, as appropriate. These control and mitigation measures shall be reviewed and revised, as needed, to address changing conditions or requirements at the site throughout the operational phase. This adaptive management approach will help ensure that impacts from operations are kept to a minimum. (Wind PEIS ROD)

10. Site monitoring protocols defined in the POD shall be implemented. These will incorporate monitoring program observations and additional mitigation measures into standard operating procedures and BMPs to minimize future environmental impacts. (Wind PEIS ROD)

11. Results of monitoring program efforts shall be provided to the BLM authorized officer. (Wind PEIS ROD)

WILDLIFE

1. Operators shall review existing information on species and habitats in the vicinity of the project area to identify potential concerns. (Wind PEIS ROD)

2. Operators shall conduct surveys for Federal and/or state-protected species and other species of concern (including priority wildlife and special status plant and animal species) within the project area and design the project to avoid, minimize, or mitigate impacts to these resources. (Wind PEIS ROD)

3. Operators shall identify important, sensitive, or unique habitats in the vicinity of the project and design the project to avoid, minimize, or mitigate impacts to these habitats (e.g., locate the turbines, roads, and ancillary facilities in the least environmentally sensitive areas; i.e., away from riparian habitats, streams, wetlands, drainages, or critical wildlife habitats). (Wind PEIS ROD)

4. Operators shall evaluate avian and bat use of the project area and design the project to minimize or mitigate the potential for bird and bat strikes (e.g., development shall not occur in riparian habitats and wetlands). Avian and bat use surveys consistent with current methodologies and standards shall be conducted; the amount and extent of ecological baseline data required shall be determined on a project basis. (Wind PEIS ROD)

5. Turbines shall be configured to avoid landscape features known to attract raptors if site studies show that placing turbines there would pose a significant risk to raptors.

6. Operators shall determine the presence of bat colonies and avoid placing turbines near known bat hibernation, breeding, and maternity/nursery colonies; in known migration corridors; or in known flight paths between colonies and feeding areas. (Wind PEIS ROD)

7. Operators shall determine the presence of active raptor nests (i.e., raptor nests used during the breeding season) and design the project to provide for spatial buffers and timing restrictions for surface disturbing activities. Measures to reduce raptor use at a project site (e.g., minimize road cuts, maintain either no vegetation or plant species that are unattractive to raptors around the turbines) shall also be identified. (Wind PEIS ROD)

8. A habitat restoration plan shall be developed to avoid, minimize, or mitigate negative impacts on vulnerable wildlife while maintaining or enhancing habitat values for other species. The plan shall identify reclamation, soil stabilization, and erosion reduction measures that shall be implemented to ensure that all temporary use areas are restored. The plan shall require that restoration occur as soon as possible after completion of activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats. (Wind PEIS ROD)

9. Procedures shall be developed to mitigate potential impacts to special status species and other priority wildlife species. Such measures may include avoidance, relocation of project facilities or lay-down areas, and/or relocation of biota. (Wind PEIS ROD)

10. Facilities shall be designed to discourage their use as perching or nesting substrates by birds. For example, power lines and poles shall be configured to minimize raptor electrocutions and discourage raptor and raven nesting and perching. (Wind PEIS ROD)

11. Timing restrictions for construction activities may be implemented to minimize impacts to wildlife. (Wind PEIS ROD)

12. In accordance with the habitat restoration plan, restoration shall be undertaken as soon as possible after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats. (Wind PEIS ROD)

13. All construction employees and site visitors shall be instructed to avoid harassment and disturbance of wildlife, especially during reproductive (e.g., courtship and nesting) seasons. In addition, pets shall not be permitted on site during construction. (Wind PEIS ROD)

14. Observations of potential wildlife impacts, including wildlife mortality, shall be reported to the BLM authorized officer immediately. (Wind PEIS ROD)

15. Seasonal limitation may be placed on over-the-snow vehicles on crucial mule deer & pronghorn antelope winter range if Idaho Department of Fish and Game determines harassment is occurring. (1987 Jarbidge RMP)

16. Crested wheatgrass seedings will generally not be located in crucial big game habitat. (1985 Wells RMP)

17. Alteration of sagebrush areas either through application of herbicides, prescribed burning, or by mechanical means will be in accordance with procedures specified in the Western States' Sage-Grouse Guidelines, the Memorandum of Understanding between Nevada Department of Wildlife (NDOW) and Bureau of Land Management (Autenrieth, Molini, and Braun, 1982; Braun, Britt, and Wallestad, 1977), as amended, and as future studies might dictate. (1985 Wells RMP)

18. Active raptor nests adjacent to areas proposed for vegetation manipulation will be protected. On-the-ground work will be confined to the period preceding nesting activity or after the young have fledged (left the nest). Areas containing suitable nesting habitat will be inventoried for active raptor nests prior to initiation of any project. (1985 Wells RMP)

19. Time-of-day and/or time-of-year restrictions will be placed on construction activities associated with transmission and utility facilities and leasable and salable mineral exploration and/or development that are in the immediate vicinity or would cross crucial sage-grouse, deer and pronghorn antelope winter habitats, antelope kidding areas, or raptor nesting areas. (1985 Wells RMP)

20. Emphasis will be placed on the management of browse on crucial mule deer winter range. (1985 Wells RMP)

21. Fences on mule deer range should not exceed 42 inches in total height from the ground to the top wire, with at least a 12-inch space between the top two wires to prevent leg twisting. Fences on pronghorn antelope range should not exceed 38 inches total height from the ground to the top wire. The bottom wire should be smooth and at least 16 inches above ground level. (1985 Wells RMP)

22. This ROW may contain lands which have been identified as mule deer crucial winter range. These lands are subject to seasonal protection from disturbance during the period of 15 November through 16 March to avoid displacement and mortality to animals during the winter. The most current seasonal range maps provided by NDOW will be used to delineate crucial winter range at the time of construction, decommissioning, or major maintenance.

    This stipulation applies to construction, decommissioning, and major maintenance. Examples of what will be considered major maintenance are outlined in Section 2.4.3 – Operation and Maintenance. Daily operation and minor maintenance are exempt from this stipulation.

    Authority/Supporting Documentation: Wells RMP ROD (p. 22 – Terrestrial Wildlife Habitat SOP # 10, p. 25 – Minerals and Energy SOP # 2); Field Guide to Mammals (1976)

23. This ROW may contain lands which have been identified as pronghorn antelope crucial winter range. These lands are subject to seasonal protection from disturbance during the period of 15 November through 16 March to avoid displacement and mortality to animals during the winter. The most current seasonal range maps provided by NDOW will be used to delineate crucial winter range at the time of construction, decommissioning, or major maintenance.

    This stipulation applies to construction, decommissioning, and major maintenance. Examples of what will be considered major maintenance are outlined in Section 2.4.3 – Operation and Maintenance. Daily operation and minor maintenance are exempt from this stipulation.

    Authority/Supporting Documentation: Wells RMP ROD (p. 22 – Terrestrial Wildlife Habitat SOP # 10, p. 25 – Minerals and Energy SOP # 2); Field Guide to Mammals (1976)

24. This ROW may contain lands which have been identified as pronghorn antelope kidding areas. These lands are subject to seasonal protection from disturbance during the period of 1 May through 30 June to avoid displacement and mortality to animals during kidding season. The most current seasonal range maps provided by NDOW will be used to delineate crucial summer range at the time of construction, decommissioning, or major maintenance.
    This stipulation applies to construction, decommissioning, and major maintenance. Examples of what will be considered major maintenance are outlined in Section 2.4.3 – Operation and Maintenance. Daily operation and minor maintenance are exempt from this stipulation.

    Authority/Supporting Documentation: Wells RMP ROD (p. 22 – Terrestrial Wildlife Habitat SOP # 10, p. 25 – Minerals and Energy SOP # 2); Field Guide to Mammals (1976)

25. This ROW may contain lands which have been identified as greater sage-grouse strutting grounds (leks) that are subject to seasonal protection from disturbance during the period of 1 March through 15 May between 7:00 PM and 10:00 AM Pacific time. Seasonal restrictions from disturbance apply within view of or within 0.31 miles (0.5 km) of greater sage-grouse

leks. The most current lek data provided by NDOW will be used to delineate active leks at the time of construction, decommissioning, or major maintenance.

This stipulation applies to construction, decommissioning, and major maintenance. Examples of what will be considered major maintenance are outlined in Section 2.4.3 – Operation and Maintenance. Daily operation and minor maintenance are exempt from this stipulation.

Authority/Supporting Documentation: Wells RMP ROD (p. 22 – Terrestrial Wildlife Habitat SOP # 10, p. 25 – Minerals and Energy SOP # 2); Guidelines to manage sage-grouse populations and their habitats (Connelly, Schroeder, Sands, & Braun, 2000).

26. This ROW may contain lands which have been identified as greater sage-grouse brood rearing areas that are subject to seasonal protection from disturbance during the period of 15 May through 15 August. The most current seasonal range maps provided by NDOW will be used to delineate brood rearing habitat at the time of construction, decommissioning, or major maintenance.

This stipulation applies to construction, decommissioning, and major maintenance. Examples of what will be considered major maintenance are outlined in Section 2.4.3 – Operation and Maintenance. Daily operation and minor maintenance are exempt from this stipulation.

Authority/Supporting Documentation: Wells RMP ROD (p. 22 – Terrestrial Wildlife Habitat SOP # 10, p. 25 – Minerals and Energy SOP # 2)

27. This ROW may contain lands which have been identified as greater sage-grouse crucial winter habitat that are subject to seasonal protection from disturbance during the period of 1 November through 15 March. The most current seasonal range maps provided by NDOW will be used to delineate crucial winter habitat at the time of construction, decommissioning, or major maintenance.

This stipulation applies to construction, decommissioning, and major maintenance. Examples of what will be considered major maintenance are outlined in Section 2.4.3 – Operation and Maintenance. Daily operation and minor maintenance are exempt from this stipulation.

Authority/Supporting Documentation: Wells RMP ROD (p. 22 – Terrestrial Wildlife Habitat SOP # 10, p. 25 – Minerals and Energy SOP # 2)

28. Fences, guy wires, powerlines, telecommunication lines, and all other structures within 0.62 miles (1 km) of greater sage-grouse seasonal habitats that pose potential collision risks to greater sage-grouse shall be marked with flight diverters. The type or brand of flight diverters used will be selected from those that have been previously tested and determined to be effective. Flight diverters shall be maintained for the life of the project by the proponent.

This stipulation applies to construction, operation, and maintenance.

Authority/Supporting Documentation: Guidelines to manage sage-grouse populations and their habitats and Avian Power Line Interaction Committee (APLIC), 1994.

29. This ROW may contain lands which have been identified as greater sage-grouse strutting grounds (leks), nesting habitat, brood rearing habitat, or wintering habitat. The most current GIS data provided by NDOW will be used to delineate these seasonal habitats at the time of construction, decommissioning, or major maintenance.

Powerlines, meteorological towers, or other tall structures within 1.86 miles (3 km) of greater sage-grouse seasonal habitats shall be of one of the following designs:

1) Most preferred – Self-supporting solid steel (not lattice) construction with no components that would allow perching or nest building (horizontal or near-horizontal components, crotches in steelwork, etc.).
2) Self-supporting solid steel (not lattice) construction with perch deterrents placed on all components that would allow perching or nest building (horizontal or near-horizontal components, crotches in steelwork, etc.).
3) Least preferred – Self-supporting lattice construction with perch deterrents placed on all components that would allow perching or nest building (horizontal or near-horizontal components, crotches in steelwork, etc.).

Perch deterrents shall be maintained for the life of the project by the proponent.

This stipulation applies to construction and maintenance.

Authority/Supporting Documentation: Guidelines to manage sage-grouse populations and their habitats.

30. For small-scale construction and routine maintenance, a 0.6 mile (1 km) sage-grouse and sharp-tailed grouse lek disturbance buffer will apply between approximately March 15 through May 1 in lower elevations and March 25 through May 15 in higher elevations, from 6:00 P.M. to 9:00 AM (Information Bulletin No ID-2010-039).

This stipulation applies only to minor, small-scale construction and routine maintenance.

Authority/Supporting Documentation: Information Bulletins No. ID-2010-039. (Seasonal restrictions meet the intent of the 1987 Jarbidge RMP but has been updated based on current literature).

THREATENED, ENDANGERED AND SENSITIVE SPECIES AND MIGRATORY BIRDS

1. Threatened or endangered plant or animal species clearance is required before implementation of any project. Consultation with the U.S. Fish and Wildlife Service as required by Section 7 of the Endangered Species Act is necessary if a threatened or endangered species or their habitat may be impacted. If it is determined that adverse impacts will occur, either special design, relocation, or abandonment of the project will follow. (1985 Wells RMP)

2. Threatened, Endangered, and Special Status Species - BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification or a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act, as amended, including completion of any required procedure for conference or consultation. (1985 Wells RMP)

3. The BLM will prohibit the disturbance of any population of federally listed plant species under the Endangered Species Act. (Wind PEIS ROD)

4. The ROW area may contain plants or animals determined to be candidate species. To ensure that the action does not contribute to the need to list a candidate species or to protect habitat for a candidate species, BLM may require special design features, relocation, or modification of an approved activity. The project proponent is required to work with the U.S. Fish and Wildlife Service to ensure compliance with the Endangered Species Act as amended (16 U.S.C. §§ 1531-1544) in the event that a candidate species is present. Compliance with this stipulation in no way implies full compliance with or exemption from the requirements of the Endangered Species Act. (BLM ID Team)

5. The ROW area may contain plants or animals determined to be sensitive species. The BLM may require special design, relocation, or modification of an approved activity when sensitive species are present, as per guidance in the BLM Manual 6840 – Special Status Species. If eagles are present, the project proponent is required to work with the U.S. Fish and Wildlife Service to ensure compliance with the Bald and Golden Eagle Protection Act as amended (16 U.S.C. §§ 668-668d). Compliance with this stipulation in no way implies full compliance with or exemption from the requirements of the Bald and Golden Eagle Protection Act.

6. The ROW area contains nesting habitat for migratory birds and raptors. If surface-disturbing activities will take place between April 1 and July 30 and if an approved activity has the potential to disrupt or disturb nesting activities of migratory birds, BLM will require migratory bird and raptor nesting surveys to be conducted by a BLM-approved wildlife biologist using

current U.S. Fish and Wildlife Service protocols. Such surveys shall be conducted no more than 14 days prior to commencement of surface-disturbing activities in an area. If disturbance does not occur within 14 days of the survey, the site shall be resurveyed. If during any surveys, nests or nesting behavior are documented, the area must be avoided until the young have fledged from the nest or the nest fails. Nest results will be determined by the above-mentioned wildlife biologist. Survey results shall be reported to the BLM, Idaho Department of Fish and Game and NDOW, and the U.S. Fish and Wildlife Service once the survey is completed. The project proponent is required to work with the U.S. Fish and Wildlife Service to ensure compliance with the Migratory Bird Treaty Act as amended (16 U.S.C. §§ 703-712). Compliance with this stipulation in no way implies full compliance with or exemption from the requirements of the Migratory Bird Treaty Act.

This stipulation applies to construction, decommissioning, and major maintenance. Examples of what will be considered major maintenance are outlined in Section 2.4.3 – Operation and Maintenance. Daily operation and minor maintenance are exempt from this stipulation.

Authority/Supporting Documentation: Endangered Species Act as amended (16 U.S.C. §§ 1531-1544); Bald and Golden Eagle Protection Act as amended (16 U.S.C. §§ 668-668d); Migratory Bird Treaty Act as amended (16 U.S.C. §§ 703-712); BLM Manual 6840 – Special Status Species; Migratory Bird Executive Order (50 Code of Federal Regulations [CFR] 10.13)

WATER RESOURCES AND FISH

1. Utilize a 1,000 foot (500 feet each side) buffer zone year-round for the total exclusion of the following activities: introduction of chemical toxicants as a result of construction, mining, or agriculture. (1987 Jarbidge RMP)

2. Provide a riparian buffer zone of sufficient width (100 to 300 feet minimum) to protect riparian vegetation, fisheries, and water quality year-round as determined by an interdisciplinary team of resource specialists, which includes fisheries and wildlife specialists. Utilize this zone for the general exclusion of the following activities:

   -- Limit new road construction that parallels streams;
   -- use BMPs when construction cannot be avoided. (1987 Jarbidge RMP)

3. Avoid construction activities which remove or destroy riparian vegetation and instream fish cover year-round. (1987 Jarbidge RMP)

4. In all activities including maintenance of roads and other facilities follow the guidelines outlined in the BMPs manual for management and protection of western stream ecosystems (American Fisheries Society, 1982). (1987 Jarbidge RMP)

5. No occupancy within 500 feet of redband trout-bearing streams year-round. (1987 Jarbidge RMP)

6. Prior to development of water wells by BLM, a detailed hydrological study to determine groundwater availability will be required. (1985 Wells RMP)

7. The holder shall comply with the construction practices and mitigating measures established by 33 CFR 323.4, which sets forth the parameters of the "nationwide permit" required by Section 404 of the Clean Water Act. If the Proposed Action exceeds the parameters of the nationwide permit, the holder shall obtain an individual permit for the appropriate office of the Army Corps of Engineers and provide the authorized officer with a copy of the same. Failure to comply with this requirement shall be cause for suspension or termination of this right-of-way grant. (BLM Handbook H-2801-1)

8. The holder shall restore drainages, to the greatest extent possible, to the original bank configuration, stream bottom width, and channel gradient. Loose soil, fill, and culverts shall be removed from drainage channels as directed by the authorized officer. (BLM Handbook H-2801-1)

9. Fording of streams and rivers with construction equipment and other motorized vehicles shall be permitted only with prior approval of the authorized officer. Temporary bridges, culverts, or other structures shall be used whenever stream crossings are required, unless otherwise approved of in writing by the authorized officer. Rivers, streams, and impoundments shall be promptly cleared of all pilings, debris, or other obstructions placed therein or caused by the construction activities. (BLM Handbook H-2801-1)

10. Stream channels as designated by the authorized officer will be bored under and not trenched where electrical collector lines are buried to minimize disturbance to hydrological features (drainages). (BLM ID Team)

11. Gravel should not be taken from streambeds. At no time should gravel washing operations be conducted in or adjacent to aquatic areas. (BLM ID Team)

12. In excavating bridge footings and abutments, limit machine work as much as possible to avoid disturbing the stream. (BLM ID Team)

13. BMPs in the *Programmatic Biological Assessment for Stream Crossing Construction, Replacement, and or Removal* (United States Fish and Wildlife Service [USFWS], 2005) and conservation measures from the *Stream Crossing Structure Replacement and Removal Program – Idaho and Nevada – Biological Opinion and Concurrence* (USFWS, 2006) should be implemented. (BLM ID Team)

14. Conservation recommendations for bull trout from the *Biological Opinion for the Bureau of Land Management's Ongoing Activities in the Jarbidge River Watershed in Owyhee County, Idaho and Elko County, Nevada* (USFWS, 2004) should be implemented for redband trout occupied streams and potential habitat. (BLM ID Team)

15. All noxious weed treatments in the riparian habitat conservation area would be conducted according to existing requirements identified during Endangered Species Act consultation with the USFWS. Treatments in the riparian habitat conservation area would only use chemicals approved for aquatic use and would not occur within 15 feet of surface water. Surfactants such as R-900 may not be used within 100 feet of surface water. *[Noxious and Invasive Weed Treatment Program for the Boise District and the Jarbidge Field Office of the Twin Falls District Ada, Adams, Boise, Canyon, Elmore, Gem, Owyhee, Payette, Twin Falls, Valley and Washington Counties, Idaho. 2005.]* (BLM ID Team)

16. Operators shall develop a storm water management plan for the site to ensure compliance with applicable regulations and prevent offsite migration of contaminated storm water or increased soil erosion. (Wind PEIS ROD)

17. In all activities, including maintenance of roads and other facilities, shall follow the applicable guidelines outlined in the BMPs manual for management and protection of western stream ecosystems (American Fisheries Society, 1982). (BLM ID Team)

VISUAL RESOURCES

1. The public shall be involved and informed about the visual site design elements of the proposed wind energy facilities. Possible approaches include conducting public forums for disseminating information, offering organized tours of operating wind developments, and using computer and visualization simulations in public presentations. (Wind PEIS ROD)

2. Visual resource management considerations shall take place early in the project-planning phase in accordance with BLM Visual Resource Management manual and handbooks. Operators shall utilize digital terrain mapping tools at a landscape/viewshed scale for site planning and design, visual impact analysis, and visual impact mitigation planning and design. Visual mitigation planning and design shall be performed through field assessments, applied global positioning system technology, photo documentation, use of computer-aided design and development software, and visual simulations to reflect a full range of visual resource BMPs. The digital terrain mapping tools shall be at a resolution and contour interval suitable for site design and accurate placement of proposed developments into the digital viewshed. Visual simulations shall be prepared and evaluated in accordance with BLM Handbook H-8432-1, or other agency requirements, to create spatially accurate depictions of the appearance of proposed facilities. Simulations shall depict proposed project facilities from Key Observation Points and other visual resource sensitive locations. (Wind PEIS ROD)

3. Turbine arrays and turbine design shall be integrated with the surrounding landscape. Design elements to be addressed include visual uniformity, use of tubular towers, proportion and color of turbines, nonreflective paints, and prohibition of commercial messages on turbines. (Wind PEIS ROD)

4. Other site design elements shall be integrated with the surrounding landscape. Elements to address include minimizing the profile of the ancillary structures, burial of cables, prohibition of commercial symbols, and lighting. Regarding lighting, efforts shall be made to minimize the need for and amount of lighting on ancillary structures. (Wind PEIS ROD)

5. Operators shall reduce visual impacts during construction by clearly delineating construction boundaries and minimizing areas of surface disturbance; preserving vegetation to the greatest extent possible; utilizing undulating surface disturbance edges; stripping, salvaging and replacing topsoil; contoured grading; controlling erosion; using dust suppression techniques; and restoring exposed soils as closely as possible to their original contour and vegetation. (Wind PEIS ROD)

6. Operators shall monitor and maintain visual mitigation measures for the approved project in accordance with a visual monitoring and compliance plan. The operator shall maintain revegetated surfaces until a self-sustaining stand of vegetation is reestablished and visually adapted to the undisturbed surrounding vegetation. No new disturbance shall be created during operations without completion of a visual resource management analysis and approval by the authorized officer. (Wind PEIS ROD)

7. Visual resource management requires all actions to be in compliance with BLM Visual Resource Management Design Procedures in BLM Manual 8400. On any project, which has a visual contrast rating that exceeds the recommended maximum for the visual class zone in which it is proposed, the visual contrasts will be considered significant and mitigating measures must be examined. The decision as to whether mitigating measures must be implemented rests with the District Manager and will be made on a project-by-project basis. (1985 Wells RMP)

8. Turbine arrays and turbine design shall be integrated with the surrounding landscape. Design elements to be addressed include visual order and uniformity, use of tubular towers, proportion and color of turbines, non-reflective paints, and prohibition of commercial messages on turbines. (BLM ID Team)

9. Hood and direct lights downward to minimize horizontal and skyward illumination. (BLM ID Team)

10. Use only red, or dual red and white strobe, strobe like, or flashing lights, not steady burning lights, to meet Federal Aviation Administration requirements for visibility lighting. (BLM ID Team)

11. Project-related lighting at operation and maintenance facilities and substations would be minimized by the use of hoods and directional lighting to reduce backscatter and illumination of areas outside of substations and operation and maintenance buildings.

12. The holder shall coordinate with the authorized officer on the design and color of the towers, blades, poles, and transmission lines to achieve the minimum practicable visual impacts. (BLM Handbook H-2801-1)

13. All aboveground structures not subject to safety requirements or other painting requirements specified by the authorized officer shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates 'Standard Environmental Colors' designated by the Rocky Mountain Five-State Interagency Committee. The color selected for this right-of-way is (to be determined in the Visual Resource Management Plan). (BLM Handbook H-2801-1)

VEGETATION INCLUDING NOXIOUS WEEDS AND WEED CONTROL

1. Operators shall develop a noxious weed control plan and an integrated pest management plan, which could occur as a result of new surface disturbance activities at the site. The plan shall address monitoring, education of personnel on weed identification, the manner in which weeds spread, and methods for treating infestations. The use of certified weed-free mulch and certified weed-free seed shall be required. If trucks and construction equipment are arriving from locations with known invasive vegetation problems, a controlled inspection and cleaning area shall be established to visually inspect construction equipment arriving at the project area and to remove and collect seeds that may be adhering to tires and other equipment surfaces. If pesticides are to be used, applications will be conducted within the framework of BLM and Department of Interior policies and entail only the use of Environmental Protection Agency-registered pesticides. Pesticide use shall be limited to nonpersistent, immobile pesticides and shall only be applied in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Any applications of herbicides will be subject to BLM herbicide treatment standard operating procedures. Only herbicides on the list of approved herbicide formulations (updated annually) will be used on public lands (Wind PEIS ROD)

2. Minimal clearing of vegetation will be accomplished on project sites requiring excavation. (1985 Wells RMP)

3. Vegetation manipulation that would alter the potential natural plant composition will not be allowed in riparian areas. For the purpose of riparian management, crested wheatgrass is not considered a native species. (1985 Wells RMP)

4. Use of pesticides shall comply with the applicable Federal and state laws. Pesticides shall be used only in accordance with their registered uses and within limitations imposed by the Secretary of the Interior. Prior to the use of pesticides, the holder shall obtain from the

authorized officer written approval of a plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, location of storage and disposal of containers, and any other information deemed necessary by the authorized officer. Emergency use of pesticides shall be approved in writing by the authorized officer prior to such use. (BLM Handbook H-2801-1)

5. The holder shall be responsible for weed control on disturbed areas within the limits of the right-of-way. The holder is responsible for consultation with the authorized officer and/or local authorities for acceptable weed control methods (within limits imposed in the grant stipulations). (BLM Handbook H-2801-1)

6. All trucks and other vehicles entering the project area will be thoroughly washed clean of dirt, debris, and vegetation. (BLM ID Team)

7. Straw or hay that may be used to control erosion and sedimentation must be certified weed-free. (BLM ID Team)

8. Pre-construction vegetation surveys will be conducted to document the presence and extent of noxious weeds or invasive plants. These vegetation surveys will be conducted during the growing season and prior to construction and will provide baseline data to plan for weed control. Locations of noxious weeds and invasive plant would be documented using a hand-held global positioning system instrument and used to develop a pre-construction map (BLM ID Team)

9. Pre-construction weed treatment would be conducted prior to the start of ground-disturbing activities and at the time most appropriate for the target species. (BLM ID Team)

10. Weed control conservation measures for slickspot peppergrass (*Lepidium papilliferum*) would be followed along haul routes in slickspot peppergrass habitat as outlined in the Confirmation of Concurrence from the USFWS to the BLM on the Noxious and Invasive Weed Treatment, Dec 2009. (BLM ID Team)

11. Prevention measures will be followed as outlined in the Final Programmatic EIS Vegetation Treatments using herbicides on public lands in 17 western states, June 2007. (BLM ID Team)

12. Standard operating procedures for applying herbicides will be followed as outlined in the Final Programmatic EIS Vegetation Treatments using herbicides on public lands in 17 western states, June 2007. (BLM ID Team)

13. All herbicide applications would comply with label restrictions, Federal, state, and county regulations, and landowner agreements. Only herbicides and methods approved for use on public lands, per the BLM vegetation treatment EIS

(http://www.blm.gov/wo/st/en/prog/more/veg_eis.html), will be used. No spraying would occur prior to notification of the applicable land management agency. On Federal or state controlled lands, an herbicide use plan will be submitted prior to any herbicide application as recommended in the BLM vegetation treatment EIS. The herbicide use plan will include the dates and locations of application, target species, herbicide, adjuvants, and application rates and methods of application. No herbicide would be applied to any private property without written approval of the landowner. The final Reclamation Plan will contain a list of herbicides that may be used, target species, best time for application, and application rates. (BLM ID Team)

14. The vegetation cover, composition, and diversity shall be revegetated to values commensurate with the ecological setting. (Wind PEIS ROD)

15. Fire management conservation measures for slickspot peppergrass (*Lepidium papilliferum*) would be followed along haul routes in slickspot peppergrass habitat as outlined in the Confirmation of Concurrence from the USFWS to the BLM on the Normal Fire Emergency Stabilization and Rehabilitation, December 2009. (BLM ID Team)

LIVESTOCK GRAZING

1. Fence construction must comply with BLM Manual 1737. Lay-down fences will be constructed in wildlife areas if necessary and feasible. (1985 Wells RMP)

2. When construction activity in connection with the right-of-way breaks or destroys a natural barrier used for livestock control, the gap, this opened, shall be fenced to prevent the drift of livestock. The subject natural barrier shall be identified by the authorized officer and fenced by the holder as per instruction of the authorized officer. (BLM Handbook H-2801-1)

CULTURAL AND PALEO RESOURCES

1. The BLM will consult with Indian tribal governments early in the planning process to identify issues regarding the proposed wind energy development, including issues related to the presence of cultural properties, access rights, disruption to traditional cultural practices, and impacts to visual resources important to the Tribe(s). (Wind PEIS ROD)

2. The presence of archaeological sites and historic properties in the area of potential effect shall be determined on the basis of a records search of recorded sites and properties in the area and/or, depending on the extent and reliability of existing information, an archaeological survey. Archaeological sites and historic properties present in the area of potential effect shall be reviewed to determine whether they meet the criteria of eligibility for listing on the National Register of Historic Places. (Wind PEIS ROD).

3. When any right-of-way application includes remnants of a National Historic Trail, is located within the viewshed of a National Historic Trail's designated centerline, or includes or is within the viewshed of a trail eligible for listing on the National Register of Historic Places, the

operator shall evaluate the potential visual impacts to the trail associated with the proposed project and identify appropriate mitigation measures for inclusion as stipulations in the POD. (Wind PEIS ROD).

4. If cultural resources are present at the site, or if areas with a high potential to contain cultural material have been identified, a programmatic agreement will be prepared that incorporates the elements of a cultural resources mitigation plan. This plan shall address mitigation activities to be taken for cultural resources found at the site. Avoidance of the area is always the preferred mitigation option. Other mitigation options include archaeological survey and excavation, and monitoring. If an area exhibits a high potential, but no artifacts were observed during an archaeological survey, monitoring by a qualified archaeologist may be required during all excavation and earthmoving in the high-potential area. A report shall be prepared documenting these activities. The programmatic agreement also shall (1) establish a monitoring program, (2) identify measures to prevent potential looting/vandalism or erosion impacts, and (3) address the education of workers and the public to make them aware of the consequences of unauthorized collection of artifacts and destruction of property on public land. (Wind PEIS ROD).

5. Operators shall determine whether paleontological resources exist in a project area on the basis of the sedimentary context of the area, a records search for past paleontological finds in the area, and/or, depending on the extent of existing information, a paleontological survey. (Wind PEIS ROD).

6. If paleontological resources are present at the site, or if areas with a high potential to contain paleontological material have been identified, a paleontological resources management plan shall be developed. This plan shall include a mitigation plan for collection of the fossils; mitigation may include avoidance, removal of fossils, or monitoring. If an area exhibits a high potential but no fossils were observed during survey, monitoring by a qualified paleontologist may be required during all excavation and earthmoving in the sensitive area. A report shall be prepared documenting these activities. The paleontological resources management plan also shall (1) establish a monitoring program, (2) identify measures to prevent potential looting/vandalism or erosion impacts, and (3) address the education of workers and the public to make them aware of the consequences of unauthorized collection of fossils on public land. (Wind PEIS ROD)

7. Unexpected discovery of cultural or paleontological resources on public lands during construction shall be brought to the attention of the responsible BLM authorized officer immediately. Work shall be halted in the vicinity of the find to avoid further disturbance to the resources while they are being evaluated and appropriate mitigation measures are being developed. (Wind PEIS ROD)

8. Cultural resource values discovered in a proposed work area will be protected by adhering to the following methods:

   -- Redesigning or relocating the project;
   -- Salvaging, through scientific methods, the cultural resource values pursuant to the State Historic Preservation Office agreement; and
   -- Should the site be determined to be of significant value, and/or the above-mentioned methods are not considered adequate, the project will be abandoned. (1987 Jarbidge RMP)

9. Prior to commencement of any Bureau-initiated or authorized action, which involves surface disturbing activities, sale or transfer from Federal management, in order to comply with Section 106 of the National Historic Preservation Act, the BLM will conduct or cause to be conducted, a Class III (intensive) inventory. (1987 Jarbidge RMP).

10. A Programmatic Agreement will be developed that will take into account adverse effects to cultural resources. The Programmatic Agreement will be approved by the BLM, Nevada and Idaho State Historic Preservation Officers, and the Advisory Council (if they choose to consult). A Treatment Plan will also be developed, approved by BLM and the State Historic Preservation Officers, and implemented prior to the issuance of Notices to Proceed and ground disturbing activities.

11. Cultural sites known to be eligible for National Register nomination, or listed on the National Register will be protected from deterioration. (1987 Jarbidge RMP)

12. The National Programmatic Agreement and the statewide Protocol Agreement between the BLM and the Nevada State Historic Preservation Office dated October 26, 2009 that define how Section 106 compliance, including the handling of adverse effects will guide how cultural resources in Nevada are managed. (1985 Wells RMP)

13. Cultural resources - The BLM will not approve any ground disturbing activities that may affect any such properties or resources until it completes its obligations under applicable requirements of the National Historic Preservation Act and other authorities. The BLM may require modification to exploration or development proposals to protect such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized, or mitigated. (1985 Wells RMP)

14. Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on his behalf, on public or Federal land shall be immediately reported to the authorized officer. Holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the authorized officer. An evaluation of the discovery will be made by the authorized officer to

determine appropriate actions to prevent the loss of significant cultural or scientific values. (BLM Handbook H-2801-1)

15. No surface disturbance or construction activity will be allowed within 100 feet of any cultural sites which are clearly marked as specified by the authorized officer. Any deviation from this requirement shall have the prior written approval of the authorized officer. (BLM Handbook H-2801-1)

HAZARDOUS MATERIALS AND WASTE MANAGEMENT

1. Operators shall develop a hazardous materials management plan addressing storage, use, transportation, and disposal of each hazardous material anticipated to be used at the site. The plan shall identify all hazardous materials that would be used, stored, or transported at the site. It shall establish inspection procedures, storage requirements, storage quantity limits, inventory control, nonhazardous product substitutes, and disposition of excess materials. The plan shall also identify requirements for notices to Federal and local emergency response authorities and include emergency response plans. (Wind PEIS ROD)

2. Operators shall develop a waste management plan identifying the waste streams that are expected to be generated at the site and addressing hazardous waste determination procedures, waste storage locations, waste-specific management and disposal requirements, inspection procedures, and waste minimization procedures. This plan shall address all solid and liquid wastes that may be generated at the site. (Wind PEIS ROD)

3. Operators shall develop a spill prevention and response plan identifying where hazardous materials and wastes are stored on site, spill prevention measures to be implemented, training requirements, appropriate spill response actions for each material or waste, the locations of spill response kits on site, a procedure for ensuring that the spill response kits are adequately stocked at all times, and procedures for making timely notifications to authorities. (Wind PEIS ROD)

4. Secondary containment shall be provided for all onsite hazardous materials and waste storage, including fuel. In particular, fuel storage (for construction vehicles and equipment) shall be a temporary activity occurring only for as long as is needed to support construction activities. (Wind PEIS ROD)

5. Wastes shall be properly containerized and removed periodically for disposal at appropriate offsite-permitted disposal facilities. (Wind PEIS ROD)

6. In the event of an accidental release of hazardous materials to the environment, the operator shall document the event, including a root cause analysis, appropriate corrective actions taken, and a characterization of the resulting environmental or health and safety impacts. Documentation of the event shall be provided to the BLM authorized officer and other Federal and state agencies, as required. (Wind PEIS ROD)

7. Any wastewater generated in association with temporary, portable sanitary facilities shall be periodically removed by a licensed hauler and introduced into an existing municipal sewage treatment facility. Temporary, portable sanitary facilities provided for construction crews shall be adequate to support expected onsite personnel and shall be removed at completion of construction activities. (Wind PEIS ROD)

8. Project area cleanup will be accomplished by removing all refuse to a sanitary landfill. (1985 Wells RMP)

9. The holder(s) shall comply with all applicable Federal, state and local laws and regulations, existing or hereafter enacted or promulgated, with regard to any hazardous materials, as defined in this paragraph, that will be used, produced, transported or stored on or within the R/W or any of the R/W facilities, or used in the construction, operation, maintenance or termination of the R/w or any of its facilities. "Hazardous material" means any substance, pollutant, or contaminant that is listed as hazardous under the Comprehensive Environmental Response Compensation and Liability Act of 1980, as amended, 42 U.S.C. 9601 et seq., and its regulations. The definition of hazardous substances under Comprehensive Environmental Response Compensation and Liability Act includes any "hazardous waste" as defined in the Resource Conservation and Recovery Act of 1976, as amended, 42 U.S.C. 6901 et seq. and its regulations. The term hazardous materials also includes any nuclear or byproduct material as defined by the Atomic Energy Act of 1954, as amended, 42 U. S. C. 2011 et seq. The term does not include petroleum, including crude oil or any fraction thereof that is not otherwise specifically listed or designated as a hazardous substance under Comprehensive Environmental Response Compensation and Liability Act Section 101(14), 42 U.S.C. 9601(14), nor does the term include natural gas. (BLM Handbook H-2801-1)

10. The holder of right-of-way Number IDI-35183 and NVN-84663_ agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601, et seq. or the Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901 et seq.) on the right-of-way (unless the release or threatened release is wholly unrelated to the right-of-way holder's activity on the right-of-way.) This agreement applies without regard to whether a release is caused by the holder, its agent, or unrelated third parties. (BLM Handbook H-2801-1)

11. The holder shall submit its contingency plan to the authorized officer prior to scheduled start up.

    a. Include provisions for oil or other pollutant spill control.
    b. The agencies responsible for contingency plans in southern Idaho shall be among the first to be notified in the event of any transformer failure resulting in a spill of oil or other pollutant.

c. Provide for restoration of the affected resource.
d. Provide that the authorized officer shall approve any materials or devices used for oil spill control and any disposal sites or techniques selected to handle oil, matter, or other pollutants.
e. Include separate and specific techniques and schedules for cleanup of spills of oil or other pollutants on land or waters. (BLM Handbook H-2801-1)

12. "Good housekeeping" procedures shall be developed to ensure that during operation the site will be kept clean of debris, garbage, fugitive trash or waste, and graffiti; to prohibit scrap heaps and dumps; and to minimize storage yards. (Wind PEIS ROD)

13. Construction sites shall be maintained in a sanitary condition at all times; waste materials at those sites shall be disposed of promptly at an appropriate waste disposal site. 'Waste' means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment. (BLM Handbook H-2801-1)

14. A litter-policing program shall be implemented by the holder, and approved of in writing by the authorized officer, which covers all roads and sites associated with the right-of-way. (BLM Handbook H-2801-1)

15. The holder shall provide the appropriate type and number of sanitation facilities for construction workers. All sanitation facilities, including port-a-potties shall comply with state requirements.

PUBLIC HEALTH AND SAFETY

1. A safety assessment shall be conducted to describe potential safety issues and the means that would be taken to mitigate them, including issues such as site access, construction, safe work practices, security, heavy equipment transportation, traffic management, emergency procedures, and fire control. (Wind PEIS ROD)

2. A health and safety program shall be developed to protect both workers and the general public during construction, operation, and decommissioning of a wind energy project. Regarding occupational health and safety, the program shall identify all applicable Federal and state occupational safety standards; establish safe work practices for each task (e.g., requirements for personal protective equipment and safety harnesses; Occupational Safety and Health Administration standard practices for safe use of explosives and blasting agents; and measures for reducing occupational electric and magnetic fields exposures); establish fire safety evacuation procedures; and define safety performance standards (e.g., electrical system standards and lightning protection standards). The program shall include a training program to identify hazard-training requirements for workers for each task and establish procedures for providing required training to all workers. Documentation of training and a mechanism for reporting serious accidents to appropriate agencies shall be established.

