United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Color Country District
Cedar City Field Office
176 East D.L. Sargent Drive
Cedar City, UT 84721
http://www.blm.gov/ut/st/en/fo/cedar_city.html

October 2012

IN REPLY REFER TO:
DOI-BLM-UT-C010-2009-0048-EIS
UTU 83067
2800

Dear Reader:

Enclosed for your review is the Final Environmental Impact Statement (EIS) for the Sigurd to Red Butte No. 2 – 345-kilovolt (kV) Transmission Project (Project). The Bureau of Land Management (BLM) prepared the EIS in consultation with cooperating agencies and in accordance with the National Environmental Policy Act of 1969 (NEPA), including Council on Environmental Quality Regulations for Implementing the Procedural Provision of NEPA outlined in 40 Code of Federal Regulations (CFR) Parts 1500-1508 and U.S. Forest Service (USFS) NEPA procedures codified at CFR 220; U.S. Department of Interior guidance at 43 CFR Part 46; the Federal Land Policy and Management Act of 1976, implementing regulations, the BLM NEPA Handbook (H-1790-1) and the BLM Land Use Planning Handbook (H-1601-1); and other applicable laws and directives.

This EIS has been prepared to analyze and disclose the impacts of granting a right-of-way across federal land to PacifiCorp (doing business as Rocky Mountain Power, the Proponent) for the purpose of constructing, operating, and maintaining the single-circuit, alternating-current, 345kV transmission line. The transmission line would be located between the existing Sigurd Substation near Richfield in Sevier County, Utah, and the Red Butte Substation near the community of Central in Washington County, Utah; a distance of approximately 170 miles. The Project also includes (1) expansion of the existing equipment at the Sigurd Substation on private land to accommodate interconnection of the proposed transmission line with the existing system, (2) communication regeneration stations associated with the transmission line, and (3) access roads to the transmission line structures where needed and where existing access is not available.

Approximately 113 miles (67 percent), of the transmission line route would be located on lands administered by three BLM field offices (the Cedar City, Fillmore, and Richfield field offices) and two national forests (Dixie and Fishlake). For this reason, the Proponent applied to the BLM and USFS for a right-of-way across federal land. If the Proposed Action is approved, the BLM would issue a right-of-way grant and the USFS would issue a special use permit for constructing, operating, and maintaining the proposed transmission line and associated facilities.

The EIS is not a decision document. Rather, its purpose is to inform the public and interested parties of impacts associated with implementing the Proponent's proposal as associated with granting a right-of-way to construct, operate, and maintain the transmission line and associated facilities across federal lands, and to provide information to other regulatory agencies for use in their decision-making process for other permits required for implementation of the Project. The Final EIS also includes a summary of changes made between the Draft EIS and the Final EIS and a summary of the written and verbal comments received during the public review period for the Draft EIS and responses to the comments (presented in Appendix M).

The 30-day review period begins with the publication of the U.S. Environmental Protection Agency's Notice of Availability (NOA) of the Final EIS in the *Federal Register*. The review period will close at the end of the 30-day period, the date of which will be posted on the website shown below. While not a formal comment period, the

public and agencies can submit comments on the Final EIS. Comments may be submitted electronically at utsrbproj@blm.gov and postal mail copies should be sent to:

BLM Cedar City Field Office
Attention: Tamara Gertsch
176 East D.L. Sargent Drive
Cedar City, Utah 84721
(435) 586-2401

Hand delivery of written comments to the same address may occur between 7:45 a.m. and 4:15 p.m., Monday through Friday, excluding federal holidays. Envelopes and the subject line of emails should be identified as "Sigurd to Red Butte Transmission Project Final EIS."

Comments received during the 30-day period following publication of the NOA will be considered prior to a decision on the Proposed Action.

Comments on the Final EIS should be as specific as possible. It is also helpful if the comments refer to chapters and pages of the Final EIS.

Before including your address, phone number, e-mail address, or any other personal identifying information in your comment, you should be aware that your entire comment—including your personal identifying information—may be made publicly available at any time. While you can request in your comment that your personal identifying information be withheld from public review, BLM cannot guarantee that it will be able to do so.

Printed copies of the Final EIS are available for review at the BLM Cedar City, Richfield and Fillmore Field Offices, as well as the Dixie and Fishlake National Forest Offices. Electronic copies of the Final EIS on CD are available for public distribution. The Final EIS is also available for review and downloading from the BLM website at:

http://www.blm.gov/ut/st/en/fo/cedar_city/planning/sigurd_to_red_butte.html

If you have any questions regarding the NEPA process used to prepare the EIS or need additional information regarding the Project, please contact Tamara Gertsch, BLM National Project Manager, at (307) 775-6115.

Sincerely,

Todd S. Christensen
District Manager

Final Environmental Impact Statement for the Sigurd to Red Butte No. 2 345kV Transmission Project

DOI-BLM-UT-C010-2009-0048-EIS
Case File: UTU 83067

October 2012

Volume I of III

BLM

Color Country

U.S. Department of the Interior
Bureau of Land Management

Final Environmental Impact Statement for the Sigurd to Red Butte No. 2 – 345kV Transmission Project

DOI-BLM-UT-C010-2009-0048-EIS
Case File: UTU 83067

Volume I of III

Color Country District
Cedar City Field Office
176 East D.L. Sargent Drive
Cedar City, Utah 84721

Cooperating Agencies
U.S. Forest Service (Dixie and Fishlake National Forests)
U.S. Army Corps of Engineers
National Park Service
Utah Governor's Public Land Policy Coordination Office
Utah School and Institutional Trust Lands Administration
Counties: Beaver, Iron, Millard, Sevier, and Washington
Communities: Enterprise and St. George

October 2012

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Final Environmental Impact Statement for the
Sigurd to Red Butte No. 2 – 345kV Transmission Project

Lead Agency:	U.S. Department of the Interior Bureau of Land Management Color Country District – Cedar City Field Office
Cooperating Agencies:	U.S. Forest Service (Dixie and Fishlake National Forests) U.S. Army Corps of Engineers National Park Service Utah Governor's Public Land Policy Coordination Office Utah School and Institutional Trust Lands Administration Beaver County, Utah Enterprise City, Utah Iron County, Utah Millard County, Utah Sevier County, Utah St. George City, Utah Washington County, Utah
Type of Action:	Right-of-Way Grant from the Bureau of Land Management Special-Use Authorization from the U.S. Forest Service
Project Location:	Sevier, Millard, Beaver, Iron, and Washington counties, Utah
For further information on this document, contact:	Bureau of Land Management Cedar City Field Office Attn: Tamara Gertsch 176 East D.L. Sargent Drive Cedar City, Utah 84720 (307) 775-6115 U.S. Forest Service Dixie National Forest Attn: Kenton Call 1789 North Wedgewood Lane Cedar City, Utah 84721 (435) 865-3730 (435) 691-0768
Or email:	utsrbproj@blm.gov
Date by which comments must be received:	30 days after the publication of the Notice of Availability in the *Federal Register*

ABSTRACT

This Environmental Impact Statement (EIS) has been prepared to analyze and disclose the impacts of granting a right-of-way across federal land to PacifiCorp (doing business as Rocky Mountain Power, the Proponent) for the purpose of constructing, operating, and maintaining the Sigurd to Red Butte No. 2 – 345-kilovolt (kV) Transmission Project (Project), which includes the single-circuit, alternating-current, overhead transmission line, ancillary facilities, and expansion of the existing Sigurd Substation on private land. The Project would be located in Sevier, Millard, Beaver, Iron, and Washington counties in Utah and would cover a distance of approximately 160 to 170 miles. Under the Proponent's Proposed Action, the Bureau of Land Management would issue a right-of-way grant and the U.S. Forest Service would issue a special-use permit for constructing, operating, and maintaining the proposed transmission line and associated facilities. The EIS discloses potential impacts on the natural, human, and cultural environment associated with several alternatives, including the Agency Preferred Alternative on federal lands, the Environmentally Preferred Alternative, the Proponent's Preferred Alternative, and the No Action Alternative. Based on these analyses, the majority of the Agency Preferred Alternative is anticipated to have low-to-moderate impacts on the environment, with significant long-term impacts in only localized areas.