3. The health and safety program shall establish a safety zone or setback for wind turbine generators from residences and occupied buildings, roads, rights-of-ways, and other public access areas that is sufficient to prevent accidents resulting from the operation of wind turbine generators. It shall identify requirements for temporary fencing around staging areas, storage yards, and excavations during construction or decommissioning activities. It shall also identify measures to be taken during the operation phase to limit public access to hazardous facilities (e.g., permanent fencing installed only around electrical substations, and turbine tower access doors locked). (Wind PEIS ROD)

4. Operators shall consult with local planning authorities regarding increased traffic during the construction phase, including an assessment of the number of vehicles per day, their size, and type. Specific issues of concern (e.g., location of school bus routes and stops) shall be identified and addressed in the traffic management plan. (Wind PEIS ROD)

5. If operation of the wind turbines is expected to cause significant adverse impacts to nearby residences and occupied buildings from shadow flicker, low-frequency sound, or electric and magnetic fields, site-specific recommendations for addressing these concerns shall be incorporated into the project design (e.g., establishing a sufficient setback from turbines). (Wind PEIS ROD)

6. The project shall be planned to minimize electromagnetic interference (e.g., impacts to radar, microwave, television, and radio transmissions) and comply with Federal Communications Commission regulations. Signal strength studies shall be conducted when proposed locations have the potential to impact transmissions. Potential interference with public safety communication systems (e.g., radio traffic related to emergency activities) shall be avoided. (Wind PEIS ROD)

7. The project shall be planned to comply with Federal Aviation Administration regulations, including lighting regulations, and to avoid potential safety issues associated with proximity to airports, military bases or training areas, or landing strips. (Wind PEIS ROD)

8. The Federal Aviation Administration required notice of proposed construction shall be made as early as possible to identify any required air safety measures. (Wind PEIS ROD)

9. Temporary fencing shall be installed around staging areas, storage yards, and excavations during construction to limit public access. (Wind PEIS ROD)

10. Permanent fencing shall be installed and maintained around electrical substations and operation and maintenance facilities and turbine tower access doors shall be locked to limit public access. (Wind PEIS ROD)

11. In the event an installed wind energy development project results in electromagnetic interference, the operator shall work with the owner of the impacted communications system to resolve the problem. Additional warning information may also need to be conveyed to aircraft with onboard radar systems so that echoes from wind turbines can be quickly recognized. (Wind PEIS ROD)

12. The holder shall provide for the safety of the public entering the right-of-way. This includes, but is not limited to, barricades for open trenches, flagmen/women with communication systems for single-lane roads without intervisible turnouts, and attended gates for blasting operations. (BLM Handbook H-2801-1)

13. The holder shall inform the authorized officer within 48 hours of any accidents on Federal lands that require reporting to the Department of Transportation as required by 49 CFR Part 195. (BLM Handbook H-2801-1)

14. A traffic management plan shall be prepared for the site project roads to ensure that no hazards would result from increased truck traffic and that traffic flow would not be adversely impacted. This plan shall incorporate measures such as informational signs, flaggers when equipment may result in blocked throughways, and traffic cones to identify any necessary changes in temporary lane configuration. (Wind PEIS ROD)

15. Signs would be erected warning the public of the increased heavy construction traffic. When possible, delivery times would be coordinated with the use patterns of the local roads to avoid traffic congestion. All trucks would be washed down at a location approved by the BLM, IDL, and counties for noxious weed control prior to entering the site.

16. During times of peak construction activity, flaggers or a signal light may need to be used to manage traffic on the section of single lane road over the dam.

17. A traffic management plan would be prepared for project construction to minimize hazards from the increased truck traffic and to minimize impacts on traffic flow on local roads and highways. This plan would incorporate measures, such as informational signs, flagmen when equipment may result in blocked throughways, traffic cones, and flashing lights, to identify any necessary changes in temporary road configuration.

AIR QUALITY

1. Dust abatement techniques shall be used on unpaved, unvegetated surfaces to minimize airborne dust. (Wind PEIS ROD)

2. Speed limits (e.g., 25 miles per hour) shall be posted and enforced to reduce airborne fugitive dust. (Wind PEIS ROD)

3. Construction materials and stockpiled soils shall be covered if they are a source of fugitive dust. (Wind PEIS ROD)

4. Dust abatement techniques shall be used before and during surface clearing, excavation, or blasting activities. (Wind PEIS ROD)

5. During construction, the roads would be sprayed with water to control dust.

6. To minimize dust, road surfaces would be watered or otherwise treated with dust control measures. These treatments would occur as needed based on weather conditions and the amount of traffic on the road. Any treatment substance other than water would be used only after approval from the BLM, IDL, and/or Twin Falls and Elko counties.

NOISE

1. Noisy construction activities (including blasting) shall be limited to the least noise-sensitive times of day (i.e., daylight hours only or specified times) and weekdays. (Wind PEIS ROD)

2. All equipment shall have sound-control devices no less effective than those provided on the original equipment. All construction equipment used shall be adequately muffled and maintained. (Wind PEIS ROD)

3. All stationary construction equipment (i.e., compressors and generators) shall be located as far as practicable from nearby residences. (Wind PEIS ROD)

4. If blasting or other noisy activities are required during the construction period, nearby residents shall be notified in advance. (Wind PEIS ROD)

5. Proponents of a wind energy development project shall take measurements to assess the existing background noise levels at a given site and compare them to the anticipated noise levels associated with the proposed project. (Wind PEIS ROD)

LIABILITY AND BONDING

1. The holder shall be liable for damage or injury to the United States to the extent provided by 43 CFR Sec. 2803.1-4. The holder shall be held to a standard of strict liability for damage or injury to the United States resulting from fire or soil movement (including landslides and slumps as well as wind and water-caused movement of particles) caused or substantially aggravated by any of the following within the right-of-way or permit area:

   (1) Activities of the holder, including but not limited to construction, operation, maintenance, and termination of the facility.

(2) Activities of other parties including but not limited to:
   (a) Land clearing and logging;
   (b) Earth-disturbing and earth-moving work;
   (c) Blasting;
   (d) Vandalism and sabotage.

The maximum limitation for such strict liability damages shall not exceed (to be determined as part of the liability and bonding plan which would be developed prior to issuance of a Notice to Proceed) for any one event, and any liability in excess of such amount shall be determined by the ordinary rules of negligence of the jurisdiction in which the damage or injury occurred. This section shall not impose strict liability for damage or injury resulting primarily from the negligent acts or omissions of the United States. (BLM Handbook H-2801-1)

2. A bond, acceptable to the authorized officer, shall be furnished by the holder prior to the issuance of a notice to proceed or at such earlier date as may be specified by the authorized officer. The amount of this bond shall be determined by the authorized officer. This bond must be maintained in effect until removal of improvements and restoration of the right-of-way has been accepted by the authorized officer. (BLM Handbook H-2801-1)

3. Should the bond delivered under this grant become unsatisfactory to the authorized officer, the holder, shall, within 30 days of demand, furnish a new bond. (BLM Handbook H-2801-1)

FIRE MANAGEMENT AND PROTECTION

1. The holder shall prepare a fire prevention and suppression plan, which shall be reviewed, modified, and approved, as appropriate, by the authorized officer. The holder shall take into account such measures for prevention and suppression of fire on the right-of-way and other public land used or traversed by the holder in connection with operation of the right-of-way. Project personnel shall be instructed as to individual responsibility in implementation of the plan. (BLM Handbook H-2801-1)

2. During construction, operation, maintenance, and termination of the right-of-way, during the period from July 1 to Sept. 15, vehicles, gas-powered equipment, and flues shall be equipped with spark arresters approved by the authorized officer. (BLM Handbook H-2801-1)

3. The holder shall maintain a fire watch with fire-fighting equipment during construction at the following locations: (to be determined as part of the Fire Management Plan 120 days prior to the issuance of a Notice to Proceed) as required by the authorized officer. (BLM Handbook H-2801-1).

4. When requested by the authorized officer, the holder shall make his equipment already at the site with operators, temporarily available for fighting fires in the vicinity of the project. Payment for such services will be made at rates determined by the authorized officer. (BLM Handbook H-2801-1)

5. During conditions of extreme fire danger, operations shall be limited or suspended in specific areas, or additional measures may be required by the authorized officer. (BLM Handbook H-2801-1)

6. Full suppression will be applied to the entire Multiple Use Area 15 area (Jarbidge Foothills). (1987 Jarbidge RMP)

7. Operators shall develop a fire management plan to implement measures to minimize the potential for a human-caused fire and respond to natural fire situations. (Wind PEIS ROD)

EXCAVATION AND BLASTING

1. Operators shall gain a clear understanding of the local hydrogeology. Areas of groundwater discharge and recharge and their potential relationships with surface water bodies shall be identified. (Wind PEIS ROD)

2. Operators shall avoid creating hydrologic conduits between two aquifers during foundation excavation and other activities. (Wind PEIS ROD)

3. Foundations and trenches shall be backfilled with originally excavated material as much as possible. Excess excavation materials shall be disposed of only in approved areas or, if suitable, stockpiled for use in reclamation activities. (Wind PEIS ROD)

4. Borrow material shall be obtained only from authorized and permitted sites. Existing sites shall be used in preference to new sites. (Wind PEIS ROD)

5. Explosives shall be used only within specified times and at specified distances from sensitive wildlife or streams and lakes, as established by the BLM or other Federal and state agencies. (Wind PEIS ROD)

6. The blasting plan shall conform to BLM policy and will conform to the *Programmatic Biological Assessment for Stream Crossing Construction, Replacement, and or Removal* (USFWS, 2006). (BLM ID Team)

ROAD AND DRAINAGE DESIGN AND LAYOUT

1. The project shall be planned to utilize existing roads and utility corridors to the maximum extent feasible and to minimize the number and length/size of new roads, lay-down areas, and borrow areas. (Wind PEIS ROD)

2. A road siting and management plan shall be prepared incorporating existing BLM standards regarding road design, construction, and maintenance such as those described in the BLM 9113 Manual and the Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (revised 2007). (Wind PEIS ROD)

3. The number and size/length of roads, temporary fences, lay-down areas, and borrow areas shall be minimized. (Wind PEIS ROD)

4. Existing roads shall be used, but only if in safe and environmentally sound locations. If new roads are necessary, they shall be designed and constructed to the appropriate BLM road design standards and be no higher than necessary to accommodate their intended functions (e.g., traffic volume and weight of vehicles). Excessive grades on roads, road embankments, ditches, and drainages shall be avoided, especially in areas with erodible soils. Special construction techniques shall be used, where applicable. Abandoned roads and roads that are no longer needed shall be recontoured and revegetated. (Wind PEIS ROD)

5. Project roads shall be located to follow natural contours and minimize side hill cuts. (Wind PEIS ROD)

6. Roads shall be located away from drainage bottoms and avoid wetlands, if practicable. (Wind PEIS ROD)

7. Roads shall be designed so that changes to surface water runoff are avoided and erosion is not initiated. (Wind PEIS ROD)

8. Project roads shall be located to minimize stream crossings. All structures crossing streams shall be located and constructed so that they do not decrease channel stability or increase water velocity. Operators shall obtain all applicable Federal and state permits. (Wind PEIS ROD)

9. Existing drainage systems shall not be altered, especially in sensitive areas such as erodible soils or steep slopes. Potential soil erosion shall be controlled at culvert outlets with appropriate structures. Catch basins, roadway ditches, and culverts shall be cleaned and maintained regularly. (Wind PEIS ROD)

10. The holder shall perform the necessary transportation studies and recommend a road standard to meet the purpose of the road. This standard and the topography, soils, and geologic hazards of the lands crossed will define the level of survey and design necessary. Accepted standards for road design, including the BLM Manual section may be used. (BLM Manual Handbook H-801-1)

11. The holder shall obtain the services of a licensed professional engineer to locate, survey, design, and construct the proposed road as directed by the authorized officer. The road design shall be based on the (1) width, (2) maximum grade, and (3) design speed of the road. (BLM Handbook H-2801-1)

12. The holder shall submit standard or typical cross sections of the road to be constructed, maintained, or reconstructed as directed by the authorized officer. The cross sections should include, but are not limited to, the proposed road width, ditch dimensions, cut and fill slopes, and typical culvert installation. (BLM Handbook H-2801-1)

13. The holder shall place slope stakes, culvert location and grade stakes, and other construction control stakes as deemed necessary by the authorized officer to ensure construction in accordance with the plan of development. If stakes are disturbed, they shall be replaced before proceeding with construction. (BLM Handbook H-2801-1)

14. The holder shall set centerline stakes to identify the location of the proposed road as directed by the authorized officer. (BLM Handbook H-2801-1)

15. Cut and fill slope stakes shall be set as directed by the authorized officer. (BLM Handbook H-2801-1)

16. The holder shall survey and clearly mark the centerline and/or exterior limits of the right-of-way, as determined by the authorized officer. (BLM Handbook H-2801-1)

17. The holder shall mark the exterior boundaries of the right-of-way with a stake and/or lath at (survey specification to be determined in Construction Operation and Maintenance Plan 120 days prior to issuance of Notice to Proceed) foot intervals. The intervals may be varied at the time of staking at the discretion of the authorized officer. The tops of the stakes and/or laths will be painted and the laths flagged in a distinctive color as determined by the holder. The survey station numbers will be marked on the boundary stakes and/or laths at the entrance to and the exit from public land. The holder shall maintain all boundary stakes and/or laths in place until final cleanup and restoration is completed and approved by the authorized officer. The stakes and/or laths will then be removed at the discretion of the authorized officer. (BLM Handbook H-2801-1)

18. Cattleguards shall be 5 feet by 16 feet and as a minimum meet the requirements of BLM Manual Section 9113.25. They shall be set on (timber, precast concrete, cast-in-place concrete) bases at right angles to the roadway. Backfill around cattle guards shall be thoroughly compacted. A bypass gate shall be built adjacent to each cattleguard structure. Gate materials, dimensions, and construction shall conform to the requirements as specified by the authorized officer. (BLM Handbook H-2801-1)

19. As directed by the authorized officer, construction stakes shall be set for each culvert to show location as well as inlet and outlet elevations, diameter, and length. (BLM Handbook H-2801-1)

20. As directed by the authorized officer, the holder shall submit a complete culvert list to reflect the drainage plan for the road. The list shall include, but not be limited to, size(s), lengths, and locations of the culverts. (BLM Handbook H-2801-1)

21. The minimum diameter for culverts shall be 18 inches. (BLM Handbook H-2801-1)

22. Culverts and lateral ditches shall be staked for location, skew, and elevation as directed by the authorized officer. (BLM Handbook H-2801-1)

23. As directed by the authorized officer, drainage structures with an end area greater than (to be specified in the Construction Operation and Maintenance Plan 120 days prior to issuance of the Notice to Proceed) square feet and all bridges shall be designed by a registered professional engineer. Design of drainage facilities shall include, but not limited to, design storms, debris, bedload, fish passage, erosion, and floodplain impact. (BLM Handbook H-2801-1)

24. Specific sites as identified by the authorized officer (e.g., archaeological sites, areas with threatened and endangered species, or fragile watersheds) where construction equipment and vehicles shall not be allowed shall be clearly marked on-site by the holder before any construction or surface disturbing activities begin. The holder shall be responsible for assuring that construction personnel are well trained to recognize these markers and understand the equipment movement restrictions involved. (BLM Handbook H-2801-1)

25. The holder shall design and construct adequate water-control structures in each drainage crossing to prevent excessive erosion along the roadway and protect the roadway from the natural erosion process within the drainage. (BLM Handbook H-2801-1)

26. All roads constructed for the specific purpose of the project would be built with adequate drainage and compaction to handle 15-ton per axle loads

27. Based on final project design and the results of geotechnical investigations, cut and fill volumes would be determined prior to construction of all project roads.

28. All project roads would be engineered and constructed per BLM Manual 9113 and BLM Gold Book. (BLM Handbook H-2801-1)

GENERAL PROJECT CONSTRUCTION INCLUDING ROADS, DRAINAGE AND POWER LINES

1. The area disturbed by construction and operation of a wind energy development project (i.e., footprint) shall be kept to a minimum. (Wind PEIS ROD)

2. Topsoil from all excavations and construction activities shall be salvaged and reapplied during reclamation. (Wind PEIS ROD)

3. All electrical collector lines shall be buried in a manner that minimizes additional surface disturbance (e.g., along roads or other paths of surface disturbance). Overhead lines may be used in cases where burial of lines would result in greater habitat disturbance. (Wind PEIS ROD)

4. Operators shall identify unstable slopes and local factors that can induce slope instability (such as groundwater conditions, precipitation, earthquake activities, slope angles, and the dip angles of geologic strata). Operators also shall avoid creating excessive slopes during excavation and blasting operations. Special construction techniques shall be used where applicable in areas of steep slopes, erodible soil, and stream channel crossings. (Wind PEIS ROD)

5. Erosion controls that comply with county, state, and Federal standards shall be applied. Practices such as jute netting, silt fences, and check dams shall be applied near disturbed areas. (Wind PEIS ROD)

6. Project roads and on-site roads shall be surfaced with aggregate materials, wherever appropriate. (Wind PEIS ROD)

7. Suitable topsoil material removed in conjunction with clearing and stripping shall be conserved in stockpiles within the right-of-way. Topsoil shall be stripped to an average depth of 4-6 inches. If deep soils are available, segregate 6-12 inches of topsoil and stockpile accordingly. (BLM Handbook H-2801-1)

8. Excavation and embankment quantities shall be balanced as nearly as design and construction considerations allow. Any waste and/or borrow needs shall be specifically identified by the holder. (BLM Handbook H-2801-1)

9. Excess excavated, unsuitable, or slide materials shall be disposed of as directed by the authorized officer. (BLM Handbook H-2801-1)

10. Earthwork areas shall be cleared of vegetation and the topsoil stockpiled for future rehabilitation. Prior to fill construction, the existing surface shall be sloped to avoid sharp banks and allow equipment operations. No fills shall be made with water-saturated soils. Materials shall be placed in uniform layers not to exceed 12 inches in thickness. Construction equipment

shall be routed evenly over the entire width of the fill to obtain a thorough compaction. (BLM Handbook H-2801-1)

11. Holder shall remove only the minimum amount of vegetation necessary for the construction of structures and facilities. Topsoil shall be conserved during excavation and reused as cover on disturbed areas to facilitate regrowth of vegetation. (BLM Handbook H-2801-1)

12. No construction or routine maintenance activities shall be performed during periods when the soil is too wet to adequately support construction equipment. If such equipment creates ruts in excess of six (6) inches deep, the soil shall be deemed too wet to adequately support construction equipment. (BLM Handbook H-2801-1)

13. The holder shall conduct all activities associated with the construction, operation, and termination of the right-of-way within the authorized limits of the right-of-way. (BLM Handbook H-2801-1)

14. Construction holes left open over night shall be covered. Covers shall be secured in place and shall be strong enough to prevent livestock or wildlife from falling through and into a hole. (BLM Handbook H-2801-1)

15. All design, material, and construction, operation, maintenance, and termination practices shall be in accordance with safe and proven engineering practices. (BLM Handbook H-2801-1)

16. Upon completion of construction, the holder shall post as directed by the authorized officer, the Bureau serial number assigned to this right-of-way grant at the following locations (these locations would be determined as part of the Construction Operation and Maintenance Plan 120 days prior to issuance of the Notice to Proceed). (BLM Handbook H-2801-1)

17. Material encountered on the project area and needed for select borrow, surfacing, riprap, or other special needs shall be conserved. (BLM Handbook H-2801-1)

18. Excess excavated, unsuitable, or slide materials shall be disposed of as directed by the authorized officer. (BLM Handbook H-2801-1)

19. Fences, gates, and brace panels shall be reconstructed to appropriate Bureau standards and/or specifications as determined by the authorized officer. (BLM Handbook H-2801-1)

20. The holder shall furnish and install culverts of the gauge, materials, diameter(s), and length(s) indicated and approved by the authorized officer. Culverts shall be free of corrosion, dents, or other deleterious conditions. Culverts shall be placed on channel bottoms on firm, uniform beds, which have been shaped to accept them and aligned to minimize erosion. Backfill shall be

thoroughly compacted. No equipment shall be routed over a culvert until backfill depth is adequate to protect the culverts. (BLM Handbook H-2801-1)

21. The holder shall construct low-water crossings in a manner that will prevent any blockage or restriction of the existing channel. Material removed shall be stockpiled for use in rehabilitation of the crossings. (BLM Handbook H-2801-1)

22. The holder shall use nonreflecting lines and conductors at the following location(s): (these locations would be determined as part of the Construction Operation and Maintenance Plan 120 days prior to issuance of the Notice to Proceed). (BLM Handbook H-2801-1)

23. The holder shall evenly spread the excess soil excavated from pole holes within the right-of-way and in the immediate vicinity of the pole structure. (BLM Handbook H-2801-1)

24. As directed by the authorizing officer, all road segments shall be winterized by providing a well-drained roadway by water barring, maintaining drainage, and any additional measures necessary to minimize erosion and other damage to the roadway or the surrounding public land. (BLM Handbook H-2801-1)

25. Unless otherwise agreed to by the authorized officer in writing, power lines shall be constructed in accordance to standards outlined in Avian Power Line Interaction Committee. 2006. "Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006". Edison Electric Institute and the Raptor Research Foundation, Washington, D.C. (see Attachment #1 – Excerpts and Figures from the above Cited Publication). The holder shall assume the burden and expense of proving that pole designs not shown in the above publication are "eagle safe." Such proof shall be provided by a raptor expert approved by the authorized officer. The BLM reserves the right to require modifications or additions to all power line structures placed on this right-of-way, should they be necessary to ensure the safety of large perching birds. Such modifications and/or additions shall be made by the holder without liability or expense to the United States. (BLM Handbook H-2801-1)

RECLAMATION

1. All areas of disturbed soil shall be reclaimed using a weed-free BLM-approved seed mixture. Reclamation activities shall be undertaken as early as possible on disturbed areas. (Wind PEIS ROD)

2. Areas disturbed during project construction will be reseeded with a mixture of grasses, forbs, and shrubs to meet site-specific needs or habitat requirements. (1987 Jarbidge RMP)

3. Disturbed areas, capable of producing vegetation, will be reseeded to prevent erosion and replace ground cover. (1985 Wells RMP)

4. The holder shall recontour disturbed areas, or designated sections of the right-of-way, by grading to restore the site to approximately the original contour of the ground as determined by the authorized officer. (BLM Handbook H-2801-1)

5. The holder shall recontour the disturbed area and obliterate all earthwork by removing embankments, backfilling excavations, and grading to reestablish the approximate original contours of the land in the right-of-way. (BLM Handbook H-2801-1)

6. The holder shall uniformly spread topsoil over all unoccupied disturbed areas. Spreading shall not be done when the ground or topsoil is frozen or wet. (BLM Handbook H-2801-1).

7. The holder shall construct water bars on all disturbed areas to the spacing and cross sections specified by the authorized officer. Water bars are to be constructed to: (1) simulate the imaginary contour lines of the slope (ideally with a grade of 1 or 2%); (2) drain away from the disturbed area; and (3) begin and end in vegetation or rock whenever possible. (BLM Handbook H-2801-1)

8. BLM shall approve seed mixes and use of shrubs or cuttings for revegetation efforts. (BLM ID Team)

9. Revegetation efforts in short-term disturbed areas and final reclamation after decommissioning shall be repeated until determined successful by the authorized BLM officer. Livestock will be kept off of revegetation areas until revegetation is deemed successful. (BLM ID Team)

10. The holder shall prepare a seedbed by (scarifying the disturbed area) (distributing topsoil uniformly) (disking the topsoil) as directed by the authorized officer. (BLM Handbook H-2801-1)

11. The holder shall seed all disturbed areas with the seed mixture(s) listed below. The seed mixture(s) shall be planted in the amounts specified in pounds of pure live seed/acre. There shall be no primary or secondary noxious weed seed in the seed mixture. Seed shall be tested and the viability testing of seed shall be done in accordance with state law(s) and within 6 months prior to purchase. Commercial seed either shall be certified or registered seed. The seed mixture container shall be tagged in accordance with state law(s) and available for inspection by the authorized officer. Seed shall be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture shall be evenly and uniformly planted over the disturbed area. (Smaller/heavier seeds have a tendency to drop to the bottom of the drill and are planted first. The holder shall take appropriate measures to ensure this does not occur.) Where drilling is not possible, seed shall be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre noted below are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer. Evaluation of growth will not be made

before completion of the 2nd season after seeding. The authorized officer is to be notified a minimum of 14 days prior to seeding of the project.

Seed Mixture

- Species of Seed Variety Pounds/acre pure live seed (seed mix to be determined in the Vegetation Management/Revegetation Plan to be prepared 120 days prior to the issuance of the notice to proceed)
- Total (to be determined Vegetation Management/Revegetation Plan to be prepared 120 days prior to the issuance of the notice to proceed) pounds/acre pure live seed

Pure Live Seed formula: percent of purity of seed mixture times percent germination of seed mixture = portion of seed mixture that is pure live seed. (BLM Handbook H-2801-1)

12. The holder shall mulch disturbed areas designated by the authorized officer. The type of mulch shall meet one of the following requirements:

a. Straw used for mulching shall be from oats, wheat, rye, or other approved grain crops, and free from noxious weeds or other objectionable material as determined by the authorized officer. Straw mulch shall be suitable for placing with mulch blower equipment.
b. Hay shall be of approved herbaceous mowing, free from noxious weeds or other objectionable material as determined by the authorized officer. Hay shall be suitable for placing with much blow equipment.
c. Wood cellulose fiber shall be natural or cooked wood cellulose fiber, shall disperse readily in water, and shall be nontoxic. The homogeneous slurry or mixture shall be capable of application with power spray equipment. A colored dye that is non-injurious to plant growth may be used when specified. Wood cellulose fiber shall be packaged in new, labeled containers. (BLM Handbook H-2801-1)

13. Road shoulders would be revegetated with an approved seed mix of species of grasses and shrubs after completion of construction.

14. Upon completion of construction, road shoulders would be revegetated with a BLM, IDL, or Twin Falls or Elko counties approved seed mixes. A qualified civil contractor would construct all required roads.

15. All disturbed areas would be revegetated with a BLM, IDL, or Twin Falls or Elko county approved seed mixture and use of shrubs and/or cuttings in some areas.

GROUND TRANSPORTATION AND ACCESS

1. A traffic management plan shall be developed, particularly for the transport of turbine components, main assembly cranes, and other large pieces of equipment. The plan shall consider specific object sizes, weights, origin, destination, and unique handling requirements

and shall evaluate alternative transportation approaches. In addition, the process to be used to comply with unique state requirements and to obtain all necessary permits shall be clearly identified. (Wind PEIS ROD)

2. Project personnel and contractors shall be instructed and required to adhere to speed limits commensurate with road types, traffic volumes, vehicle types, and site-specific conditions, to ensure safe and efficient traffic flow and to reduce wildlife collisions and disturbance and airborne dust. (Wind PEIS ROD)

3. Traffic shall be restricted to the roads developed for the project. Use of other unimproved roads shall be restricted to emergency situations. (Wind PEIS ROD)

4. Signs shall be placed along construction roads to identify speed limits, travel restrictions, and other standard traffic control information. To minimize impacts on local commuters, consideration shall be given to limiting construction vehicles traveling on public roadways during the morning and late afternoon commute time. Consideration shall also be given to opportunities for bussing of construction workers to the job site to reduce traffic volumes. (Wind PEIS ROD)

5. Ongoing ground transportation planning shall be conducted to evaluate road use, minimize traffic volume, and ensure that roads are maintained adequately to minimize associated impacts. (Wind PEIS ROD)

6. The holder shall permit free and unrestricted public access to and upon the right-of-way for all lawful purposes except for those specific areas designated as restricted by the authorized officer to protect the public, wildlife, livestock, or facilities constructed within the right-of-way. (BLM Handbook H-2801-1)

7. Construction-related traffic shall be restricted to routes approved by the authorized officer. New project roads or cross-country vehicle travel will not be permitted unless prior written approval is given by the authorized officer. Authorized roads used by the holder shall be rehabilitated or maintained when construction activities are complete as approved by the authorized officer. (BLM Handbook H-2801-1)

8. Existing roads and trails on public lands that are blocked as the result of the construction project shall be rerouted or rebuilt as directed by the authorized officer. (BLM Handbook H-2801-1)

9. If 'cross country' access is necessary, clearing vegetation or grading a roadbed will be avoided whenever practicable. All construction and vehicular traffic shall be confined to the right-of-way or designated access routes, roads, or trails unless otherwise authorized in writing by the authorized officer. All temporary roads used for construction shall be rehabilitated after

construction is completed. Only one road or access route will be permitted to each site requiring access. (BLM Handbook H-2801-1)

ROAD AND PROJECT SITE MAINTENANCE

1. If snow removal from the road is undertaken, equipment used for snow removal operations shall be equipped with shoes to keep the blade two (2) inches off the road surface. Holder shall take special precautions where the surface of the ground is uneven and at drainage crossings to ensure that equipment blades do not destroy vegetation. (BLM Handbook H-2801-1)

2. Holder shall maintain the right-of-way in a safe, usable condition, as directed by the authorized officer. (A regular maintenance program shall include, but is not limited to, blading, ditching, culvert installation, and surfacing). (BLM Handbook H-2801-1)

3. Except rights-of-way expressly authorizing a road after construction of the facility is completed, the holder shall not use the right-of-way as a road for purposes other than routine maintenance as determined necessary by the authorized officer in consultation with the holder. (BLM Handbook H-2801-1)

4. For the purpose of determining joint maintenance responsibilities, the holder shall make road use plans known to all other authorized users of the road. Holder shall provide the authorized officer, within 30 days from the date of the grant, with the names and addresses of all parties notified, dates of notification, and method of notification. Failure of the holder to share proportionate maintenance costs on the common use project road in dollars, equipment, materials, or manpower with other authorized users may be adequate grounds to terminate the right-of-way grant. The determination as to whether this has occurred and the decision to terminate shall rest with the authorized officer. Upon request, the authorized officer shall be provided with copies of any maintenance agreement entered into. (BLM Handbook H-2801-1)

5. Inoperative turbines shall be repaired, replaced, or removed in a timely manner. Requirements to do so shall be incorporated into the due diligence provisions of the rights-of-way authorization. Operators will be required to demonstrate due diligence in the repair, replacement, or removal of turbines; failure to do so may result in termination of the right-of-way authorization. (Wind PEIS ROD)

DECOMMISSIONING

1. Prior to the termination of the right-of-way authorization, a decommissioning plan shall be developed and approved by the BLM. The decommissioning plan shall include a site reclamation plan and monitoring program. (Wind PEIS ROD)

2. All management plans, BMPs, and stipulations developed for the construction phase shall be applied to similar activities during the decommissioning phase. (Wind PEIS ROD)

3. All turbines and ancillary structures shall be removed from the site. (Wind PEIS ROD)

4. Topsoil from all decommissioning activities shall be salvaged and reapplied during final reclamation. (Wind PEIS ROD)

5. All areas of disturbed soil shall be reclaimed using weed-free native shrubs, grasses, and forbs. (Wind PEIS ROD)

6. Ninety days prior to termination of the right-of-way, the holder shall contact the authorized officer to arrange a joint inspection of the right-of-way. This inspection will be held to agree to an acceptable termination (and rehabilitation) plan. This plan shall include, but is not limited to, removal of facilities, drainage structures, or surface material, recontouring, topsoiling, or seeding. The authorized officer must approve the plan in writing prior to the holder's commencement of any termination activities. (BLM Handbook H-2801-1)

MANAGEMENT PLANS

The holder will be responsible for preparing the following plans as required by individual design features above and in Chapter 2 of the Draft EIS. These plans will be submitted to the BLM for review and comment 120 days prior to the issuance of a Notice to Proceed.

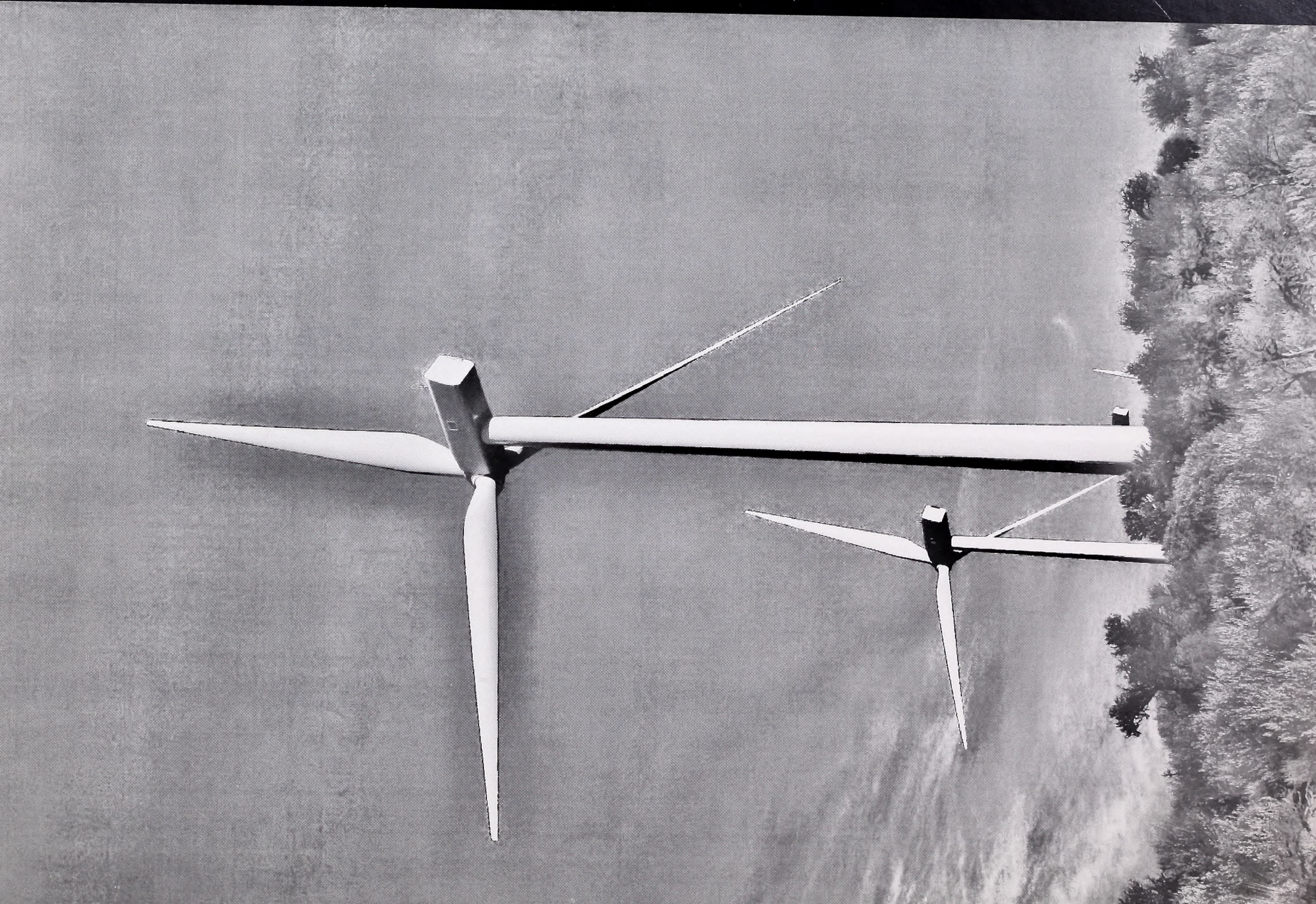
- Health and Safety Plan
- Lighting Plan
- Storm Water Pollution Prevention Plan
- Blasting Control Plan
- Spill Prevention Control and Countermeasures Plan
- Hazardous Materials and Waste Management Plan
- Public Education Plan
- National Pollutant Discharge Elimination System Permit

These plans will be submitted to the BLM for review and approval 120 days prior to the issuance of a Notice to Proceed.

- Weed Management Plan that contains a Noxious Weed Control Plan and an Integrated Pest Management Plan
- Vegetation Management/Revegetation Plan
- Traffic Management Plan
- Decommissioning Plan
- Construction and Operation Plan
- Visual Resources Management Plan

- Fire Prevention Plan – will include BMPs from U.S. Fish and Wildlife Service. 2004. Biological Opinion for the Bureau of Land Management's Ongoing Activities in the Jarbidge River Watershed in Owyhee County, Idaho and Elko County, Nevada.
- Programmatic Agreement (Cultural Resources Mitigation Plan)
- Liability and Bonding Plan

Appendix 2B – Applicants Proposed Best Management Practices, Mitigation, and Monitoring



APPLICANTS PROPOSED BEST MANAGEMENT PRACTICES, MITIGATION, AND MONITORING (FROM THE APPLICANTS PLAN OF DEVELOPMENT) – APPLICABLE TO ALTERNATIVES B1 AND B2A ONLY

This appendix contains design features, best management practices, mitigation measures and monitoring that are applicable only to Alternatives B1 and B2a. They were taken from the Applicants' plan of development which includes the Applicants' Draft Sage Grouse Conservation Plan (Tetra Tech, Nov. 2010). This appendix should not be confused with Appendix 2A which contains design features common to all action alternatives. There is some overlap between these appendices because in many cases, industry standards and BLM standards are the same.

CONSTRUCTION BEST MANAGEMENT PRACTICES

- A Project Health Safety and Environmental (HSE) Plan will be developed to address health, safety, and environmental risks and requirements during the construction stage of the project. Components of the management system that will be addressed in the HSE Plan include, but are not limited to emergency response, HSE planning and procedures, implementation, monitoring and reporting results, setting performance targets, incident classification, investigation and reporting results, audits and inspections, and HSE management review.
- A project construction plan will be developed that contains a general description of the construction steps for the major components of the project. This plan will discuss the general activities and design approaches as currently understood and anticipated. RES will remain in contact with the Bureau of Land Management (BLM)/Idaho Department of Lands (IDL)/counties as the project designs are finalized and specifics on construction are available.
- A Storm Water Pollution Prevention Plan (SWPPP), which includes erosion control measures, will be generated and implemented on site for the project.
- Good housekeeping – at the end of each work shift, care will be taken to remove debris from turbine sites and dispose of it at a county or approved private landfill. Materials still needed at the turbine site will be assembled and secured at the site, and materials no longer needed, will be returned to the construction laydown area. One designated area will be used for "washing out" concrete trucks. The washout area will include catchment with an impermeable liner. Washout water will be recycled in the batch plant or pumped into tank trucks and removed from the site. The location for disposal will be approved by the BLM/IDL/counties.
- Blasting and excavation will be completed in accordance with applicable regulations and sound engineering practice, using methods and techniques that will minimize overbreak beyond the limits indicated on the drawings and which will preserve the rock beyond these limits in the soundest possible condition. Controlled blasting techniques including presplitting and line drilling will be utilized. A blasting plan will be incorporated into the construction and operation management plan. The blasting plan will include specific

detailed information on all procedures, materials, and equipment to be used. The blasting plan will describe procedures and precautions to be taken with regard to the public, environmental and natural resources, and protection of existing structures. The blasting plan will indicate specific drilling, blasting, mucking, and hauling operation. All blasting will be performed in accordance with the approved blasting plan. Pre-blast surveys and blast monitoring will be required for blasting within 500 feet of any existing structures. Additional monitoring will also be required for blasting near identified springs.

- All excavations made by clearing and grubbing activities will be backfilled with compacted earth/aggregate available on site. All temporarily impacted areas will be restored upon completion of construction activities in accordance with the vegetation management plan. Disposal of cuttings and debris will be in an approved facility designed to handle such waste or at the direction of the BLM/IDL/counties Authorized Officers.
- A grading plan will be developed and submitted to the BLM, IDL, and Twin Falls County for review. The grading plan will show all areas where clearing and grading activities will take place. The plan will include references to all required mitigation measures and identify areas where ground-disturbing activities are to be avoided. The grading plan will also identify measures for minimization of erosion impacts, dust impacts outlined in the SWPPP.
- All excavated material removed to allow for the construction of roads and foundations will remain on site unless required and approved by the BLM/IDL/counties Authorized Officers. Machine excavation will be controlled to prevent undercutting the subgrade elevations indicated on the detailed design drawings.
- Compaction associated with the project will meet the following standards - For roads, the requirements outlined in the BLM Road Standards (Manual Section 9113) will be followed. The manual indicates that the top 12 inches of subgrades of all roads that are to be surfaced will be compacted to 95 percent of the maximum density as determined by the American Association of State Highway and Transportation Officials T-99. Rock fill will be compacted in 8-inch uncompacted thickness to 70 percent relative density as determined by American Society for Testing of Materials D4253 and D4254. Compaction will be performed with vibrating mechanical compactors.
- All permanent fences will be wildlife friendly, will meet the requirements of BLM Fencing Manual (Handbook H-1741-1), and will be appropriately marked to reduce sage-grouse collision events.
- Construction activities will not occur within 200 feet of streams. Existing or new roads which cross water features, will use fish friendly, BLM approved culverts. During construction, silt fencing will be used as well as erosion control devices to minimize erosion impacts. A SWPPP and Spill Prevention Control and Countermeasures Plan (SPCCP) will be prepared for the construction of the project. Local springs, if present, will be monitored for changes in flow due to blasting activities during construction.

The following Best Management Practices for roads are to be implemented:

- Existing BLM design standards, such as 9113 Manual (BLM, 1985), or the design standards suitable for wind energy development, approved by the BLM, indicated below.
- Preparation of a Spill Prevention Control and Countermeasures Plan
- Maximum road running surface of 20 feet plus 8-10 feet of permanent shoulder on each side.
- Final road widths will be minimized (shoulders replanted with native vegetation that does not conflict with the long-term operation of the project)
- Road surface will be that of an all weather gravel road
- All stream crossings and drainages will have culverts installed to minimize sedimentation
- All culverts will be appropriate size and materials to accommodate seasonal and daily drainage and will be maintained during construction and operation. Culverts will conform to BLM and other authorizing permitting agency standards.
- Design speed of 20 miles per hour maximum on all project roads
- A Transportation Plan will be created in consultation with the BLM and Twin Falls County and Elko County to address road standards and maintenance requirements.

The following best management practices for turbines are to be implemented:

- The construction area for each turbine will be clearly marked so sensitive areas can easily be avoided.
- Preparation of a SWPPP and SPCCP
- All temporarily impacted areas will be restored according to the vegetation management plan.
- The temporary construction area around turbine foundations will be minimized to the maximum extent possible. Where vegetation is low, turbine blades may be stored on platforms to prevent the need to remove vegetation. This is not possible for all turbine components, including tower pieces, nacelles, and hubs.

Erosion control features will be clearly stated within the SWPPP. The following best management practices will be implemented to address erosion:

- Construction areas will be clearly marked to avoid impacts in sensitive areas and minimize the overall project footprint.
- Silt fencing, geotextile fabrics, straw matting, and other tools may be used to minimize erosion impacts.
- Existing roads reconstructed for the project with seasonal washes will have culverts installed to eliminate erosion impacts.

Operation and Maintenance Best Management Practices

An Operation and Maintenance Plan will be prepared for the project to achieve reliable and safe operation. The plan will be prepared in conjunction with the manufacturer of the turbines selected for the project. The Operation and Maintenance Plan will include descriptions of each of the following major scheduled activities:

- Project Administration and Training;
- Project Performance Monitoring;
- Scheduled Wind Turbine Maintenance;
- Scheduled Balance of Plant Maintenance;
- Design Criteria, Mitigation Measures and Best Management Practices;
- Unscheduled Wind Turbine Maintenance; and
- Balance of Plant Maintenance.

Decommissioning Best Management Practices

- A decommissioning HSE Plan, similar to the construction HSE Plan, will be followed.
- A project-decommissioning plan will be developed for use in the removal of the installed power generation equipment, and for return the site to a condition as close to a pre-construction state as feasible.
- Regrading and revegetation – For areas where equipment or materials are removed, those areas will be regraded back to pre-construction contours (if possible). Holes where foundations have been removed to 3 feet will be refilled with native soils. Removed roads will be regraded to original contours if cuts and fills make such regrading practical. Crane pads will also be regraded. All areas of disturbed ground will be revegetated using seed mixtures specified by the BLM/IDL/counties.
- A SWPPP and SPCCP will be prepared for project decommissioning, if major road removal is required.

MITIGATION MEASURES AND MONITORING DURING CONSTRUCTION

Construction staff site orientation will include education on potential environmental and cultural resource impacts of the construction of the project and the project mitigation and monitoring practices. The construction manager will establish a method for staff to formally report any issues associated with the environmental impacts, to keep management informed, and allow for rapid response. It is the intention of the Proponent that the mitigation measures discussed below be effective and keep any impacts to a minimum level. If mitigation measures are found to be ineffective, or unanticipated environmental and cultural resource aspects are found on the site, the mitigation and monitoring practices will be adapted to address these conditions if possible. Any adaptations will be made with the approval of the BLM/IDL/counties Authorized Officers.

Public Safety

Given that most of the site is publicly owned, the public has a right to access the public portions of the site and use it for recreation. However, to protect the public, access may be controlled at certain times and in certain areas during construction.

Public Education: A project web site will be established to describe the status of the project and disclose the upcoming activities. As site access control is one of the primary means to provide for public safety, it will be closely monitored. The Proponent will work with the BLM/IDL/counties to make any necessary changes during the construction period to improve public safety.

The project area will not be closed to livestock grazing permit holders, and the Proponent will work with the livestock grazing permit holders to coordinate use of the project area during construction.

Fencing: For those areas where public safety could be endangered, the Applicants will install permanent fencing. The areas where permanent fencing will be used include project substations and the Interconnection substation, and operation and maintenance (O&M) facilities. Other temporary fencing may be needed during construction around open trenches, foundation holes, and other areas of active construction.

Wildlife

Sage-Grouse

Mitigation: China Mountain Wind, LLC has prepared a sage-grouse conservation plan to build mitigation measures into the project description in an effort to reduce overall impacts to sage-grouse and their habitats (Tetra Tech, 2010). A basic overview of these measures is described in Chapter 2 of this document.

- Clearing of sagebrush communities will be minimized at the project site to the greatest extent possible. In areas with very low shrubs, it will be possible to reduce the turbine pad area by laying turbine blades on hay bales or other temporary platforms. Turbine towers and other turbine components cannot be stored in this way.
- The Applicants will avoid use of the Browns Bench road for construction and operation activities.
- The Applicants will site the construction compound and O&M building near the intersection of Three Creek Road and Monument Springs Road. The Applicants will site the O&M building within the footprint of the site construction compound to reduce the overall footprint of the facility.
- The Applicants will implement an on-site restoration plan as described in the Sage-Grouse Conservation Plan.
  - The Applicants will implement an off-site mitigation strategy as described in the Sage-Grouse Conservation Plan.

Monitoring: The Applicants will implement a long-term monitoring study for a minimum of 3 years, which evaluates impacts to sage-grouse seasonal use of the project area. This will include collaboration with nearby sage-grouse studies focused on the Browns Bench population.

Golden Eagles

Mitigation: To avoid direct impacts on the golden eagles, the project will establish exclusion areas 0.25 mile centered around active golden eagle nests. These nests will be visited the season prior to construction to determine if they are active. If determined active, no project features will be sited within the exclusion areas.

Monitoring: Active eagle nests will be monitored weekly during construction. Any golden eagle carcasses discovered will be brought to the attention of the BLM/IDL Authorized Officer and to the U.S. Fish and Wildlife Service.

Migratory Birds

Mitigation: The removal of natural vegetation (grassland, shrub, and forest communities) will be minimized to the extent possible during construction. In addition, the movement of personnel and equipment on site will be limited to construction areas to avoid unnecessary trampling of area vegetation.

Monitoring: No particular monitoring for impacts to migratory birds will be performed during construction. Any avian species fatalities will be reported to the project HSE Manager, who in-turn will report the fatality to the Idaho Department of Fish and Game and the Nevada Department of Wildlife.

Mule Deer

Mitigation: Construction activities will be avoided in fauning areas between (5/1-6/30). All construction vehicles will adhere to required miles per hour limits. The Applicants will have a zero tolerance policy for wildlife harassment.

Livestock

Mitigation: Initial mitigation will be in the form of revegetation efforts applied to areas disturbed by construction activities. Reestablishment of desirable native vegetation will take several years. Throughout the life of the project, it will be important to control invasive plants and noxious weeds. Also, any open trenches or pits that are left unattended will be fenced for safety, and existing cattle guards will be left in place. If livestock are expected to be on-site during these times, the safety fencing will be chain-link rather than plastic. There are livestock watering tanks and pipes on the project site. If the Proponent damages any portions of the livestock watering system, while livestock are on the project site, the system will be repaired as soon as possible, or supplemental water will be provided. If livestock are not present, the system will be repaired before livestock are brought back to the site.

Monitoring: Avoidance measures for impacts to livestock will be monitored throughout the construction process. Any incidents will be reported to the BLM and the grazing lesee or private landowner immediately.

Construction staff will be asked to report any incidents of interaction with livestock, or livestock found close to the construction areas. If livestock are found to be attracted to the construction traffic or activities that increase their risk of injury, further mitigation measures will be discussed with ranchers, which may include the project relocating the livestock to off-site grazing areas for the remainder of the construction period. Such relocation will be with the agreement of and no cost to the rancher.

Protected Plant Species

Mitigation: Based on preliminary background research, no threatened or endangered species listed by the Endangered Species Act are believed to be found on the preference right-of-way. The northern inbound haul route overlaps a slickspot peppergrass (*Lepidium papilliferum)* management area, and suitable habitat for some BLM sensitive plant species is present within the project area. Mitigation for slickspot peppergrass will be developed as appropriate if this species is found to be present in the vicinity of the northern inbound haul route.

Noxious Weed Control

Mitigation: The control of noxious weeds is difficult. Some weeds can enter the site on equipment and vehicles, while others may spread from distant areas by spores blowing onto the site in the wind. The Proponent will design and build the project so that the amount of ground disturbance necessary will be minimized, exposing the least amount of soil possible. Large construction equipment that will be traveling off project roads will be required to be cleaned prior to entering the site. The Proponent also will work with the BLM/IDL and the Twin Falls and Elko counties Weed Control offices to establish a weed control program for the project. This may entail spot spraying with an approved herbicide along disturbed areas for noxious weeds and invasive plants species. The frequency of the spraying will be based on the season and the amount of water used for dust control, and will be adapted based on monitoring results.

Monitoring: An appropriate monitoring schedule for the Weeds Management Plan will be created in consultation with the BLM, Twin Falls County, and Elko County.

Dust

Mitigation: During construction, some localized increase in dust levels will be unavoidable. To minimize these levels, the Proponent will use water or other dust control measures on heavily used roads, and traffic speed will be held to appropriate levels. Disturbed areas will be revegetated as soon as possible following disturbance.

Monitoring: Periodic observations will be made from off-site to determine the amount of dust being generated, and the amount leaving the site. If the mitigation measures are found to be ineffective, alternative measures will be determined in coordination with the BLM/IDL/counties.

Noise

Mitigation: All construction will take place during daylight hours. If blasting is necessary, the duration will be short and it will take place during daylight hours to minimize any impacts to residences and communities in the area.

Monitoring: Through communications with the local communities, the Proponent will be kept informed of any noise complaints. If significant noise complaints are received, noise measurements will be taken along the project boundary or near the complaint sources to ascertain the true noise levels. If noise levels are found to be unsatisfactory, alternative mitigation measures will be explored.

Water Resources

Mitigation: The use of best management practices will avoid impacts to water resources. These include avoidance of construction activities within 200 feet of streams. Existing or new roads which cross water features, will use fish friendly, BLM approved culverts. During construction, silt fencing will be used as well as erosion control devices to minimize erosion impacts. A SWPPP and SPCCP will be prepared for the project. Local springs, if present will be monitored for changes in flow due to blasting activities during construction.

A SPCCP will be prepared for the project as part of the storm water program as required under 40 Code of Federal Regulations Part 112. If necessary, a site-specific program will be crafted to address any issues considered unique to this project, such as:

- Inspections of truck bottoms for leaks, drips or spills will be conducted on a daily basis
- Inspection of trucks that stay on-site for long periods (such as concrete trucks and cranes)
- Special considerations for fuel trucks
- Inspection practices for wind turbine hydraulic lines and coolant systems
- Spill clean-up protocol
- Fuel tanks should be double walled or should be located in a secondary (bunded) containment area. The secondary containment area should be able to contain at least 110 percent of the full volume of the fuel tank.

Monitoring: The SWPPP and SPCCP will include site investigation protocols. The flow through local springs near blasting areas will be monitored within an hour before and after blasting activities to determine if any changes occurred. Also, seismic monitoring will be performed at identified springs within one mile of blasting activities to ascertain the potential impacts to the spring.

The SPCCP will include the spill monitoring protocol.

Fire Prevention Plan

Mitigation: The project HSE Manual will provide a list of emergency contacts and protocols in case of a fire. During construction, fire extinguishers, five-gallon backpack hand water pumps, and fire-fighting hand tools, such as shovels, Pulaskis, or Mcleods, will be located in each project construction vehicle, in the substation control building, and the O&M building(s).

All areas where "hot work" such as welding will be performed shall be cleared of vegetation down to mineral soil or rock. Personnel performing "hot work" will be required to on hand the same fire-fighting equipment listed above.

Vegetative materials removed during construction will be treated or removed to reduce fire vulnerability. The water tank truck used for dust abatement will be left full of water and fuel at a location designated by the fire management officer for the BLM so that it is in a condition where it could be readily used in case of a fire. Smoking and off-road parking will be restricted to designated areas. The Proponent will work with the BLM Authorized Officer to establish these designated areas. Signs will be posted in strategic locations on the site to remind personnel of the emergency response procedures, liabilities, and telephone contact numbers for fire emergencies.

All ignitions will be immediately reported to South Central Idaho Interagency Dispatch Center.

Mitigation will be dependent on fire conditions and other special circumstances prevailing in the project area. If necessary, site-specific actions could include but not be limited to actions such as:

- Establishment of spotter positions on key locations within the project area
- Pre-positioning fire suppression capabilities (e.g., contracted engine crews) under high or extreme fire conditions
- Restriction of certain on-site high risk activities (e.g., welding) or suspension of all construction activities when red flag conditions occur
- Avoidance of sensitive sites and/or those having high fire potential when extreme fire conditions occur
- Road closures or travel restrictions when fire dangers are high.

Determinations of need for additional protection measures will be made by the Authorized Officer.

Cultural Resources

Mitigation: A programmatic agreement will be prepared that would take the place of a Cultural Resources Mitigation Plan prior to initiation of construction activities. The programmatic agreement would be prepared by the BLM in consultation with the Idaho and Nevada SHPOs, the ACHP, affected Tribes, the project proponents, and other interested parties.

Monitoring: Field personnel will be instructed to watch for potential artifacts, especially in areas in or near identified cultural resource boundaries. Additionally, a cultural resources specialist will be onsite to monitor construction activities in areas identified as significant according to the programmatic agreement. The cultural monitor will report periodically to the BLM designated resource specialist throughout the construction process. In the event of an inadvertent discovery, work will cease in the immediate vicinity and the BLM/IDL authorized officer will be contacted. No work shall commence until the appropriate agencies and Tribes have been notified and agree to a mitigation plan.

MITIGATION MEASURES AND MONITORING DURING OPERATION

Part of staff training will include education on potential environmental and cultural resource impacts of project operation and the site mitigation and monitoring practices. A project HSE Manager will be designated to oversee monitoring and mitigation requirements and report to the BLM/IDL/counties as needed. The success of the mitigation measures identified for project operation will be evaluated on a yearly basis. If any mitigation measures are found to be ineffective the project operation team will work with the BLM to modify mitigation (within the scope of the right-of-way grant) to address the impacts.

Public Safety

Given that the site is owned and administered by the BLM/IDL/counties, the public has a right to access the site and use it for recreation. This right will be balanced with the protection of public safety, a key aspect of the site HSE plan. To accomplish this, O&M staff will ensure public education, site access control, fencing, and limited public supervision activities.

Site Access Control: The O&M staff cannot limit public access to the site to a level lower than it was prior to the start of the construction, except in those areas where public safety could be jeopardized (or where theft-control measures are appropriate).

Fencing: The area around the substations will be fenced per requirements for public safety. In addition, there may need to be some fencing around vehicle and equipment storage areas at the O&M facilities. No other permanent fencing is currently anticipated. During some scheduled or unscheduled maintenance activities that could involve open pits or other potentially unsafe areas, temporary safety fencing will be installed.

Limited Supervision: Site operation staff will not be supervising members of the public who choose to be on the project site. During some scheduled and unscheduled maintenance activities, it may be necessary to control public access to maintain a minimum safe distance.

Wildlife

Sage-Grouse

Mitigation:

- O&M activities will be scheduled to avoid impacting known leks during the spring mating season. This will include avoidance of areas within 1 mile of known active leks before 9 am during lekking season (March 15-May 15) unless an emergency requires immediate access to an area.
- All operation staff will be trained in measures to reduce impacts to sage-grouse, including the importance of minimized disturbance during lekking and nesting seasons.

Monitoring: A detailed monitoring plan will be developed through consultation with the BLM and wildlife management agencies and be incorporated into the right-of-way grant. This will include coordination with Idaho Department of Fish and Game and Nevada Department of Wildlife on existing radio-telemetry studies. The Applicants will coordinate with wildlife agencies, consultants, universities, or non-profit organizations to make the project available for long-term monitoring studies on the effects of wind energy projects on wildlife.

Golden Eagles

Mitigation: To avoid direct impacts on the golden eagles, the project will establish exclusion areas around known active golden eagle nests. Activities within these areas will be avoided whenever possible. Golden eagle nests established after initial operation will be monitored during nesting season. Any fatalities will be reported immediately.

Monitoring: Golden eagle nests will be monitored annually for 5 years following construction. Monitoring will document nest locations, nest success, and number of young fledged.

Migratory Birds

Mitigation: The majority of mitigation measures to avoid avian collisions with wind turbines are incorporated into the turbine design. These measures include solid tubular towers to eliminate perch locations, blade positioned "upwind" of the respective towers, and slow-rotating blades for easy observation. No further mitigation measures are expected at this time. The results of avian collision monitoring, however, will be reviewed with the BLM and wildlife management and regulatory agencies to determine if additional mitigation measures are appropriate.

Wildlife Fatality Monitoring Plan

The project owner shall commit to conducting wildlife fatality monitoring for a minimum of five years. The purpose of the monitoring plan shall be to monitor impacts to birds and bats as a result of turbine operation. The project owner shall hire a reputable environmental consultant with experience in wildlife monitoring at wind projects to draft the fatality monitoring plan. The plan will be reviewed by the BLM and wildlife management and regulatory agencies and would recommend changes to the monitoring protocols and mitigation plans as determined necessary.

Wildlife Incidental Reporting Plan

The project owner shall train all operation staff in measures for reporting incidental wildlife fatality or injury events. This plan shall be reviewed by the WWG. The plan shall be in place for the life of the project. The purpose of the plan is to supplement the WOMP, and continue to report wildlife impacts to the BLM/IDL/counties after the WOMP is completed.

Mule Deer

Mitigation:

- The permanent loss of habitat will be avoided to the maximum extent possible.
- Implementation of a vegetation management plan will focus on revegetation of temporarily disturbed areas and help avoid the spread of noxious weeds which in-turn will affect habitat.
- Project road speed limits of 20 miles per hour will be enforced on all project roads to minimize collision impacts.
- Big game hunting will continue to be allowed within the project area. The Applicants will develop a handout that will be made available to hunters identifying safety recommendations for hunting in the vicinity of the operating project. Any violations of state hunting rules or poaching will be reported immediately to the local law enforcement agency and wildlife management agencies.
- A zero-tolerance policy for harassment of wildlife project staff will be implemented during project operation.

Monitoring: No specific monitoring program is outlined at this time.

Livestock

Mitigation: Initial mitigation will be in the form of revegetation efforts applied to areas disturbed by construction activities. Any safety hazards to livestock will be temporarily fenced until a permanent fix to the hazard can be implemented.

Monitoring: Other than the reporting of any incidents of operation or maintenance vehicles hitting livestock, no monitoring program is anticipated for livestock. It is expected that livestock will coexist with the project without difficulty, as has been observed at other wind energy projects. If problems occur between the livestock and project operation, discussions of other mitigation measures will be held among the operation staff, permittees, and the BLM/IDL/counties Authorized Officers.

Noxious Weed Control

Mitigation: At the completion of project construction, exposed areas will be reseeded. BLM approved spot spraying will continue until the revegetation has been determined successful. At that time, the project owners will work with the BLM/IDL and the Twin Falls and Elko County Weed Control offices to determine a weed control plan for the long-term operation of the project. Such a

plan is expected to continue the use of spot spraying on a less frequent basis. If blade washing or dust control is found to be necessary, the impacts of introducing this extra water to the site will be monitored, and if necessary, additional weed spot spraying will be performed.

Monitoring: Other than the periodic review of the project site by the BLM/IDL and the Twin Falls and Elko County Weed Control offices, no other monitoring program for noxious weeds during operation is currently expected.

Dust

Mitigation: To minimize dust levels, project road traffic speed will be kept to 20 miles per hour or less. Disturbed areas will be revegetated or otherwise covered as soon as possible following disturbance. During very dry periods, it may be necessary to apply water or other dust control substances to the project roads.

Monitoring: Periodic observations will be made from off-site to determine the amount of dust being generated, and the amount leaving the site. If the mitigation measures are found to be ineffective, alternative measures will be determined in coordination with the BLM/IDL/counties.

Noise

Mitigation: No noise mitigation measures are expected to be necessary.

Monitoring: Through communications with the local communities, O&M staff will be kept informed of any noise complaints. If significant noise complaints are received, noise measurements will be taken along the project boundary or near the complaint sources to ascertain the true noise levels and source. If noise levels are found to be unsatisfactory, alternative operation, maintenance, or mitigation measures will be explored.

Water Resources

Mitigation: The use of best management practices will avoid impacts to water resources. Project drainage components, such as culverts or drains, will be maintained in good working order.

A SPCCP will be implemented. Any spills will be promptly cleaned in a manner appropriate for the materials, and reported to plant management. If necessary, a site-specific program will be crafted to address any issues considered unique to this project, such as inspection practices for wind turbine hydraulic lines and coolant systems and spill clean-up protocol.

Monitoring: During normal project O&M activities, signs of soil erosion will be watched for. Operations will also maintain open communication with local residents in case increased sediment in water is found.

The SPCCP will include a spill reporting, monitoring and clean-up protocol.

Fire Protection Plan

Mitigation: The site HSE manual will provide a list of emergency contacts and protocols in case of a fire. Fire extinguishers will be located in the base of each wind turbine tower, in each project vehicle, in the substation control building, and the O&M building(s). Smoking will be restricted to designated areas, and off-road parking will be restricted. Signs will be posted in periodic locations on the site to remind personnel and the public of emergency response procedures, liabilities, and contact telephone numbers.

During the O&M phase of the project, activities in the project area will generally be subject to the same fire restrictions and use parameters as those public lands outside the project area. Under circumstances where non-routine or major O&M work needs to be accomplished, the Authorized Officer shall be notified and determine the need for additional fire protection measures, which could include those identified under Fire Protection Plans above.

Monitoring: If project site personnel find a fire, they will immediately report it to South Central Idaho Interagency Dispatch Center.

Hazardous Materials Storage and Removal

Mitigation: Hazardous materials will be clearly stored in containers appropriate for their storage and use. Project staff will be trained in the safe storage and handling practices of any on-site hazardous materials. Materials Safety Data Sheets will be in the O&M building(s) and easily accessible to plant personnel. If containers of such materials are required to be taken to the project site, they will be in appropriate containers and clearly labeled as hazardous in a manner clear to the general public. Storage areas for hazardous materials will include impermeable containment capable of holding at least 110 percent of all materials.

Storage and handling of hazardous materials will be in accordance with the SPCCP approved by the BLM/IDL/counties in the project Operation Manual, to be developed at the end of the construction-phase.

Monitoring: Monitoring of hazardous materials will be performed per the HSE manual. If an accidental release occurs, the event shall be documented and evaluated. This includes a root cause analysis, appropriate corrective action, and characterization of the resulting environmental, health, and safety impacts. As required, the release documentation will also be forwarded to appropriate Federal, state, or local government agencies.

Cultural Resources

Mitigation: A programmatic agreement will be completed before the initiation of construction activities. The programmatic agreement will detail the monitoring and mitigation that is to occur during construction, operation and decommissioning of the project.

Monitoring: Monitoring during the operation phase will be implemented where needed within the operational boundaries of the project. The details of operational monitoring for cultural resources will be outlined in the programmatic agreement.

MITIGATION MEASURES AND MONITORING DURING DECOMMISSIONING

Public Safety

Given that the majority of the project area is administered by the BLM/IDL, the public has a right to access the site and use it for recreation. This right will be balanced with the protection of public safety, a key aspect of the project HSE plan. To accomplish this, the Proponent will perform public education, site access control, fencing, and limited supervision activities.

Public Education: A project web site will be established to describe the status of the project, and disclose the upcoming activities. Additional outreach will be performed as necessary. The goal of this program is to provide information to the curious public without them needing to physically access the site.

Site Access Control: During decommissioning, portions of the project area may need to have public access controlled for limited duration for health and safety purposes. During short-duration decommissioning activities such as wind turbine disassembly, the project owner will have crews on-site performing the activity and monitoring overall safety. Crew members and safety monitors will ask members of the public to maintain a safe distance from the work zone. Neither the crew members nor the safety officers have the authority or responsibility of keeping all members of the public away from the decommissioning zone, especially if members of the public choose to ignore posting signs or requests for them to keep some distance from the decommissioning zone.

Fencing: For those areas where public safety could be endangered, the Applicants will install temporary fencing. The areas where temporary fencing will be used include open trenches and excavations where a fall hazard exists.

Wildlife

Sage-Grouse

Mitigation: Clearing of sagebrush community will be minimized to the maximum extent possible at the project site. In addition, methods of avoiding or minimizing fragmentation of the community will be taken into account prior to clearing. Decommissioning activities will be scheduled to avoid off-limit areas and seasonal timing restrictions identified in the right-of-way grant.

Monitoring: Signage or other markings for restricted activity areas will be checked at minimum once each week to insure presence and proper placement. Damaged or missing signage will be replaced as soon as possible. Site managers will observe restricted areas and be responsible for taking appropriate actions if entry to these areas occurs. Persons responsible for environmental compliance

will be cognizant of site clearing activities and insure that impacts to the sagebrush community are minimized to the extent possible.

Staff will also be asked to report any sightings of sage-grouse on the project site, especially near the leks during the spring mating season. Significant numbers of sage-grouse found in areas without identified leks will be reported to the BLM/IDL/Idaho Department of Fish and Game for further inspection.

Golden Eagles

Mitigation: Active golden eagle nests will be monitored within the vicinity of the project during decommissioning. Any sign of distress or fatality will be reported immediately to the Idaho Department of Fish and Game and Nevada Department of Wildlife.

Monitoring: The project site will be visually monitored on a weekly basis during decommission, at minimum. Any golden eagle carcasses discovered will be brought to the attention of the BLM/IDL Authorized Officer.

Migratory Birds

Mitigation: The removal of natural vegetation (grassland, shrub, and forest communities) will be minimized to the extent possible during decommissioning. In addition, the movement of personnel and equipment on site will be limited to decommissioning areas to avoid unnecessary trampling of area vegetation.

Monitoring: No particular monitoring for impacts to migratory birds will be performed during decommissioning.

Mule Deer

Mitigation: No mitigation is identified for decommissioning at this time.

Monitoring: No mitigation is identified for decommissioning at this time.

Livestock

Mitigation: Revegetation efforts will be applied to areas disturbed by decommissioning activities. Also, any open trenches or pits that are left unattended will be fenced for safety, and existing cattle guards will be left in place. If livestock are expected to be on-site during these times, the safety fencing will be chain-link rather than plastic. If any portions of potential livestock watering system are damaged during decommissioning while livestock are on the project site, the system will be repaired as soon as possible. If no livestock are present, the system will be repaired before livestock are brought back to the site.

Monitoring: The project site will be visually monitored on a weekly basis, at minimum, to insure that decommissioning sites, laydown areas, roadways, and associated activities potentially impacting grazing lands are limited to areas agreed to prior to decommissioning. Irregularities and/or violations will be reported immediately to project management and corrective actions taken.

Staff will be asked to report any incidents of interaction with livestock, or livestock found close to the construction areas. If livestock are found to be attracted to the decommissioning traffic or activities such that it increases their risk of injury, further mitigation measures will be discussed with ranchers, which may include the project relocating the livestock to off-site grazing areas for the remainder of decommissioning.

Noxious Weed Control

Mitigation: All large construction equipment (such as earthmovers and cranes) will be required to be cleaned prior to entering the site. A truck wash will be established near the base of the project road. The project owners will work with the BLM/IDL and the Twin Falls and Elko County Weed Control offices to update the weed control program for the project decommissioning activities, which will entail spot spraying with approved pesticides along disturbed areas for noxious weeds and invasive plant species. The frequency of the spraying will be based on the season and the amount of water used for dust control, and will be adapted based on monitoring results.

Monitoring: A noxious weed inventory will be performed before the start of decommissioning. The project owners will work with the Twin Falls and Elko County Weed Control offices to perform monthly weed surveys on the project site during the spring and summer months of the decommissioning phase of the project.

Dust

Mitigation: During decommissioning, some localized increase in dust levels will be unavoidable. To minimize these levels, the project owners will use water or other dust control measures on heavily used roads, and traffic speed will be held to appropriate levels. Disturbed areas will be revegetated or otherwise covered as soon as possible following disturbance.

Monitoring: Periodic observations will be made from off-site to determine the amount of dust being generated, and the amount leaving the site. If the mitigation measures are found to be ineffective, alternative measures will be determined in coordination with the BLM/IDL/counties.

Noise

Mitigation: All decommissioning will take place during daylight hours.

Monitoring: Through communications with the local communities, the Proponent will be kept informed of any noise complaints. If significant noise complaints are received, noise measurements will be taken along the project boundary or near the complaint sources to ascertain the true noise levels. If noise levels are found to be unsatisfactory, alternative mitigation measures will be explored.

Water Resources

Mitigation: The use of best management practices will avoid impacts to water resources. A SWPPP and SPCCP may be required for the decommissioning, if major road removal is required.

A SPCCP will be part of the project's decommissioning plan, and may also be prepared for the project as part of the storm water program as required under 40 Code of Federal Regulations Part 112. If necessary, a site-specific program will be crafted to address any issues considered unique to this project, such as:

- Inspections of truck bottoms for leaks, drips, or spills will be conducted on a daily basis.
- Inspection of trucks that stay on-site for long periods (such as concrete trucks and cranes)
- Special considerations for fuel trucks.
- Inspection practices for wind turbine hydraulic lines and coolant systems.
- Spill clean-up protocol.
- Fuel tanks should be double-walled or should be located in a secondary (bunded) containment area. The secondary containment area should be able to contain at least 110 percent of the full volume of the fuel tank.

Monitoring: The SWPPP and SPCCP will include site investigation protocols. The SPCCP will include the spill monitoring protocol.

Fire Prevention Plan

Mitigation: The site HSE manual will provide a list of emergency contacts in case of a fire. Fire extinguishers will be located in the base of each wind turbine tower, in each project vehicle, in the substation control building, and the O&M building(s).

All areas where "hot work" such as welding will be performed shall be cleared of vegetation down to mineral soil or rock. Personnel performing "hot work" will be required to have a fire extinguisher, a five-gallon backpack hand water pump, and fire-fighting hand tool, such as a shovel, Pulaski, or a Mcleod nearby.

Vegetative materials removed during the decommissioning process will be treated or removed to reduce fire vulnerability. If a water truck is used for dust abatement, this piece of equipment will be maintained full of water and fuel so that it is in a condition where it could be readily used in case of fire. Smoking will be restricted to designated areas, and off-road parking will be restricted. Signs will be posted in periodic locations on the site to remind personnel of the emergency response procedures, liabilities, and contact telephone numbers.

All ignitions will be immediately reported to South Central Idaho Interagency Dispatch Center.

Mitigation will be dependent on fire conditions and other special circumstances prevailing in the project area. If necessary, specific actions could include, but not be limited to, actions such as:

- Restriction of certain on-site high risk activities (e.g., welding) or suspension of all on the ground decommissioning activities when red flag conditions occur
- Establishment of spotter positions on key locations within the project area
- Road closures or travel restrictions when fire dangers are high
- Pre-positioning fire suppression capabilities (e.g., contracted engine crews) under high or extreme fire conditions

Cultural Resources

Mitigation: Prior to decommissioning, a cultural resources inventory will be conducted in areas proposed for decommissioning activities that have not been previously surveyed to ensure all resources are identified and mitigated accordingly.

Monitoring: Field personnel will be instructed to watch for potential artifacts, especially in areas in or near identified cultural resource boundaries. If any artifacts are located, decommissioning work in that area will cease and the BLM/IDL authorized officer or designee will be consulted.

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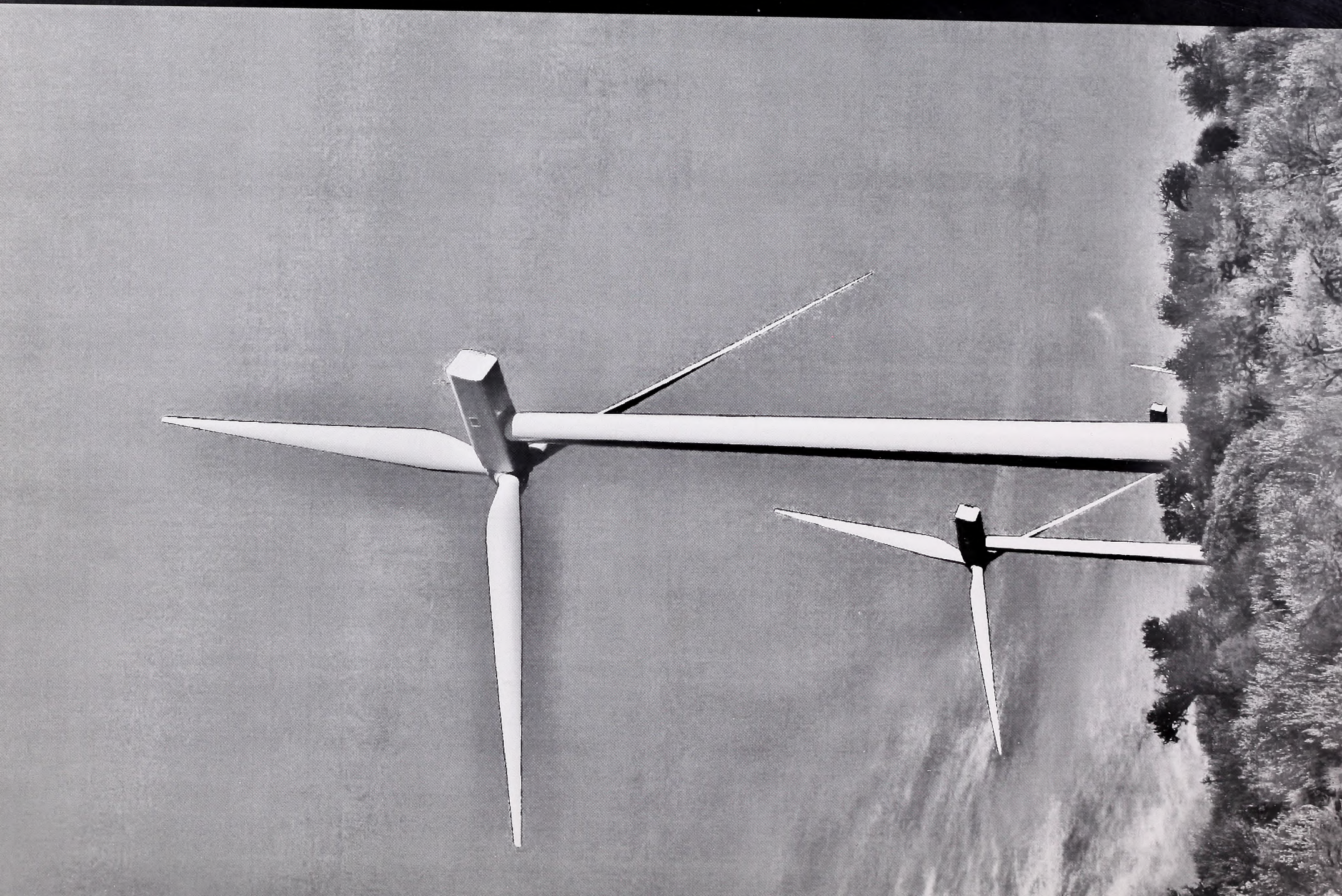
Appendix 3A – Proper Functioning Condition Assessed Streams within and near the Project Area and Haul Routes



PROPER FUNCTIONING CONDITION ASSESSED STREAMS WITHIN AND NEAR THE PROJECT AREA AND HAUL ROUTES

Stream Name	Stream Reach Identifier	Stream Type	Last Year Rated	PFC Rating[1]	Reach Mileage
IDAHO					
Antelope Springs	0.0 – 0.3	Intermittent	2006	FAR-DN	0.4
Antelope Springs	1.4 – 2.7	Intermittent	2006	FAR-DN	1.3
Bear Creek	4.2 – 4.3	Perennial	2005	FAR	0.2
Bear Creek	4.3 – 4.6	Perennial	2005	FAR-DN	0.2
Bear Creek	4.6 – 5.4	Perennial	2005	FAR-DN	0.8
Bear Creek	5.4 – 5.6	Perennial	2007	Non-Riparian	0.1
Bear Creek	5.6 – 5.9	Perennial	2007	Non-Riparian	0.4
Bear Creek	5.9 – 6.0	Perennial	2007	Non-Riparian	0.1
Bear Creek EF	0.6 – 1.5	Perennial	2005	FAR	0.9
Bear Creek EF	0.6 – 1.5	Intermittent	2005	FAR	0.1
Bear Creek Middle Fork	0.2 – 0.4	Perennial	2005	FAR	0.3
Big Flat Creek	7.7 – 8.6	Perennial	2006	PFC	0.9
Big Flat Creek	8.6 – 8.9	Perennial	2006	PFC	0.3
Browns Creek	1.4 – 3.1	Intermittent	2006	FAR-DN	1.6
Browns Creek	3.1 – 4.2	Perennial	2006	PFC	0.9
Browns Creek	3.1 – 4.2	Intermittent	2006	PFC	0.1
Browns Creek	3.1 – 4.2	Intermittent	2006	PFC	0.2
Camas Slough	4.8 – 5.1	Intermittent	2006	NF	0.2
Camas Slough	5.1 – 5.4	Intermittent	2006	NF	0.4
Cedar Creek	15.2 – 15.7	Perennial	2007	FAR	0.5
Cedar Creek	15.7 – 16.7	Perennial	2007	PFC	1.0
Cedar Creek	16.7 – 17.3	Perennial	2007	FAR-UP	0.6
Cedar Creek	17.3 – 18.8	Perennial	2007	PFC	2.0
Cedar Creek	24.9 – 25.6	Perennial	2005	FAR-UP	0.7
Cedar Creek	25.6 – 26.1	Perennial	2005	FAR-UP	0.5
Cedar Creek	26.1 – 26.7	Perennial	2005	FAR-UP	0.5
Cedar Creek	26.7 – 27.4	Perennial	2005	PFC	0.7
Cedar Creek	27.4 – 27.9	Perennial	2005	PFC	0.6
Cedar Creek	28.2 – 28.4	Perennial	2005	FAR-UP	0.2
Cedar Creek	28.4 – 29.0	Perennial	2005	FAR-UP	0.6
Cedar Creek	29.0 – 30.0	Perennial	2005	FAR-UP	0.6
Cedar Creek	30.0 – 30.7	Perennial	2005	FAR	0.8
Cedar Creek	30.7 – 31.1	Perennial	2005	PFC	0.4
Cherry Creek	1.5 – 1.8	Intermittent	2006	FAR	0.3
Cherry Creek	5.1 – 5.2	Intermittent	2006	FAR	0.2
China Creek	0.2 – 0.7	Perennial	2006	FAR-UP	0.5
China Creek	0.7 – 1.4	Perennial	2006	FAR-UP	0.8
China Creek	1.4 – 1.8	Perennial	2006	FAR	0.6
China Creek	2.0 – 2.8	Perennial	2006	FAR	0.8
China Creek	2.8 – 3.2	Perennial	2006	FAR-UP	0.3
China Creek	4.5 – 4.7	Perennial	2006	PFC	0.2
China Creek	4.7 – 5.0	Perennial	2006	PFC	0.4
China Creek	5.0 – 5.2	Perennial	2006	PFC	0.3
China Creek East Fork	0.0 – 3.5	Perennial	2006	FAR	2.0