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LIST OF ACRONYMS AND ABBREVIATIONS

µg/m3	Micrograms per cubic meter
AC	Alternating current
ACEC	Area of critical environmental concern
ACHP	Advisory Council on Historic Preservation
A.D.	Anno Domini
APE	Area of potential effect
APLIC	Avian Power Line Interaction Committee
ARPA	Archaeological Resources Protection Act of 1979
ATV	All-terrain vehicle
BEA	U.S. Department of Commerce, Bureau of Economic Analysis
BLM	Bureau of Land Management
B.P.	Before Present
BPA	Bonneville Power Administration
CAS	Conservation Agreement Species
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	Methane
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CO	Carbon monoxide
Company	Rocky Mountain Power
CRTG	Cultural Resources Task Group
CWA	Clean Water Act of 1972
CWG	Community Working Group
dBµV/m	Decibels above 1 microvolt per meter
dBA	Decibel (A-weighted)
DC	Direct current
DHHS	U.S. Department of Health and Human Services
DOE	U.S. Department of Energy
EIA	U.S. Energy Information Administration
EIS	Environmental impact statement
EMF	Electric and magnetic fields or electromagnetic fields
ENBB	Environmental Notification Bulletin Board
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESRI	Environmental Systems Research Institute, Inc.
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FLPMA	Federal Land Policy and Management Act of 1976
FMP	Fire Management Plan

FMU	Fire Management Unit
FR	Forest Road
FWS	U.S. Fish and Wildlife Service
GAP	Southwest Regional Gap Analysis Project
GHG	Greenhouse gas
GIS	Geographic Information System
HMA	Herd management area
HPTP	Historic Properties Treatment Plan
HUC	Hydrologic unit code
HVDC	High-voltage direct current
Hz	Hertz
I-15	Interstate 15
I-70	Interstate 70
ICES	International Committee on Electromagnetic Safety
ICNIRP	International Commission on Non-Ionizing Radiation Protection
ID	Interdisciplinary
IEEE	Institute of Electrical and Electronics Engineers
IM	Instruction Memorandum
IPP	Intermountain Power Project 500kV transmission line
IRA	Inventoried roadless area
kHz	Kilohertz
KOP	Key observation point
kV	Kilovolt
kV/m	Kilovolts per meter
K_w	Numerical factor to express the whole soil's susceptibility to water erosion
L_{50}	Median sound level
L_{dn}	Day-night sound level
L_{eq}	Equivalent sound level
LDS	Church of Jesus Christ of Latter-day Saints (Mormons)
LQ	Location quotient
LRMP	Land and Resource Management Plan
LWC	Lands with wilderness characateristics
mG	Milligauss
MIS	Management Indicator Species
MV	Map Volume
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NAIP	National Agriculture Imagery Program
NEIC	National Earthquake Information Center
NEPA	National Environmental Policy Act of 1969
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NHL	National Historic Landmark

NHPA	National Historic Preservation Act of 1966
NHT	National Historic Trail
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
NOA	Notice of Availability
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OHV	Off-highway vehicle
OPGW	Overhead optical ground wire
OPLMA-PRP	Omnibus Public Land Management Act-Paleontological Resource Preservation
P.L.	Public Law
PEM	Palustrine Emergent
PFO	Palustrine Forested Overstory
PFYC	Potential fossil yield classification
PGA	Peak ground acceleration
PLPCO	Utah Governor's Public Lands Policy Coordination Office
PM_{10}	Particulate matter less than 10 micrometers in diameter
$PM_{2.5}$	Particulate matter less than 2.5 micrometers in diameter
POD	Plan of Development
ppb	Parts per billion
ppm	Parts per million
Project	Sigurd to Red Butte No. 2 – 345kv Transmission Project
Proponent	Rocky Mountain Power
PRTP	Paleontological Resources Treatment Plan
PSS	Palustrine Scrub/Shrub
RACR	Roadless Area Conservation Rule of 2001
RARE	Roadless Area Review and Evaluation
REIS	Regional Economic Information System
RMP	Resource management plan
ROD	Record of Decision
ROS	Recreation opportunity spectrum
SHPO	State Historic Preservation Office
SIO	Scenic integrity objectives
SITLA	School and Institutional Trust Lands Administration
SLRU	Sensitivity level rating unit
SMS	Scenery Management System
SO_2	Sulfur dioxide
SQRU	Scenic quality rating unit
SR	State Route
SRMA	Special Recreation Management Area
SSURGO	Soil Survey Geographic Database
STATSGO	State Soil Geographic Database
SUWA	Southern Utah Wilderness Alliance

TCP	Traditional cultural property
THPO	Tribal Historic Preservation Office
TMDL	Total Maximum Daily Load
UAC	Utah Administrative Code
UDNR	Utah Department of Natural Resources
UDNR-DWR	Utah Department of Natural Resources, Division of Water Resources
UDOT	Utah Department of Transportation
UDWR	Utah Division of Wildlife Resources
UNHP	Utah Natural Heritage Program
UPDES	Utah Pollutant Discharge Elimination System
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
VOC	Volatile organic compound
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WECC	Western Electricity Coordinating Council
WMA	Wildlife Management Area
WO	Washington Office
WRCC	Western Regional Climate Center
WWEC	West-wide Energy Corridor

NHPA	National Historic Preservation Act of 1966
NHT	National Historic Trail
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
NOA	Notice of Availability
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
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SQRU	Scenic quality rating unit
SR	State Route
SRMA	Special Recreation Management Area
SSURGO	Soil Survey Geographic Database
STATSGO	State Soil Geographic Database
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UDOT	Utah Department of Transportation
UDWR	Utah Division of Wildlife Resources
UNHP	Utah Natural Heritage Program
UPDES	Utah Pollutant Discharge Elimination System
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
VOC	Volatile organic compound
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WECC	Western Electricity Coordinating Council
WMA	Wildlife Management Area
WO	Washington Office
WRCC	Western Regional Climate Center
WWEC	West-wide Energy Corridor

Summary

SUMMARY

Introduction

This Environmental Impact Statement (EIS) is being prepared in response to an Application for Transportation and Utility Systems and Facilities on Federal Lands (Standard Form 299), submitted by PacifiCorp (doing business as Rocky Mountain Power, the Proponent) to the Bureau of Land Management (BLM) and U.S. Forest Service (USFS) (UTU-83067). The Proponent proposes to construct, operate, and maintain the Sigurd to Red Butte No. 2 – 345-kilovolt (kV) Transmission Project (Project) from the existing Sigurd Substation in Sevier County, Utah, to the existing Red Butte Substation in Washington County, Utah; a distance of approximately 170 miles. The Project also includes the addition of new substation equipment for interconnecting the transmission line at the existing Sigurd Substation. The original application was submitted and received on December 19, 2008, and revised by the Proponent on September 11, 2009, and July 5, 2011, to reflect changes in the Project description. The BLM has prepared this EIS to evaluate and disclose the potential Project-related environmental impacts that could result from implementation of the Proposed Action and alternatives.

The BLM serves as the lead federal agency for preparing the EIS and published a Notice of Intent to prepare the EIS in the *Federal Register* on January 5, 2010. Twelve agencies, including the USFS, are participating as cooperating agencies in preparation of the EIS (Chapter 5).

Agencies' Purpose and Need

The purpose of this federal action is to respond to the Proponent's application to the BLM and USFS for right-of-way for the Project across the federal lands they administer.

The purpose and need of both the BLM and USFS stems from the overarching policy and direction in the Federal Land Policy and Management Act of 1976, as amended, and its mission, which is multiple-use, sustained-yield management of the National System of Public Lands and National Forest System lands. Federal Land Policy and Management Act also provides BLM and USFS with discretionary authority to grant rights-of-way on lands they administer, taking into consideration impacts on natural and cultural resources (including historical resources). In doing so, BLM and USFS must endeavor "to minimize damage to scenic and aesthetic values and fish and wildlife habitat and otherwise protect the environment" through avoidance or mitigation (46 Code of Federal Regulations [CFR] 18026).

The agencies' purpose and need is further guided by the Energy Policy Act of 2005, which recognized the need to improve domestic energy production, develop renewable energy resources, and enhance the infrastructure (e.g., transmission lines) for collection and distribution of energy resources across the nation. To this end, the BLM and USFS are charged with analyzing applications of utility and transportation systems on federal lands they administer. When analyzing applications, the agencies also must consider the recommendations in the 2011 Western Electricity Coordinating Council 10-Year Regional Transmission Plan regarding future transmission needs (Western Electricity Coordinating Council 2011).

Summary of Changes from the Draft EIS

Substantive changes made between the Draft and Final EIS are demarcated on the left margin of this chapter by a vertical black line.

Decisions to be Made

The decision to be made by each agency is whether or not to grant the Proponent a right-of-way to construct, operate, and maintain the proposed facilities on lands it administers and, if so, under what terms and conditions. In so doing, the BLM (as lead agency) will analyze, through the EIS, the Proponent's plan for, and the potential environmental impacts of constructing, operating, and maintaining the Project. Based on the analysis presented in this EIS, the BLM will issue a Record of Decision whether or not to grant a right-of-way on land administered by the BLM, and the USFS will issue a Record of Decision on whether or not to grant a special-use authorization for a right-of-way on land administered by the USFS.

Proposed Action

The BLM and USFS are proposing to grant the Proponent right-of-way across the federal lands they administer to accommodate the Proponent's proposed Project for a lease term of 50 years.

The Proponent's Proposed Action is to construct, operate, and maintain a single-circuit 345kV transmission line from the existing Sigurd Substation, located north of Richfield, in Sevier County, Utah, to the existing Red Butte Substation, located west of Central, in Washington County, Utah.