Stream Name	Stream Reach Identifier	Stream Type	Last Year Rated	PFC Rating[1]	Reach Mileage
China Creek East Fork	0.0 – 3.5	Intermittent	2006	FAR	1.5
China Creek Middle Fork	1.8 – 2.0	Perennial	2006	PFC	0.7
Clover Creek	0.0 – 0.7	Perennial	2006	FAR-DN	0.6
Clover Creek	0.7 – 3.4	Perennial	2006	FAR-DN	2.8
Clover Creek	3.4 – 7.8	Perennial	2006	FAR-DN	4.4
Clover Creek	7.8 – 9.3	Perennial	2006	FAR-DN	1.6
Clover Creek	11.0 – 12.3	Perennial	2006	FAR	1.3
Clover Creek	12.3 – 13.5	Perennial	2006	FAR-UP	1.0
Clover Creek	13.5 – 15.7	Perennial	2006	FAR-UP	2.5
Clover Creek	17.4 – 18.3	Perennial	2006	FAR-UP	1.1
Clover Creek	18.3 – 18.5	Perennial	2006	FAR-UP	0.1
Clover Creek	18.5 – 21.9	Perennial	2006	FAR-DN	3.5
Clover Creek	21.9 – 22.5	Perennial	2006	FAR-DN	0.6
Clover Creek	23.0 – 23.8	Perennial	2006	FAR-UP	0.9
Clover Creek	26.8 – 27.6	Perennial	2006	FAR-UP	0.9
Clover Creek	27.6 – 29.2	Perennial	2006	FAR-UP	1.5
Clover Creek	29.2 – 29.9	Perennial	2006	FAR-UP	0.7
Clover Creek	29.9 – 30.2	Perennial	2006	FAR-UP	0.3
Clover Creek	30.2 – 30.9	Perennial	2006	FAR-UP	0.7
Clover Creek	30.9 – 31.1	Perennial	2006	FAR	0.2
Clover Creek	31.1 – 32.8	Perennial	2006	FAR-UP	1.7
Clover Creek	32.8 – 33.0	Perennial	2006	FAR-UP	0.2
Clover Creek	33.0 – 33.6	Perennial	2006	FAR	0.6
Clover Creek	35.5 – 36.4	Perennial	2006	FAR-UP	0.9
Clover Creek	36.4 – 38.0	Perennial	2006	FAR-UP	1.6
Clover Creek	38.0 – 40.2	Perennial	2006	FAR-UP	2.2
Clover Creek	40.2 – 41.8	Perennial	2006	FAR	1.6
Clover Creek	41.8 – 46.0	Perennial	2006	FAR-UP	4.2
Corral Creek	0.4 – 1.1	Perennial	2006	PFC	0.4
Corral Creek	0.4 – 1.1	Intermittent	2006	PFC	0.2
Crawfish Springs Creek	0.5 – 0.9	Perennial	2007	PFC	0.1
Deer Creek	4.3 – 5.1	Perennial	2006	FAR-UP	0.8
Deer Creek	5.1 – 5.7	Perennial	2006	PFC	0.6
Deer Creek	5.7 – 6.3	Perennial	2006	FAR	0.7
Devil Creek	28.7 – 32.8	Perennial	2006	FAR	0.4
Devil Creek	32.8 – 34.7	Perennial	2006	FAR	1.2
Devil Creek	33.2 – 33.4	Perennial	2006	FAR	0.2
Devil Creek	33.4 – 34.0	Perennial	2006	FAR-DN	0.6
Devil Creek	34.0 – 34.7	Perennial	2006	FAR-DN	0.8
House Creek	0.0 – 0.3	Perennial	2006	FAR	0.3
House Creek	16.8 – 17.5	Perennial	2004	PFC	0.7
House Creek	17.6 – 17.8	Perennial	2004	PFC	0.2
House Creek	17.8 – 18.1	Perennial	2004	PFC	0.3
House Creek	18.4 – 19.6	Perennial	2004	PFC	1.2
House Creek	3.4 – 3.6	Perennial	2004	PFC	0.2
House Creek	3.6 – 4.4	Perennial	2004	FAR-UP	0.8
Little House Creek	4.2 – 5.6	Ephemeral	2007	FAR	1.0

Stream Name	Stream Reach Identifier	Stream Type	Last Year Rated	PFC Rating[1]	Reach Mileage
Little House Creek	4.2 – 5.6	Intermittent	2007	FAR	0.4
Little House Creek	5.6 – 6.2	Intermittent	2006	PFC	0.4
Little House Creek	5.6 – 6.2	Perennial	2006	PFC	0.3
Little House Creek	5.6 – 6.2	Intermittent	2006	PFC	0.0
Little Spring Creek	2.5 – 2.8	Perennial	2006	NF	0.3
Little Spring Creek	2.8 – 3.0	Perennial	2006	NF	0.2
Little Spring Creek	3.4 – 4.0	Perennial	2006	NF	0.1
Little Spring Creek	3.4 – 4.0	Intermittent	2006	NF	0.6
Meadow Springs Creek	0.6 – 1.0	Perennial	2005	PFC	0.4
Mud Flat Creek	2.5 – 2.8	Intermittent	2006	NF	0.3
Mud Flat Creek	2.8 – 3.4	Intermittent	2006	NF	0.5
Mud Flat Creek	3.4 – 3.5	Intermittent	2006	NF	0.2
Mud Flat Creek East Fork	0.0 – 0.4	Intermittent	2006	NF	0.4
Player Creek	1.9 – 3.4	Intermittent	2006	PFC	0.1
Player Creek	1.9 – 3.4	Intermittent	2006	PFC	0.1
Player Creek	1.9 – 3.4	Intermittent	2006	PFC	0.5
Player Creek	1.9 – 3.4	Intermittent	2006	PFC	0.6
Player Creek	1.9 – 3.4	Perennial	2006	PFC	0.2
Player Creek	trib. 1 (0.3 mi.)	Intermittent	1999	PFC	0.3
Player Creek	trib. 2 (0.2 mi.)	Intermittent	1999	PFC	0.2
Rocky Canyon	0.7 – 1.7	Perennial	2006	FAR-UP	1.1
Rocky Canyon	1.7 – 2.0	Perennial	2006	FAR-UP	0.5
Rocky Canyon	1.7 – 2.0	Intermittent	2006	FAR-UP	0.0
Shack Creek	3.6 – 3.8	Perennial	2004	FAR	0.2
Shack Creek	3.8 – 4.2	Perennial	2001	FAR	0.4
Shack Creek	4.2 – 4.9	Intermittent	2007	Non-Riparian	0.7
Shack Creek	5.2 – 5.7	Intermittent		Unknown	0.5
Shack Creek EF	0.0 – 0.2	Perennial	2005	FAR-UP	0.1
Taylor Canyon Creek	0.0 – 1.0	Perennial	2006	PFC	1.0
Three Creek	4.7 – 5.8	Perennial	2006	FAR	0.5
Three Creek	6.3 – 6.8	Perennial	2006	FAR-UP	1.1
Timber Canyon	0.7 – 2.0	Perennial	2006	FAR-DN	1.5
Timber Canyon	2.0 – 2.3	Perennial	2006	FAR-DN	0.3
Whiskey Slough	0.0 – 1.3	Perennial	2006	FAR	0.3
Whiskey Slough	0.0 – 1.3	Perennial	2006	FAR	1.1
NEVADA					
Bear Creek	N/A	Perennial	N/A	PFC	0.13
Bear Creek	N/A	Perennial	N/A	FAR-DN	0.03
Bear Creek	N/A	Perennial	N/A	N/A	1.12
Cottonwood Creek (Jackpot)	N/A	Perennial	2000	PFC	0.81
North Fork Salmon Falls Creek	N/A	Perennial	1999	FAR-NA	0.80
North Fork Salmon Falls Creek	N/A	Perennial	N/A	N/A	1.61
Shack Creek	N/A	Perennial	2000	FAR-DN	0.79
Shack Creek	N/A	Perennial	N/A	N/A	0.26

[1] PFC: proper functioning condition; FAR: functional-at risk; FAR-UP: FAR with an upward trend; FAR-NA: FAR no apparent trend; FAR-DN: FAR with a downward trend; NF: non-functional (BLM, 1998).

Sources: BLM, 2006; BLM, 2009.

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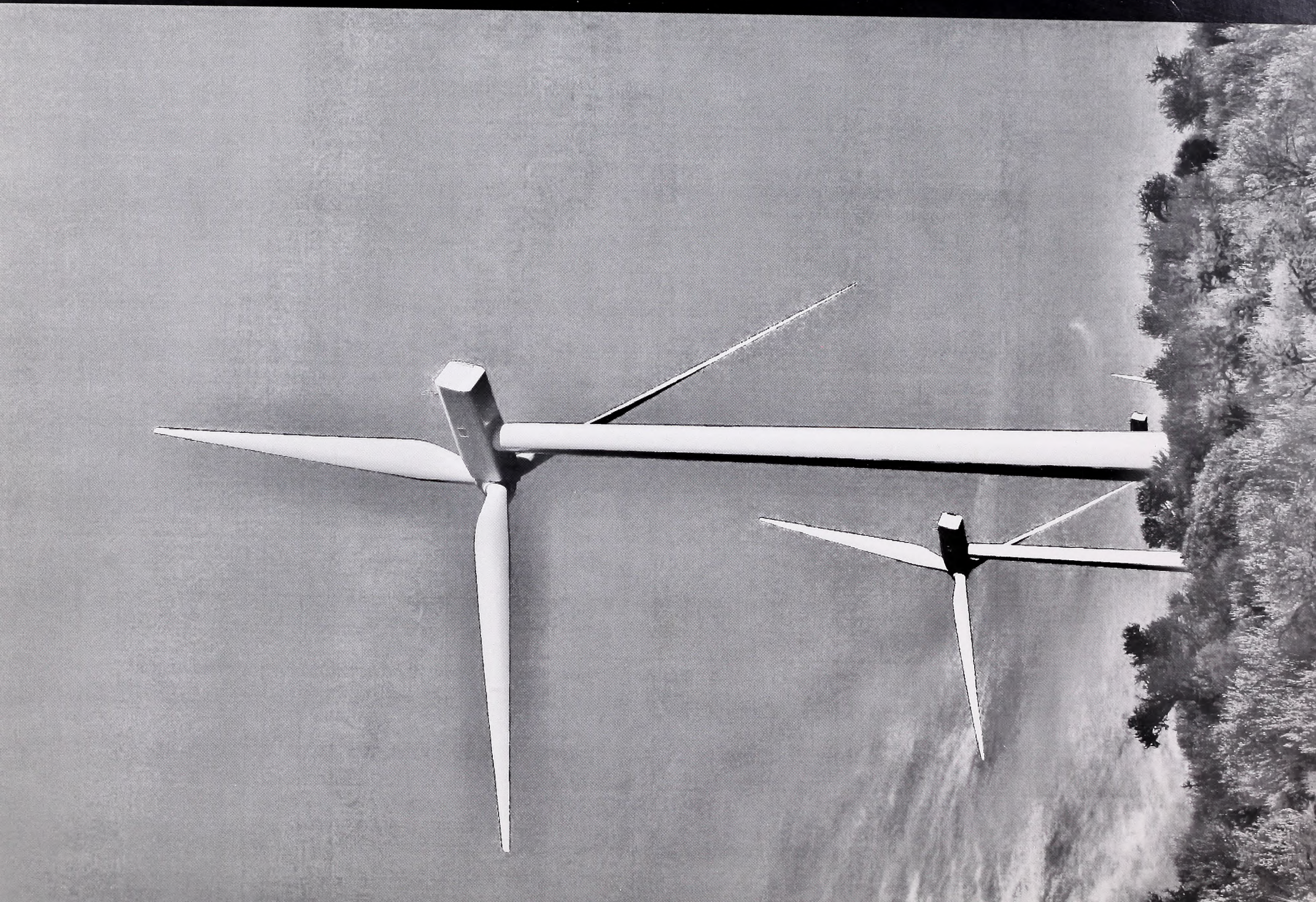
Appendix 3B – Acoustics Fundamentals



ACOUSTICS FUNDAMENTALS

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

Sound is a physical phenomenon consisting of minute vibrations, which travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by a number of variables including frequency and intensity. Frequency describes the sound's pitch and is measured in Hertz (Hz), while intensity describes the sound's loudness and is measured in decibels (dB).

Hertz is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates a number of times per second. When the drum skin vibrates at 100 times per second, a sound pressure wave is generated that is oscillates at 100 Hz and this pressure oscillation is perceived as a tonal pitch of 100 Hz. Sound frequencies between 20 Hz and 20,000 Hz are within the range of sensitivity of the best human ear.

The decibel is the basic unit of sound measurement. Decibels are units that represent relative acoustic energy. Because the range of energy found throughout the spectrum of normal human hearing is so wide, the quantities necessary to define these levels must be able to represent huge variations in energy. To compensate for this variance, the analogy of which might be using a common scale to describe both the mass of a paperclip at one end and that of a battleship at the other, a base-10 logarithmic scale is used to make the sound magnitude values more convenient for discussion purposes.

Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually pain at still higher levels. The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. An increase (or decrease) in sound level of about 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness, and this relation holds true for loud sounds and for quieter sounds.

Because of the logarithmic nature of the dB unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. However, some simple rules of thumb are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, for example, 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB.

Sound from a tuning fork (a pure tone) contains a single frequency. In contrast, sounds heard in the environment usually consist of a range of frequencies, each having different amplitude. People respond differently to sound energy in varying acoustic frequency ranges. The method of correlating human response to equivalent sound pressure levels at different frequencies is termed "A-weighting." The weighting system used to correlate human hearing to frequency response is the "A-weighting scale" and the resultant sound pressure level is called "A-weighted sound pressure level." This is generally abbreviated by the expression dBA. With standardized adjustments to the octave-band center frequencies of a measured sound level, the dBA scale de-emphasizes very low and very high frequencies and instead emphasizes the middle frequencies, thereby closely approximating the frequency response of the human ear. For instance, the weighting for sound at 63 Hz is approximately -26 dB, but sound at 1000 Hz (*i.e.*, typical of speech) is not weighted at all.

Other weighting systems include the "C-weighting scale," which does not discount low frequencies as aggressively as the A-weighting scale. Identified as "dBC" when used, the C-weighting scale finds application when there is interest in evaluating low frequency noise, such as exhaust from fossil-fuel burning engines and turbines at power plants and similar industrial facilities.

To give the reader some context of how loud a particular decibel level may be, and to relate that level to a familiar noise environment, Table 1 provides examples of common outdoor and indoor noise environments and, inline horizontally on the table, their respective approximate magnitudes in dBA.

Table 1. Sound Pressure Levels of Typical Noise Sources and Noise Environments.

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Jet Fly-over at 1000 feet (300 meters)	110-100	Rock Band
Gas Lawn Mower at 3 feet (1 meter)	100-90	
Diesel Truck at 50 feet (15 meters), at 50 miles per hour (80 kilometer/hour)	90-80	Food Blender at 3 feet (1 meter)
Commercial Area, Gas Lawn Mower at 100 feet (30 meters)	70	Vacuum Cleaner at 10 feet (3 meters)
Heavy Traffic at 300 feet (90 meters)	60	Normal Speech at 3 feet (1 meter)
Quiet Urban Daytime	50-40	Large Business Office
Quiet Urban/Suburban Nighttime	40-30	Theater, Large Conference Room (Background)
Quiet Rural Nighttime	30-20	Library, Bedroom at Night, Concert Hall (Background)
	20-10	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	0	

Source: Hendriks, 1998.

In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve. Although a measured A-weighted sound level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a conglomeration of noise from distant sources that creates a relatively steady background noise in which no particular source is identifiable. To help characterize this phenomenon, a single descriptor called the equivalent sound level (L_{eq}) is used,

which is the energy-mean A-weighted sound level during a measured time interval. It is the "equivalent" constant sound level that would have to be produced by a given source to equal the total energy of the fluctuating level measured.

In addition to the energy-average level, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the maximum L_{eq} and minimum L_{eq} (L_{min}) indicators that represent the root-mean-square maximum and minimum noise levels measured during the monitoring interval. The L_{min} value obtained for a particular monitoring location is often called the acoustic floor for that location.

Finally, another sound descriptor known as the Day-Night Average Noise Level is defined as the A-weighted equivalent sound level for a 24-hour day. It is calculated by adding a 10 dB penalty to sound levels at night (10:00 p.m. to 7:00 a.m.) to compensate for the increased sensitivity to noise during the quieter evening and nighttime hours.

Sound level, or amplitude, attenuates with distance as it propagates over a larger area, generally in a spherical spreading pattern, away from a point source where the sound waves were generated. By way of analogy, light intensity decreases in a similar manner: when one steps farther and farther away from, say, a 25-watt light bulb, the bulb appears to be less and less bright—even though, of course, the power or wattage of the light at the source (i.e., the bulb) has not changed. Generally speaking, the sound pressure level emitted from a point source decreases by approximately six dBA for each doubling of distance. Outdoor environmental factors can influence this rate of sound level "drop-off."

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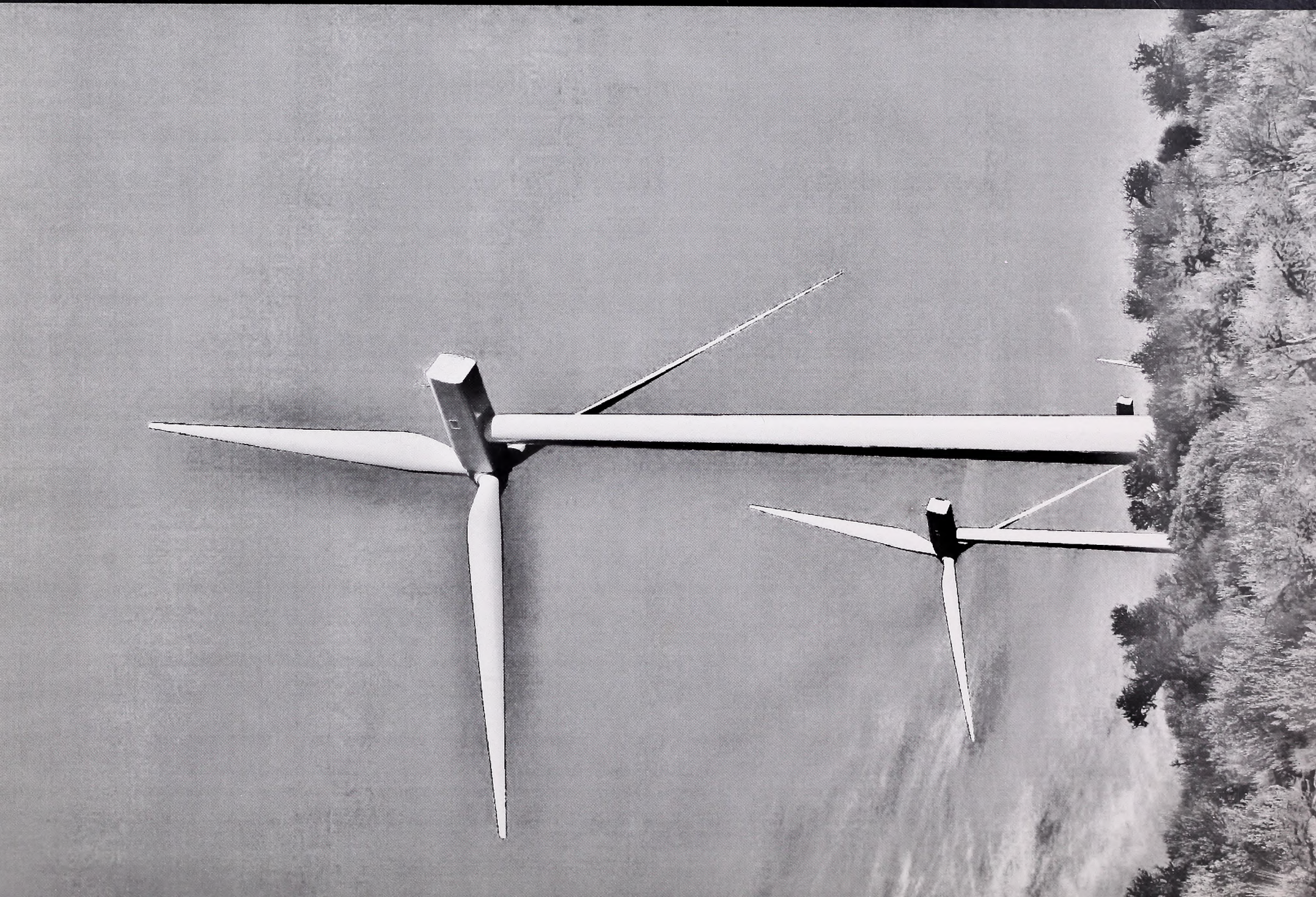
Appendix 3C – Bird Survey Data for the China Mountain Wind Project Area



BIRD SURVEY DATA FOR THE CHINA MOUNTAIN WIND PROJECT AREA

Table 1. Total number of individuals and groups for each bird type and species, by season and overall, observed during the fixed-point bird use surveys at the China Mountain Wind Power Project Area.

Species/Type	Scientific Name	Spring		Summer		Fall		Winter		Total	
		grps	individs	grps	individs	grps	individs	grps	individs	grps	individs
Waterbirds		**1**	**1**	**2**	**4**	**0**	**0**	**0**	**0**	**3**	**5**
sandhill crane	*Grus canadensis*	1	1	0	0	0	0	0	0	1	1
unidentified gull		0	0	2	4	0	0	0	0	2	4
Waterfowl		**0**	**0**	**0**	**0**	**0**	**0**	**3**	**177**	**3**	**177**
snow goose	*Chen caerulescens*	0	0	0	0	0	0	2	155	2	155
unidentified goose		0	0	0	0	0	0	1	22	1	22
Shorebirds		**1**	**1**	**1**	**1**	**0**	**0**	**0**	**0**	**2**	**2**
common snipe	*Gallinago gallinago*	1	1	0	0	0	0	0	0	1	1
killdeer	*Charadrius vociferus*	0	0	1	1	0	0	0	0	1	1
Raptors		**98**	**108**	**159**	**172**	**105**	**115**	**23**	**25**	**385**	**420**
Accipiters		*2*	*2*	*1*	*1*	*27*	*29*	*0*	*0*	*30*	*32*
Cooper's hawk	*Accipiter cooperii*	1	1	1	1	6	7	0	0	8	9
northern goshawk	*Accipiter gentilis*	0	0	0	0	1	1	0	0	1	1
sharp-shinned hawk	*Accipiter striatus*	1	1	0	0	20	21	0	0	21	22
Buteos		*26*	*29*	*56*	*61*	*15*	*17*	*5*	*5*	*102*	*112*
Swainson's hawk	*Buteo swainsoni*	0	0	3	3	0	0	0	0	3	3
ferruginous hawk	*Buteo regalis*	1	1	0	0	0	0	0	0	1	1
red-tailed hawk	*Buteo jamaicensis*	25	28	53	58	14	16	0	0	92	102
rough-legged hawk	*Buteo lagopus*	0	0	0	0	0	0	5	5	5	5
unidentified buteo		0	0	0	0	1	1	0	0	1	1
Eagles		*9*	*9*	*15*	*17*	*30*	*33*	*18*	*20*	*72*	*79*
golden eagle	*Aquila chrysaetos*	9	9	15	17	30	33	18	20	72	79

Table 1. Total number of individuals and groups for each bird type and species, by season and overall, observed during the fixed-point bird use surveys at the China Mountain Wind Power Project Area (continued).

Species/Type	Scientific Name	Spring		Summer		Fall		Winter		Total	
		grps	individs	grps	individs	grps	individs	grps	individs	grps	individs
Falcons		*14*	*14*	*30*	*31*	*22*	*23*	*0*	*0*	*66*	*68*
American kestrel	*Falco sparverius*	14	14	29	30	21	22	0	0	64	66
merlin	*Falco columbarius*	0	0	0	0	1	1	0	0	1	1
prairie falcon	*Falco mexicanus*	0	0	1	1	0	0	0	0	1	1
Other Raptors		*47*	*54*	*57*	*62*	*11*	*13*	*0*	*0*	*115*	*129*
northern harrier	*Circus cyaneus*	47	54	55	60	9	11	0	0	111	125
osprey	*Pandion haliaetus*	0	0	0	0	1	1	0	0	1	1
unidentified hawk		0	0	1	1	1	1	0	0	2	2
unidentified raptor		0	0	1	1	0	0	0	0	1	1
Vultures		**9**	**16**	**38**	**92**	**7**	**10**	**0**	**0**	**54**	**118**
turkey vulture	*Cathartes aura*	9	16	38	92	7	10	0	0	54	118
Upland Gamebirds		**2**	**8**	**4**	**28**	**6**	**13**	**4**	**31**	**16**	**80**
chukar	*Alectoris chukar*	2	8	3	27	1	3	2	9	8	47
greater sage grouse	*Centrocercus urophasianus*	0	0	1	1	5	10	2	22	8	33
Doves/Pigeons		**3**	**12**	**12**	**24**	**11**	**52**	**5**	**13**	**31**	**101**
mourning dove	*Zenaida macroura*	0	0	8	10	4	4	0	0	12	14
rock pigeon	*Columba livia*	3	12	4	14	7	48	5	13	19	87
Passerines		**417**	**707**	**823**	**1,591**	**369**	**1,049**	**79**	**271**	**1,688**	**3,618**
American goldfinch	*Carduelis tristis*	1	1	0	0	0	0	0	0	1	1
American robin	*Turdus migratorius*	14	22	20	28	17	76	3	15	54	141
black-billed magpie	*Pica pica*	1	2	1	2	10	13	6	6	18	23
black-headed grosbeak	*Pheucticus melanocephalus*	2	2	4	5	1	2	0	0	7	9
blue gray gnatcatcher	*Polioptila caerulea*	1	1	1	2	0	0	0	0	2	3

Table 1. Total number of individuals and groups for each bird type and species, by season and overall, observed during the fixed-point bird use surveys at the China Mountain Wind Power Project Area (continued).

Species/Type	Scientific Name	Spring		Summer		Fall		Winter		Total	
		grps	individs	grps	individs	grps	individs	grps	individs	grps	individs
blue grosbeak	*Guiraca caerulea*	0	0	0	0	1	1	0	0	1	1
Brewer's blackbird	*Euphagus cyanocephalus*	1	2	0	0	0	0	0	0	1	2
Brewer's sparrow	*Spizella breweri*	37	68	105	185	32	69	0	0	174	322
brown-headed cowbird	*Molothrus ater*	2	4	7	11	0	0	0	0	9	15
Bullock's oriole	*Icterus bullockii*	1	1	0	0	0	0	0	0	1	1
canyon wren	*Catherpes mexicanus*	0	0	1	1	0	0	0	0	1	1
Cassin's finch	*Carpodacus purpureus*	1	1	0	0	3	6	0	0	4	7
cedar waxwing	*Bombycilla cedrorum*	0	0	0	0	1	1	0	0	1	1
chipping sparrow	*Spizella passerina*	3	5	2	2	7	52	0	0	12	59
Clark's nutcracker	*Nucifraga columbiana*	0	0	1	1	1	1	0	0	2	2
cliff swallow	*Petrochelidon pyrrhonota*	3	10	14	113	0	0	0	0	17	123
common raven	*Corvus corax*	33	56	24	53	84	232	27	41	168	382
dark-eyed junco	*Junco hyemalis*	0	0	0	0	2	12	1	1	3	13
dusky flycatcher	*Empidonax oberholseri*	17	20	42	49	4	4	0	0	63	73
fox sparrow	*Passerella iliaca*	29	38	45	61	3	3	0	0	77	102
gray-crowned rosy finch	*Leucosticte arctoa*	0	0	0	0	0	0	14	88	14	88
green-tailed towhee	*Pipilo chlorurus*	12	14	24	30	4	5	0	0	40	49
horned lark	*Eremophila alpestris*	39	54	63	135	42	160	21	97	165	446
house wren	*Troglodytes aedon*	12	15	8	12	2	3	0	0	22	30
lark sparrow	*Chondestes grammacus*	0	0	0	0	1	2	0	0	1	2
lazuli bunting	*Passerina amoena*	6	6	33	44	0	0	0	0	39	50
MacGillivray's warbler	*Oporornis tolmiei*	3	3	21	24	5	5	0	0	29	32
mountain bluebird	*Sialia currucoides*	14	26	47	110	41	189	1	2	103	327

Table 1. Total number of individuals and groups for each bird type and species, by season and overall, observed during the fixed-point bird use surveys at the China Mountain Wind Power Project Area (continued).

Species/Type	Scientific Name	Spring		Summer		Fall		Winter		Total	
		grps	individs	grps	individs	grps	individs	grps	individs	grps	individs
Nashville warbler	*Vermivora ruficapilla*	1	1	0	0	0	0	0	0	1	1
N rough-winged swallow	*Stelgidopteryx serripennis*	0	0	1	2	0	0	0	0	1	2
olive-sided flycatcher	*Contopus cooperi*	1	1	0	0	1	1	0	0	2	2
orange-crowned warbler	*Vermivora celata*	17	21	19	20	0	0	0	0	36	41
pine siskin	*Carduelis pinus*	0	0	0	0	10	29	0	0	10	29
red-breasted nuthatch	*Sitta canadensis*	1	2	0	0	6	7	0	0	7	9
rock wren	*Salpinctes obsoletus*	25	36	80	131	32	41	0	0	137	208
sage thrasher	*Oreoscoptes montanus*	16	29	29	47	3	5	0	0	48	81
spotted towhee	*Pipilo maculatus*	10	14	42	62	14	19	0	0	66	95
Townsend's solitaire	*Myadestes townsendi*	0	0	1	1	0	0	4	5	5	6
tree swallow	*Tachycineta bicolor*	11	21	23	47	0	0	0	0	34	68
unidentified finch		1	4	1	1	2	10	0	0	4	15
unidentified flycatcher		1	1	0	0	0	0	0	0	1	1
unidentified passerine		0	0	1	8	6	26	2	16	9	50
unidentified sparrow		0	0	2	2	7	10	0	0	9	12
unidentified swallow		4	5	4	122	1	1	0	0	9	128
unidentified warbler		1	1	2	3	1	2	0	0	4	6
vesper sparrow	*Pooecetes gramineus*	45	80	68	113	9	17	0	0	122	210
violet-green swallow	*Tachycineta thalassina*	10	80	17	74	0	0	0	0	27	154
Virginia's warbler	*Vermivora virginiae*	1	1	1	1	3	4	0	0	5	6
warbling vireo	*Vireo gilvus*	2	2	13	22	0	0	0	0	15	24
western meadowlark	*Sturnella neglecta*	15	25	9	11	2	2	0	0	26	38
western tanager	*Piranga ludoviciana*	0	0	1	1	1	1	0	0	2	2

Table 1. Total number of individuals and groups for each bird type and species, by season and overall, observed during the fixed-point bird use surveys at the China Mountain Wind Power Project Area (continued).

Species/Type	Scientific Name	Spring		Summer		Fall		Winter		Total	
		grps	individs	grps	individs	grps	individs	grps	individs	grps	individs
western wood-pewee	*Contopus virens*	0	0	5	6	0	0	0	0	5	6
white-crowned sparrow	*Zonotrichia leucophrys*	5	8	12	17	2	3	0	0	19	28
Wilson's warbler	*Wilsonia pusilla*	1	1	0	0	0	0	0	0	1	1
yellow warbler	*Dendroica petechia*	13	16	25	28	2	2	0	0	40	46
yellow-breasted chat	*Icteria virens*	1	1	3	3	0	0	0	0	4	4
yellow-rumped warbler	*Dendroica coronata*	3	6	1	1	6	33	0	0	10	40
Other Birds		**39**	**48**	**86**	**166**	**47**	**65**	**5**	**5**	**177**	**284**
broad-tailed hummingbird	*Selasphorus platycercus*	3	3	3	3	0	0	0	0	6	6
common nighthawk	*Chordeiles minor*	1	1	22	89	6	12	0	0	29	102
common poorwill	*Phalaenoptilus nuttallii*	0	0	1	1	0	0	0	0	1	1
hairy woodpecker	*Picoides villosus*	0	0	4	5	3	3	2	2	9	10
Lewis's woodpecker	*Melanerpes lewis*	4	5	0	0	0	0	0	0	4	5
northern flicker	*Colaptes auratus*	27	32	49	61	35	47	3	3	114	143
red-naped sapsucker	*Sphyrapicus nuchalis*	3	4	3	3	1	1	0	0	7	8
unidentified hummingbird		0	0	3	3	1	1	0	0	4	4
unidentified woodpecker		0	0	1	1	1	1	0	0	2	2
white-throated swift	*Aeronautes saxatalis*	1	3	0	0	0	0	0	0	1	3
Overall		**570**	**901**	**1,125**	**2,078**	**545**	**1,304**	**119**	**522**	**2,359**	**4,805**

Source: Young et al., 2009

Table 2. Mean bird use (# birds/point/5-min survey), percent of total composition, and frequency of occurrence (%) for each bird type and species during the breeding bird surveys in the China Mountain Wind Power Project Area, June 2008.

Species	Groups	Individuals	Use	Percent Composition	Occurrence Frequency
Waterbirds	**1**	**1**	**0.01**	**0.1**	**1.0**
sandhill crane	1	1	0.01	0.1	1.0
Shorebirds	**3**	**5**	**0.05**	**0.4**	**3.0**
killdeer	3	5	0.05	0.4	3.0
Raptors	**17**	**18**	**0.15**	**1.3**	**14.0**
Buteos	*11*	*11*	*0.09*	*0.8*	*9.0*
red-tailed hawk	11	11	0.09	0.8	9.0
Falcons	*1*	*1*	*0.01*	*0.1*	*1.0*
American kestrel	1	1	0.01	0.1	1.0
Other Raptors	*5*	*6*	*0.05*	*0.4*	*4.0*
northern harrier	5	6	0.05	0.4	4.0
Vultures	**4**	**4**	**0.03**	**0.3**	**3.0**
turkey vulture	4	4	0.03	0.3	3.0
Upland Gamebirds	**1**	**1**	**NA**	**NA**	**NA**
Chukar	1	1	**NA**	**NA**	**NA**
Doves/Pigeons	**8**	**8**	**0.07**	**0.6**	**6.0**
mourning dove	8	8	0.07	0.6	6.0
Passerines	**1,065**	**1,098**	**10.94**	**94.5**	**100**
Blackbirds/Orioles	*26*	*28*	*0.28*	*2.4*	*21.0*
Brewer's blackbird	2	4	0.04	0.3	2.0
brown-headed cowbird	7	7	0.07	0.6	7.0
western meadowlark	17	17	0.17	1.5	12.0
Finches	*6*	*6*	*0.06*	*0.5*	*6.0*
American goldfinch	1	1	0.01	0.1	1.0
Cassin's finch	3	3	0.03	0.3	3.0
house finch	1	1	0.01	0.1	1.0
pine siskin	1	1	0.01	0.1	1.0
Flycatchers	*74*	*74*	*0.74*	*6.4*	*51.0*
dusky flycatcher	63	63	0.63	5.4	45.0
gray flycatcher	6	6	0.06	0.5	6.0
olive-sided flycatcher	1	1	0.01	0.1	1.0
unidentified flycatcher	2	2	0.02	0.2	2.0
western wood-pewee	2	2	0.02	0.2	2.0

Table 2. Mean bird use (# birds/point/5-min survey), percent of total composition, and frequency of occurrence (%) for each bird type and species during the breeding bird surveys in the China Mountain Wind Power Project Area, June 2008 (cont'd).

Species	Groups	Individuals	Use	Percent Composition	Occurrence Frequency
Gnatcatchers/Kinglet	*3*	*3*	*0.03*	*0.3*	*2.0*
blue gray gnatcatcher	3	3	0.03	0.3	2.0
Grassland/Sparrows	*534*	*545*	*5.45*	*47.1*	*99.0*
Brewer's sparrow	229	237	2.37	20.5	87.0
chipping sparrow	8	8	0.08	0.7	8.0
fox sparrow	36	36	0.36	3.1	27.0
green-tailed towhee	67	67	0.67	5.8	44.0
horned lark	23	24	0.24	2.1	17.0
lazuli bunting	11	11	0.11	0.9	10.0
song sparrow	1	1	0.01	0.1	1.0
spotted towhee	10	11	0.11	0.9	7.0
unidentified sparrow	1	1	0.01	0.1	1.0
vesper sparrow	131	132	1.32	11.4	74.0
white-crowned sparrow	17	17	0.17	1.5	16.0
Mimids	*112*	*112*	*1.12*	*9.7*	*64.0*
sage thrasher	112	112	1.12	9.7	64.0
Swallows	*17*	*30*	*0.30*	*2.6*	*13.0*
cliff swallow	1	1	0.01	0.1	1.0
tree swallow	11	17	0.17	1.5	9.0
violet-green swallow	5	12	0.12	1.0	3.0
Tanagers/Grosbeaks	*9*	*9*	*0.09*	*0.8*	*7.0*
black-headed grosbeak	6	6	0.06	0.5	5.0
western tanager	3	3	0.03	0.3	2.0
Thrushes	*36*	*39*	*0.39*	*3.4*	*28.0*
American robin	13	14	0.14	1.2	11.0
mountain bluebird	23	25	0.25	2.2	20.0
Titmice/Chickadees	*1*	*1*	*0.01*	*0.1*	*1.0*
mountain chickadee	1	1	0.01	0.1	1.0
Vireos	*30*	*30*	*0.30*	*2.6*	*22.0*
warbling vireo	30	30	0.30	2.6	22.0
Warblers	*114*	*115*	*1.15*	*9.9*	*51.0*
MacGillivray's warbler	42	42	0.42	3.6	32.0
orange-crowned warbler	33	34	0.34	2.9	26.0
Virginia's warbler	3	3	0.03	0.3	3.0

Table 2. Mean bird use (# birds/point/5-min survey), percent of total composition, and frequency of occurrence (%) for each bird type and species during the breeding bird surveys in the China Mountain Wind Power Project Area, June 2008 (cont'd).

Species	Groups	Individuals	Use	Percent Composition	Occurrence Frequency
yellow-breasted chat	33	33	0.01	0.1	1.0
yellow-rumped warbler	1	1	0.02	0.2	2.0
yellow warbler	2	2	0.33	2.8	28.0
Wrens	*86*	*86*	*0.86*	*7.4*	*55.0*
house wren	34	34	0.34	2.9	25.0
rock wren	52	52	0.52	4.5	43.0
Corvids	*17*	*20*	*0.16*	*1.4*	*12.0*
black-billed magpie	3	3	0.02	0.2	2.0
Clark's nutcracker	1	1	0.01	0.1	1.0
common raven	13	16	0.13	1.1	10.0
Other Birds	**32**	**33**	**0.33**	**2.8**	**26.0**
Woodpeckers	*32*	*33*	*0.33*	*2.8*	*26.0*
hairy woodpecker	1	1	0.01	0.1	1.0
Lewis's woodpecker	5	5	0.05	0.4	4.0
northern flicker	22	23	0.23	2.0	20.0
red-naped sapsucker	3	3	0.03	0.3	3.0
unidentified woodpecker	1	1	0.01	0.1	1.0
Total	**1,131**	**1,168**	**11.58**	**100**	

Source: Young et al., 2009

Table 3. Total number of groups and individuals for each raptor species observed during raptor migration surveys at the China Mountain Wind Power Project Area.

Species/Type	Scientific Name	Spring		Fall	
		Number Groups	Number Individs.	Number Groups	Number Individs.
Raptors		**164**	**192**	**108**	**116**
Accipiters		*19*	*24*	*33*	*33*
Cooper's hawk	*Accipiter cooperii*	8	10	12	12
sharp-shinned hawk	*Accipiter striatus*	11	14	21	21
Buteos		*50*	*61*	*9*	*10*
ferruginous hawk	*Buteo regalis*	1	1	0	0
red-tailed hawk	*Buteo jamaicensis*	37	45	8	9
rough-legged hawk	*Buteo lagopus*	1	1	0	0
Swainson's hawk	*Buteo swainsoni*	4	5	0	0
unidentified buteo		7	9	1	1
Eagles		*38*	*45*	*46*	*53*
golden eagle	*Aquila chrysaetos*	38	45	46	53
Falcons		*33*	*35*	*8*	*8*
American kestrel	*Falco sparverius*	28	30	6	6
merlin	*Falco columbarius*	1	1	1	1
prairie falcon	*Falco mexicanus*	3	3		
peregrine falcon	*Falco peregrinus*	0	0	1	1
unidentified falcon		1	1		
Other Raptors		*24*	*27*	*12*	*12*
northern harrier	*Circus cyaneus*	22	25	11	11
osprey	*Pandion haliaetus*	1	1	0	0
unidentified raptor		1	1	1	1
Vultures		**39**	**72**	**4**	**11**
turkey vulture	*Cathartes aura*	39	72	4	11
Total		**203**	**264**	**113**	**133**

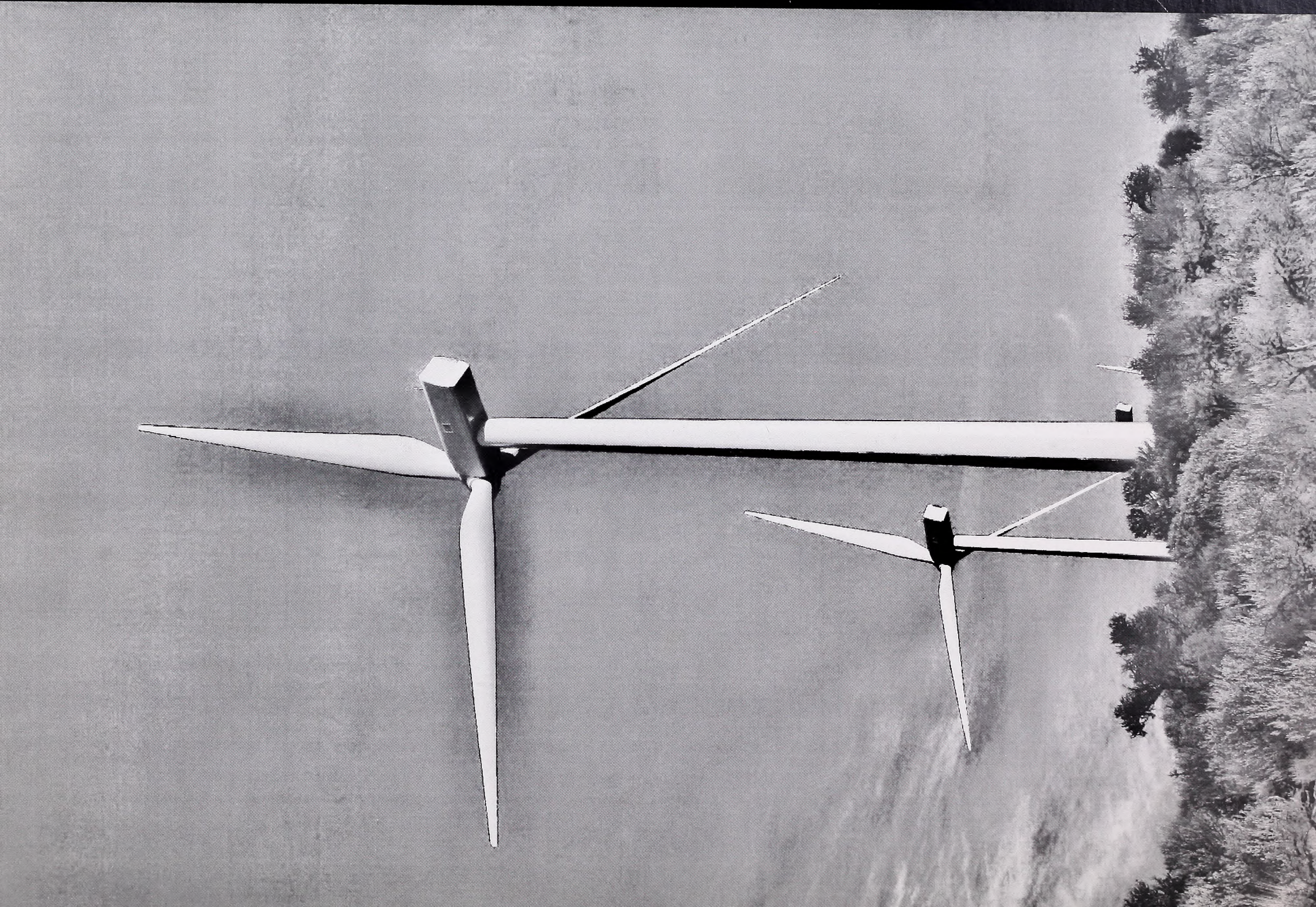
Source: Young et al, 2009

Table 4. Mean use, percent of total use (% composition), and frequency of occurrence for species observed during raptor migration surveys at the China Mountain Wind Power Project Area.

Species/Type	Spring			Fall		
	Use	Percent Composition	Occurrence Frequency	Use	Percent Composition	Occurrence Frequency
Raptors	**2.00**	**78.8**	**75.0**	**1.49**	**98.0**	**57.5**
Accipiters	*0.15*	*5.8*	*12.5*	*0.43*	*28.3*	*31.3*
Cooper's hawk	0.10	3.9	7.5	0.14	9.2	13.8
sharp-shinned hawk	0.05	1.9	5.0	0.29	19.1	22.5
Buteos	*0.53*	*20.9*	*35.0*	*0.14*	*9.3*	*10.0*
red-tailed hawk	0.48	18.5	32.5	0.13	8.6	10.0
Swainson's hawk	0.03	1.2	2.5	-	-	-
unidentified buteo	0.03	1.2	2.5	0.01	0.7	1.3
Eagles	*0.28*	*10.8*	*20.0*	*0.63*	*41.4*	*36.3*
golden eagle	0.28	10.8	20.0	0.63	41.4	36.3
Falcons	*0.63*	*24.8*	*47.5*	*0.09*	*5.3*	*7.5*
American kestrel	0.53	20.5	40.0	0.06	3.9	6.3
merlin	0.03	1.2	2.5	*0.01*	*0.7*	*1.3*
prairie falcon	0.05	1.9	5.0	-	-	-
peregrine falcon	-	-	-	0.01	0.7	1.3
unidentified falcon	0.03	1.2	2.5	-	-	-
Other Raptors	*0.43*	*16.6*	*29.5*	*0.21*	*13.8*	*13.8*
northern harrier	0.40	15.4	27.5	0.21	13.8	13.8
Osprey	0.03	1.2	2.5			
Vultures	**0.55**	**21.2**	**30.0**	**0.03**	**2.0**	**2.5**
turkey vulture	0.55	21.2	30.0	0.03	2.0	2.5

Source: Young et al., 2009

Appendix 3D – Flight Height Characteristics of Birds in the China Mountain Project Area



FLIGHT HEIGHT CHARACTERISTICS OF BIRDS IN THE CHINA MOUNTAIN PROJECT AREA

Table 1. Flight height characteristics by bird type observed during fixed-point bird use surveys at the China Mountain Wind Project Area.

Bird Type	# Groups Flying	# Obs Flying	Mean Flight Height (ft)	% Obs Flying	% within Flight Height Categories		
					0-114 ft	114-427 ft	> 427 ft
Waterbirds	**3**	**5**	**31.67**	**100**	**40.0**	**60.0**	**0**
Raptors	**305**	**333**	**40.45**	**95.1**	**65.5**	**27.3**	**7.2**
Accipiters	*26*	*28*	*76.85*	*100*	*17.9*	*53.6*	*28.6*
Buteos	*79*	*88*	*43.67*	*93.6*	*52.3*	*40.9*	*6.8*
Northern Harrier	*101*	*114*	*16.41*	*95.8*	*93.0*	*6.1*	*0.9*
Eagles	*47*	*49*	*78.94*	*98.0*	*38.8*	*46.9*	*14.3*
Falcons	*51*	*53*	*24.96*	*91.4*	*79.2*	*18.9*	*1.9*
Other Raptors	*1*	*1*	*250.00*	*100*	*0*	*0*	*100*
Vultures	**45**	**101**	**43.31**	**100**	**65.3**	**33.7**	**1.0**
Upland Gamebirds	**2**	**13**	**65.50**	**16.3**	**7.7**	**92.3**	**0**
Doves/Pigeons	**20**	**61**	**35.10**	**60.4**	**34.4**	**57.4**	**8.2**
Passerines	**546**	**1,852**	**17.90**	**51.6**	**74.5**	**24.7**	**0.9**
Other Birds	**70**	**147**	**16.77**	**53.3**	**92.5**	**6.8**	**0.7**
Overall	**991**	**2,512**	**26.40**	**55.8**	**72.6**	**25.6**	**1.9**

Source: Young et al., 2009

Table 2. Flight height characteristics of raptors observed during spring 2008 raptor migration surveys at the China Mountain Wind Project Area.

Species/Type	# grps	# obs.	Mean Flight Ht. (ft)	Median Flight Ht. (ft)	% in Flight
Raptors	**163**	**191**	**105.2**	**75.0**	**99.5**
Accipiters	19	24	76.3	55.0	100
Cooper's hawk	*8*	*10*	*67.5*	*50.0*	*100*
sharp-shinned hawk	*11*	*14*	*82.7*	*60.0*	*100*
Buteos	50	61	148.1	110.0	100
ferruginous hawk	*1*	*1*	*175.0*	*175.0*	*100*
red-tailed hawk	*37*	*45*	*145.6*	*100*	*100*
rough-legged hawk	*1*	*1*	*10.0*	*10.0*	*100*
Swainson's hawk	*4*	*5*	*173.8*	*187.5*	*100*
unidentified buteo	*7*	*9*	*162.1*	*100*	*100*
Northern Harrier	22	25	57.5	17.5	100
northern harrier	*22*	*25*	*57.5*	*17.5*	*100*
Eagles	38	45	132.9	100	100
golden eagle	*38*	*45*	*132.9*	*100*	*100*
Falcons	32	34	51.3	10.0	97.1
American kestrel	*27*	*29*	*49.3*	*10.0*	*96.7*
merlin	*1*	*1*	*4.0*	*4.0*	*100*
prairie falcon	*3*	*3*	*74.0*	*20.0*	*100*
unidentified falcon	*1*	*1*	*85.0*	*85.0*	*100*
Other Raptors	2	2	167.5	167.5	100
osprey	*1*	*1*	*125.0*	*125.0*	*100*
unidentified raptor	*1*	*1*	*210.0*	*210.0*	*100*
Vultures	**39**	**72**	**103.2**	**75.0**	**100**
turkey vulture	*39*	*72*	*103.2*	*75.0*	*100*
Overall	**294**	**716**	**81.1**	**45.0**	**90.2**

Source: Young et al., 2009

Table 3. Flight height characteristics of raptors observed during fall 2008 raptor migration surveys at the China Mountain Wind Project Area.

Species/Type	# grps	# obs.	Mean Flight Ht. (ft)	Median Flight Ht. (ft)	% in Flight
Raptors	**108**	**116**	**125.5**	**85.0**	**100**
Accipiters	33	33	102.8	90.0	100
Cooper's hawk	*12*	*12*	*99.8*	*82.5*	*100*
sharp-shinned hawk	*21*	*21*	*104.5*	*90.0*	*100*
Buteos	9	10	242.2	80.0	100
red-tailed hawk	*8*	*9*	*216.3*	*80.0*	*100*
unidentified buteo	*1*	*1*	*450.0*	*450.0*	*100*
Northern Harrier	11	11	10.3	5.0	100
northern harrier	*11*	*11*	*10.3*	*5.0*	*100*
Eagles	46	53	154.9	107.5	100
golden eagle	*46*	*53*	*154.9*	*107.5*	*100*
Falcons	8	8	83.1	67.5	100
American kestrel	*6*	*6*	*69.2*	*50.0*	*100*
merlin	*1*	*1*	*125.0*	*125.0*	*100*
peregrine falcon	*1*	*1*	*125.0*	*125.0*	*100*
Other Raptors	1	1	75.0	75.0	100
unidentified hawk	*1*	*1*	*75.0*	*75.0*	*100*
Vultures	**4**	**11**	**168.8**	**145.0**	**100**
turkey vulture	*4*	*11*	*168.8*	*145.0*	*100*
Overall	**112**	**127**	**125.2**	**85.0**	**100**

Source: Young et al., 2009

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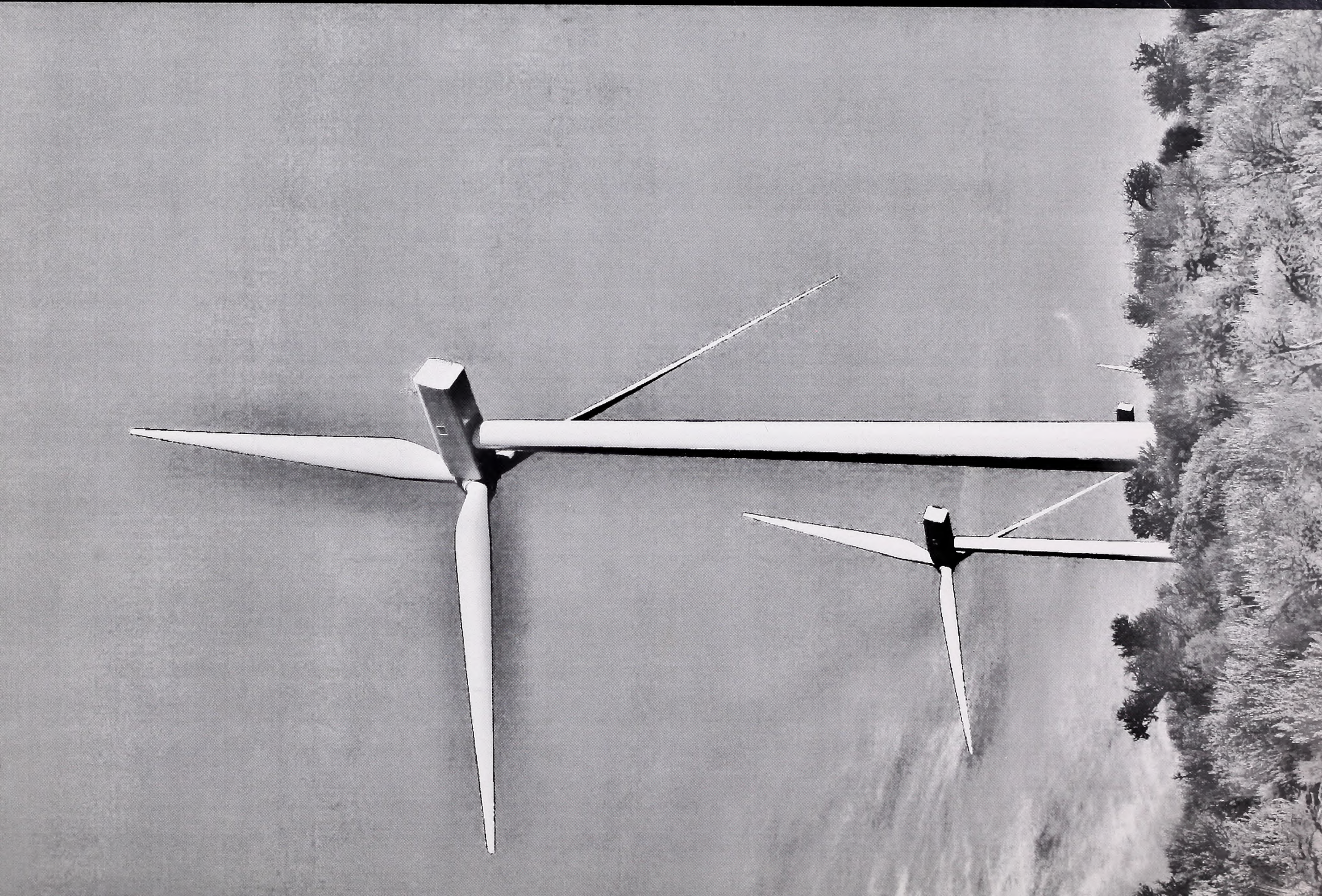
Appendix 3E – Special Status Animals in the China Mountain Project Area and Along the Haul Routes



SPECIAL STATUS ANIMALS IN THE CHINA MOUNTAIN PROJECT AREA AND ALONG THE HAUL ROUTES

Common Name	Scientific Name	BLM Status[1]	General Habitat	Habitat Association[2]	Occurrence[3]
Birds					
Greater Sage-grouse	*Centrocercus urophasianus*	Type 1/NV (Federal Candidate)	Totally dependent on sagebrush-dominated habitats with canopy cover of 15-25% with a healthy grass and forb understory (Idaho Department of Fish and Game [IDFG], 2005a).	Shrublands	Present. Abundant use adjacent to and within the project area.
Columbian Sharp-tailed Grouse	*Tympanuchus phasianellus columbianus*	Type 3/NV	Big sagebrush is the preferred summer cover type; mountain shrub and riparian cover types are critical components of winter habitat (IDFG, 2005a).	Shrublands, Mountain Brush or Woodland, Riparian Habitat Conservation Areas (RHCAs)	Present during winter.
Mountain quail	*Oreortyx pictus*	Type 3/NV	Breed and winter in shrub–dominated communities. Also found in riparian areas of hawthorn, willow, and chokecherry (IDFG, 2005a).	Shrublands, RHCAs	Not within predicted distribution for Idaho. Incidental use possible.
Peregrine Falcon	*Falco peregrinus anatum*	Type 3/NV	Associated with mountains, major river corridors, reservoirs and lake basins and typically nests on cliffs (IDFG, 2005a).	Mountain Brush or Woodland, Breaks	Observed during raptor migration surveys.
Prairie Falcon	*Falco mexicanus*	Type 3/NV	Inhabits arid environments where cliffs or bluffs provide nest sites within open grasslands and shrub-steppe deserts (BLM, 2010a).	Grasslands, Shrublands, Breaks	Nests in the project area. Observed during bird surveys.
Northern Goshawk	*Accipiter gentilis*	Type 3/NV	Prefers aspen forests. Will inhabit coniferous forests, broadleaf forests, open forests, or semi-open areas (Alsop, 2001).	Mountain Brush or Woodland	Identified by BLM within the project area, also identified during 2008 bird surveys.
Ferruginous Hawk	*Buteo regalis*	Type 3/NV	Occurs in grasslands, sagebrush, shrublands, and periphery of piñon-juniper and other forests (IDFG, 2005a).	Grasslands, Shrublands, Mountain Brush or Woodland	Observed during bird surveys.

Common Name	Scientific Name	BLM Status[1]	General Habitat	Habitat Association[2]	Occurrence[3]
Swainson's hawk	*Buteo swainsoni*	NV	Prefers to nest in trees or shrubs near riparian zones and forages in open grasslands, sparse shrublands, agricultural fields, and small open woodlands (IDFG, 2005a).	Shrublands, RHCAs, Grasslands, Mountain Brush or Woodland	Observed during bird surveys.
Golden Eagle	*Aquila chrysaetos*	NV	Prefers canyon lands. Will inhabit mountains, wooded canyons, and open landscapes such as grasslands (Alsop, 2001).	Grasslands, Mountain Brush or Woodland	Present. Active burrow within the project area. Burrows known to occur along the northern inbound haul route and outbound haul route.
Bald Eagle	*Haliaeetus leucocephalus*	Type 2/NV	Nests are built in mature or old-growth timber along water sources that can provide adequate foraging opportunities. Large concentrations of wintering bald eagles occur along Idaho's lakes and rivers where they typically roost in large trees (IDFG, 2008).	Mountain Brush or Woodland	Possible winter residents at Salmon Falls Reservoir and likely migrants through the project area. Bald eagle identified during summer surveys.
Western Burrowing Owl	*Athene cunicularia hypugaea*	NV	Breed in open, well-drained grasslands, prairies, farmlands, steppes, and airfields. Typically nest in abandoned badger burrows (IDFG, 2005a).	Grasslands	Present. Active nest on site.
Flammulated owl	*Otus flammeolus*	Type 3	Habitat includes montane pine forests for nesting, scattered thickets of saplings or shrubs for roosting and calling, and grassland edge habitat for foraging (IDFG, 2005a).	Mountain Brush or Woodland, Grasslands	Low probability but could use the small aspen patches in the northern portion of the project area (Monument Canyon area).
Short-eared Owl	*Asio flammeus*	NV	Associated with open landscapes such as marshes, grasslands, tundra, and agricultural lands (IDFG, 2005a).	Grasslands	Presence confirmed during plant surveys.
Calliope Hummingbird	*Stellula calliope*	Type 3	Prefers montane forest types as well as wet meadows and riparian areas. Important habitats include mixed conifer, aspen, and mountain riparian (Neel, 1999).	Mountain Brush or Woodland, Grasslands, RHCAs	Potentially present, especially in the small aspen patches in the northern portion of the project area.

Common Name	Scientific Name	BLM Status[1]	General Habitat	Habitat Association[2]	Occurrence[3]
Piñon jay	*Gymnorhinus cyanocephalus*	NV	Is common in piñon -juniper forests. Can also be found in sagebrush and scrub oak (IDFG, 2005a).	Mountain Brush and Woodlands, Shrublands	Low probability – juniper habitat limited in the project area.
Willow Flycatcher	*Empidonax traillii*	Type 3	Riparian deciduous shrubs or trees such as willows and alder are essential components of willow flycatcher territories (Neel, 1999).	RHCAs	Known within project area and northern inbound haul route. Likely occurs throughout the region in suitable habitat.
Hammond's Flycatcher	*Empidonax hammondii*	Type 3	Strongly favors coniferous forest as nesting habitat, but also nests in aspen stands (Parrish, Howe, & Norvell, 2002).	Mountain Brush and Woodlands	Potentially present. Project area contains suitable habitat in small aspen stands.
Olive-sided Flycatcher	*Contopus borealis*	Type 3	Typically nests in conifer forests but have been known to nest in willows, alders, and oaks; highly associated with edges and openings of otherwise dense forests and prefers snags for perching during calling and foraging (Shuford & Gardali, 2008).	Mountain Brush or Woodlands, RCHAs	Observed during bird surveys.
Loggerhead shrike	*Lanius ludovicianus*	Type 3/NV	In Idaho, nest primarily in sagebrush, bitterbrush, and greasewood shrubs (Woods & Cade, 1996). Forages in open short grass areas with scattered shrubs and some bare ground (Pruitt, 2000).Often found on poles, wires, or fence posts (BLM, 2008).	Shrublands, Grasslands	Present. Observed incidentally outside of standardized bird surveys.
Black-Throated sparrow	*Amphispiza bilineata*	Type 4	Favors sparsely vegetated desert scrub, including thorn brush, cacti, chaparral, mesquite and juniper, most often found on desert uplands, alluvial fans, and hillsides where thorny xeric brush dominates, and sometimes also in dry shrubby washes, but avoids desert valley floors (Natureserve, 2010)	Shrublands, Mountain Brush or Woodlands	
Brewer's Sparrow	*Spizella breweri*	Type 3	Closely associated with big sagebrush, but can also be found in shrubby openings of juniper and mountain mahogany (IDFG, 2005a).	Shrublands, Mountain Brush or Woodlands	Observed during bird surveys.

Common Name	Scientific Name	BLM Status[1]	General Habitat	Habitat Association[2]	Occurrence[3]
Sage Sparrow	*Amphispiza belli*	Type 3	Nests mainly in shrubs like big sagebrush, bitterbrush, rabbitbrush, and greasewood, but also nests in bunch grasses (Parrish et al., 2002).	Shrublands	Potentially present. Project area contains suitable habitat.
Vesper sparrow	*Pooecetes gramineus*	NV	Found in various open habitats with grass, including prairie, sagebrush steppe, meadows, pastures, and roadsides (Dechant et al., 2002).	Grasslands, Shrublands	Observed during bird surveys.
Juniper titmouse	*Baeolophus griseus*	NV	Prefers warm, dry, open juniper and piñon-juniper woodlands with large, mature trees capable of providing cavities for nesting (IDFG, 2005a).	Mountain Brush or Woodland	Low probability – juniper habitat limited in the project area.
Gray vireo	*Vireo vicinior*	NV	Prefers open piñon juniper forest with an understory of shrubs such as bitterbrush (Neel, 1999).	Mountain Brush or Woodland	Low probability – juniper habitat limited in the project area.
Lewis' Woodpecker	*Melanerpes lewis*	Type 3/NV	Nests in open woodland and forest, including riparian woodland, and commonly found in forested areas after wildfire (BLM, 2008).	Mountain Brush or Woodland, RHCAs	Observed during bird surveys.
Red-naped sapsucker	*Sphyrapicus nuchalis*	NV	A cavity nester, found primarily in coniferous forests that include aspen and other hardwoods (BLM, 2008).	Mountain Brush or Woodland	Observed during bird surveys.
Long-billed Curlew	*Numenius americanus*	NV	Nest in open short-grass or mixed-prairie habitat with level to slightly rolling topography (IDFG, 2005a).	Grasslands	Potentially present. Project area contains suitable habitat.
Mammals					
Pygmy Rabbit	*Brachylagus idahoensis*	Type 2/NV	A sagebrush obligate, requires dense, tall stands of big sagebrush growing on deep, friable soils that allow for burrowing (IDFG, 2005a).	Shrublands	Present. Confirmed during special status species surveys.
Kit Fox	*Vulpes macrotis*	Type 4	Primarily found in open desert, shrubby or shrub-grassland habitat; in Great Basin, in shadscale, greasewood and sagebrush (NatureServe, 2010)	Shrublands	Rare/incidental.
Pallid Bat	*Antrozous pallidus*	NV	Prefers canyon lands. Can include lowland riparian, desert shrub, sagebrush, sagebrush-rabbitbrush, piñon-juniper-sagebrush, piñon-juniper, mountain meadow, and submontane tall shrubland (tamarisk-willow-piñon). It has also been reported in towns and roosting in buildings and caves (Oliver, 2000).	Shrublands, RHCAs, Mountain Brush or Woodland	Likely to utilize habitat in or fly through the project area.

Common Name	Scientific Name	BLM Status[1]	General Habitat	Habitat Association[2]	Occurrence[3]
Townsend's big-eared bat	*Plecotus townsendii*	Type 3/NV	Occurs in a variety of habitats from desert shrub to deciduous and coniferous forests at a wide range of elevations. Uses mines and caves as day and night roosts, and mines are used as day and maternity roosts (BLM, 2008).	Shrublands, Mountain Brush or Woodland	Observed in project area (caught during mist-netting 2010). Documented adjacent to the outbound haul route.
Big brown bat	*Eptesicus fuscus*	NV	Occupies a wide variety of habitats including lowland riparian, desert shrub, sagebrush, juniper-sagebrush, aspen, ponderosa pine forest, mountain brush, mountain meadow, urban areas and around manmade structures (Oliver, 2000).	RHCAs, Shrublands, Mountain Brush or Woodland	Observed in project area (caught during mist-netting 2010). Documented adjacent to the outbound haul route.
Spotted bat	*Euderma maculatum*	Type 3/NV	Characteristically occurs in association with xeric and riparian habitats in deep, narrow canyons where massive cliffs predominate (IDFG, 2005a).	RHCAs, Breaks	Likely to utilize habitat in or fly through the project area. Documented adjacent to the outbound haul route and within 1 mile of the northern inbound haul route.
Silver-haired bat	*Lasionycteris noctivagans*	NV	Prefers a variety of habitats including lowland riparian, desert shrub, piñon-juniper, sagebrush-rabbitbrush, sagebrush-greasewood near piñon-juniper, sagebrush-grass in mixed forest, a grassy park with willows near mixed tress and sagebrush, a cottonwood grove, lodgepole pine forest, ponderosa pine forest, mixed coniferous forest, mixed aspen-coniferous forest, and alpine meadow. These bats have also been found in towns (Oliver, 2000).	RHCAs, Shrublands, Mountain Brush or Woodland	Observed in project area (caught during mist-netting 2010).
Western red bat	*Lasiurus blossevillii*	NV	Have been reported to occur in towns and cottonwood groves in lowland riparian areas (Oliver, 2000).	RHCAs	Unknown. Potential fly-overs during migration.

Common Name	Scientific Name	BLM Status[1]	General Habitat	Habitat Association[2]	Occurrence[3]
Hoary bat	*Lasiurus cinereus*	NV	Uses a range of habitats including lowland riparian, desert shrub, sagebrush-greasewood (near piñon-juniper), lodgepole pine forest, montane grassland (grass-aspen), and montane forest and woodland (grass-spruce-aspen) (Oliver, 2000).	RHCAs, Shrublands, Mountain Brush or Woodland	Detected during bat surveys.
California myotis	*Myotis californicus*	Type 4/NV	Inhabits dry conifer forest, sagebrush steppe, riparian, and juniper habitats. Mines and caves may be used for roosts (IDFG, 2005a).	Mountain Brush or Woodland, Shrublands, RHCAs	Likely to utilize habitat in or fly through the project area. Documented within 1 mile of the northern inbound haul route.
Small-footed myotis	*Myotis ciliolabrum*	NV	Inhabits desert and shrub land habitat. Uses caves and rock crevices (BLM, 2008).	Shrublands	Observed in project area (caught during mist-netting 2010). Documented within 1 mile of the northern inbound haul route.
Long-eared myotis	*Myotis evotis*	NV	Found in a wide range of habitats often associated with forests, under exfoliating bark, in tree cavities, and stumps resulting from logging. In shrub communities, may be found in crevices in cliffs and rocks on the ground, in lava-tube caves, and abandoned mines. It has also been found occasionally in buildings and under bridges (BLM, 2008).	Mountain Brush or Woodland, Shrublands	Observed in project area (caught during mist-netting 2010).
Little brown myotis	*Myotis lucifugus*	NV	Inhabits forests of various types, primarily at moderately high elevation, and is also common in cities and towns where artificially created parks can resemble open forests (Oliver, 2000).	Mountain Brush or Woodland	Observed in project area (caught during mist-netting 2010). Documented close to the outbound haul route and within 1 mile of the northern inbound haul route.

Common Name	Scientific Name	BLM Status[1]	General Habitat	Habitat Association[2]	Occurrence[3]
Fringed myotis	*Myotis thysanodes*	Type 3/NV	Desert, grassland, and woodland habitats, primarily at middle elevations of 1,200-2,250 meters above sea level (BLM, 2008).	Shrublands, Grasslands, Mountain Brush or Woodland	Likely to utilize habitat in or fly through the project area.
Long-legged myotis	*Myotis volans*	NV	This bat occurs in a variety of habitats from desert to mountainous coniferous forests, where it appears to be most common, especially if open water occurs in the area (BLM, 2008).	Shrubland, Mountain Brush or Woodland	Observed in project area (caught during mist-netting 2010).
Yuma myotis	*Myotis yumanensis*	NV	Occurs in a variety of western lowland habitats in areas of abundant water where it forages for insects just above the surface of slack water (BLM, 2008).	RHCAs, Shrublands, Grasslands	Likely to utilize habitat in or fly through the project area.
Western pipistrelle bat	*Pipistrellus hesperus*	NV	Uses a range of habitats including lowland riparian, desert shrub, sagebrush-greasewood, montane grassland, and montane forest and woodland, and can also be found in towns and cities (Oliver, 2000).	RHCAs, Shrublands, Grasslands, Mountain Brush or Woodland	Likely to utilize habitat in or fly through the project area. Documented adjacent to the outbound haul route
Brazilian free-tailed bat	*Tadarida brasiliensis*	NV	Will inhabit cities, towns, lowland riparian, desert shrub, and ponderosa pine forest habitats and roosts in building attics, crevices in cliffs, and possibly in caves (Oliver, 2000).	RHCAs, Shrublands, Mountain Brush or Woodland	Detected during bat surveys.
Piute Ground Squirrel	*Spermophilus mollis artemesiae*	Type 3	Found in both sagebrush and grassland habitats (BLM, 2010b).	Shrublands, Grasslands	Present in the China Mountain area.
Wyoming Ground Squirrel	*Spermophilus elegans nevadensis*	Type 4	Occupies shrublands and grasslands, often in relatively mesic or productive sites such as mid- to high-elevation montane meadows and valley bottoms (IDFG, 2005a).	Shrublands, Grasslands	Present in the China Mountain area.
Pahranagat Valley montane vole	*Microtus montanus fucosus*	NV	Found in alpine meadows, mountain valleys, wet meadows, cropland, and fields and pastures of grass and legumes (Linzey and Hammerson, 2008).	Mountain Brush or Woodland, Grasslands	Potentially present.

Common Name	Scientific Name	BLM Status[1]	General Habitat	Habitat Association[2]	Occurrence[3]
Preble's shrew	*Sorex preblei*	NV	Arid and semiarid sagebrush-grasslands and openings in coniferous forests dominated by sagebrush as well as riparian areas of willow or riparian shrubs and grasses (Wyoming Game and Fish Department, 2005).	Grasslands, Shrublands, RHCAs, Mountain Brush or Woodland	Potentially present.
Reptiles					
Short-horned lizard	*Phrynosoma douglassii*	NV	Open, shrubby, or openly wooded areas with sparse vegetation at ground level, loose soils for burrowing (Wildlife Action Plan Team, 2006).	Shrublands, Mountain Brush or Woodland	Potentially present.
Amphibians					
Columbia Spotted Frog	*Rana luteiventris*	Type 1 (Federal Candidate)	Wetland habitat is generally associated with springs or small lowland and foothill streams, suitable sites contain shallow breeding pools and deeper-water overwintering sites (IDFG, 2005a).	RHCAs	Present. Documented occurrence in the project area.
Northern Leopard Frog	*Rana pipiens*	Type 2/NV	Associated with permanent water sources and occur in a variety of wetland situations, including marshes, pond margins, and slow moving sections of streams and rivers (IDFG, 2005a).	RHCAs	Found throughout the Elko District. Inventories for the Jarbidge Field Office in 2007 did not document this species (BLM, 2007). Predicted habitat exists along the northern inbound haul route and outbound haul route (Idaho Vertebrate Modeling Database [IDVMD], 2009).
Western Toad	*Bufo boreas boreas*	Type 3	Found in a wide variety of habitats: desert springs and streams, meadows and woodlands, mountain wetlands (Alaska Natural Heritage Program [ANHP], 2010). In and around ponds, lakes, reservoirs, and slow-moving rivers and streams (ANHP, 2010).	RHCAs, Grasslands, Mountain Brush or Woodland	Occurs in the Jarbidge Field Office (BLM, 2007) and the Wells Field Office (BLM, 2009), but is not likely to occur within the project area or haul routes (IDVMD, 2009)

Common Name	Scientific Name	BLM Status[1]	General Habitat	Habitat Association[2]	Occurrence[3]
Fish					
Redband Trout	*Oncorhynchus mykiss gibbsi*	Type 2	Found in a range of stream habitats in desert areas. They prefer cool streams with temperatures less than 70 F (IDFG, 2005b).	Water	Known to occur in streams that are within or originate from the project area.

[1] Idaho BLM Sensitive Species are listed as Type 1 through Type 4. Type 1 = Threatened, Endangered, Proposed and Candidate: species listed by the United States Fish and Wildlife Service or the National Marine Fisheries Service as threatened or endangered, or proposed or candidates for listing under the Endangered Species Act of 1973; Type 2 = Rangewide/Globally Imperiled: species that are experiencing significant declines throughout their range with a high likelihood of being listed in the foreseeable future due to their rarity and/or significant endangerment factors; Type 3 = Regional/state imperiled: species that are experiencing significant declines in population or habitat and are in danger of regional or local extinctions in Idaho in the foreseeable future if factors contributing to their decline continues; Type 4 = Peripheral: species that are generally rare in Idaho with the majority of their breeding range largely outside the state. NV = Nevada BLM sensitive species.

[2] Habitat Associations: Shrublands – includes mountain big sagebrush, Wyoming big sagebrush, low sagebrush, black sagebrush, and rabbitbrush; Grasslands – includes perennial native bunch grasses, non-native perennial grasses, and annual grasses; Mountain Brush or Woodland – includes deciduous mountain brush, evergreen mountain brush, aspen, and mountain mahogany; Riparian Habitat Conservation Areas – includes riparian areas; and Breaks – includes barren areas, cliffs, or rock outcrops.

[3] Occurrence based on literature (BLM, 2007; BLM, 1997; and BLM, 1996), Idaho Gap Analysis (IDVMD, 2009), Idaho Fish and Wildlife Information System (Idaho Fish and Wildlife Information System, 2010), habitat data, field survey data, and resource specialist incidental observations.

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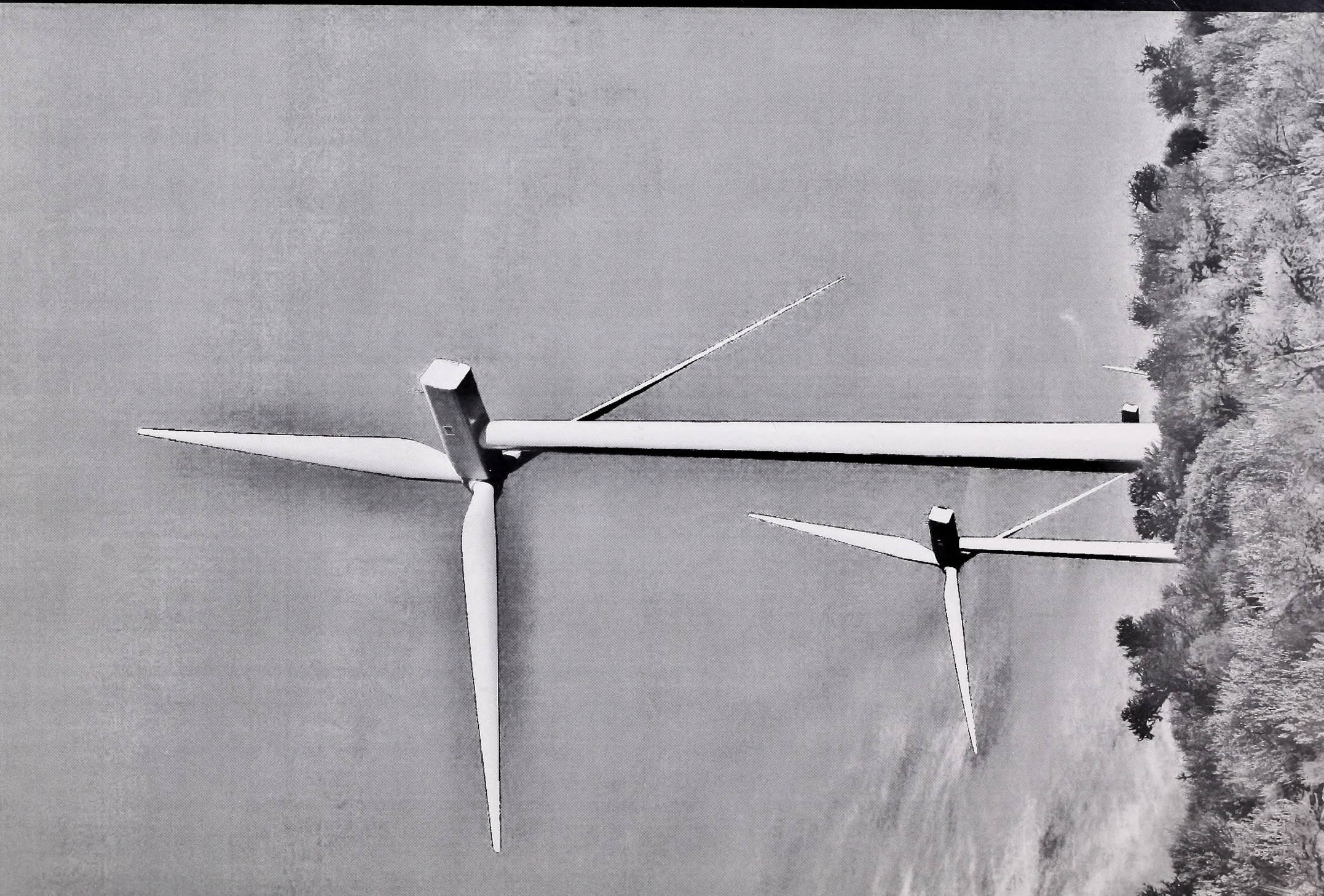
Appendix 3F – Visual Resources Photo Log



VISUAL RESOURCES PHOTO LOGS

Appendix 3F includes a collection of images intended to illustrate the landscape character of the project area. Associated data, including: (1) Camera Type and lens, (2) Date, (3) Time, and (4) Cardinal direction are included. A narrative discussing the purpose of the photo is also included to provide context for the image.

URS

SITE PHOTOS

Project: China Mountain Wind Project: Monument Springs Road Viewshed Area

URS Project No. 36258811

Photo ID: 1-A

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 22 July 2010

Time of Day: 1:30 pm

Cardinal Direction: East

Photographer: L. Kling

Purpose of photo:

To document the project area in the vicinity of T1-T22, located within the Monument Springs Road Viewshed Area. Note distinct silhouette of the ridgeline that creates an enclosed landscape character, despite panoramic views to the east.

Photo ID: 1-B

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 22 July 2010

Time of Day: 1:30 pm

Cardinal Direction: East

Photographer: L. Kling

Purpose of photo:

To document the project area in the vicinity of T1-T22, located within the Monument Springs Road Viewshed Area.