Permanent facilities would include:

- A single-circuit 345kV overhead transmission line (including structures, shield wires, conductors, and insulators) between the Sigurd Substation and Red Butte Substation
- Communication regeneration stations associated with the transmission line
- Access roads to the 345kV transmission line structures where needed and where there is no existing access
- New substation equipment at terminus points to interconnect the Project with the existing Sigurd and Red Butte substations

The Proposed Action and Project description are presented in detail in Chapter 2, Sections 2.2 and 2.3.

Proponent's Purpose and Need for the Action

As a regulated utility, the Proponent is responsible for providing its customers with safe, reliable, and adequate transmission capacity to meet short- and long-term projected load growth via connection to generation resources and through access to energy markets. As part of a forward-looking and long-range transmission plan to meet customer requirements, the Project addresses the Proponent's need to meet these obligations by adding facilities to its transmission system that would improve reliability and increase the capacity required to serve forecasted loads in Utah. The Project would allow for potential access to renewable energy resources and other generation sources in the future and would provide increased capacity to export energy in the event of energy surpluses. A detailed description of the Proponent's purpose and need for the Project is presented in Appendix A.

Through the course of meeting its business and regulatory obligations, the Proponent's purpose and the need for the Project is based on the following factors:

- **Need to Improve Capacity.** The capacity of the existing system, which includes the Sigurd to Red Butte No. 1 – 345kV transmission line, is expected to be exceeded by 2015 and the Project is intended to provide sufficient and reliable capacity for load service.

- **Need to Allow Power Sales, Transfers, and Purchases**. Under the Proponent's Open Access Transmission Tariff, the Proponent has transmission-service-contract obligations for firm transmission service into and out of southwestern Utah. The Proponent has contractual commitments to deliver 400 megawatts of additional service from Utah into Nevada beginning in 2013 and has received requests for 600 megawatts of imported power beginning June 2012. The Project is intended to fulfill the Proponent's contractual agreements.

- **Need to Provide Reliable Transmission.** The Proponent's regulatory and governing bodies (North American Electric Reliability Corporation and Western Electricity Coordinating Council) have established regulations and criteria that require transmission providers to evaluate expected normal and potential abnormal operating conditions and plan adequate redundancy in the system (e.g., provided through construction of multiple transmission lines or locating multiple lines in wide, geographically diverse transmission corridors) to meet expected system reliability performance. If designed in a manner that meets the Proponent's system planning criteria, the Project would provide redundancy to the existing infrastructure and substantially improve the Proponent's ability to provide reliable electrical service to its customers.

- **Service Load.** The Project would support future regional electrical load growth in southwestern Utah and also would improve the ability of the Proponent's transmission system to transport energy into central Utah.

- **Access to Potential Renewable Generation Sources**. The Project would provide improved access to existing and new generation sources, and would provide options to access other energy resources, including renewable resources.

Transmission Line Alternative Routes

Thirteen alternative routes (and two route variations) are analyzed in the Final EIS, including the Agency Preferred Alternative on federal lands and the Proponent's Preferred Alternative, as well as the alternative of taking no action. The alternative routes have been organized into two segments: (1) the northern area from the existing Sigurd Substation to south of the Black Mountains and (2) the southern area from south of the Black Mountains to the existing Red Butte Substation. Maps presenting the alternative routes are presented in Chapter 2, Maps 2-1 and 2-2, and Volume II of the EIS.

Northern Area – Sigurd Substation to South of the Black Mountains

There are six transmission line alternative routes (and one route variation) in this segment that begins at the Sigurd Substation and end south of the Black Mountains. Each alternative route crosses Sevier, Millard, Beaver, and Iron counties. The following are the transmission line alternative routes located in the northern area:

- **Alternative N1 –** Black Rock Road to Intermountain Power Project 500kV transmission line (IPP) north of Milford Wind Farm – 120.6 miles
- **Alternative N2 –** Black Rock Road to IPP south of Milford Wind Farm – 120.4 miles
- **Alternative N2-A** (route variation of Alternative N2) – Black Rock Road to IPP south of Milford Wind Farm (Agency Preferred Alternative) – 120.0 miles
- **Alternative N3 –** Black Rock Road parallel to Kern River Pipeline – 117.2 miles
- **Alternative N4 –** Mineral Mountains to IPP south of Milford Wind Farm – 109.4 miles
- **Alternative N5 –** Mineral Mountains parallel to Kern River Pipeline – 106.2 miles
- **Alternative N6 –** Mineral Mountains 1,500 feet east of Kern River Pipeline (Proponent's Preferred Alternative) – 105.4 miles

Southern Area – South of the Black Mountains to Red Butte Substation

There are seven transmission line alternative routes (and one route variation) in this segment that begin south of the Black Mountains and end at the Red Butte Substation. Each alternative route crosses Iron and Washington counties. The following are the transmission line alternative routes located in the southern area:

- **Alternative S1 –** Pinto Creek – 55.9 miles
- **Alternative S2 –** IPP West – 49.6 miles
- **Alternative S3 –** Ox Valley – 57.4 miles
- **Alternative S4 –** IPP East – 48.9 miles
- **Alternative S5 –** Iron Springs and Pinto Creek (Proponent's Preferred Alternative) – 59.0 miles
- **Alternative S6 –** Iron Springs and Ox Valley – 61.8 miles
- **Alternative S7** – Middle Hybrid Route – 49.8 miles
- **Alternative S7-A** (route variation of Alternative N7) – Middle Hybrid Route 300 feet east of Sigurd to Red Butte No. 1 transmission line adjacent to Atchinson Inventoried Roadless Area (IRA) (Agency Preferred Alternative) – 49.8 miles

Affected Resources

Climate and Air Quality

Implementation of the Project on any of the alternative routes would have similar emissions and impacts on air quality. The same construction equipment would be used on any of the alternative routes and construction would occur over the same timeframe. Therefore, the only differences could be the amount of fugitive dust generated from earth-moving operations because each alternative could have slightly different surface disturbance based on different terrain. However, the differences among the alternative routes would be negligible.

Particulate-matter emissions associated with construction of the transmission line would result predominantly from fugitive dust generated by construction vehicles traveling on unpaved roads. Frequent watering, speed control, and possible application of dust suppressant would minimize these emissions.

Gaseous pollutant emissions associated with construction of the transmission line would result predominantly from diesel construction equipment. Proper equipment maintenance and use of equipment

that meets current Environmental Protection Agency (EPA) emission standards would reduce these emissions and associated impacts on air quality.

Overall, impacts on air quality from Project construction would be temporary and localized to the vicinity of the activity and would disperse or settle quickly. The screening-level air quality model performed to analyze potential impacts on air quality could not rule out a potential exceedance of the numerical value of the 1-hour standard for nitrogen dioxide (NO_2) or the 24-hour standard for particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$) because of emissions from diesel equipment to be used during Project construction. However, both the 24-hour $PM_{2.5}$ and 1-hour NO_2 National Ambient Air Quality Standards (NAAQS) are based on a 3-year average of sub-maximum concentrations, while the model only predicts maximum concentrations over a construction duration of less than 2 years. Based on the conservative assumptions used in estimating the concentrations and dispersion of criteria pollutants generated from construction activities, violations of the NAAQS for $PM_{2.5}$, NO_2, or any other criteria pollutant resulting from Project construction would not be anticipated.

Although the Project would emit greenhouse gas (GHG) emissions during construction, the emissions would be temporary, only occurring over a period of less than 2 years. GHG emissions from operation of substation circuit breakers during operation would be negligible. The maximum annual GHG emissions from Project construction would represent approximately 0.001 percent of annual U.S. energy-related emissions, an insignificant additional contribution.

Earth Resources

Geologic Hazards

A potential for direct impacts on transmission reliability, the integrity of Project structures, and constructability and indirect impacts on public health and safety associated with geologic hazards (including earthquakes and landslides) would exist regardless of the alternative route selected. The alternative routes (Alternatives N1 to N6) with the highest potential for impacts associated with geologic hazards are located in the Sevier River Valley and Sulphurdale areas. Alternative routes considered for the southern segment of the Project crosses more areas with moderate susceptibility to landslides and some faults. Alternative routes considered for the northern area of the Project would be characterized by less landslide susceptibility, but more faults and seismicity.

Because all alternative routes considered for the northern area of the Project would have several links (i.e., segments of a route sharing common endpoints determined by the point of intersection with other adjacent links) in common, the potential impacts on earth resources associated with these links would be common for all alternative routes. Along these links, the potential for impacts would be associated with the concentrated areas with high susceptibility for landslides and several faults that occur between the communities of Sigurd and Elsinore (as well as near the community of Sevier). Other areas with higher concentrations of faults occur near other links. Alternative N3 has the highest number of Quaternary faults and the second highest amount of area with steep slopes. Alternative N6 has the largest areas with moderate landslide susceptibility. Alternative N1 has the least number of Quaternary faults and the lowest amount of areas with steep slopes. Overall, Alternative N1 would have the least total potential for impacts associated with geologic hazards. The southern alternative routes have fewer areas with geologic hazards; Alternative S5 and S6 have the smallest number of Quaternary faults. However, Alternative S2 would have the least overall total potential for impacts associated with geologic hazards.