URS

SITE PHOTOS

Project: China Mountain Wind Project: Monument Springs Road Viewshed Area

URS Project No. 36258811

Photo ID: 2-A

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 22 July 2010

Time of Day: 1:30 pm

Cardinal Direction:

Photographer: L. Kling

Purpose of photo:

To document the project area in the vicinity of T24-T34, located within the Monument Springs Road Viewshed Area

Project: China Mountain Wind Project

Photo ID: 2-B

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 22 July 2010

Time of Day: 1:35 pm

Cardinal Direction:

Photographer: L. Kling

Purpose of photo:

To document the project area in the Monument Springs Road Viewshed Area.

URS

SITE PHOTOS

Project: China Mountain Wind Project: Monument Springs Road Viewshed Area

URS Project No. 36258811

Photo ID: 2-C

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 22 July 2010

Time of Day: 1:30 pm

Cardinal Direction:

Photographer: L. Kling

Purpose of photo:

To document the project area in the vicinity of T24-T34, located within the Monument Springs Road Viewshed Area. Note Monument Springs Road in frame.

Photo ID: 2-D

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 22 July 2010

Time of Day: 1:30 pm

Cardinal Direction:

Photographer: L. Kling

Purpose of photo:

To document the project area in the vicinity of T24-T34, located within the Monument Springs Road Viewshed Area. Note Monument Springs Road in frame.

URS

SITE PHOTOS

Project: China Mountain Wind Project: Monument Springs Road Viewshed Area

URS Project No. 36258811

Photo ID: 2-E	
Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens	
Photo Date: 6/16/10	
Time of Day: 2:45	
Cardinal Direction:	
Photographer: L. Kling	
Purpose of photo: To document canyons and ridgeline to the east of the project area. Note that the canyon edges signify the border between the Monument Springs Road Viewshed Area and the Salmon Falls Creek Reservoir Viewshed Area (located to the east).	

Photo ID: 2-F	
Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens	
Photo Date: 6/16/10	
Time of Day: 2:15 pm	
Cardinal Direction:	
Photographer: L. Kling	
Purpose of photo: To document dispersed camping areas within the project area (Monument Springs Road Viewshed Area.)	

URS

SITE PHOTOS

Project: China Mountain Wind Project: Southern Primitive Road Network Viewshed Area

URS Project No. 36258811

Photo ID: 3A

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 23 July 2010

Time of Day: 10:45 am

Cardinal Direction: East

Photographer: L. Kling

Purpose of photo:

View from road across Cottonwood Creek drainage (VRM Class II), located in the Southern Primitive Road Network Viewshed Area.

Photo ID: 3B

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 23 July 2010

Time of Day: 10:45 am

Cardinal Direction:

Photographer: L. Kling

Purpose of photo:

View from road across Cottonwood Creek drainage (VRM Class II), located in the Southern Primitive Road Network Viewshed Area.

URS

SITE PHOTOS

Project: China Mountain Wind Project: Southern Primitive Road Network Viewshed Area.

URS Project No. 36258811

Photo ID: 4a

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 23 July 2010

Time of Day: 11:10 am

Cardinal Direction:

Photographer: L. Kling

Purpose of photo:

To document landform and enclosed landscape character of a localized area of the Southern Primitive Road Network Viewshed Area. View of Southern Haul Route (existing conditions). Roadway winding to the northwest, away from Cottonwood Creek.

Photo ID: 4b

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 23 July 2010

Time of Day: 11:25 am

Cardinal Direction: North

Photographer: L. Kling

Purpose of photo:

To document landform and vegetation patterns along the Southern Haul Route, located in the Southern Primitive Road Network Viewshed Area. Photo documents views when entering project area from the south.

URS

SITE PHOTOS

Project: China Mountain Wind Project: Southern Primitive Road Network Viewshed Area.

URS Project No. 36258811

Photo ID: 4c

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 23 July 2010

Time of Day: 11:25 am

Cardinal Direction: West

Photographer: L. Kling

Purpose of photo:

To document unique rock outcrops along the Southern Haul Route, located in the Southern Primitive Road Network Viewshed Area.

Photo ID: 4d

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 23 July 2010

Time of Day: 12:00 pm

Cardinal Direction:

Photographer: L. Kling

Purpose of photo:

To document landform and vegetation along the Southern Haul Route, located in the Southern Primitive Road Network Viewshed Area. Note meteorological tower in frame.

URS

SITE PHOTOS

Project: China Mountain Wind Project: Salmon Falls Creek Reservoir Viewshed Area

URS Project No. 36258811

Photo ID: 5a

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 23 July 2010

Time of Day: 12:00 pm

Cardinal Direction:

Photographer: L. Kling

Purpose of photo:

To document view of Salmon Falls Creek Reservoir and Viewshed Area from the project area. Note ridgeline to the north (location of T48-T54).

Photo ID: 5b

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 23 July 2010

Time of Day: 12:10 pm

Cardinal Direction: North

Photographer: L. Kling

Purpose of photo:

To document view of project area looking north from the state line between Nevada and Idaho (indicated by fence line).

URS

SITE PHOTOS

Project: China Mountain Wind Project: Southern Primitive Road Network Viewshed Area.

URS Project No. 36258811

Photo ID: 6A

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 23 July 2010

Time of Day: 12:10 pm

Cardinal Direction: North

Photographer: L. Kling

Purpose of photo:

To document views of existing north/south running transmission lines in the vicinity of the proposed interconnection compound. Lines parallel Highway 93 to the east.

Photo ID: 7A

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 09/24/10

Time of Day: 12:00

Cardinal Direction:

Photographer: L. Kling

Purpose of photo:

To document the approach toward Cottonwood Creek on the Southern Haul Route, located in the Southern Primitive Road Network Viewshed Area. The photograph shows areas that would likely require cut/fill.

URS

SITE PHOTOS

Project: China Mountain Wind Project: Southern Primitive Road Network Viewshed Area.

URS Project No. 36258811

Photo ID: 7B

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 09/24/10

Time of Day: 12:00

Cardinal Direction:

Photographer: L. Kling

Purpose of photo:

To document the approach toward Cottonwood Creek on the Southern Haul Route, located in the Southern Primitive Road Network Viewshed Area. The photograph shows areas that would likely require cut/fill. Photo taken from eastern edge of Cottonwood Creek.

Photo ID: 7C

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 09/24/10

Time of Day: 12:00

Cardinal Direction:

Photographer: L. Kling

Purpose of photo:

To document the approach toward Cottonwood Creek on the Southern Haul Route, located in the Southern Primitive Road Network Viewshed Area. The photograph shows areas that would likely require cut/fill. Note strip of riparian vegetation in frame (Cottonwood Creek).

URS

SITE PHOTOS

Project: China Mountain Wind Project: Southern Primitive Road Network Viewshed Area.

URS Project No. 36258811

Photo ID: 7D

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 09/24/10

Time of Day: 12:00

Cardinal Direction:

Photographer: L. Kling

Purpose of photo:

To document the approach toward Cottonwood Creek on the Southern Haul Route, located in the Southern Primitive Road Network Viewshed Area. Note riparian vegetation in frame (Cottonwood Creek).

Photo ID: 8a

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 9/24/2010

Time of Day: 1:00 pm

Cardinal Direction: East

Photographer: L. Kling

Purpose of photo:

To document the location of the construction vehicle staging area (laydown area), located in the Southern Primitive Road Network Viewshed Area.

URS

SITE PHOTOS

Project: China Mountain Wind Project: Southern Primitive Road Network Viewshed Area.

URS Project No. 36258811

Photo ID: 8b

Type of Camera / Lens: Nikon D200 with a 35-70mm/fixed 2.8 lens

Photo Date: 9/24/2010

Time of Day: 1:00 pm

Cardinal Direction: East

Photographer: L. Kling

Purpose of photo:

To document the location of the construction vehicle staging area (laydown area), located in the Southern Primitive Road Network Viewshed Area.

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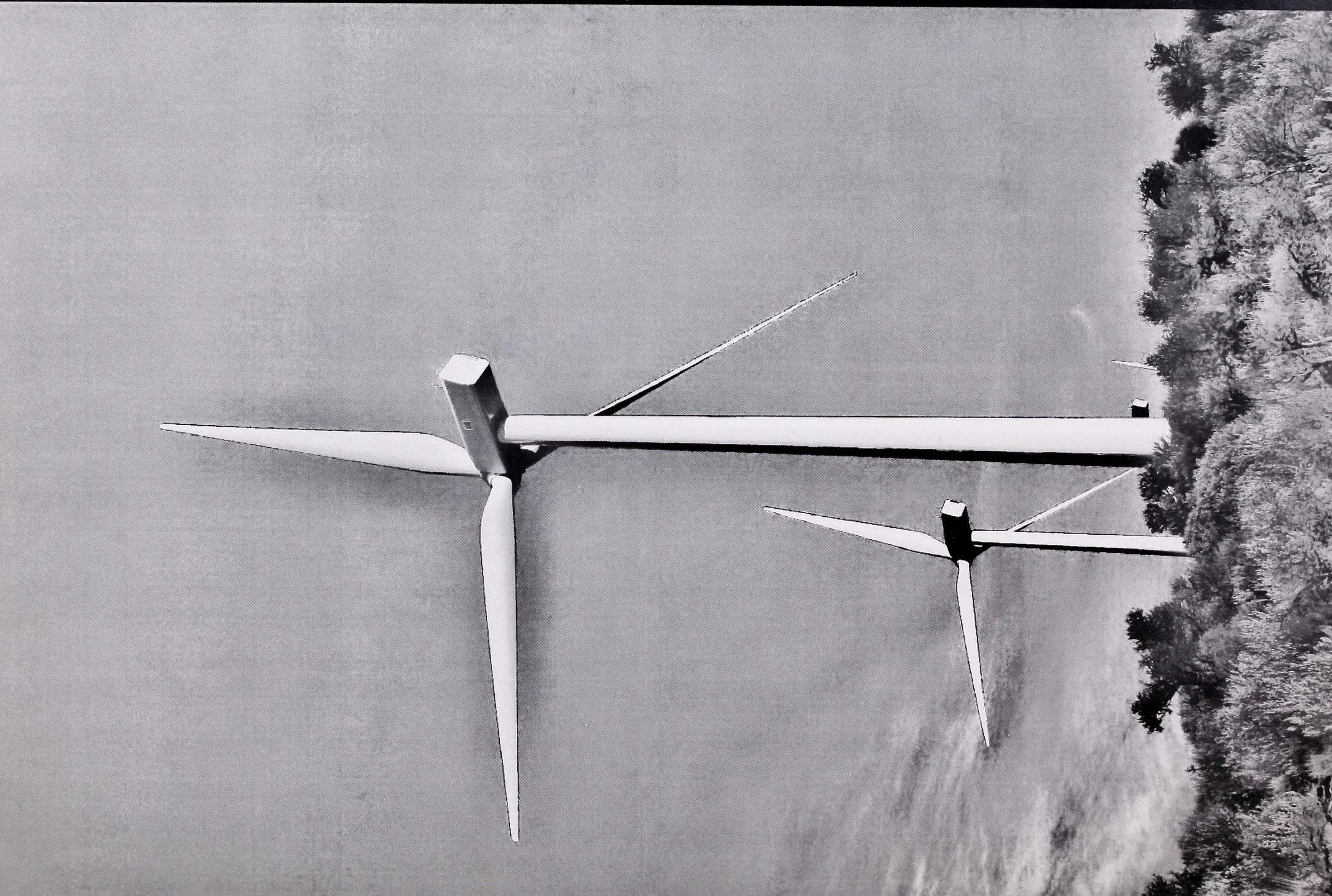
Appendix 3G – Visual Resources Assessment and Contrast Rating



VISUAL RESOURCES ASSESSMENT AND CONTRAST RATING

The BLM Contrast Rating procedure was used to determine visual contrast that may result from the construction and operation of the project (Bureau of Land Management, 1986). This method assumes that the extent to which the project results in adverse effects to visual resources is a function of the visual contrast between the project and the existing landscape character. Impact determinations described in Chapter 4, Section 4.3.4 are based on the identified level of contrast, and are not a measure of the overall attractiveness of the project. Appendix 3G includes completed forms documenting the contrast rating procedure used for the proposed project.

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Form 8400-4

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 6/2/2009

District/ Field Office: Twin Falls

Resource Area: Burley

Activity (program): Lands & Realty

SECTION A. PROJECT INFORMATION

1. Project Name
China Mountain Wind Power

2. Key Observation Point
KOP 1

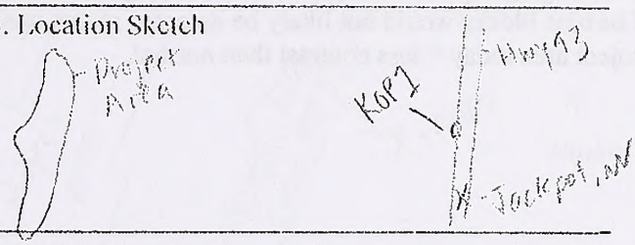
3. VRM Class
II & III

4. Location
Township 16 S

Range 15 E

Section 23

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Rolling panorama with massive rectangular ridge	Low, consistent, simple with undulating patterns	Linear fence posts, T0line, and road features
LINE	Simple horizontal & shallow diagonals	Undulating & weak digitate edges.	Vertical, regular & short
COLOR	Browns, grays. tans, white	Low chrome green, grey & tan hues	Dark brown & grey hues. Black in background.
TEX-TURE	Smooth to medium	Smooth in middle-background. Medium in foreground.	Regular, sparse and coarse, spike features.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	No change	No change	Vertical 2-dimensional. Short pyramidal w/ movement.
LINE	No change	No change	Vertical poles are short blades or short & move.
COLOR	No change	No change	Transition from white to grey to black from day-night.
TEX-TURE	No change	No change	Coarse & dense

SECTION D. CONTRAST RATING SHORT TERM X LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM				X				X			X	
	LINE				X				X		X		
	COLOR				X				X			X	
	TEXTURE				X				X		X		

2. Does project design meet visual resource management objectives? X (III) Yes X (II) No
(Explain on reverses side)

3. Additional mitigating measures recommended
X Yes No (Explain on reverses side)

Evaluator's Names Date 6/2/2009
Max Yingst, Zachary Pratt,
Tamara Hawthorne, Kavi Koleini,
Amanda Hoffman

SECTION D. (Continued)

Comments from item 2.

The proposed project meets VRM Class III objectives but does not meet VRM Class II objectives. Movement would likely draw the attention of a casual observer.

Low hanging fog obscures portions of the projects area today. Typical observer is traveling 60 mph in vehicle at this KOP. Movement of turbine blocks would not likely be detected at that speed. Project size spans VRM Class III & II areas. Low hanging fog obscures project area today = less contrast than normal.

Additional Mitigating Measures (See item 3)

Explore coloration but balance with the need for lighting. Coloration at this distance would result in only a very minor reduction in overall contrast. Blinking lights would outweigh any benefits than coloration could provide, since lights would be more apparent at this distance. Coloration would provide some mitigation if lights were not required by FAA. Consider grey coloration if possible with no lights.

Form 8400-4

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 6/2/2009
District/ Field Office: Twin Falls
Resource Area: Burley
Activity (program): Lands & Realty

SECTION A. PROJECT INFORMATION

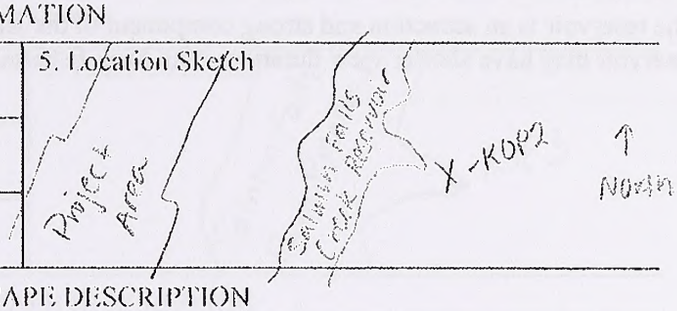
1. Project Name
China Mountain Wind Power

2. Key Observation Point
KOP 2

3. VRM Class
II

4. Location
Township 15 S
Range 15 E
Section 19

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat, wide, reservoir flanked by blocky massive buttes	Low & patchy. Irregular patterns.	None
LINE	Horizontal and steep diagonals; bold.	Indistinct, undulating.	None
COLOR	Water – blue, green. Land – brown, gray, rust	Dark green, tan, yellows.	None
TEX-TURE	Water – smooth. Land – unchanging.	Smooth	None

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	No change	No change	Wind turbine forms poles & fans => motion
LINE	No change	No change	Straight, vertical with angular & rectangular
COLOR	No change	No change	White
TEX-TURE	No change	No change	Rough

SECTION D. CONTRAST RATING SHORT TERM X LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM				X				X	X			
	LINE				X				X	X			
	COLOR				X				X	X			
	TEXTURE				X				X	X			

2. Does project design meet visual resource management objectives? Yes X No
(Explain on reverses side)

3. Additional mitigating measures recommended
X Yes No (Explain on reverses side)

Evaluator's Names
Max Yingst, Zachary Pratt, Tamara Hawthorne, Kari Kolcini, Amanda Hoffman

Date 6/2/2009

SECTION D. (Continued)

Comments from item 2.

The proposed project would not meet VRM class objectives because the wind turbines and towers would tend to dominate the characteristic landscape. Motion would draw the eye of observers & structures don't repeat landscape elements.

The reservoir is an attraction and strong component of the landscape here. Activities vary from fishing to boating. Boaters on the reservoir may have shorter view durations than bank fisherman. Two existing Met towers are visible at the project site.

Additional Mitigating Measures (See item 3)

Consider moving the few turbines visible at this location back off the ridge (i.e. west) so that existing landforms obscure more of the structures at this steep viewing angle. Coloration may have to be mitigation here since color is distinct at this distance.

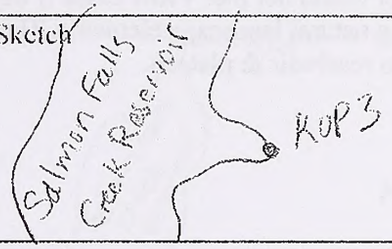
Form 8400-4

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 6/2/2009
District/ Field Office: Twin Falls
Resource Area: Burley
Activity (program): Lands & Realty

SECTION A. PROJECT INFORMATION

1. Project Name China Mountain Wind Power	4. Location Township 15 S	5. Location Sketch
2. Key Observation Point KOP 3	Range 15 E	
3. VRM Class II & III	Section 08	



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Massive rectangular blocks around arcing flat water.	Simple and low shrub patches	None
LINE	Bold horizontal skyline; shallow diagonals & arcs	Smooth and soft	None
COLOR	Browns, grays, black, red, dark hues	Greens, grays, yellows, matte appearance	None
TEX-TURE	Coarse outcrops in foreground. Smooth in mid-ground to background	Smooth and patchy continuous	None

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	No change	No change	Revolving turbines on tall cylindrical
LINE	No change	No change	Vertical pickets, regular
COLOR	No change	No change	White
TEX-TURE	No change	No change	Rough continuous and spikey

SECTION D. CONTRAST RATING SHORT TERM X LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM				X				X	X			
	LINE				X				X	X			
	COLOR				X				X	X			
	TEXTURE				X				X	X			

2. Does project design meet visual resource management objectives? X (III) Yes X (II) No (Explain on reverses side)

3. Additional mitigating measures recommended X Yes ____ No (Explain on reverses side)

Evaluator's Names: Max Yingst, Zachary Pratt, Tamara Hawthorne, Kari Koleini, Amanda Hoffman
Date 6/2/2009

SECTION D. (Continued)

Comments from item 2.

The proposed project would meet VRM class III objectives because it would partially retain the existing character of the landscape. Although the turbines would attract attention they would not dominate the view due to the strong reservoir feature here.

The project would not met VRM Class II objectives because the level of landscape change would be too great and would not repeat the existing natural landscape elements. The proposed project would attract attention. Foreground frames background and draws attention to reservoir & plateau.

Additional Mitigating Measures (See item 3)

Consider moving towers back off the ridgeline to obstruct views, particularly in VRM Class II areas. Consider coloration to reduce color contrasts. Grey might reduce color constrast.

Form 8400-4

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 6/2/2009
District/ Field Office: Twin Falls
Resource Area: Burley
Activity (program): Lands & Realty

SECTION A. PROJECT INFORMATION

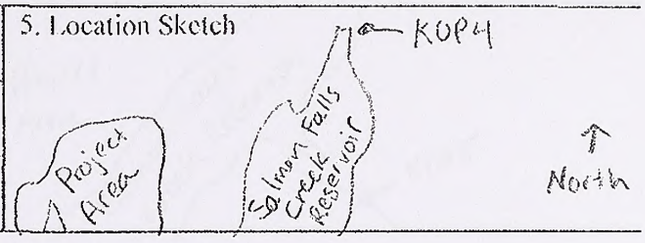
1. Project Name
China Mountain Wind Power

2. Key Observation Point
KOP 4

3. VRM Class
II & III

4. Location
Township 14 S
Range 15 E
Section 17

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Irregular & massive 3-D land forms, 2-D water.	Trees in foreground few but prominent. Rough & patchy in background.	Linear box features. Solid geometric shapes.
LINE	Jagged butte edges with horizontals & horseshoes.	Indistinct & diffuse edges. Bold in foreground (trees).	Regular angles with horizontal, vertical & diagonals.
COLOR	Subtle browns, grays, & reds. Low chroma. Vivid blue at reservoir.	Subtle browns, greens & yellows.	Subtle yellows & tans. Browns.
TEXTURE	Land – rough & rugged. Water – smooth.	Coarse in foreground. Medium to grainy in background.	Coarse & random.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	No change	No change	Turbines/poles are cylindrical & angular. Linear road features.
LINE	No change	No change	Vertical lines w/ movement cherry stem roads.
COLOR	No change except at pads & roads = ^ bareground	No change	White
TEXTURE	No change	No change	Coarse & dense random arrangement.

SECTION D. CONTRAST RATING ___ SHORT TERM X LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM				X				X		X		
	LINE				X				X		X		
	COLOR				X				X	X			
	TEXTURE				X				X	X			

2. Does project design meet visual resource management objectives? Yes X No
(Explain on reverses side)

3. Additional mitigating measures recommended
X Yes ___ No (Explain on reverses side)

Evaluator's Names — Date 6/2/2009
Max Yingst, Zachary Pratt, Tamara Hawthorne, Kari Kokeini, Amanda Hoffman

SECTION D. (Continued)

Comments from item 2.

The strong color & texture contrasts combined with movement of turbine blades would not be overlooked and would begin to dominate the characteristic landscape at this location. Focus would be split between water tower/turbine features, scale of project along ridgeline draws attention.

Additional Mitigating Measures (See item 3)

Color is important at this KOP. Consider battleship gray. Decrease the number of proposed turbines visible from this location.

Form 8400-4

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 6/2/2009

District/ Field Office: Twin Falls

Resource Area: Burley

Activity (program): Lands & Realty

SECTION A. PROJECT INFORMATION

1. Project Name
China Mountain Wind Power

2. Key Observation Point
KOP 5

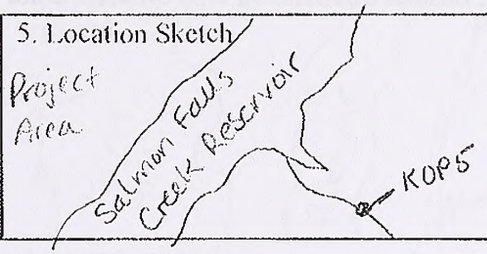
3. VRM Class
II & III

4. Location
Township 15 S

Range 15 E

Section 19

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat plateau rises sharply to rectangular ridges.	Simple amorphous shrubs rising to complex tree patches.	Flat 2-D road feature.
LINE	Horizontals and shallow diagonals.	Simple lines with diffuse edges on ridge.	Vertical
COLOR	Dark hues of brown, gray & red. White (snow)	Dull greens, tans with light greens.	Brown & gray.
TEX-TURE	Foreground – fine & even. Background – coarse & random	Medium & even with graduation to background.	Fine to medium.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	No change	No change	Angular 2-D geometric figures motion on horizon
LINE	No change	No change	Bold vertical lines. Angular & complex at horizon.
COLOR	No change	No change	White, gray.
TEX-TURE	No change	No change	Coarse & regularly spaced. Scattered across horizon.

SECTION D. CONTRAST RATING SHORT TERM X LONG TERM

1. DEGREE OF CONTRAST		FEATURES											
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM				X				X	X			
	LINE				X				X	X			
	COLOR				X				X		X		
	TEXTURE				X				X	X			

2. Does project design meet visual resource management objectives? Yes X No
(Explain on reverses side)

3. Additional mitigating measures recommended
Yes No (Explain on reverses side)

Evaluator's Names
Max Yingst, Zachary Pratt, Tamara Hawthorne, Kari Kolcini, Amanda Hoffman

Date 6/2/2009

SECTION D. (Continued)

Comments from item 2.

Pulling back from ridgeline could mitigate to meet VRM Class II objectives. Color contrasts are les apparent in winter or under cloudy conditions. People living west will undoubtedly notice the structures, which do not repeat basic elements of existing landscape. Project will dominate the view of observers accessing reservoir since horizon is natural focal point. Coloration could be a trade off of FAA required lights. Consider a simulation with different color add lights.

Additional Mitigating Measures (See item 3)

Back towers away from ridgeline so that more of the structures are obscured by landform. Consider coloration other than white (gray?).

Form 8400-4

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 6/2/2009

District/ Field Office: Twin Falls

Resource Area: Burley

Activity (program): Lands & Realty

SECTION A. PROJECT INFORMATION

1. Project Name
China Mountain Wind Power

2. Key Observation Point
KOP 6

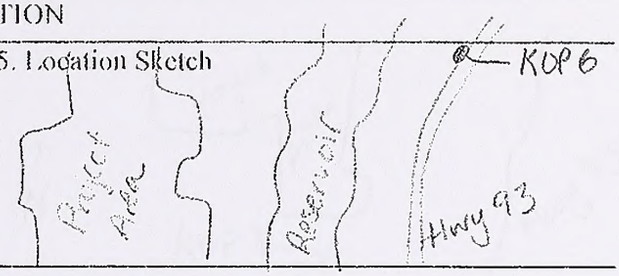
3. VRM Class
II & III

4. Location
Township 15 S

Range 15 E

Section 3

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Simple low gentle strip features.	Irregular, small clumps non-geometric.	Fence post pickets. Thing linear sign, rectangular (2-D).
LINE	Parallel horizontals. Middleground forms strong line.	Weak & simple.	Perpendicular fence posts at regular intervals. Sign & antennae
COLOR	Dark brown & reds & gray	Matte greens, tans, light & dark values.	Browns & gray.
TEX-TURE	Smooth	Smooth & consistent	Coarse

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	No change	No change	Intermittent poles with fan blades – motion possible.
LINE	No change	No change	Short, vertical poles with angular fan blades.
COLOR	No change	No change	White => black silhouette depending on lighting.
TEX-TURE	No change	No change	Coarse & dense

SECTION D. CONTRAST RATING ___ SHORT TERM X LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM				X				X			X	
	LINE				X				X			X	
	COLOR				X				X			X	
	TEXTURE				X				X		X		

2. Does project design meet visual resource management objectives? X (III) Yes X (II) No
(Explain on reverses side)

3. Additional mitigating measures recommended
X Yes ___ No (Explain on reverses side)

Evaluator's Names
Max Yingst, Zachary Pratt, Tamara Hawthorne, Kari Kolcini, Amanda Hoffman

Date 6/2/2009

SECTION D. (Continued)

Comments from item 2.

The project would meet VRM class III objectives. It appears that portions of the project that fall into VRM Class II areas would be visible from this KOP and those portions would not meet the VRM class objectives. A very small portion of the project is in VRM Class II area. The KOP itself is in VRM Class III area. Most observers will be driving at 60 MPH at this KOP.

Additional Mitigating Measures (See item 3)

Consider moving structures further west to conceal appearance behind topography from this perspective.

Form 8400-4

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 6/3/2009

District/ Field Office: Elko

Resource Area: Wells

Activity (program): Lands & Realty

SECTION A. PROJECT INFORMATION

1. Project Name
China Mountain Wind Power

2. Key Observation Point
KOP 7

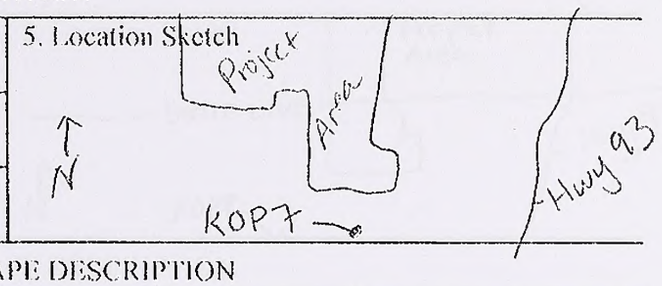
3. VRM Class
III

4. Location
Township 46 N

Range 63 E

Section 22

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Irregular bluffs & hills flat & rectangular.	Low shrubs with irregular forms.	Two track road. Flat linear parallel meander.
LINE	Numerous overlapping strong lines from horizon.	Weak and undulating & complex.	Parallel banding at two-track road.
COLOR	Browns & grays (light & dark) tans & dark red/	Light green/sage, grays & browns (light).	Unimproved two-track same as land (1)
TEX-TURE	Uneven random medium ->coarse	Uneven & random medium -> smooth	Regular & even medium -> smooth.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	No change	No change	
LINE	No change	No change	
COLOR	No change	No change	
TEX-TURE	No change	No change	

SECTION D. CONTRAST RATING SHORT TERM X LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM				X				X		X		
	LINE				X				X			X	
	COLOR				X				X			X	
	TEXTURE				X				X			X	

2. Does project design meet visual resource management objectives? X (III) Yes X (II) No
(Explain on reverses side)

3. Additional mitigating measures recommended
X Yes No (Explain on reverses side)

Evaluator's Names
Zachary Pratt,
Tamara Hawthorne, Kari Kolcini,

Date 6/3/2009

SECTION D. (Continued)

Comments from item 2.

The KOP may represent visual impacts for hunters spotting game. Project would be noticeable but would not dominate landscape due to oblique viewing angle and narrow field of proposed project.

Additional Mitigating Measures (See item 3)

Consider coloration to reduce color contrasts. Color darker than white (e.g. battleship gray) might fade into distance. Lights would be noticeable here.

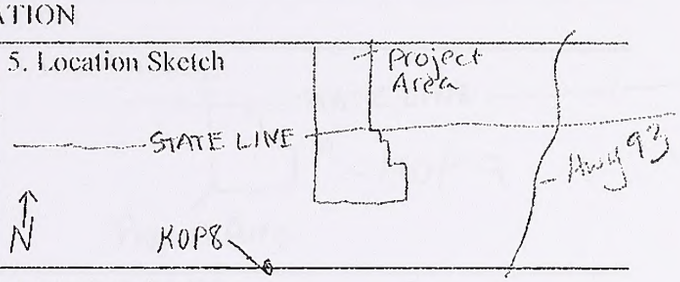
Form 8400-4

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 6/3/2009
District/ Field Office: Elko
Resource Area: Wells
Activity (program): Lands & Realty

SECTION A. PROJECT INFORMATION

1. Project Name China Mountain Wind Power	4. Location Township 46 N	5. Location Sketch
2. Key Observation Point KOP 8	Range 63 E	
3. VRM Class III	Section 6	



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat to rolling hilltops; convex domes	Low to medium shrub. Irregular & numerous.	Only two-track road. Flat linear.
LINE	Simple curving horizontals.	Soft diffuse; irregular & short.	Parallel two-track road.
COLOR	Browns, tans, dark reds/rust.	Dark -> light greens Grays & tans	Same as land (1) at two-track road.
TEX-TURE	Uneven but smooth to medium texture.	Gradation of medium to smooth.	Smooth (two-track road)

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat – convex hilltops with linear roads in background.	No change.	Regular & geometric wind turbine forms.
LINE	Simple curving horizontals & verticals.	Butt edges at constructed roads.	Complex angles & vertical poles.
COLOR	Browns, tans, dark reds/rust.	Dark -> light green/grays, tans	White
TEX-TURE	Uneven & smooth to medium	Medium -> Smooth	Coarse & jagged.

SECTION D. CONTRAST RATING ___ SHORT TERM X LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM				X				X	X			
	LINE			X				X		X			
	COLOR				X			X		X			
	TEXTURE			X					X	X			

2. Does project design meet visual resource management objectives? Yes X No
(Explain on reverses side)

3. Additional mitigating measures recommended
X Yes ___ No (Explain on reverses side)

Evaluator's Names
Zachary Pratt,
Tamara Hawthorne, Kari Koleini.

Date 6/3/2009

SECTION D. (Continued)

Comments from item 2.

Wind turbines would be the most prominent features on the landscape. They would demand attention & dominate the view. Roads & construction pads would also be noticeable, along with motion of rotor blades.

Additional Mitigating Measures (See item 3)

Re-vegetate roads & construction areas. Consider darker color for structures. Some tall shrub plantings could reduce visibility here, assuming a natural/native variety would succeed. (Mtn. Mahogony; service berry?)

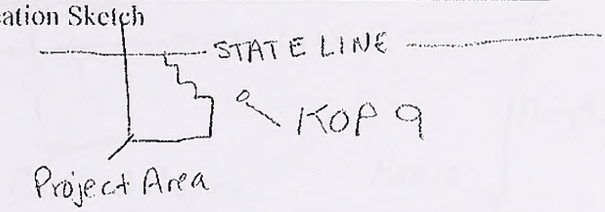
Form 8400-4

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 6/3/2009
District/ Field Office: Elko
Resource Area: Wells
Activity (program): Lands & Realty

SECTION A. PROJECT INFORMATION

1. Project Name China Mountain Wind Power	4. Location Township 47 N	5. Location Sketch
2. Key Observation Point KOP 9	Range 63 E	
3. VRM Class III	Section 14	



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Steep & massive trapezoid/rectangles	Mottled low irregular shrubs/grasses.	Road – linear regular & simple.
LINE	Strong uneven horizon weak shallow diagonals.	Irregular, short, transitional edges.	Straight parallel edges; strong convergence.
COLOR	Brownish reds, rust, grays.	Greens (light & dark), tans.	Browns, grays, white.
TEX-TURE	Rough horizon, medium valley (bench).	Smooth -> rough at ridgeline.	Flat & smooth. Regular.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	No change.	No change.	Solid complex wind turbines at ridge; motion.
LINE	No change.	No change.	Vertical towers with angular blades; strong.
COLOR	No change.	No change.	White.
TEX-TURE	No change.	No change.	Rough, continuous & dense at ridge.

SECTION D. CONTRAST RATING SHORT TERM X LONG TERM

1. DEGREE OF CONTRAST		FEATURES											
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM				X				X		X		
	LINE				X				X		X		
	COLOR				X				X		X		
	TEXTURE				X				X		X		

2. Does project design meet visual resource management objectives? X Yes No (Explain on reverses side)

3. Additional mitigating measures recommended X Yes No (Explain on reverses side)

Evaluator's Names Date 6/3/2009
Zachary Pratt,
Tamara Hawthorne, Kari Kolein.

SECTION D. (Continued)

Comments from item 2.

Wind turbines would be prominent landscape features at this location due to motion & general proximity to proposed project area. However, the wind turbine forms may not dominate the characteristic landscape since mountains & rock outcrops are most dominant features & unchanged. Consider an active simulation at this location to demonstrate motion.

Additional Mitigating Measures (See item 3)

Painting a darker color could reduce color contrasts if lighting were not required.

Form 8400-4

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 6/3/2009

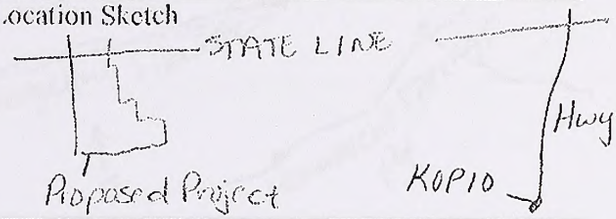
District/ Field Office: Elko

Resource Area: Wells

Activity (program): Lands & Realty

SECTION A. PROJECT INFORMATION

1. Project Name China Mountain Wind Power	4. Location Township 46 N	5. Location Sketch
2. Key Observation Point KOP 10	Range 64 E	
3. VRM Class III	Section 22	



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Narrow rectangles & irregular hills.	Short and amorphous.	Flat, strong Hwy. Lattice T-line structures.
LINE	Bold uneven horizontal.	Flat & regular. Short.	Strong convergence (Hwy). Vertical T-line poles.
COLOR	Grey, brown, lavender, black.	Green (light -> dark), yellows & tans.	Dark Brown -> Black.
TEX-TURE	Rough (background), Smooth (foreground).	Smooth.	Coarse & regular (T-line). Smooth (Hwy).

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	No change.	No change.	Wind turbines at horizon.
LINE	No change.	No change.	Angular & vertical.
COLOR	No change.	No change.	White to gray depending on lighting.
TEX-TURE	No change.	No change.	Rough & regular.

SECTION D. CONTRAST RATING SHORT TERM X LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM				X				X			X	
	LINE				X				X			X	
	COLOR				X				X			X	
	TEXTURE				X				X				X

2. Does project design meet visual resource management objectives? X Yes No
(Explain on reverses side)

3. Additional mitigating measures recommended
Yes X No (Explain on reverses side)

Evaluator's Names
Zachary Pratt,
Tamara Hawthorne, Kari Kolcini,

Date 6/3/2009

SECTION D. (Continued)

Comments from item 2.

KOP represents the 1st location along the Hwy 93 that travelers could see the proposed project. Difficult to determine if motion would be visible but not likely at this distance.

Additional Mitigating Measures (See item 3)

Mitigation would not be necessary from this location. Coloration would not be detectable.

Form 8400-4

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 7/22/2010

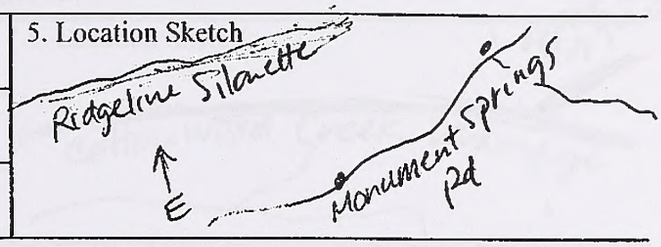
District/ Field Office: Twin Falls

Resource Area: Burley

Activity (program): Lands & Realty

SECTION A. PROJECT INFORMATION

1. Project Name China Mountain Wind Power	4. Location Township 16 S	5. Location Sketch
2. Key Observation Point KOP 11 & 12 (Roving KOP)	Range 15 E	
3. VRM Class II & III	Section 23	



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Rolling Hills; Incised drainages to the east	Oval to elliptical patches; linear in some places	Dirt road (Monument Springs Road); single family residence (out of KOP frame); small bluebird nest box.
LINE	Horizontal; strong silhouette of ridgeline. Drainages appear angular.	Irregular; undulating	Vertical; horizontal; diagonal (structures) Curving (road)
COLOR	Dark Grey; Patchy	Dark green (Mt. Mahogany/Juniper); Tan of grasses; Blue/Grey sage	Brown., tans
TEX-TURE	Rough; Irregular	Smooth; Soft	smooth

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	No change	No change	Vertical 2-dimensional. Short pyramidal w/ movement.
LINE	No change	No change	Vertical poles are short blades or short & move.
COLOR	No change	No change	Transition from white to grey to black from day-night.
TEX-TURE	No change	No change	Smooth

SECTION D. CONTRAST RATING __SHORT TERM X LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM				X				X	X			
	LINE				X				X	X			
	COLOR				X				X	X			
	TEXTURE				X				X	X			

2. Does project design meet visual resource management objectives? X (III) No X (II) No (Explain on reverses side)

3. Additional mitigating measures recommended X Yes ___No (Explain on reverses side)

Evaluator's Names: Louise Kling, Max Yingst

Date: 9/23/2010

SECTION D. (Continued)

Comments from item 2.

The project would not meet VRM Class II or III objectives. Turbines and project roads would dominate the landscape, and would attract the attention of the casual observer.

Additional Mitigating Measures (See item 3)

It is expected that change in color to blend to existing landscape would not result in a large reduction in contrast.

Consider radar controlled lighting to reduce contrast in night sky.

Consider reducing the number of turbines, or grouping in one portion of the project area to minimize aerial extent of visual impacts.