Mineral Resources

All northern alternative routes share common links characterized by the concentrated areas of mineral resources occurring between Sigurd and Richfield, and between Elsinore and Sevier. Alternatives N3 and N5 would be anticipated to result in the lowest impacts on mineral resources. Overall, the southern alternative routes would result in less impact on mineral resources than alternative routes in the northern area. Alternative S1 would be anticipated to have the least potential for impacts on mineral resources, as only low-to-moderate impacts on mineral resources located along the alternative routes would be anticipated.

Soil Resources

Soils were assessed for their potential to be affected by Project-related activities based on (1) whether the soils are capable of supporting farmland (regarded as soils susceptible to potential adverse impacts associated with Project-related construction activities) or (2) whether soils have a moderate or high susceptibility to erosion. Impacts on soils would be limited to areas where ground-disturbing activities would occur (i.e., access-road cutting and grading, clearing and leveling of transmission-line structure work areas, and other work areas). Construction activities would result in short-term impacts on soils by increasing exposure of soils susceptible to water or wind erosion at the surface. This could result in degradation of the surface and loss of soils. Road construction would crush vegetative cover, expose land surfaces, compact soils, cause rutting, and increase and/or accelerate soil erosion, which could result in further degradation of the surface, soil productivity, or water quality if sediment is washed into nearby drainages. Such impacts would be reduced by minimizing ground-disturbing activities, implementing design features of the Proposed Action, and applying area-specific selective mitigation. Examples of area-specific selective mitigation include spanning sensitive areas (i.e., placing tower structures so the transmission line extends across a sensitive area or resource) and measures to restrict the construction or improvement (e.g., widening) of access roads in areas with sensitive soils.

Impact on soils along the alternative routes would be mostly low; however, moderate impacts could result. In the northern area of the Project, Alternatives N1, N4, N5, and N6 cross the least amount of soils that could result in moderate impacts (approximately 19 to 22 miles). Alternatives N2, N2-A, and N3 cross areas of soils (ranging from approximately 27 to 29 miles) that could result in moderate-to-high impacts. In the southern area of the Project, Alternatives S5 and S6 cross the least amount of soils that could result in moderate impacts (approximately 10 to 12 miles). Alternatives S1, S2, S3, S4, S7, and S7-A cross areas of soils (approximately 16 to 17 miles) where moderate impacts could occur.

Water Resources

By implementing design features of the proposed Project, permanent and temporary impacts on surface-water quality and groundwater quality and quantity could largely be avoided or minimized. However, implementation of the Project would result in both high and low residual impacts. High residual impacts would be attributed to actions that potentially would result in the permanent loss of Palustrine Forested Overstory wetlands and the loss of wetlands that support a federally listed endangered species; activities that could result in the deposition of materials into state-listed impaired waters; and impacts on springs, wells, and shallow groundwater or aquifers located along the alignment. Moderate residual impacts would not anticipated for the Project. Low residual impacts resulting from construction, operation, and maintenance of the proposed Project would be attributed to permanent loss of Palustrine Emergent wetlands, temporary loss of Palustrine Scrub/Shrub wetlands, and temporarily filling waters of the United

States that subsequently would result in temporary increases in sedimentation to nearby surface water resources.

All alternative routes considered for the northern area share very similar attributes and impacts on water resources would not differ much across these alternatives. All residual impacts in the northern area would be anticipated to be low. The least surface disturbance and the least overall impacts on all water-resource types would be anticipated from implementation of Alternatives N5 or N6. Alternative N3 would be anticipated to have higher impacts on rivers and streams but no impacts on shallow groundwater and the least permanent surface disturbance. Alternative N3 would have the least overall impacts on all water resource types.

In the southern area, impacts on water resources would vary more among the alternative routes considered. Construction of Alternatives S1, S5, and S6 would require the placement of permanent fill in emergent wetlands and waters of the United States, the permanent removal of Palustrine Scrub/Shrub wetlands, and the clearing of old-grown Palustrine Forested Overstory wetlands considered by the U.S. Army Corps of Engineers and EPA to be a unique and valuable resource. Additionally, these alternative routes could require access roads or overland access routes to be located in proximity to state-listed impaired waters, potentially increasing sediment load and further deteriorating the quality of those protected waters. However, high residual impacts associated with construction of these alternatives would be 0.5 mile for Alternatives S1 and S5 and 0.6 mile for Alternative S6. In the southern Project area, Alternative S4 would be anticipated to have the lowest overall impact on water resources.

Biological Resources

The construction, operation, and maintenance of the Project would result in both direct and indirect effects on biological resources regardless of the alternative selected. Impacts on biological resources due to implementation of any alternative are dependent on the type of resources present along the selected route and each resource's sensitivity to the construction, operation, and maintenance of the Project.

Direct effects associated with the Project likely would include (1) behavioral disturbance and the displacement of wildlife during construction; (2) habitat loss, modification, and fragmentation, including increased potential for the establishment and spread of noxious weeds in disturbed areas; (3) long-term displacement of individual animals; (4) clearing of vegetation; (5) potential for mortality of plants and wildlife due to construction disturbance and ongoing interactions with the Project features; and (6) potential for mortality of birds and bats due to collisions with the transmission line or towers.

Indirect effects associated with Project-related activities could result from the construction of permanent access roads, which could be used by the general public to access habitats currently not frequented by humans. Additional human presence and vehicle noise could result in displacement of animals, abandonment of habitat, behavioral disruption, and additional stress during critical periods. Construction of new access into habitats rarely visited by humans in their existing condition could increase hunting or poaching pressures on wildlife. Public use of access roads could facilitate the spread of noxious weeds and increase the risk of human-caused wildfire. Additionally, prey species for raptors could experience increased predation due to use of transmission structures by raptors as perches in habitats with otherwise limited perching opportunities.

The Project could affect federally listed and candidate species. Alternatives N3, N5, and N6 cross an active Utah prairie dog colony and would be located within 2 miles of active greater sage-grouse leks. All alternative routes cross sage-grouse crucial brood-rearing and crucial winter habitat. Alternatives S1, S5, and S6 cross habitat where the Southwestern willow flycatcher is known to breed and forage. Impacts on

sensitive biological resources, including threatened, endangered, and candidate species, would be reduced under any alternative through application of mitigation measures. Mitigation measures effective at reducing impacts on biological resources include implementation of timing constraints for construction activities and avoidance of sensitive habitats. Additionally, preconstruction surveys for special status species, construction monitoring, and avoidance of sensitive habitats would be implemented in accordance with land management requirements defined in the Plan of Development (POD). The POD is a document required by BLM and USFS if the Project is approved. It outlines site-specific mitigation measures and resource protections that would be implemented. The POD would provide specific details on compliance with land-management plans and required resource protections during the construction, operation, and maintenance of the Project.

Cultural Resources

The prehistory and history of southern Utah are described in the EIS (refer to Section 3.2.5). The prehistory of southern Utah is classified currently into four general phases, exhibiting major cultural changes: the Paleoindian (ca. 12,000 before present [B.P.] to 8000 B.P.), Archaic (ca. 8000 B.P. to 1500 B.P.), Formative, which includes the Fremont Complex and Virgin Anasazi Complex (1500 B.P. to 700 B.P.), and Late Prehistoric (1300 anno domini [A.D.] to 1776 A.D.). The history of southern Utah is described in five major time periods associated with significant events and activities: the Exploration Period (1776 to 1847), Settlement Period (1847 to 1870), Community and Business Development (1870 to 1929), Depression Era (1929 to 1940), and World War II and the Post-war Era (1941 to present). Also addressed in the EIS are two primary cultural groups indigenous to the Project area—the Southern Paiute and Ute tribes.

For this Project, baseline cultural resource data were collected within a 4-mile-wide study corridor (i.e., 2 miles on either side of the reference centerline for each alternative route). Baseline data consisted of Class I data (previously recorded cultural resources sites on file with the Utah Division of State History, Utah State Historic Preservation Office [SHPO], National Register of Historic Places [NRHP]-listed properties, National Historic Trails [NHT], and National Historic Landmarks [NHL]). In addition, the county historic files of the SHPO also were reviewed to identify historic architectural properties located within each study corridor. These data sources provided information on the presence of recorded sites in locations that have been surveyed for cultural resources; however, it is important to note that the absence of sites in areas where cultural resources surveys have not been conducted is not indicative of an absence of cultural resources sites in those locations. The Class I inventory resulted in the identification of 1,847 previously recorded sites: 1,435 prehistoric sites, 287 historic sites, and 125 multi-component sites.