Form 8400-4

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 7/22/2010

District/ Field Office: Twin Falls

Resource Area: Burley

Activity (program): Lands & Realty

SECTION A. PROJECT INFORMATION

1. Project Name
China Mountain Wind Power

2. Key Observation Point
KOP 13

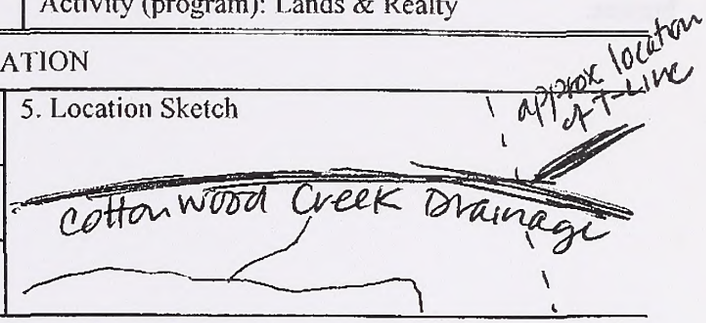
3. VRM Class
II & III

4. Location
Township 16 S

Range 15 E

Section 23

5. Location Sketch



SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Rolling, dome-like hills; flat mesas; prominent cliffs; talus/scree slopes	Uniform; non-directional	road
LINE	Horizontal, Vertical, and angular. Curvature in hills	Gentle, simple lines. Can appear weak.	Curving; linear; directional. Small n scale, but apparent
COLOR	Tan, dark brown/ grey rock. Grey/Brown boulders.	Green/grey; tan	Tan; pale grey
TEX-TURE	Subtle roughness; ordered	Appears rough in FM; smooth in B	Rough / granular

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	No change	No change	No change (assumed no blasting is required)
LINE	No change	No change	Predominantly Vertical
COLOR	No change	No change	Brown/ rust
TEX-TURE	No change	No change	course

SECTION D. CONTRAST RATING __SHORT TERM X LONG TERM

1. DEGREE OF CONTRAST		FEATURES											
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM				X				X			X	
	LINE				X				X			X	
	COLOR				X				X			X	
	TEXTURE				X				X			X	

2. Does project design meet visual resource management objectives? X (III) Yes X (II) Yes
(Explain on reverses side)

3. Additional mitigating measures recommended
X Yes ___No (Explain on reverses side)

Evaluator's Names
Louise Kling, Tamara Hawthorne

Date
9/24/2010

SECTION D. (Continued)

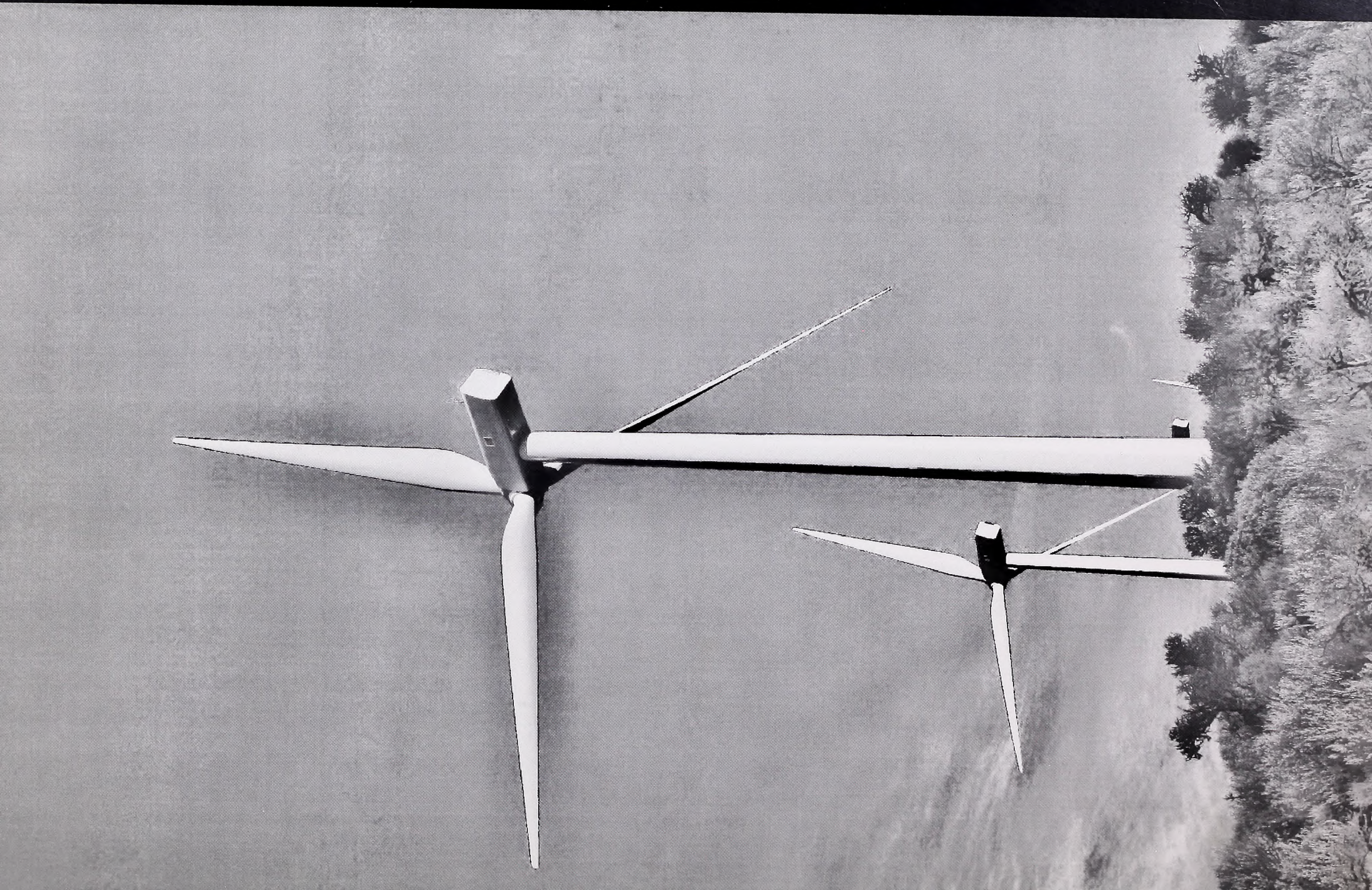
Comments from item 2.

The transmission line would appear small in scale against the surrounding landscape. Color would blend with surrounding mosaic of browns.

Additional Mitigating Measures (See item 3)

Minimize impacts of access roads by driving overland where possible.

Appendix 3H – Natural Resource Recreation Settings of the China Mountain Wind Project



NATURAL RESOURCE RECREATION SETTINGS OF THE CHINA MOUNTAIN WIND PROJECT

Criteria for Classification and Prescriptions							Existing Recreation Setting	Post-Project Recreation Setting
PHYSICAL – LAND & FACILITIES: Character of the natural landscape								
	Primitive		Back Country	Middle Country	Front Country	Rural	Urban	
	Pristine	Transition						
a. Remoteness	More than 10 mi. from any road	More than 3 mi. from any road	More than ½ mi. from any kind of road, but not as distant as 3 miles and no road is in sight.	On or near four-wheel drive roads, but at least ½ mile from all improved roads, though they may be in sight	On or near improved country roads, but at least ½ mile from all highways	On or near primary highways, but still within a rural area	On or near primary highways, municipal streets, and roads within towns or cities	
b. Naturalness:	Undisturbed natural landscape		Naturally-appearing landscape having modifications not readily noticeable	Naturally-appearing landscape except for obvious primitive roads	Landscape partially modified by roads, utility lines, etc., but none overpower natural landscape features	Natural landscape substantially modified by agriculture or industrial development	Urbanized developments dominate landscape	
c. Facilities:	None		Some primitive trails made of native materials such as log bridges and carved wood signs	Maintained and marked trails, simple trailhead developments, improved signs, and very basic toilets	Improved yet modest, rustic facilities such as campsites, restrooms, trails, and interpretive signs	Modern facilities such as campgrounds, group shelters, boat launches, and occasional exhibits	Elaborate full-service facilities such as laundry, groceries, and book sale	
SOCIAL – VISITOR USE & USERS: Character of recreation & tourism use								
	Primitive		Back Country	Middle Country	Front Country	Rural	Urban	
	Pristine	Transition						
d. Contacts (with other groups):	Fewer than 3 encounters/day at camp sites and fewer than 6 encounters/day on travel routes		3-6 encounters/day off travel routes (e.g., campsites) and 7-15 encounters/day on travel routes	7-14 encounters/day off travel routes (e.g. staging areas) and 15-29 encounters/day en route	15-29 encounters/day off travel routes (e.g. campgrounds) and 30 or more encounters/day en route	People seem to be generally everywhere	Busy place with other people constantly in view route	
e. Group Size (not your own):	Fewer than or equal to 3 people per group		4-6 people per group	7-12 people per group	13-25 people per group	26-50 people per group	Greater than 50 people per group	
f. Evidence of Use:	Only footprints observed. No noise or litter.		Footprints and bicycle tracks observed. Noise and litter infrequent. Slight vegetation trampling at campsites and popular areas. Fire rings seen.	Vehicle tracks observed. Occasional noise and litter. Vegetation and soils becoming worn at campsites and at high-use areas.	Vehicle tracks common. Some noise and litter. Vegetation and soils commonly worn at campsites, along travel routes and at popular areas.	Frequent noise and litter. Large but localized areas with vegetation damage and soil compaction.	Unavoidable noise, music, and litter. Widespread vegetation damage and soil compaction.	
ADMINISTRATIVE – ADMINISTRATION & SERVICES: How Public Land Managers, County Commissioners and Municipal Governments, and Local Businesses Care for the Area and Serve Visitors and Local Residents								
	Primitive		Back Country	Middle Country	Front Country	Rural	Urban	
	Pristine	Transition						
g. Mechanized Use:	None whatsoever		Mountain bikes and perhaps other mechanized use, but all is nonmotorized	Four-wheel drives, all-terrain vehicles, dirt bikes, or snowmobiles in addition to non-motorized, mechanized use	Two-wheel drive vehicles predominant, but also four wheel drives and non-motorized, mechanized use	Ordinary highway auto and truck traffic is characteristic	Wide variety of street vehicles and highway traffic is ever-present	
h. Visitor Services:	None is available on-site		Basic maps, but area personnel seldom available to provide on-site assistance	Area brochures and maps, plus area personnel occasional present to on-site assistance	Information materials describe recreation areas and activities. Area personnel are periodically available	Information described to the left, plus experience and benefit descriptions. Area personnel do on-site education.	Information described to the left, plus regularly scheduled on-site outdoor skills demonstrations and clinics	
i. Management Controls:	No visitor controls apparent. No use limits. Enforcement presence very rare.		Signs at key access points on basic user ethics. May have backcountry use restrictions. Enforcement presence rare.	Occasional regulatory signing. Motorized and mechanized use restrictions. Random enforcement presence.	Rules clearly posted with some seasonal or day-of week use restrictions. Periodic enforcement presence.	Regulations prominent. Total use limited by permit, reservation, etc. Routine enforcement presence.	Continuous enforcement to redistribute use and reduce user conflicts, hazards, and resource damage.	

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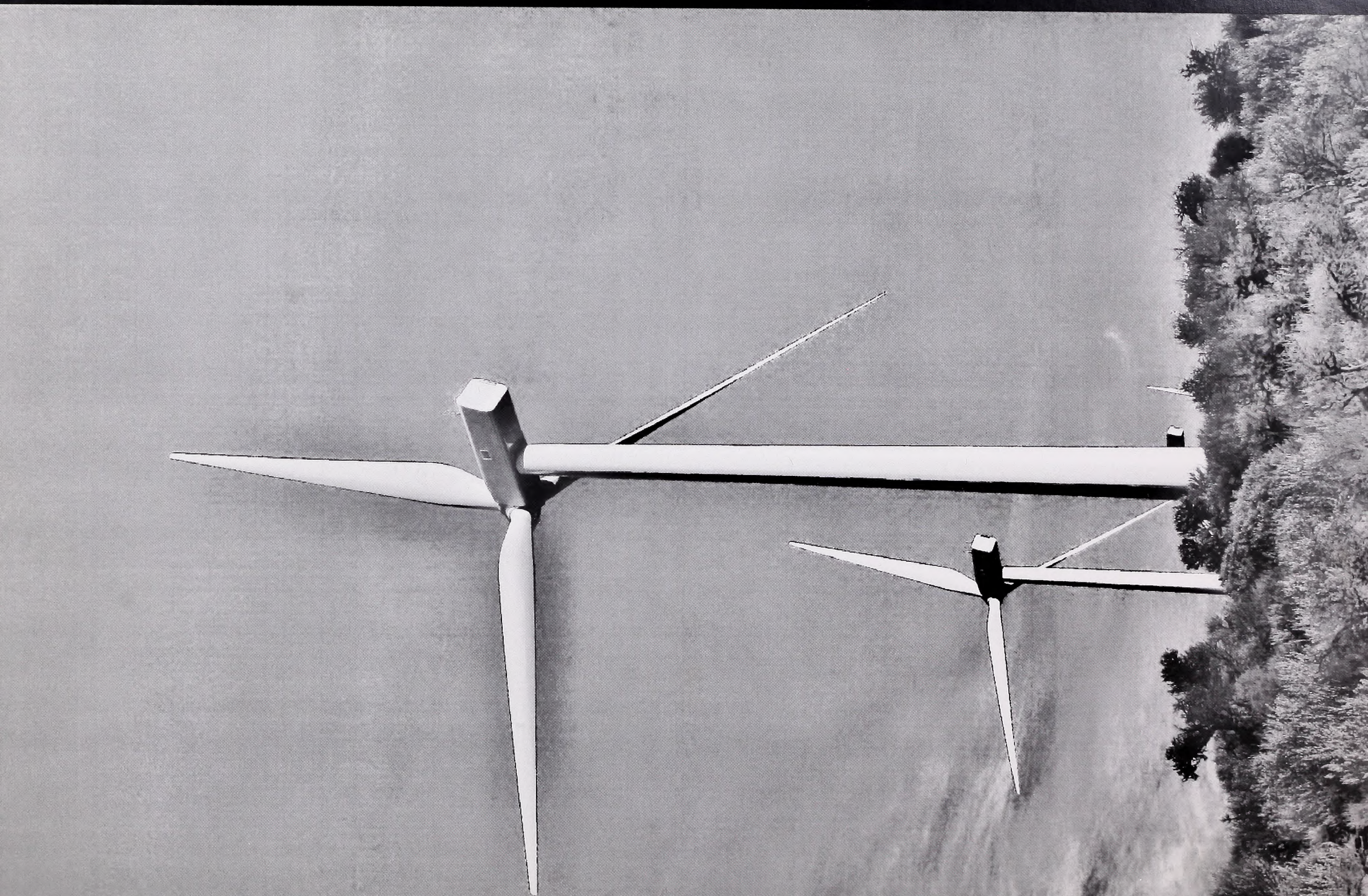
Appendix 4A– Construction and Operation Noise Prediction Details



CONSTRUCTION AND OPERATION NOISE PREDICTION DETAILS

Construction Noise Prediction Detail

As introduced in Section 3.2.1 of the Noise Technical Report available in the project record, it is expected that heavy equipment would be utilized during construction activities including, but not limited to, installation of wind turbine foundations, project roads, and substations for the project. The two noisiest types of typical construction equipment at a wind turbine project site are a derrick crane and a truck (Bureau of Land Management [BLM], 2005). If one assumes one of each would operate simultaneously at peak load during some period of time in an 8-hour work day, the anticipated construction noise sound pressure level (SPL_{CN}) can be calculated with the following expression:

$$SPL_{CN} = SPL_{ref} - 20*LOG(d/d_{ref}) - d/1000 - A_{gr};$$

where SPL_{ref} is the logarithmic sum of the two sound sources (91 dBA), d is the distance from the acoustic center of the equipment or construction activity, d_{ref} is 50 feet (BLM, 2005), and A_{gr} is expected attenuation from ground effects (e.g., terrain and vegetation) as follows:

$$A_{gr} = 4.8 - \left(\frac{2h_m}{r}\right)\left[17 + \left(\frac{300}{r}\right)\right] \geq 0\text{dB}$$

where h_m is mean height of the sound path between source and receiver (International Organization for Standardization, 1996). In this expression for A_{gr}, r is in units of meters and is the horizontal distance between source and receiver. The expression for SPL_{CN} can thus be recast as follows:

$$SPL_{CN} = 91 - 20*LOG(d/50) - d/1000 - A_{gr}$$

In order to find a setback distance that avoids SPL_{CN} greater than a specific threshold, one can iteratively input values for d (in feet) until SPL_{CN} matches it. Note that because SPL_{CN} is a 1-hour L_{eq}, one would need to reduce a day-night threshold by as much as 6 dBA in order to make a correct comparison. Since the lower of the two guidance indicators is 45 dBA L_{dn}, a corresponding minimum setback distance d for 39 dBA L_{eq} (i.e., 45-6=39) between heavy equipment construction activity and a receiver to avoid potential noise impact would be 5,900 feet (1,800 meters).

Blasting may be necessary in order to construct project roads and set WTG foundations. The estimated noise level from blasting activity can be derived from the Federal Highway Administration *Roadway Construction Noise Model User's Guide* (Federal Highway Administration, 2006). It describes that the maximum noise level at 50 feet (15 meters) from blasting would be 94 dBA. Using the same expression for calculating SPL_{CN} at some receiver distance, blasting noise SPL can thus be estimated as follows:

$$SPL_{BN} = 94 - 20*LOG(d/50) - d/1000 - A_{gr}$$

And in similar fashion to the technique for heavy equipment construction noise, one can estimate an approximate setback distance by iteratively inputting values for *d* (in feet) until SPL_{BN} matches a desired impact threshold. Note that because SPL_{BN} is a 1-hour Leq, one would need to reduce a day-night threshold by as much as 6 dBA in order to make a correct comparison. Since the lower of the two guidance indicators is 45 dBA L_{dn}, a corresponding noise impact avoidance distance *d* for 39 dBA L_{eq} (i.e., 45-6=39) between the blast location and a receiver would be 6,800 feet (2,073 meters).

Operation Noise Prediction Detail

Predicted noise from the aggregate of operating turbines associated with Alternative B1 was estimated for the two most probable wind directions (and their corresponding highest average velocities according to available meteorological data) at each of six identified representative recreational land use locations as presented in Table 1.

Table 1. Estimated Operational Noise Levels — Alternative B1.

SPL Assessment Locations	Existing Ambient SPL (dBA)		Estimated Project Operation SPL (dBA)	Future Ambient with Project SPL [1] (dBA)	
	Daytime L_{eq} (7 AM-10 PM)	Nighttime L_{eq} (10 PM-7 AM)		Daytime L_{eq} (7 AM-10 PM)	Nighttime L_{eq} (10 PM-7 AM)
Scenario 1 (Wind Speed 12meters per second from west)					
Rock House Place	35	25	46 L_{eq}	46	46
	35 L_{dn}		52 L_{dn}	52 L_{dn}	
Harrell Place	35	25	35 L_{eq}	38	35
	35 L_{dn}		41 L_{dn}	42 L_{dn}	
China Creek Ranch	35	25	35 L_{eq}	38	35
	35 L_{dn}		41 L_{dn}	42 L_{dn}	
Duncan Place	35	25	36 L_{eq}	39	36
	35 L_{dn}		42 L_{dn}	43 L_{dn}	
Player Place	35	25	38 L_{eq}	40	38
	35 L_{dn}		44 L_{dn}	45 L_{dn}	
Brown's Bench Ranch	35	25	39 L_{eq}	40	39
	35 L_{dn}		45 L_{dn}	46 L_{dn}	
Scenario 2 (Wind Speed 6meters per second from south-southwest)					
Rock House Place	35	25	45 L_{eq}	45	45
	35 L_{dn}		51 L_{dn}	51 L_{dn}	
Harrell Place	35	25	31 L_{eq}	36	32
	35 L_{dn}		37 L_{dn}	39 L_{dn}	
China Creek Ranch	35	25	32 L_{eq}	36	33
	35 L_{dn}		38 L_{dn}	40 L_{dn}	
Duncan Place	35	25	36 L_{eq}	39	36
	35 L_{dn}		42 L_{dn}	43 L_{dn}	
Player Place	35	25	36 L_{eq}	39	36
	35 L_{dn}		42 L_{dn}	43 L_{dn}	
Brown's Bench Ranch	**35**	**25**	**39 L_{eq}**	**40**	**39**
	35 L_{dn}		**45 L_{dn}**	**46 L_{dn}**	

NOTES: [1] A logarithmic sum of Existing Ambient and Estimated Project Operation levels, not an algebraic sum.

Predicted noise from the aggregate of operating wind turbines associated with Phase I of Alternative B2a was estimated for the two most probable wind directions (and their corresponding highest average velocities according to available meteorological data) at each of six identified representative recreational land use locations as presented in Table 2.

Table 2. Estimated Operational Noise Levels — Alternative B2a – Phase I.

SPL Assessment Locations	Existing Ambient SPL (dBA)		Estimated Project Operation SPL (dBA)	Future Ambient with Project SPL [1] (dBA)	
	Daytime L_{eq} (7 AM-10 PM)	Nighttime L_{eq} (10 PM-7 AM)		Daytime L_{eq} (7 AM-10 PM)	Nighttime L_{eq} (10 PM-7 AM)
Scenario 1 (Wind Speed 12meters per second from west)					
Rock House Place	35	25	46 L_{eq}	46	46
	35 L_{dn}		52 L_{dn}	52 L_{dn}	
Harrell Place	35	25	35 L_{eq}	38	35
	35 L_{dn}		41 L_{dn}	42 L_{dn}	
China Creek Ranch	35	25	34 L_{eq}	38	34
	35 L_{dn}		40 L_{dn}	41 L_{dn}	
Duncan Place	35	25	36 L_{eq}	39	36
	35 L_{dn}		42 L_{dn}	43 L_{dn}	
Player Place	35	25	37 L_{eq}	39	37
	35 L_{dn}		43 L_{dn}	44 L_{dn}	
Brown's Bench Ranch	35	25	39 L_{eq}	40	39
	35 L_{dn}		45 L_{dn}	46 L_{dn}	
Scenario 2 (Wind Speed 6meters per second from south-southwest)					
Rock House Place	35	25	45 L_{eq}	45	45
	35 L_{dn}		51 L_{dn}	51 L_{dn}	
Harrell Place	35	25	31 L_{eq}	36	31
	35 L_{dn}		37 L_{dn}	39 L_{dn}	
China Creek Ranch	35	25	31 L_{eq}	36	31
	35 L_{dn}		37 L_{dn}	39 L_{dn}	
Duncan Place	35	25	35 L_{eq}	39	35
	35 L_{dn}		41 L_{dn}	42 L_{dn}	
Player Place	35	25	36 L_{eq}	39	36
	35 L_{dn}		42 L_{dn}	43 L_{dn}	
Brown's Bench Ranch	35	25	39 L_{eq}	40	39
	35 L_{dn}		45 L_{dn}	46 L_{dn}	

NOTES: [1] A logarithmic sum of Existing Ambient and Estimated Project Operation levels, not an algebraic sum.

Predicted noise from the aggregate of operating turbines associated with Phase I of Alternative B2b was estimated for the two most probable wind directions (and their corresponding highest average velocities according to available meteorological data) at each of six identified representative recreational land use locations as presented in Table 3.

Table 3. Estimated Operational Noise Levels — Alternative B2b – Phase I.

SPL Assessment Locations	Existing Ambient SPL (dBA)		Estimated Project Operation SPL (dBA)	Future Ambient with Project SPL[1] (dBA)	
	Daytime L_{eq} (7 AM-10 PM)	Nighttime L_{eq} (10 PM-7 AM)		Daytime L_{eq} (7 AM-10 PM)	Nighttime L_{eq} (10 PM-7 AM)
Scenario 1 (Wind Speed 12meters per second from west)					
Rock House Place	35	25	46 L_{eq}	46	46
	35 L_{dn}		52 L_{dn}	52 L_{dn}	
Harrell Place	35	25	35 L_{eq}	38	35
	35 L_{dn}		41 L_{dn}	42 L_{dn}	
China Creek Ranch	35	25	33 L_{eq}	38	34
	35 L_{dn}		39 L_{dn}	41 L_{dn}	
Duncan Place	35	25	30 L_{eq}	36	31
	35 L_{dn}		36 L_{dn}	39 L_{dn}	
Player Place	35	25	29 L_{eq}	36	30
	35 L_{dn}		35 L_{dn}	38 L_{dn}	
Brown's Bench Ranch	35	25	20 L_{eq}	35	26
	35 L_{dn}		26 L_{dn}	35 L_{dn}	
Scenario 2 (Wind Speed 6meters per second from south-southwest)					
Rock House Place	35	25	45 L_{eq}	45	45
	35 L_{dn}		51 L_{dn}	51 L_{dn}	
Harrell Place	35	25	31 L_{eq}	36	31
	35 L_{dn}		37 L_{dn}	39 L_{dn}	
China Creek Ranch	35	25	28 L_{eq}	36	30
	35 L_{dn}		34 L_{dn}	38 L_{dn}	
Duncan Place	35	25	27 L_{eq}	36	29
	35 L_{dn}		33 L_{dn}	37 L_{dn}	
Player Place	35	25	19 L_{eq}	35	26
	35 L_{dn}		25 L_{dn}	35 L_{dn}	
Brown's Bench Ranch	35	25	13 L_{eq}	35	25
	35 L_{dn}		19 L_{dn}	35 L_{dn}	

NOTES: [1] A logarithmic sum of Existing Ambient and Estimated Project Operation levels, not an algebraic sum.

Predicted noise from the aggregate of operating turbines associated with Phase I of Alternative B2c was estimated for the two most probable wind directions (and their corresponding highest average velocities according to available meteorological data) at each of six identified representative recreational land use locations as presented in Table 4.

Table 4. Estimated Operational Noise Levels — Alternative B2c – Phase I.

SPL Assessment Locations	Existing Ambient SPL (dBA)		Estimated Project Operation SPL (dBA)	Future Ambient with Project SPL[1] (dBA)	
	Daytime L_{eq} (7 AM-10 PM)	Nighttime L_{eq} (10 PM-7 AM)		Daytime L_{eq} (7 AM-10 PM)	Nighttime L_{eq} (10 PM-7 AM)
Scenario 1 (Wind Speed 12meters per second from west)					
Rock House Place	35	25	<10 L_{eq}	35	25
	35 L_{dn}		<10 L_{dn}	35 L_{dn}	
Harrell Place	35	25	27 L_{eq}	36	29
	35 L_{dn}		33 L_{dn}	37 L_{dn}	
China Creek Ranch	35	25	31 L_{eq}	36	32
	35 L_{dn}		37 L_{dn}	39 L_{dn}	
Duncan Place	35	25	36 L_{eq}	39	36
	35 L_{dn}		42 L_{dn}	43 L_{dn}	
Player Place	35	25	38 L_{eq}	39	38
	35 L_{dn}		44 L_{dn}	45 L_{dn}	
Brown's Bench Ranch	35	25	39 L_{eq}	40	39
	35 L_{dn}		45 L_{dn}	46 L_{dn}	
Scenario 2 (Wind Speed 6meters per second from south-southwest)					
Rock House Place	35	25	<10 L_{eq}	35	25
	35 L_{dn}		<10 L_{dn}	35 L_{dn}	
Harrell Place	35	25	26 L_{eq}	36	29
	35 L_{dn}		32 L_{dn}	37 L_{dn}	
China Creek Ranch	35	25	31 L_{eq}	36	32
	35 L_{dn}		37 L_{dn}	39 L_{dn}	
Duncan Place	35	25	36 L_{eq}	39	36
	35 L_{dn}		42 L_{dn}	43 L_{dn}	
Player Place	35	25	36 L_{eq}	39	36
	35 L_{dn}		42 L_{dn}	43 L_{dn}	
Brown's Bench Ranch	35	25	39 L_{eq}	40	39
	35 L_{dn}		45 L_{dn}	46 L_{dn}	

NOTES: [1] A logarithmic sum of Existing Ambient and Estimated Project Operation levels, not an algebraic sum.

Predicted noise from the aggregate of operating turbines associated with Alternative C was estimated for the two most probable wind directions (and their corresponding highest average velocities according to available meteorological data) at each of six identified representative recreational land use locations as presented in Table 5.

Table 5. Estimated Operational Noise Levels — Alternative C.

SPL Assessment Locations	Existing Ambient SPL (dBA)		Estimated Project Operation SPL (dBA)	Future Ambient with Project SPL [1] (dBA)	
	Daytime L_{eq} (7 AM-10 PM)	Nighttime L_{eq} (10 PM-7 AM)		Daytime L_{eq} (7 AM-10 PM)	Nighttime L_{eq} (10 PM-7 AM)
Scenario 1 (Wind Speed 12meters per second from west)					
Rock House Place	35	25	29 L_{eq}	36	30
	35 L_{dn}		35 L_{dn}	38 L_{dn}	
Harrell Place	35	25	35 L_{eq}	38	35
	35 L_{dn}		41 L_{dn}	42 L_{dn}	
China Creek Ranch	35	25	35 L_{eq}	38	35
	35 L_{dn}		41 L_{dn}	42 L_{dn}	
Duncan Place	35	25	36 L_{eq}	39	36
	35 L_{dn}		42 L_{dn}	43 L_{dn}	
Player Place	35	25	38 L_{eq}	39	38
	35 L_{dn}		44 L_{dn}	45 L_{dn}	
Brown's Bench Ranch	35	25	39 L_{eq}	40	39
	35 L_{dn}		45 L_{dn}	46 L_{dn}	
Scenario 2 (Wind Speed 6meters per second from south-southwest)					
Rock House Place	35	25	27 L_{eq}	36	29
	35 L_{dn}		33 L_{dn}	37 L_{dn}	
Harrell Place	35	25	31 L_{eq}	36	32
	35 L_{dn}		37 L_{dn}	39 L_{dn}	
China Creek Ranch	35	25	32 L_{eq}	37	33
	35 L_{dn}		38 L_{dn}	40 L_{dn}	
Duncan Place	35	25	36 L_{eq}	39	36
	35 L_{dn}		42 L_{dn}	43 L_{dn}	
Player Place	35	25	36 L_{eq}	39	36
	35 L_{dn}		42 L_{dn}	43 L_{dn}	
Brown's Bench Ranch	35	25	39 L_{eq}	40	39
	35 L_{dn}		45 L_{dn}	46 L_{dn}	

NOTES: [1] A logarithmic sum of Existing Ambient and Estimated Project Operation levels, not an algebraic sum.

Predicted noise from the aggregate of operating turbines associated with Alternative D was estimated for the two most probable wind directions (and their corresponding highest average velocities according to available meteorological data) at each of six identified representative recreational land use locations as presented in Table 6.

Table 6. Estimated Operational Noise Levels — Alternative D.

SPL Assessment Locations	Existing Ambient SPL (dBA)		Estimated Project Operation SPL (dBA)	Future Ambient with Project SPL [1] (dBA)	
	Daytime L_{eq} (7 AM-10 PM)	Nighttime L_{eq} (10 PM-7 AM)		Daytime L_{eq} (7 AM-10 PM)	Nighttime L_{eq} (10 PM-7 AM)
Scenario 1 (Wind Speed 12meters per second from west)					
Rock House Place	35	25	29 L_{eq}	36	30
	35 L_{dn}		35 L_{dn}	38 L_{dn}	
Harrell Place	35	25	35 L_{eq}	38	35
	35 L_{dn}		41 L_{dn}	42 L_{dn}	
China Creek Ranch	35	25	34 L_{eq}	38	34
	35 L_{dn}		40 L_{dn}	41 L_{dn}	
Duncan Place	35	25	35 L_{eq}	38	35
	35 L_{dn}		41 L_{dn}	42 L_{dn}	
Player Place	35	25	36 L_{eq}	39	36
	35 L_{dn}		42 L_{dn}	43 L_{dn}	
Brown's Bench Ranch	35	25	28 L_{eq}	36	30
	35 L_{dn}		34 L_{dn}	38 L_{dn}	
Scenario 2 (Wind Speed 6meters per second from south-southwest)					
Rock House Place	35	25	27 L_{eq}	36	29
	35 L_{dn}		33 L_{dn}	37 L_{dn}	
Harrell Place	35	25	31 L_{eq}	36	32
	35 L_{dn}		37 L_{dn}	39 L_{dn}	
China Creek Ranch	35	25	31 L_{eq}	36	32
	35 L_{dn}		38 L_{dn}	39 L_{dn}	
Duncan Place	35	25	35 L_{eq}	38	35
	35 L_{dn}		41 L_{dn}	42 L_{dn}	
Player Place	35	25	34 L_{eq}	38	34
	35 L_{dn}		40 L_{dn}	41 L_{dn}	
Brown's Bench Ranch	35	25	20 L_{eq}	35	26
	35 L_{dn}		26 L_{dn}	35 L_{dn}	

NOTES: [1] A logarithmic sum of Existing Ambient and Estimated Project Operation levels, not an algebraic sum.

Predicted noise from the aggregate of operating turbines associated with Alternative E was estimated for the two most probable wind directions (and their corresponding highest average velocities according to available meteorological data) at each of six identified representative recreational land use locations as presented in Table 7.

Table 7. Estimated Operational Noise Levels — Alternative E.

SPL Assessment Locations	Existing Ambient SPL (dBA)		Estimated Project Operation SPL (dBA)	Future Ambient with Project SPL [1] (dBA)	
	Daytime L_{eq} (7 AM-10 PM)	Nighttime L_{eq} (10 PM-7 AM)		Daytime L_{eq} (7 AM-10 PM)	Nighttime L_{eq} (10 PM-7 AM)
Scenario 1 (Wind Speed 12meters per second from west)					
Rock House Place	35	25	26 L_{eq}	36	29
	35 L_{dn}		32 L_{dn}	37 L_{dn}	
Harrell Place	35	25	32 L_{eq}	37	33
	35 L_{dn}		38 L_{dn}	40 L_{dn}	
China Creek Ranch	35	25	32 L_{eq}	37	33
	35 L_{dn}		38 L_{dn}	40 L_{dn}	
Duncan Place	35	25	33 L_{eq}	37	34
	35 L_{dn}		39 L_{dn}	41 L_{dn}	
Player Place	35	25	34 L_{eq}	38	34
	35 L_{dn}		40 L_{dn}	42 L_{dn}	
Brown's Bench Ranch	35	25	38 L_{eq}	40	38
	35 L_{dn}		44 L_{dn}	45 L_{dn}	
Scenario 2 (Wind Speed 6meters per second from south-southwest)					
Rock House Place	35	25	25 L_{eq}	35	28
	35 L_{dn}		31 L_{dn}	37 L_{dn}	
Harrell Place	35	25	30 L_{eq}	36	31
	35 L_{dn}		36 L_{dn}	39 L_{dn}	
China Creek Ranch	35	25	30 L_{eq}	36	31
	35 L_{dn}		36 L_{dn}	39 L_{dn}	
Duncan Place	35	25	31 L_{eq}	36	32
	35 L_{dn}		37 L_{dn}	39 L_{dn}	
Player Place	35	25	33 L_{eq}	37	34
	35 L_{dn}		39 L_{dn}	41 L_{dn}	
Brown's Bench Ranch	35	25	38 L_{eq}	40	38
	35 L_{dn}		44 L_{dn}	45 L_{dn}	

NOTES: [1] A logarithmic sum of Existing Ambient and Estimated Project Operation levels, not an algebraic sum.

Predicted noise from the aggregate of operating turbines associated with Alternative F was estimated for the two most probable wind directions (and their corresponding highest average velocities according to available meteorological data) at each of six identified representative recreational land use locations as presented in Table 8.

Table 8. Estimated Operational Noise Levels — Alternative F.

SPL Assessment Locations	Existing Ambient SPL (dBA)		Estimated Project Operation SPL (dBA)	Future Ambient with Project SPL [1] (dBA)	
	Daytime L_{eq} (7 AM-10 PM)	Nighttime L_{eq} (10 PM-7 AM)		Daytime L_{eq} (7 AM-10 PM)	Nighttime L_{eq} (10 PM-7 AM)
Scenario 1 (Wind Speed 12meters per second from west)					
Rock House Place	35	25	29 L_{eq}	36	30
	35 L_{dn}		35 L_{dn}	38 L_{dn}	
Harrell Place	35	25	34 L_{eq}	38	34
	35 L_{dn}		40 L_{dn}	41 L_{dn}	
China Creek Ranch	35	25	33 L_{eq}	37	34
	35 L_{dn}		39 L_{dn}	41 L_{dn}	
Duncan Place	35	25	29 L_{eq}	36	30
	35 L_{dn}		35 L_{dn}	38 L_{dn}	
Player Place	35	25	27 L_{eq}	36	29
	35 L_{dn}		33 L_{dn}	37 L_{dn}	
Brown's Bench Ranch	35	25	19 L_{eq}	35	26
	35 L_{dn}		25 L_{dn}	35 L_{dn}	
Scenario 2 (Wind Speed 6meters per second from south-southwest)					
Rock House Place	35	25	27 L_{eq}	36	29
	35 L_{dn}		33 L_{dn}	37 L_{dn}	
Harrell Place	35	25	30 L_{eq}	36	31
	35 L_{dn}		36 L_{dn}	39 L_{dn}	
China Creek Ranch	35	25	28 L_{eq}	36	30
	35 L_{dn}		34 L_{dn}	38 L_{dn}	
Duncan Place	35	25	24 L_{eq}	35	28
	35 L_{dn}		30 L_{dn}	36 L_{dn}	
Player Place	35	25	23 L_{eq}	35	27
	35 L_{dn}		29 L_{dn}	36 L_{dn}	
Brown's Bench Ranch	35	25	16 L_{eq}	35	25
	35 L_{dn}		22 L_{dn}	35 L_{dn}	

NOTES: [1] A logarithmic sum of Existing Ambient and Estimated Project Operation levels, not an algebraic sum

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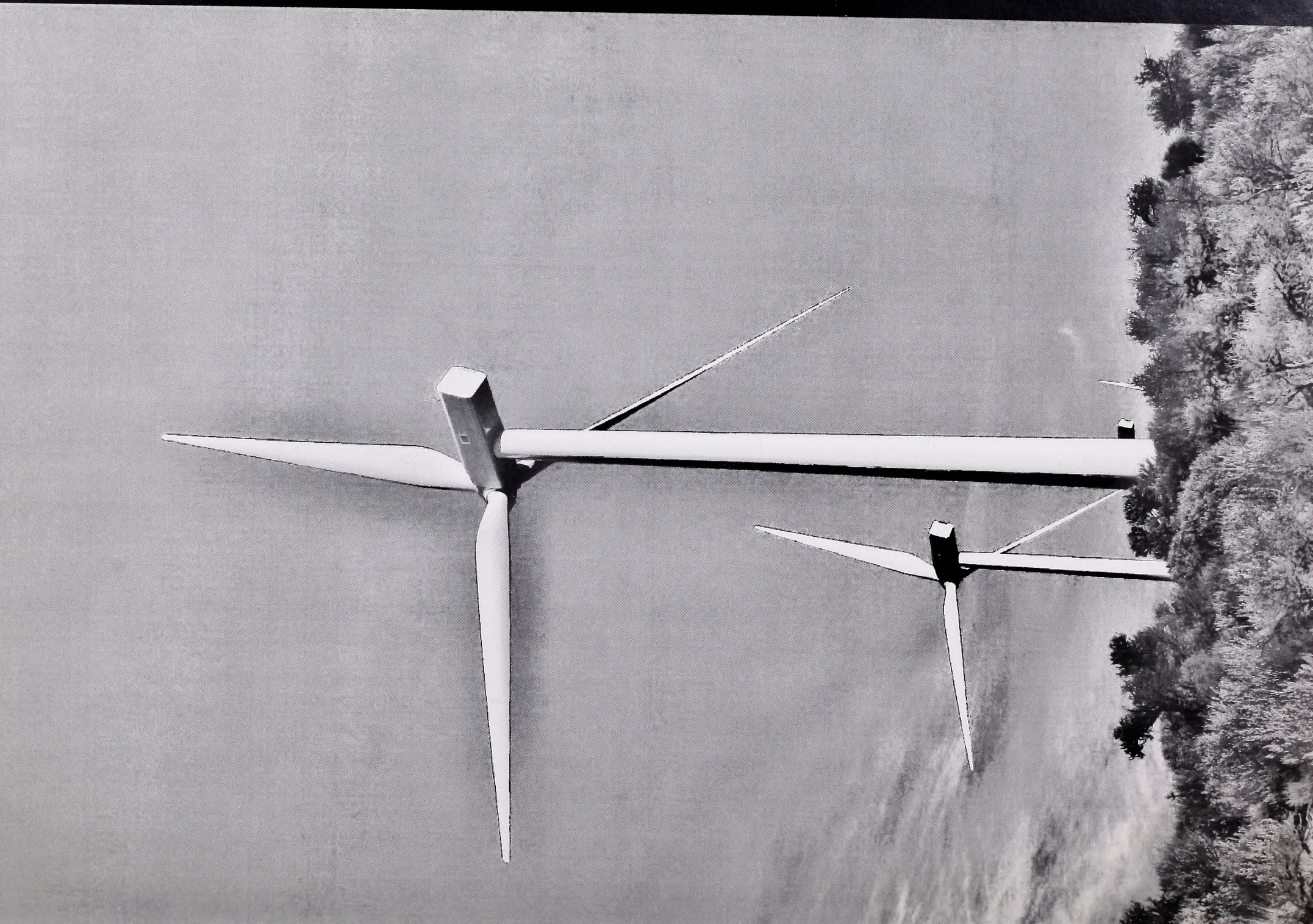
Appendix 4B – Visual Simulations



VISUAL SIMULATIONS

Appendix 4B contains visual simulations used to demonstrate the appearance of project roads, turbines, and transmission lines (as defined by Alternative B1) within the context of the existing landscape character. A total of eight visual simulations were developed using images obtained at eight of the Key Observation Points (KOPs). Simulations created at KOP 1, 2, 3, 4, and 6 were generated using images obtained with a 27mm lens size (wide angle). The remainder of simulations (KOP 11, 12 and 13) were prepared using a fixed 50 mm lens size (normal vision). For each visual simulation, a pair of photos is shown. The top photo represents existing conditions and the bottom photo represents a visual simulation of what the project (Alternative B1) would look like after being constructed from one of the above referenced KOPs.