Issues raised by the public and agencies during Project scoping and preparation of the EIS related to potentially significant effects on cultural resources include potential impacts on archaeological and historic sites. Specific resources cited were the Mountain Meadows Massacre Site, remnants of the Old Spanish NHT, the Cove Fort Historic Site, the Mineral Mountains obsidian sources, and historic properties listed on the NRHP.

In the northern area of the Project, Alternative N1 would have the lowest number of miles of route through areas of high cultural resource intensity (11.6 miles), and it has the fewest number of recorded cultural resources sites (43) located within the Project area of potential effect. Much of Alternative N1 is located along existing transportation corridors and or existing corridors for other development projects (e.g., wind farms, pipelines, fiber optic lines, and transmission lines). The construction and maintenance associated with these projects likely has either compromised or destroyed cultural resources sites, or greatly reduced the likelihood of finding intact cultural resources sites with surface manifestations.

In response to agency and public comments received on the Draft EIS and additional information provided since the Draft EIS was published one additional alternative route (Alternative S7, derived from a combination of segments of Alternatives S2 and S4) and one additional alternative route variation (Alternative S7-A) were developed for analysis in the southern area of the Project. In the southern Project area, Alternative S3 has the lowest number of miles of route through areas of high cultural resource intensity (1.0 mile) and the fewest number of recorded cultural resources sites located within the Project area of potential effect (5). Similar to Alternative N1, a portion of Alternative S3 is located along existing transportation corridors and or existing corridors for other development projects (e.g., pipelines, fiber optic lines, and transmission lines). The construction and maintenance associated with these projects likely has either compromised or destroyed cultural resources sites, or greatly reduced the likelihood of finding intact cultural resources sites with surface manifestations. In addition, this alternative avoids the sensitive cultural resources of Mountain Meadows Massacre Site NHL and the Mountain Meadows Historic Site. It should be noted, however, that Alternative S3 bisects the Old Spanish NHT) in five locations. Using segments of Alternative S2 on Alternatives S7 and S7-A (route variation of Alternative S7) to the point of crossover would reduce impacts on the Cove Mountain and Atchinson IRAs. Crossing over to segments of Alternative S4 north of the Mountain Meadows Massacre Site NHL Alternatives S7 and S7-A (route variation of Alternative S7) would place more distance between the proposed transmission line and the NHL and would site the Project behind the existing transmission lines. Alternatives S7 and S7-A cross more miles of areas with high cultural resource sensitivity and more cultural resource sites than Alternative S3.

Paleontological Resources

Paleontological resources, the fossilized remains, traces, or imprints of organisms preserved in the Earth's crust, provide information about the history of life on Earth. Paleontological resources occurring on federal and state lands are afforded protection by federal and state law and regulation. Geologic units in the Project area (and crossed by the alternative routes) range in age from Proterozoic to Cenozoic. There are 16 known fossil localities in the corridor, some of which are considered to be scientifically significant by the BLM, USFS, and the state of Utah because they contain vertebrate fossils and/or scientifically significant invertebrate or plant fossils.

In the northern area of the Project, Alternatives N1 to N6 cross a similar area of paleontological sensitivity (i.e., between approximately 10 to 12 miles in high sensitivity areas). Alternatives N1, N2, N2-A, and N4 cross the least areas of high sensitivity, and Alternative N6 crosses the most area of high sensitivity. Geological units with high sensitivity for paleontological resources along these alternative routes include the Green River, Crazy Hollow, Flagstaff, and Sevier River formations. In the southern area of the Project, Alternatives S1 to S7 cross a varying amount of area of paleontological sensitivity: between approximately 1 and 6 miles of high sensitivity areas and between approximately 1 and 8 miles in moderate/undetermined sensitivity area. Alternatives S2 and S7 (and S7-A) cross the least area of high sensitivity and Alternative S5 crosses the most area of high sensitivity. Geological units with high-to-moderate/undetermined sensitivity for paleontological resources along these alternative routes include the Iron Springs Formation, Mancos Shale, Claron Formation, and Flagstaff Formation.

Mitigation measures would be implemented in areas of high or moderate/undetermined sensitivity before and during construction. Mitigation would include a preconstruction survey to describe and collect scientifically significant fossils, monitoring of ground-disturbing activities during construction in order to collect scientifically significant fossils, curation of any fossils collected during the survey or monitoring, and deposition of the fossils into a federally approved repository for future scientific study and education.

Visual Resources

Regional landscapes in the Project area range from developed urban and suburban landscapes in the northern area to rural areas and landscape of intact character in the central and southern areas:

- The northern area contains foothills and the Pahvant, Tushar, and Mineral mountain ranges, along with urban and suburban development paralleling Interstate 70 from Sigurd to the Fishlake National Forest boundary.
- The central area is largely sagebrush basins surrounded by foothills.
- The southern area contains foothills and the Bull Valley, Atchinson, and Pine Valley mountains.

Agricultural development, such as center-pivot farming, dryland agriculture, and livestock grazing lands are integral to the character of the areas around the Sevier River, Escalante Desert, Ox Valley, Mountain Meadows, and along Pinto Creek.

To characterize and assess visual resources for all alternative routes, regardless of jurisdiction, landscape scenery, sensitive viewers, and federal agency resource management objectives components were inventoried.

Northern Area

Impacts on visual resources would be similar for all six alternatives (and one route variation) evaluated between Sigurd and the Cove Fort area. Generally, the construction and operation of these alignments would result in similar impacts on viewers associated with Interstate 15, Cove Fort Pioneer Historic Place, and Fremont Indian State Park. Additionally, these alternatives share the same alignment through the utility window designated by the Fishlake National Forest.

Landscape Scenery

The landscape scenery associated with the Mineral Mountains would be affected by Alternatives N4, N5, and N6 since these routes cross this landscape. In contrast, Alternatives N1, N2, N2-A, and N3 would avoid crossing the Mineral Mountains; therefore, impacts on landscape scenery would be minimal.

Sensitive Viewers

Impacts on the Escalante Trail and viewers within the community of Milford would be similar for the northern route alternatives. Alternatives N3, N5, and N6 would have more miles of moderate impacts on the American Discovery Trail than Alternatives N1, N2, N2-A, and N4 because these routes parallel the IPP corridor, which would minimize contrast resulting from the Project. Therefore, impacts on viewers would be reduced for these alternatives. Anticipated impacts on residential viewers in Minersville would be higher for Alternatives N3, N5, and N6 because these routes are closer to this community, therefore having proposed transmission line facilities more apparent in the landscape.

Southern Area

Impacts on visual resources would be similar among all seven alternatives (and one route variation) in the southern area between Link 163 and Newcastle except for impacts on the landscape character of the Antelope Range.

Landscape Scenery

Alternatives S1, S2, S3, S4, S7, and S7-A would affect landscape scenery associated with the Antelope Range. Conversely, Alternatives S5 and S6 do not cross the Antelope Range; therefore effects to landscape scenery would be minimal. Areas of valued landscapes with high scenic integrity within the Dixie National Forest would be modified to a greater level as a result of the construction, operation, and maintenance of Alternatives S1, S3, S5, or S6 as compared to Alternatives S2, S4, S7, and S7-A, based on the occurrence and dominance of existing multiple major transmission lines. Alternative S2 would minimize effects to valued landscapes within the Dixie National Forest for the southern alternative routes.

Sensitive Viewers

Alternative S2 would result in the strongest amount of contrast introduced into the viewshed of the Old Spanish NHT based on the proximity of the route to the trail. In comparison, Alternative S5 would minimize any perceptible level of change because the route would be located more than 2.5 miles away from the trail except where this alternative ties into the Red Butte Substation. All other southern alternative routes would result in a similar level of effects to views to adjacent landscapes from the Old Spanish NHT. Alternative S2 would modify the viewshed from the Mountain Meadows Massacre Site NHL to a greater extent as compared to Alternatives S4, S7, and S7-A. Alternatives S1 and S5 would result in effects to residential viewers in Pine Valley, the Pine Valley Wilderness, and recreation areas adjacent to Pine Valley more than Alternatives S2, S3, S4, S6, S7, and S7-A. Viewers associated with residences within the community of Central would be affected to the greatest extent by Alternatives S2, S4, S7, and S7-A while Alternatives S3 and S6 would minimize the visibility and contrast resulting from the proposed facilities.

Land Use and Recreation Resources

Impacts on existing land uses associated with the implementation of the Project would generally be low to moderate. If Alternative N1 were selected, an area of high impact would be the portion of Alternative N1 that crosses the Milford Wind Corridor, LLC Phase III facility. If Alternative S2 were selected, a high impact on a residential use would occur if a direct crossing of the residential structure could not be mitigated through engineering design.

Portions of Alternatives S2, S4, S7, and S7-A that cross IRAs on the Dixie National Forest could result in moderate impacts. Moderate impacts occur where the Project would conflict physically with IRAs and include changes that are large enough that it may result in changes to ecological conditions, a loss of acres, or a decrease in user experience, but would not preclude the ability of the area to be managed as an IRA and/or wilderness.

Portions of all alternative routes cross unroaded/undeveloped areas on the Fishlake and Dixie National Forests and could result in moderate impacts. Moderate impacts occur where the Project would conflict physically with unroaded/undeveloped areas and includes changes that are large enough that it may result

in changes to ecological conditions, a loss of acres, or a decrease in user experience, but would not preclude the ability of the area to be managed as an IRA and/or wilderness.

Potential impacts on future land use, particularly other proposed energy projects, would include constraints on the development of facilities (e.g., placement of wind turbines, solar facilities, and other proposed transmission lines, etc.). The intensity and extent of impacts on specific future development activities could not be assessed due to the preliminary nature of these projects. However, the study areas for other future projects were avoided to the extent possible during the identification of alternative routes for the Project. Also, in response to agency and public comments received on the Draft EIS and additional information provided since the Draft EIS was published, one additional alternative route variation (Alternative N2-A) was developed for analysis. It is anticipated that any impacts related to co-location of projects could be mitigated through final engineering design.

All alternative routes would diminish wilderness qualities and attributes of unroaded/undeveloped areas on USFS-administered lands, varying by alternative and location. The wilderness qualities and attributes of the USFS unroaded/undeveloped areas would be diminished as more human developments and prescribed burns are permitted or implemented within these areas. However, the wilderness qualities and attributes of these areas could increase as burned areas recover over time and other developments, such as oil and gas leases, are not constructed.

Impacts on recreation would result from potential conflicts with the prescribed management for certain recreation opportunity spectrum designations (e.g., high impact to semi-primitive nonmotorized) on both the Fishlake and Dixie National Forests associated with the increased access to these areas, which are common to all alternatives. Additional recreation impacts would result from off-highway vehicle trail and scenic backway crossings, which would temporarily limit the use of these facilities during construction of the Project.

Wildland Fire Ecology and Management

The potential effects on wildland fire ecology and management associated with the Project include the (1) risk of potential fire caused by construction activities; (2) presence of transmission lines and the limited ability of the agencies to manage fire in remote mountain areas; and (3) potential effect on operation of the transmission line in the event of a wildland fire.

It would not be anticipated that implementation of the Project would have impacts on wildland fire ecology and management within the Project area. Potential fire risk is posed by construction activities (e.g., welding and vehicle ignition) and the presence of energized transmission lines (e.g., arc ignition). The alternatives do not conflict with the FMPs relevant to the study area. It would be unlikely the Project facilities would cause fires, except in the rare case of arcing from the transmission line to the ground or nearby vegetation. In the event of a lightning strike, ground wires on the structures ground the current. However, there would be potential short-term impacts during construction when there is an increased risk of ignitions due to construction activities. Fire-safety mitigation measures and protocols will be addressed in detail in the Emergency Preparedness and Response Plan and the Fire Protection Plan, two implementation plans to be included in the POD (refer to Section 2.3.5.1). Potential indirect effects include increased fire frequency due to increased traffic on access roads and increased complexity of fire management operations due to rugged terrain and remote locations of the Project and limited access, particularly on Alternatives S1, S3, S5, and S6. Studies have shown road density may be related to the frequency of human-caused ignitions. Mitigation would be implemented in areas of concern to limit the construction of new access roads or limit access to new roads.

Wildland fires have the potential to affect the operation of the Project facilities and, consequently, the reliability of the transmission system in the region. The alternative routes in the northern segment from Sigurd to Lund Road (Alternatives N1 to N6), in particular, would be susceptible to outages due to the incidence of wildfires in the area. Wildfires generate heat and smoke and have been documented to cause line outages in Utah and other parts of the western United States. The Tushar and Mineral mountains are highly susceptible to lightning strikes, and cheatgrass in the area allows fires to grow and spread rapidly (Utah Division of Forestry, Fire, and State Lands 2009). Wildfires can damage transmission line structures and smoke can cause transmission lines to arc, rendering them out-of-service.

Social and Economic Conditions

The five counties in central and southwestern Utah within the Project area—Beaver, Iron, Millard, Sevier, and Washington counties—comprise the study area of approximately 17,070 square miles. The purpose of the study was to identify the existing social and economic conditions in the area and assess the potential effects of implementing the Project. The inventory of social and economic resources includes conditions and trends in each of the counties for demographics (i.e., population trends, projections and income), transportation, economic characteristics (i.e., employment, economic base), and local resources (i.e., housing, schools, and public services). Also addressed is environmental justice with the intent of avoiding disproportionately high and adverse health and environmental effects on minority and low-income populations.

The construction, operation, and maintenance of the proposed transmission line and related facilities under all alternative routes would be expected to result in minimal, long-term impacts on local employment. The largest potential impact from the Project on employment would occur during the construction phase. However, construction is expected to be staggered over approximately 2 years, so average direct employment would not be expected to exceed 200 people at any one time and would be dispersed across the study area. It is anticipated that a large percentage of the construction workforce would commute to the Project work areas from their residences rather than relocate. Construction expenditures would be expected to beneficially affect local economies through direct jobs and income, as well as through workers spending their wages in local communities. Impacts on population, housing, and government services from the construction and operations of the transmission line would be expected to be minimal.

For all alternative routes, construction and operation of the Project could affect private property values although the impact would be expected to be small since only four structures fall within 0.1 mile of the transmission line routes. The impacts are difficult to measure, would vary among individual properties, and would be influenced by a number of interplaying factors (e.g., proximity of residential properties to towers and lines, types and size of lines, and locations of landscaping and surrounding topography). Impacts would tend to decline with distance from a particular line and dissipate over time (i.e., less impact on private property values after the transmission line has been constructed and is in operation).

While potential environmental justice populations are located the study area near all the alternative routes, these populations would not be affected disproportionately by the development or operation of the Project.

The construction and operation of the Project would generate additional property taxes to counties where the transmission line would be located. The magnitude of these tax revenues range by alternative route from $1.0 million to $2.2 million in the first year of operation and $98,000 to $213,000 in following years the line is in operation. The counties would each receive their proportional share of such tax revenues.

Public Health and Safety

The existing and proposed transmission lines (circuits) between the Sigurd and Red Butte substations are would be sources of electric and magnetic fields (EMF), audible noise, and radio noise. The calculated magnetic field levels associated with the operation of the Project would be below limits for the general public recommended by the International Commission on Non-Ionizing Radiation Protection and the International Committee on Electromagnetic Safety. Because the Project would increase transfer capability between the Sigurd and Red Butte substations, operation of the Project would decrease magnetic fields on the route of the existing Sigurd to Red Butte No. 1 – 345kV transmission line. The highest calculated electric-field level associated with the operation of the Project would be below limits recommended by the International Commission on Non-Ionizing Radiation Protection and the International Committee on Electromagnetic Safety for the general public outside the right-of-way.

In general, levels of audible noise from alternating current transmission lines are higher in inclement/stormy weather than fair weather. In fair weather, the audible noise from the additional line would be hard to detect and would be lower outside the right-of-way than the EPA's recommendations.

The existing and proposed transmission lines meet the criterion for fair-weather radio noise recommended in the Institute of Electrical and Electronics Engineers' *Radio Noise Design Guide*.

Cumulative Effects

Climate and Air Quality

Cumulative effects associated with the construction and operation phases of the Project would be common to all alternatives. For emission sources (e.g., construction activities and road dust), cumulative effects would be temporary and limited in geographic extent. Because of the limited geographical extent and the temporary nature of such activities, the potential for cumulative impacts is minimal and would occur only in the unlikely event construction activities for other projects occur at essentially the same time and place as the construction of the Project.

The emissions occurring from other power projects that might serve the proposed Project would be managed and planned to adhere to air quality rules, regulations, and attainment plans established by the Utah Department of Environmental Quality and EPA. Power plant emissions would be required to meet permitted emission levels required by air management agencies (with oversight by EPA). At such levels, the emissions would be consistent with applicable air quality management plans. Because the Project has the potential to import renewable energy resources, a reduction of emissions from existing thermal power plants in the region actually could occur.

Based on the cumulative character of the phenomena of GHG emissions and global climate change, it is impractical to link the effects of climate change to GHG emissions associated with a particular project or projects. GHG emissions from Project construction would total approximately 96,500 tons of carbon dioxide equivalent, with up to 62,700 tons carbon dioxide equivalent emitted in the year with maximum construction activity. In contrast, U.S. energy-related carbon dioxide emissions totaled 6,215 million tons in 2010 (U.S. Energy Information Administration 2011a); energy related carbon dioxide constitutes approximately 80 percent of total U.S. anthropogenic GHG emissions (U.S. Energy Information Administration 2011b). The maximum annual GHG emissions from Project construction would represent approximately 0.001 percent of annual U.S. energy-related emissions, an insignificant additional contribution to cumulative impacts on air quality in the Great Basin.