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KOP 1 Existing Condition
US-93 Viewshed

KOP 1 Proposed Project
US-93 Viewshed

Key Observation Point 2
- 28mm. Lens Length
- 09/09/2008
- 10:40am

KOP 2 Existing Condition
Salmon Falls Creek Viewshed

Key Observation Point 2
- 28mm. Lens Length
- 09/09/2008
- 10:40am

KOP 2 Proposed Project
Salmon Falls Creek Viewshed

Key Observation Point 3
- 18mm. Lens Length
- 09/09/2008
- 11:27am

KOP 3 Existing Conditions: Salmon Falls Creek Viewshed

Key Observation Point 3
- 18mm. Lens Length
- 09/09/2008
- 11:27am

KOP 3 Proposed Project: Salmon Falls Creek Viewshed

Key Observation Point 4
- 55mm. Lens Length
- 09/09/2008
- 11:58am

KOP 4 Existing Conditions: Salmon Falls Creek Viewshed

Key Observation Point 4
- 55mm. Lens Length
- 09/09/2008
- 11:58am

KOP 4 Proposed Project: Salmon Falls Creek Viewshed

KOP 6 Existing Conditions: US 93 Viewshed

KOP 6 Proposed Project: US 93 Viewshed

KOP 11: Recreation Destination Travel Corridor
Existing Condition

KOP 11 Existing Conditions: Monument Springs Road Viewshed

KOP 11: Recreation Destination Travel Corridor
Proposed Project

KOP 11 Proposed Project: Monument Springs Road Viewshed

KOP 12: Recreation Destination Travel Corridor
Existing Condition

KOP 12 Existing Conditions: Monument Springs Road Viewshed

KOP 12: Reereation Destination Travel Corridor
Proposed Projeet

KOP 12 Proposed Project: Monument Springs Road Viewshed

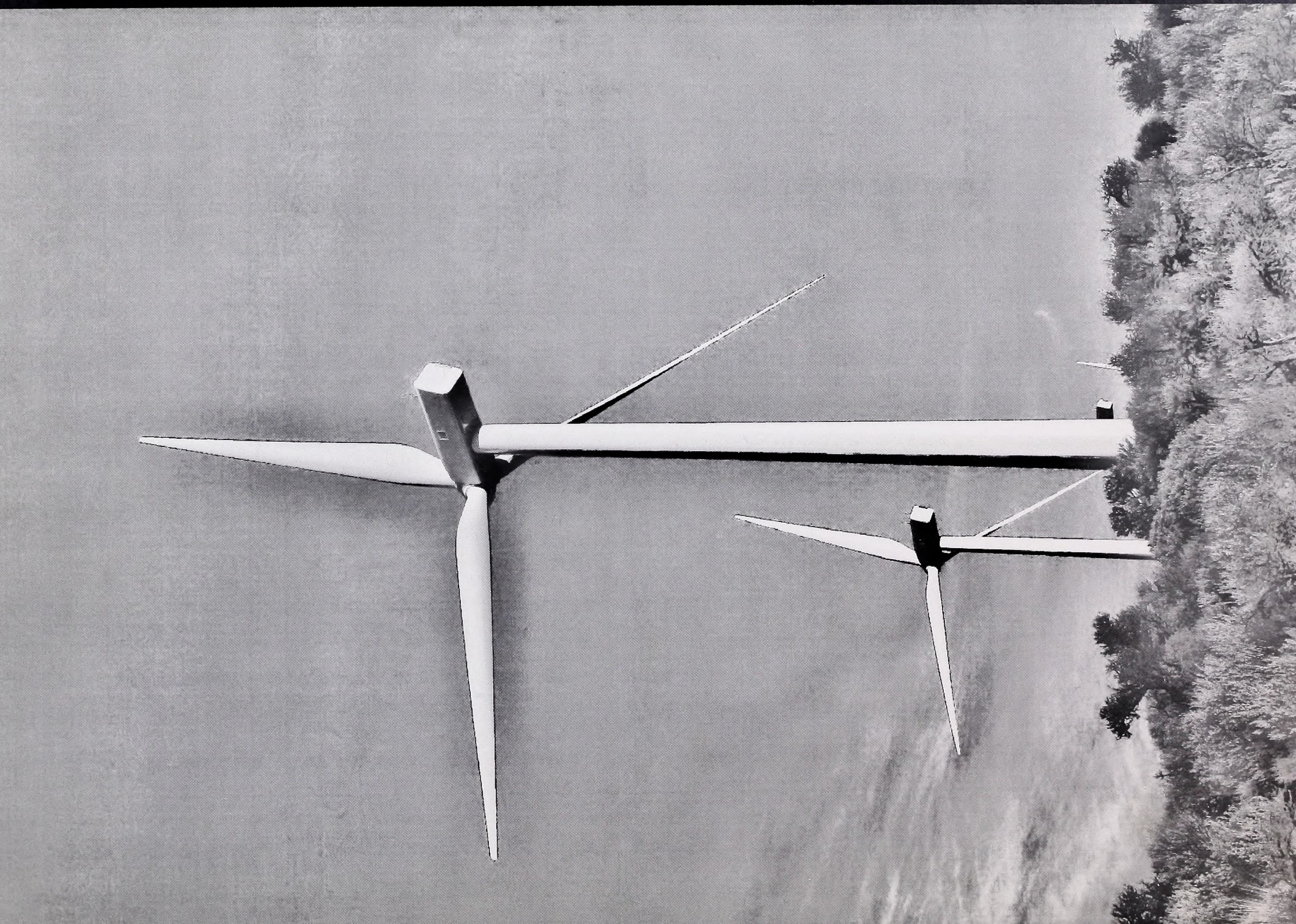
KOP 13: Recreation Destination Travel Corridor
Existing Condition

KOP 13 Existing Conditions: Southern Primitive Road Network Viewshed

KOP 13 Recreation Destination Travel Corridor
Proposed Project

KOP 13 Proposed Project: Southern Primitive Road Network Viewshed

GLOSSARY



ACOUSTICS. The science of sound including the generation, transmission, and effects of sound waves, both audible and inaudible.

ACTIVE USE. The portion of the grazing preference available for livestock use under a permit or lease based on livestock carrying capacity and resource conditions in a grazing allotment.

AIR INVERSIONS. A reversal in the normal temperature layers of the atmosphere. A layer of warm air settles on top of a layer of cold air, and the cold air becomes trapped underneath the warm air, usually associated with local conditions and isolated areas.

AIR QUALITY CLASSIFICATION. Classifications established under the Prevention of Significant Deterioration portion of the Clean Air Act, which limits the amount of air pollution considered significant within an area. Class I – Areas where almost any change in air quality would be significant. Class II – Areas where the deterioration normally accompanying moderate well-controlled growth would be insignificant. Class III – Areas where industrial deterioration would generally be insignificant.

AIRSHED. A relatively large atmospherical area where the air quality and environment are influenced by similar topographical, physical, and climatic changes.

ALLOTMENT. An area allocated for livestock use by one or more qualified grazing permittees including prescribed numbers and kinds of livestock under one plan of management.

AMBIENT AIR QUALITY. The state of the atmosphere at ground level as defined by the range of measured and/or predicted ambient concentrations of all significant pollutants for all averaging periods of interest.

ANALYSIS AREA. The area that defines where each resource, resource use, or social and economic feature will be analyzed.

ANIMAL UNIT MONTH (AUM). The amount of forage needed to sustain one cow/calf pair, five sheep, or five goats for one month.

ANNUAL VEGETATION. Plants that complete their life cycles and die in 1 year or less.

ANTHROPOGENIC. Relating to or resulting from the influence of human beings on nature.

AQUATIC. Living or growing in or on the water.

AQUIFER. A saturated, permeable sediment or rock that can transmit significant quantities of water under hydraulic gradients.

ARCHAEOLOGICAL SITE. A geographic location containing structures, artifacts, material remains, and/or other evidence of past human activity.

AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC). An area of public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources; or other natural systems or processes; or to protect humans from natural hazards.

ASPECT. The direction a given side or surface is facing.

ASSOCIATION, SOIL. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

BACKGROUND NOISE LEVEL. The noise level in the absence of a particular source, or sources, of interest. For example, the noise level both outside and inside of a residential building in the absence of contributions from aircraft noise.

BEDROCK. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

BEHAVIORAL AVOIDANCE. Avoidance of otherwise suitable habitat by wildlife species because of project-related disturbance and/or infrastructure.

BEST MANAGEMENT PRACTICES (BMPs). Practices based on current scientific information and technology that, when applied during implementation of management actions, ensure that negative impacts are minimized. BMPs are applied based on-site specific evaluation and represent the most effective and practical means to achieve management goals for a given site.

BIG GAME. Those species of large mammals normally managed as a sport hunting resource; includes elk, mule deer, pronghorn, and bighorn sheep.

BIOLOGICAL OPINION. A document prepared by United States Fish and Wildlife Service stating their opinion as to whether or not a Federal action will likely jeopardize the continued existence or adversely modify the habitat of a listed Threatened or Endangered species.

BIOLOGICAL SOIL CRUST. Community of non-vascular primary producers that occur as a "crust" on the surface of soils and made up of a mixture of algae, lichens, mosses, and cyanobacteria.

BROOD-REARING. Caring for young birds hatched at one time.

BROWSE. Branches and stems of woody plants used as food by wildlife.

BULK DENSITY. A measure of the weight of the soil per unit volume (g/cc), usually given on an oven-dry (110° C) basis.

CAIRNS. A pile of stones used as markers for various purposes.

CANDIDATE SPECIES. Species not protected under the Endangered Species Act but under consideration by the United States Fish and Wildlife Service for inclusion on the list of Federally Threatened or Endangered species.

CHEATGRASS (*Bromus tectorum*). An exotic annual grass, native to Eurasia and the Mediterranean, which can dominate disturbed ground in shrub steppe ecosystems of the western United States and Canada.

CLIMATE. The average prevailing weather conditions, including but not limited to precipitation and temperature, of a place over time.

COMPACTION, SOIL. Changing the nature of the soil such that there is a decrease in the volume of voids between soil particles or aggregates; it is manifest as an increase in bulk density and a severely compacted soil can become effectively impermeable.

COMPETITION. The general struggle for existence in which living organisms compete for a limited supply of the necessities of life. Competition can exist between species, and even between individuals of a species, for food, shelter, space, nest sites, birthing sites, mates, access to water, and many other habitat and life cycle requirements.

COMPLEX, SOIL. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

CONSOCIATIONS, SOIL. Delineated areas are dominated by a single soil taxon (or miscellaneous area) and similar soils.

CONTRAST. The degree to which sharp differences in adjacent objects or areas exist.

CONTRAST RATING. A systematic process to analyze visual impacts of proposed projects and actions.

DECIBEL (dB). A measurement reported on a base-10 logarithmic scale that transforms the linear ratio of a particular quantity of sound pressure or sound power relative to a standard reference value.

DISTURBANCE. Any activity that has the potential to accelerate erosion or mass movement. Also, any other activity that may tend to disrupt the normal movement or habits of a particular wildlife or plant species.

DIVERSITY. The relative abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area.

EARLY BROOD-REARING HABITAT (Sage-grouse). Sagebrush habitat within the vicinity of the nest used by sage-grouse hens with chicks up to 3 weeks following hatch.

ECOLOGICAL CONDITION. The present state of vegetation on a site compared to the natural potential of vegetation on the site.

ECOLOGICAL SITE. Land with a specific potential natural community and specific physical characteristics, differing from other kinds of land in its ability to produce vegetation and in its response to management.

ECOSYSTEM. A functioning system comprised of a community of animals, plants, and bacteria and its interrelated physical and chemical environment.

ELIGIBLE RIVER SEGMENT. A section of a river that qualifies for inclusion into the National Wild and Scenic River System through determination that it is free flowing and, with its adjaeent land area, possesses at least one river-related value considered to be outstandingly remarkable.

ENCLOSED LANDSCAPE. A landscape surrounded by a continuous grouping of objects; thereby forming a distinct "wall" and "floor."

EMERGENCY STABILIZATION AND REHABILITATION (ESR). Emergency stabilization actions are initiated within one year of a fire to stabilize and prevent unacceptable damage of natural and cultural resources, minimize threats to life and property resulting from the effects of a fire, and repair/replace/construct physical improvements necessary to prevent degradation of land or resources. Rehabilitation actions are taken within three years of the fire to repair or improve lands that are unlikely to recover to a management-approved condition, and repair or replace minor facilities damaged by fire.

ENDANGERED SPECIES. Any animal or plant species in danger of extinction throughout all or a significant portion of its range. These species are listed by the United States Fish and Wildlife Service under provisions of the Endangered Species Act.

EROSION. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

EROSION (ACCELERATED). Erosion much more rapid than natural erosion, mainly as a result of the activities of man or other animals, or of a catastrophe in nature. For example, fire, that exposes the surface.

FIDELITY. Term used to describe wildlife species that return to the same breeding area or other seasonal habitats each year.

FIELD OFFICE. A geographic portion of a Bureau of Land Management District that is the smallest administrative subdivision in the Bureau of Land Management.

FIRE FREQUENCY (Fire Return Interval). How often fire burns a given area, often expressed in terms of fire return intervals (e.g., fire returns to a site every 5-15 years).

FIRE INTENSITY. The energy output from a fire often expressed as reaction intensity, fireline intensity, temperature, heating duration, or radiant energy.

FIRE MANAGEMENT PLAN. Identifies resource values and conditions pertaining to fire management and recommends strategies for wildland fire suppression, wildland fire use, prescribed fire, non-fire fuels treatment, Emergency Stabilization and Rehabilitation, and community assistance/protection.

FIRE MANAGEMENT UNIT. A land management area definable by objectives, management constraints, topographic features, access, values to be protected, political boundaries, fuel types, and fire regime groups, that set it apart from the management characteristics of an adjacent fire management unit.

FIRE REGIME. Periodicity and pattern of naturally occurring fires in a particular area or vegetative type, described in terms of frequency, biological severity, and area of extent.

FIRE REGIME CONDITION CLASS. A classification system that describes the amount of departure an area or landscape is from the historic condition to the present condition. It is used to classify existing ecosystem conditions and to determine priority areas for treatment as mandated by national direction.

FIRE SEVERITY. A qualitative assessment of the heat pulse directed toward the ground during a fire often measured by organic matter loss, both above ground and below ground.

FIXED KERNEL. The fixed kernel method is a statistical method for estimating the size of an animal's home range and area of use (its utilization distribution) from radio-telemetry data.

FORAGE. Vegetation of all forms available and of a type used for animal consumption.

FORB. Any herbaceous plant that is not a grass or grass like.

FORM. The mass of an object or a combination of objects that appears unified.

FRAGMENTATION. Landscape transformation that includes the breaking of large habitat into smaller pieces through (1) the conversion of fairly continuous tracts of a vegetation type to other vegetation types such that only scattered or isolated fragments of the original type remain, or (2) human-created structures or barriers that partition fairly continuous habitats into smaller habitats1. The level of transformation necessary to achieve fragmentation varies by species.

FREQUENCY. The time rate (number of times per second) that the wave of sound repeats itself, or that a vibrating object repeats itself that is expressed in Hertz (Hz), formerly labeled as cycles per second (cps).

FUEL MODEL. Simulated fuel complex (or combination of vegetation types) for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified.

GAME FISH. Any species of fish for which populations are managed by regulations.

GEOGRAPHIC INFORMATION SYSTEM (GIS). A collection of computer hardware, software, and geographic data for capturing, managing, analyzing, and displaying all forms of geographically referenced information.

GRABEN. A depressed block of land bordered by parallel faults.

GRADIENT. The slope of a stream channel.

GULLIES. Deep, narrow channels or miniature valleys cut by concentrated runoff events through which water commonly flows only during and immediately after heavy rains or during the melting of snow.

HABITAT. An area with the combination of resources (e.g., food, cover, and water) and environmental conditions (e.g., temperature, precipitation, presence or absence of predators and competitors) that promotes use by individuals of a given species or population and allows those individuals to survive and reproduce.

HABITAT CONDITION RATINGS (HCR). Habitat condition ratings are used to describe conservation and restoration priorities for streams occupied by special status fish. They are one of the methods used in the Jarbidge Field Office to identify conservation reaches which have important value for protecting populations of special status aquatic species. Evaluated stream reaches in the Jarbidge Field Office have been classified as either conservation reaches or restoration reaches.

HAUL ROUTES. Inbound and outbound routes that would be used to transport construction equipment and project infrastructure to and from the project area.

HAZARDOUS MATERIAL. A substance, pollutant, or contaminant that, due to its quantity, concentration, or physical or chemical characteristics, poses a potential hazard to human health and safety or to the environment if released into the workplace or the environment.

HIBERNACULA. A sheltered location occupied during the winter by a hibernating animal.

HISTORIC FIRE REGIME. Description of the patterns of fire occurrences, frequency, size, severity, and sometimes vegetation and fire effects in a given area or ecosystem.

HOME RANGE. The area within which an animal normally lives.

HORIZON, SOIL. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes.

HYBRID. An offspring resulting from crossbreeding.

HYDROLOGY. The science of dealing with the study of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere.

INFILTRATION. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

IMPERILED. Put into danger.

INVASIVE SPECIES. A non-native species whose introduction does or is likely to cause economic or environmental harm or harm to human health.

INVERTEBRATE. An animal lacking a backbone or spinal column.

KERNEL. Kernel estimators are based on probability "kernels," which are regions around each point location containing some likelihood of animal presence.

LANDSCAPE. A large land area composed of interacting ecosystems that are repeated due to factors such as geology, soils, climate, and human impacts.

LANDSLIDE. The rapid downhill movement of a mass of soil and loose rock; generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

LANDSCAPE CHARACTER. The character of a landscape is the overall impression created by its unique combination of visual features (such as land, vegetation, water, and structures).

LATE BROOD-REARING HABITAT (Sage-grouse). Those habitats used by sage-grouse following desiccation of herbaceous vegetation in sagebrush uplands. Habitat is selected based on availability of forbs.

LEK. Traditional courtship display and mating areas attended by sage-grouse in or adjacent to sagebrush dominated nesting habitat.

LINE. The path (real or imagined) that the eye follows in a landscape.

LINEAR ROW GRANT AREAS. Transmission interconnect lines, haul routes, project roads outside of preference ROW.

LITHIC SCATTER. A type of archaeological site marked by a distribution of stone artifacts. The scatter may include formed tools such as projectile points, knives, or scrapers, or it may contain only chipping debris from tool-making activities.

LOCATABLE MINERALS. Minerals or materials subject to claim and development under the Mining Law of 1872, as amended. Generally includes metallic minerals such as gold and silver, and other materials not subject to lease or sale (some bentonites, limestone, talc, some xeolites, etc.). Whether or not a particular mineral deposit is locatable depends on such factors as quality, quantity, mineability, demand, and marketability.

MECHANICAL TREATMENT. Use of mechanical equipment for seeding, brush management, and other management practices.

MITIGATION. Measures taken to avoid, compensate for, rectify, or reduce the potential negative impacts of an action.

MONITORING. The systematic gathering of data to determine whether progress is being made in achieving land use objectives or goals.

NATIONAL REGISTER OF HISTORIC PLACES (NRHP). The official list, established by the National Historic Preservation Act, of the Nation's cultural resources worthy of preservation. The NRHP lists archaeological, historic, architectural, and traditional cultural properties (districts, sites, buildings, structures, and objects) nominated for their local, state, or national significance by Federal and state agencies and approved by the National Register Staff.

NATIONAL WILD AND SCENIC RIVERS SYSTEM. Established by the Wild and Scenic Rivers Act of 1968 to protect rivers and their immediate environments that have outstanding scenic, recreation, geologic, fish and wildlife, historic, cultural, and other similar values and are preserved in free-flowing conditions. The system provides for the designation of three river classifications based primarily on the amount of shoreline development and access: recreational, scenic, and wild.

NATIVE SPECIES. Plants or animals indigenous to the area.

NATIVE VEGETATION COMMUNITY. A plant community that is populated by plants or cultivars of plants that are indigenous to an area.

NESTING HABITAT (Sage-grouse). The area including and surrounding the location of a nest. Sage-grouse females move into the vicinity of their nest location within a few days of being bred, and remain relatively sedentary until they nest.

NOCTURNAL. An animal behavior characterized by activity during the night and sleeping during the day.

NOISE. Any sound that is unwanted by a listener because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying.

NON-GAME SPECIES. Species managed as "protected" by state wildlife agencies with no authorized seasons for hunting or trapping. Common non-game species include the majority of birds, small mammals, bats, reptiles, and amphibians.

NON-NATIVE SPECIES. An animal or plant species that is not a part of an area's original fauna or flora.

NON-NATIVE VEGETATION COMMUNITY. A plant community that is populated by plants that are not indigenous to an area.

NOXIOUS WEED. Plant species designated "noxious" by law. According to Idaho Statute, a noxious weed is defined as any plant having the potential to cause injury to public health, crops, livestock, land, or other property and is designated as noxious by the director (Idaho Statute 22-2402).

OVERSTORY. That portion of a plant community consisting of the taller plants on the site; the forest or woodland canopy.

OZONE. One of the six criteria pollutants for which the Environmental Protection Agency established National Ambient Air Quality Standards.

PALUSTRINE. Term used in wetland classification. It includes a system of inland, nontidal wetlands characterized by the presence of trees, shrubs, and emergent vegetation (vegetation that is rooted below water but grows above the surface). Palustrine wetlands range from permanently saturated or flooded land (as in marshes, swamps, and lake shores) to land that is wet only seasonally (as in vernal pools).

PARENT MATERIAL. The unconsolidated organic and mineral material in which soil forms.

PARTICULATE MATTER (PM). Any small particles suspended in the air including dust, dirt, soot, smoke, and liquid droplets. $PM_{2.5}$. Particles less than 2.5 micrometers.

PASSERINES. Birds of the order Passeriformes, which includes more than half of all bird species. Sometimes known as perching birds or, less accurately, as songbirds.

PERENNIAL VEGETATION. Plants that have life cycle of 3 or more years.

PERMITTED USE. The forage allocated by, or under the guidance of, an applicable land use plan for livestock grazing in an allotment under a permit or lease and is expressed in animal unit months.

PERMITTEE. A person or organization legally permitted to graze a specific number and class of livestock on designated areas of public land during specified seasons each year.

PLAYA. A nearly level area at the bottom of an undrained desert basin, sometimes temporarily covered with water.

PM_{10}. Particles of 10 micrometers or less.

POLLUTANTS. Any substance introduced into the environment that negatively affects the usefulness of a resource or the health of humans, animals, or ecosystems.

PRESCRIBED FIRE. Any fire ignited by management actions to meet specific objectives.

PREVAILING WINDS. Winds from the customary, predominant, or usual direction.

PREVENTION, FIRE. Activities directed at reducing the number of person-caused (human-caused) fires, including public education, law enforcement, dissemination of information, and the reduction of hazards.

PRIMITIVE AND UNCONFINED RECREATION. Recreation that occurs when the sights, sounds, and evidence of other people are rare or infrequent, where visitors can be isolated, alone, or secluded from others, where the use of the area is through non-motorized, non-mechanical means, and where no or minimal developed recreation facilities are encountered.

PRODUCTION. The quantity of biomass produced by the current year's growth in terms of pounds per acre.

PROJECT AREA. Right-of-way preference area and a 250-foot buffer around linear right-of-way grant areas outside of the right-of-way preference area.

PROJECT DISTURBANCE AREA. This includes all areas where the surface would be disturbed as a result of the project, including roads, turbine pads, laydown areas, batch plants, disturbance areas around project features, and quarry sites.

PROJECT FEATURES OR PROJECT INFRASTRUCTURE. Includes project roads, wind turbines, underground collection system, substations, transmission lines, permanent meteorological towers, and Operation and Maintenance facilities.

PUBLIC LAND. Any land or interest in land owned by the United States and administered by the Secretary of the Interior through the Bureau of Land Management, without regard to how the United States acquired ownership, except for land located on the Outer Continental Shelf and land held for the benefit of Native Americans, Aleuts, and Eskimos.

RADIO-TELEMETRY. The transmission of information from a transmitter to a receiver. Wildlife-related telemetry consists of placing a radio-transmitter on a free-ranging wild animal and collecting data on it through a receiver. It is also known as radio tagging, radio tracking or simply 'tagging' or 'tracking'. It is used to acquire detailed data on many aspects of wildlife biology, including habitat use, home range size, mortality and survivorship, and migration timing and routes.

RANGE INFRASTRUCTURE. Any activity or program on or relating to rangelands that is designed to improve forage production, change vegetation composition, control patterns of use, provide water, stabilize soil and water conditions, and enhance habitat for livestock, wildlife, and wild horses and burros. Range infrastructure includes land treatments (e.g., chaining, seeding, burning, etc.), water developments, fences, and trails.

RANGELAND. Land on which the potential natural vegetation is predominantly grasses, grass-like plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundra, and areas that support certain forb and shrub communities.

RAPTOR. Bird of prey with sharp talons and strongly curved beaks (e.g., hawks, owls, vultures, eagles).

REACH. A section of stream between two specified points.

RECLAMATION. The reconstruction of disturbed ecosystems by returning the land to a condition approximate or equal to that which existed prior to disturbance, or to a stable and productive condition compatible with the land use plan. The immediate goal of reclamation is to stabilize disturbed areas and protect both disturbed and adjacent undisturbed areas from unnecessary degradation.

RECRUITMENT. Young that survive to reproductive age and are considered mature.

RESEEDING. Planting seed into an area previously seeded when a seeding treatment was unsatisfactory. The seedbed preparation could be done through prescribed fire, brush control, or mechanical or chemical treatments.

RESTORATION. The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. A restored plant community would be similar to the potential native community in structure and species composition to the greatest practicable extent. It is expected that, once restored, the community would be sustainable and resilient to normal periodic stress.

RIGHT-OF-WAY (ROW). A permit or an easement that authorizes the use of public land for certain specified purposes, commonly for pipelines, roads, telephone lines, electric lines, and reservoirs. It also refers to the land covered by such an easement or permit.

RIPARIAN. Situated on or pertaining to the bank of a river, stream, or other body of water. Normally describes plants of all types that grow rooted in the water table or sub irrigation zone of streams, ponds, and springs.

RIVERINE. Relating to a system of inland wetlands and deep-water habitats associated with nontidal flowing water (streams/rivers), characterized by the absence of trees, shrubs, or emergent vegetation (vegetation that is rooted below water but grows above the surface).

ROADLESS. Refers to the absence of roads that have been constructed and maintained by mechanical means to ensure regular and continuous use.

RUNOFF. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

SACRED SITE. Any specific, discrete, narrowly delineated location on Federal land that is identified by a Native American Tribe, or Native American individual determined to be appropriately authoritative representative of a Native American religion, as sacred by virtue of its established religious significance to, or ceremonial use by, a Native American religion.

SAGEBRUSH-STEPPE. A semi-arid plant community that is characterized by a predominance of big sagebrush and other sagebrush species, plus grasses and forbs.

SAGE-GROUSE BREEDING HABITATS. Habitat where lek attendance, nesting, and early brood-rearing occur.

SALMONID. A fish belonging to the family Salmonidae, which includes salmon and trout.

SCALE. The proportional size relationship between an object and the surroundings in which it is placed.

SEQUENCE. Succession of landscape elements (form, line, color, or texture).

SEEDING. A vegetation treatment that includes the application of grass, forb, or shrub seed, either aerially or from the ground.

SEEP (SPRING). A saturated zone at or near the ground surface where voids in the rock or soil are filled with water at greater than atmospheric pressure. Seep or spring sites are typically characterized by riparian vegetation and soil formed in the presence of water. Water may or may not be discharging from these sites, depending on the underlying geology, water source, season, or long-term climatic trends. A seep is a small spring.

SENSITIVE SPECIES. Includes Endangered, Threatened, Proposed, and Candidate species as well as species designated by the Bureau of Land Management State Director that 1) could become endangered in or extirpated from the State, 2) are undergoing significant downward trends, 3) have typically small or widely dispersed populations, or 4) are inhabiting specialized or unique habitats.

SERAL STAGES. Ecological communities that succeed one another in the biotic development of an area.

SHRUB. A woody plant distinguished from a tree by short stature (less than 20 feet tall) and the presence of multiple stems.

SLICKSPOT. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

SLICKSPOT PEPPERGRASS HABITAT. Areas that meet the criteria for potential habitat and contain slickspots. Slickspot peppergrass habitat can be classified as occupied or unoccupied.

SLICKSPOT PEPPERGRASS OCCUPIED HABITAT. Areas where slickspot peppergrass populations occur; occupied habitat includes a 0.5 mile habitat integrity zone buffering populations.

SLICKSPOT PEPPERGRASS POTENTIAL HABITAT. Areas within the known range of slickspot peppergrass with general soil and elevation characteristics that indicate the potential for the area to support the species, although the presence of slickspots or slickspot peppergrass plants is unknown.

SOUND. The minute fluctuations in atmospheric pressure that accompany the passage of a sound wave; the pressure fluctuations on the tympanic membrane are transmitted to the inner ear and give rise to the sensation of audible sound. (2) For a steady sound, the value of the sound pressure averaged over a period of time.

SOUND LEVEL (Noise Level). When expressed as a noise level, a sound level is generally a single-number method of reporting that requires the use of a standardized A-weighting filter to account for the relative sensitivity of the human ear to amplitudes of sound at different frequencies. Generally an A-weighting filter is employed to obtain a single-number A-weighted sound pressure level. Other weighting filters include a C-weighting filter.

SPECIAL STATUS SPECIES. All Endangered, Threatened, Proposed, and Candidate species designated by United States Fish and Wildlife Service and other Bureau of Land Management Sensitive species designated by the State Director.

STOCKING LEVEL (Stocking Ratio). The current level of livestock grazing use on a unit of land, usually expressed as acres of land per animal unit month grazed.

SUBSTRATES. Mineral or organic material such as silt, sand, gravel, cobble, boulder, or woody debris that forms a stream or lake bed.

SUCCESSION. The gradual process of ecological change in which a series of plant communities are established and then replaced over time. Within any ecological community some species may become less abundant over some time interval, or they may even vanish from the ecosystem altogether. Similarly, over some time interval, other species within the community may become more abundant, or new species may even invade into the community from adjacent ecosystems.

SUITABLE RIVER. A river segment found, through administrative study by an appropriate agency, to be suitable for designation as a component of the National Wild and Scenic Rivers system, specified in Section 4(a) of the Wild and Scenic Rivers Act.

SUMMER HABITAT (Sage-grouse). A variety of sagebrush and other habitats (e.g., riparian, wet meadows and alfalfa fields) used by sage-grouse during the summer. Sites typically provide an abundance of forbs and insects for hens and chicks.

SUPPRESSION, FIRE. All the work of extinguishing or containing a wildland fire, beginning with its discovery.

TELEMETRY. See Radio-telemetry

TEXTURE. The aggregation of small forms or color mixtures into a continuous surface pattern.

TERRESTRIAL. Living or growing in or on the land.

THREATENED SPECIES. Any species or significant population of that species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Usually includes only those species that have been recognized and listed as Threatened by Federal and state governments, but may include species categorized as rare, very rare, or depleted.

TOPOGRAPHY. The relief features or surface configuration of a landscape or particular area in respect to elevational changes over distance.

TRADITIONAL CULTURAL PROPERTIES. A cultural property that is eligible for inclusion in the National Register of Historic Places because of its association with a living community's cultural practices or beliefs rooted in that community's history and important in maintaining the community's continuing cultural identity.

TREATY. A formal agreement between the United States and one or more Native American tribes. Typically, these arrangements ceded lands to the United States, reserving certain rights, privileges, and/or lands to the Native American signatories.

TREATY RIGHTS. Rights of land use retained by Native American tribes through treaty with the United States; such rights commonly include, but may not be limited to, hunting, fishing and gathering.

TRESPASS. Any unauthorized use of public land.

UNDERSTORY. Herbaceous plant components, including grasses and forbs, that grow beneath the overstory in stand of woody shrubs; or the herbaceous and woody shrubs growing beneath the overstory in a stand of trees.

UNGULATE. A hoofed mammal.

UPLAND. The portion of land located away from riparian and floodplain areas.

VEGETATION COMMUNITY. A collection of plant species within a designated geographical unit, which forms a relatively uniform patch and is distinct from adjacent patches of different vegetation types. The components of each vegetation community are influenced by soil type, topography, climate, and disturbance.

VEGETATION GROUP. An aggregation of vegetation communities, as defined in the Jarbidge Field Office vegetation dataset, based on dominant vegetation and structure. The vegetation groups are used in this Environmental Impact Statement: mountain big sagebrush, Wyoming big sagebrush, grassland-native perennial, low sagebrush, black sagebrush, and breaks.

VEGETATION TREATMENT. Changing the characteristics of an established vegetation type for the purpose of improving rangeland forage or wildlife habitat resources. Treatments are designed for specific areas and differ according to the area's suitability and potential. The most common land treatment methods alter the vegetation by chaining, spraying with pesticides, burning, and plowing, followed by seeding with well-adapted desirable plant species.

VIEWER SENSITIVITY. A measure of public concern for visual quality

WATERSHED. An area that collects and discharges runoff to a given point. It is often used synonymously with drainage basin or catchment.

WILDERNESS. An area formally designated by congress as a part of the National Wilderness Preservation System.

WILDERNESS CHARACTERISTICS. Features of the land associated with the concept of wilderness that may be considered in land use planning when Bureau of Land Management determines those characteristics are reasonably present, of sufficient value (condition, uniqueness, relevance, importance) and need (trend, risk), and are practical to manage.

WILDFIRE. An unwanted wildland fire, regardless of ignition source, which is unplanned, has escaped control, or does not meet management objectives and therefore requires a suppression response.

WILDLAND. An area in which development is essentially non-existent, except for roads, railroads, power lines, and similar transportation facilities; structures, if any, are widely scattered.

WILDLAND FIRE. Any fire on the landscape, including a prescribed fire or wildfire.

WILDLAND-URBAN INTERFACE (WUI). The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

WIND ENERGY FACILITY. All facilities necessary to the construction and generation of wind energy including, but not limited to, wind turbines, roads, transmission lines, and batch plants.

WINTER HABITAT (sage-grouse). Sagebrush dominated areas that provide shelter and food for sage-grouse during the winter. Variation in topography and availability of sagebrush above the snow under various conditions determine the location of these habitats.

WINTER RANGE. An Idaho Department of Fish and Game definition that applies to elk and mule deer. That part of the overall range where 90% of the individuals are located during the average five winters out of ten from the first heavy snowfall to spring green-up, or during a site-specific period of winter.

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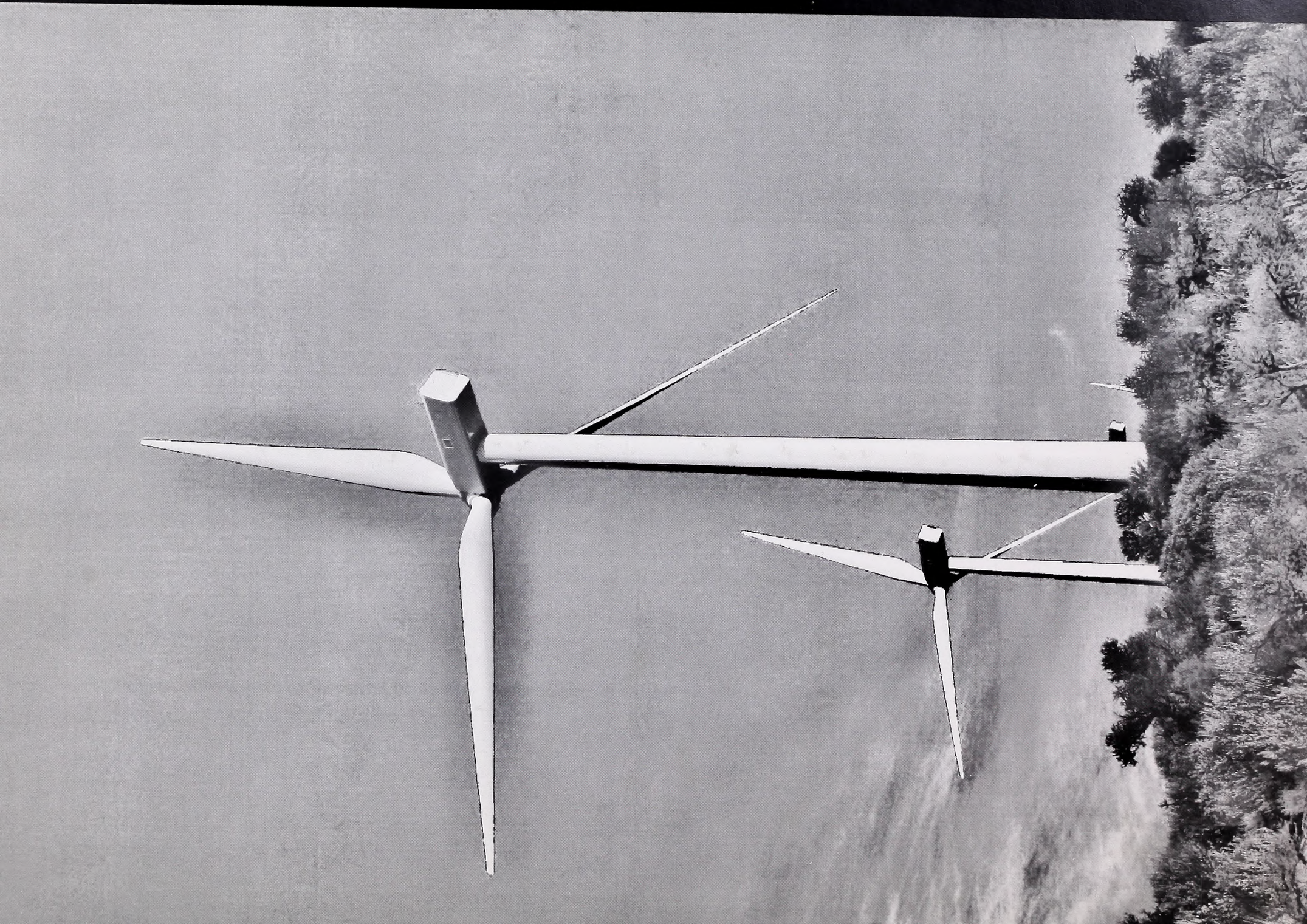

The following is not intended to be an exhaustive list of terms or concepts. The reader is encouraged to use this index in conjunction with thoroughly reading the document. Tables 2.15-1 and 2.15-2, Figures, and Appendices are not included in this index.

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