Regarding potential cumulative impacts of climate change on the Project over time, design features of the Proposed Action and mitigation measures applied for protection of other resources, such as treatment of noxious and invasive weeds during construction, reclamation of disturbed areas, and post-construction reclamation and weed monitoring, would mitigate cumulative impacts of climate change on the Project.

Geologic Hazards

Numerous geologic hazards are present within the broad area covered by the Project. Past, present, and reasonably foreseeable future actions were reviewed for potential cumulative effects on geologic hazards. In general, the Project would not have an effect on geologic hazards; rather geologic hazards could have an effect on the Project. Depending on the alternative route, there could be a varying degree of landslide susceptibility where the implementation of the Project and other current and future projects could increase the potential for landslides and impact the Project. Cumulative effects of past, present, and reasonably foreseeable future actions would not be expected to affect Quaternary faults or seismicity in the region.

Mineral Resources

The addition of the Project to past, present, and reasonably foreseeable future actions would result in the greater potential for effect on mineral resources throughout the Project area. Grading and cutting of access roads, auguring for tower footings and anchors, or creating staging areas for the Project and other current and future could directly interfere with the mining of mineral resources. Direct effects could be the loss of a mineral resource caused by construction activities or the limiting of development or extraction of the mineral resource. Indirect effects could include improved access and increased visibility of mineral resources. However, mineral resources are associated with the geological formations or units they are found within, which are typically localized and do not encompass large areas. Therefore, a particular geological formation and its mineral resources might not be affected by different projects in the same region. Also, not all geological formations contain mineral resources, or mineral resources could be found only in a portion of a certain geological formation.

Depending on the route selected, other current and future projects could cross mineral resources that are also crossed by or located adjacent to the alternative. Many of these projects are or would be located in proximity to or parallel an alternative route, potentially contributing to cumulative effects on mineral resources. Direct effects from construction activities could be the cumulative loss of a mineral resource or the limiting of development or extraction of the mineral resource. Numerous active mines or producing wells are scattered throughout the Project area. The cumulative effect on such localized mineral resources from implementing the Project would increase with the number of projects in a certain region. Areas with concentrations of mineral resources occur near the Cove Fort, Blundell, Milford, and Minersville areas in the northern Project area and near the Newcastle and the Red Butte Substation areas in the southern Project area. Greater cumulative effects on mineral resources as a result of implementation of the Project and other future projects could occur in these areas.

Soil Resources

Project-related impacts on soil resources resulting either from the permanent conversion of designated farmland soils to nonagricultural uses or from alterations to the natural environment that could increase the rate of soil erosion by water or wind could result in some cumulative loss of productivity of soils

within the watershed. The cumulative effect of the Project on soil resources would increase with the number and size of projects in a certain region.

The Project would not cross any actively irrigated fields but would cross soil units that could support Prime and Unique Farmland. The potential for increased erosion resulting from unrestricted public access to previously undisturbed areas could be mitigated by closing and rehabilitating any access roads not necessary for future maintenance of the Project. Furthermore, the cumulative effect the Project could have on increased access would be reduced significantly in previously disturbed areas (e.g., along the Kern River Pipeline) because the Project would use pre-existing access points.

The implementation of appropriate mitigation measures would minimize short-term cumulative impacts, such as disturbance of surface soils and other alterations to the natural landscape stemming from construction of the Project and other current projects in a particular area. Localized soil resources would be stabilized or returned to a state close to their preconstruction condition. Long-term cumulative impacts on soil resources would be associated with the permanent conversion of designated farmland soils to nonagricultural uses and unrestricted public access via new access roads to previously undisturbed areas associated with construction and maintenance of the Project and other current and future projects.

No other current or future energy production or transmission projects are planned adjacent or in proximity to Links 24, 26, 33, 30, 45, 64, 63, 66, and 68, which are common to Alternatives N1 through N6 in the northern Project area. The Twitchell Canyon Fire burned more than 44,000 acres of USFS-administered lands in this area during the summer of 2010. The *Burned Area Emergency Response Report* (USFS 2010a) created by the Fishlake National Forest details the short- and long-term plans for the response and rehabilitation projects that would be implemented within the burned area. Ongoing aspects of the response and rehabilitation would include applications of wheat straw mulch to stabilize and protect the unvegetated land surface and seeding efforts to restore vegetation to the land surface. These efforts, along with reclamation measures and post-reclamation monitoring, could cumulatively result in beneficial effects on soil resources in these areas. Construction of power plants and pumping systems associated with geothermal leases in the Project area could affect erodible soils in some areas by increasing potential for erosion and indirectly impacting soil productivity. Impacts would increase with the number of leases developed.

Water Resources

In the northern Project area, the alternative routes considered share the same route between the Sigurd Substation and the boundary between the Middle Sevier Watershed and the Beaver Bottoms – Upper Beaver Watershed just east of Cove Fort. For this route segment, cumulative effects from the Project and current or future projects would have the same effects on water resources regardless of the alternative route selected. Potential cumulative effects would result mainly from the construction of access roads, as well as the current and future use of existing roads by construction and mining equipment.

Project access roads and stream crossings could result in increased sedimentation to intermittent and ephemeral streams that potentially could be transferred downstream into the Sevier River, a state-listed impaired water. The culmination of construction-related dust and stormwater runoff from the Sevier Power Plant could have impacts on the Sevier River. Potentially, there are seven intermittent or ephemeral streams that could transfer sediment to the Sevier River.

The operation of a mine between Carter Hollow and Joe Lott Creek potentially could add to and culminate with the proposed Project to increase construction-related sedimentation in the two creeks, both tributaries to Clear Creek and the Sevier River.

In the southern area, Project-related and impacts associated with other current and future projects potentially effect sensitive perennial and intermittent streams as well as state-listed impaired waters in the Pinto Creek drainage. Project-related impacts (e.g., construction of access roads and stream crossings) could lead to unstable soil conditions and increased sediment load to the streams. Additionally, removal of riparian vegetation could be necessary. This subsequently would reduce available habitat for wildlife; nutrient exchange between vegetation, water, and soil; and soil stability. This also would reduce shade provided by trees and shrubs, which would increase water temperature. These effects could reduce habitat quality for fish and wildlife utilizing the riparian corridors and also would degrade further state-listed impaired waters. These impacts would vary by alternative route.

Biological Resources

The potential for introduction and spread of invasive non-native plant species within the study corridors would increase as a result of vegetation clearing and construction of the Project and other development activities within the Project area. Also, the removal and modification of vegetation also could cumulatively alter wildfire regimes and affect patterns of vegetation community distribution.

Under all action alternatives, migratory bird species, mammals, fish, reptiles, amphibians, and plants could be affected by construction and operation of the Project in addition to other present and future actions. Displacement or direct mortality of federally listed and sensitive wildlife species, big game, and other animals could occur as a result of vegetation clearing, construction equipment operation, and increased human activity in the Project area. Construction activities during the migratory bird breeding season could cause abandonment or destruction of nests and the loss of eggs or young but would not likely to affect populations of migratory bird species that occur in the study corridor. While some construction-related cumulative effects (e.g., ground disturbance, construction equipment noise, and other human activities) would be short-term, the presence of permanent Project features (e.g., access roads and the transmission line and ancillary facilities) would contribute to permanent cumulative effects. The intensity of potential adverse cumulative effects on vegetation, wildlife, and fish resources would be dependent on the distribution and abundance of vegetation communities and other habitat features, as well as the nature and extent of past actions that have contributed to the incremental modification of them throughout the Project area.

Cumulative effects on raptors could occur as a result of incremental modification of habitat, increased disturbance and human presence, and as a result of the additive effects of the Project with other present and future actions. Members of the public have expressed concern about potential cumulative impacts on eagles and other raptors that could occur if wind energy generation and transmission line facilities are colocated. Transmission line structures are known to be used by raptors as hunting perches. There is a potential for eagle and raptor mortality when these birds take flight from transmission lines or other tall structures adjacent to wind turbines. All action alternatives would locate transmission line structures near existing wind energy development, proposed wind energy development, or wind testing areas with the potential to become a wind energy development. Site-specific preconstruction surveys would be conducted to locate occupied habitat for listed and sensitive plant and wildlife species, raptors, and other migratory birds, as well as appropriate avoidance and other mitigation strategies would be employed to limit impacts of the Project.

Cultural Resources

Cumulative effects from direct impacts associated with the construction and operation phase of the Project and other current and future projects would be similar for any of the alternative routes. Cultural

resources could be destroyed by construction activities, such as clearing, grading, drilling, and substation development. Development of new access corridors and rights-of-way could increase access to previously inaccessible areas, leading to potential vandalism of cultural resources sites. There also could be cumulative effects from indirect impacts in the form of visual impacts to visually sensitive cultural resource sites. The introduction of additional development could alter the setting and feeling of historic properties such as the Mountain Meadows Massacre Site NHL and the Old Spanish NHT. The extent of cumulative effects on cultural resources could be reduced significantly through avoidance and the implementation of mitigation measures. Potential impacts on cultural resources in the area would be incremental and the potential to mitigate impacts on archaeological and historical sites is expected to be high. The indirect cumulative effects on cultural resources, resulting from increased public access, would be expected to be low.

Native American Concerns

Potential cumulative effects on traditional cultural properties (TCP) from impacts associated with the construction and operation phase of the Project and other current and future projects would be similar for any of the alternative routes. TCPs could be affected by construction activities, such as clearing, grading, drilling, and substation development. Development of new access corridors and rights-of-way for the Project cumulatively could increase access to previously inaccessible areas, leading to potential vandalism of TCPs. There also could be cumulative effects from indirect impacts in the form of visual impacts on TCPs. The introduction of additional development could alter the setting and feeling of TCPs.

The extent of cumulative effects on TCPs could be reduced significantly through avoidance and the implementation of mitigation measures. Potential impacts on TCPs in the area would be incremental; as a result, major impacts on TCPs would be unlikely. Mitigation of impacts on TCPs is expected to be effective, and indirect cumulative effects on TCPs, resulting from increased public access to this area would be expected to be low.

Paleontological Resources

The addition of the Project to past, present, and reasonably foreseeable future actions would result in the greater potential for effect on fossils, resulting in the loss of important scientific information. Ground disturbance associated with construction of the Project, such as grading and cutting of access roads, auguring for tower footings and anchors, or creating staging areas, could contribute to the destruction of important paleontological resources. Improved access and increased visibility indirectly could result in unauthorized collection or vandalism. Also, accelerated soil erosion potentially resulting from construction activities cumulatively could increase the potential for destruction of fossils. These impacts would vary by alternative route and would be expected to be low.

Visual Resources

Cumulative visual effects could result from the incremental modification of the inherent character of affected landscapes and the disruption of sensitive viewer viewsheds resulting from the construction, operation, and maintenance of the Project and other past and reasonable foreseeable future actions. Cumulative impacts common to all alternatives (at varying degrees) would be the industrialization of natural-appearing landscapes resulting from the construction of multiple projects, including associated vegetation clearing, in forested and arid environments. These impacts would vary by alternative route.

Land Use and Recreation Resources

In the vicinity of the Sigurd Substation, agricultural land uses (e.g., irrigated agriculture) would be lost permanently with the addition of the Project and other current and future projects. The anticipated loss would be minimal when compared to the surrounding agricultural land uses in the Sevier Valley, which is dominated by irrigated agricultural uses. Opportunities for grazing (livestock) west of the Tushar and Pahvant mountains would be reduced permanently as more projects (especially wind and solar farms) occupying vast tracts of land are constructed in addition to existing facilities (e.g., Milford Wind Farm, Phases I and II). Similar impacts would occur on lands where the approved Milford Wind Corridor, LLC Phase III and proposed Milford Wind Corridor, LLC Phase IV projects would be constructed. However, grazing would remain the dominant land use and would continue, considering the context and composition of western Utah's existing agricultural land uses. Cumulative impacts on grazing would vary depending on alternative route.

The new access roads constructed for the Project on the Fishlake National Forest between the Sigurd Substation and the Cove Fort area, in addition to the existing access road for the 138kV transmission line and those potentially built for other current and future projects, could increase off-highway vehicles and motorized access into semi-primitive motorized and nonmotorized recreation opportunity spectrum areas. These new and existing access roads would reduce opportunities for solitude and primitive recreation.

The wilderness qualities identified by USFS for areas of "draft unroaded/undeveloped" lands on the Fishlake and Dixie National Forests would be diminished as more human developments and prescribed burns are permitted or implemented within these areas. The cumulative effects would reduce the natural and undeveloped characters of these areas, opportunities for solitude and primitive recreation would be limited, and the overall manageability of these areas as wilderness would be compromised permanently. However, the wilderness qualities of these areas could increase as burned areas recover over time and other developments, such as oil and gas leases, are not constructed.

Similar impacts would occur on BLM-administered lands where the Project and other current and future projects could either increase access to popular destination points (e.g., rock-hounding sites), in turn hastening the degradation of these areas, or could hinder access, in turn compromising the recreational enjoyment of the area by future generations.

Impacts associated with the implementation of the Project in addition to the existing facilities and current and future projects identified would result in a cumulative loss of grazing opportunities in both the northern and southern areas. However, the impacts would be less in the southern alternative areas than the northern alternative areas because there are fewer future projects identified in the southern area. Cumulative effects on dispersed recreation on BLM-administered lands also would be similar to all northern alternatives, again to a lesser extent for the southern alternatives.

Wildland and Fire Ecology Management

Potential cumulative effects on wildland fire ecology and management from implementation of the Project and other reasonably foreseeable future actions include (1) an increase in fuels-loading and the spread of cheatgrass, which has the potential to alter significantly natural fire regimes by increasing fire frequency and size, and (2) an increase in the complexity of fire suppression operations.

New access roads, combined with new disturbance in the right-of-way and staging areas, could lead to an increased potential for proliferation of invasive species such as cheatgrass. In areas where previous disturbance has been invaded by cheatgrass, the risk of wildfire from implementation of the Project

cumulatively increases. Increased access along access roads and rights-of-way established for the Project and other projects could lead to increases in the number of human-caused ignitions in the Project area. In the short-term, these cumulative impacts would be mitigated during construction of the Project, as prescribed in the weed management plan and fire protection plan that would be approved by the BLM and USFS and included in the POD. Long-term cumulative impacts could be mitigated by limiting the number of new access roads constructed and prohibiting access along permanent access roads, especially during periods of high fire danger.

The addition of linear features and developments in the Project area would further fragment the landscape and increase the complexity of fire suppression operations. However, access roads also could be used as fire breaks and access for firefighting vehicles. The proposed and future transmission line projects, pipelines, and other projects (e.g, renewable energy sites) could affect areas by limiting opportunities for prescribed fire where the restoration of natural fire processes is desired. Additional features and structures on the landscape would increase the complexity of fire suppression operations by increasing the number of structures that need protection, potentially posing safety hazards to firefighters and the public. Despite these potential impacts, the addition of the Project facilities to the landscape would not be expected to affect significantly the fire ecology and management of the area.

Social and Economic Conditions

There are five additional projects in the Project area with similar schedules:

- Thermo North to First Wind Transmission Corridor
- Milford Wind Corridor, LLC Phases III and IV
- Sevier Power Company Power Plant
- UNEV Pipeline
- TransWest Express Transmission Project

These projects in particular have similar construction schedules. As a result, the construction schedules of the Project, when added to these schedules, could lead to cumulative effects. If there is some overlap in construction schedules among the Project and the other current and future projects, all would be expected to draw on the regional construction workforce in southwestern Utah where there is a supply of qualified workers. The cumulative demand for skilled laborers in construction and operation likely could require additional workers to relocate temporarily or permanently from outside the Project area to fill these positions. However, there is an ample supply of construction workforce in St. George and Provo, Utah, and Las Vegas, Nevada, all within 150 miles of the Project area. The bulk of these construction workers likely would commute from their residences in these areas to the Project area. This would result in a slight increase in population and an increased demand on housing, public services, and infrastructure.

If the Project is built, the cumulative beneficial impact on the social and economic conditions within the Project area could be significant, including operational revenues, employment revenues, and increased availability of electricity. It is reasonable to assume a future transmission line would have similar beneficial cumulative effects. In addition, indirect cumulative effects range from increases in housing stock to job growth. If current trends continue, Utah’s economy would continue to grow, the population would increase, government services would expand, and the housing stock would increase. This Project would not induce this growth; however, this Project would accommodate the increased demand that would be placed on the current electrical system.

Public Health and Safety

Past, present, and reasonably foreseeable future actions that could affect EMF levels near residences were considered in this cumulative effects analysis. Additionally, other potential impacts on occupational and public safety were considered. Reasonably foreseeable future actions in the analysis include other current and future projects.

Several public health and scientific organizations have reviewed the research on EMF and health and considered the strengths and limitations of the epidemiologic and laboratory studies. These reviewers have concluded the overall body of research does not indicate any disease or adverse health effect caused by EMF exposure at levels below the guideline limits. The audible noise levels at the edges of the right-of-way are estimated to be less than 55 decibel (A-weighted level), the annual average level outdoor target value published by the EPA. While the proposed transmission line would produce EMF, as do all sources of electricity, EMF at intensity levels that would be produced at the edge of the right-of-way also can be found in the ordinary environment. EMF exposure resulting from the proposed transmission line would be well below exposure limits. With the addition of any future transmission line(s), cumulative effects of audible noise levels and EMF exposures could be additive. If additional transmission lines were built in the same right-of-way, estimates of EMF exposure would have to be reevaluated.

Potential effects on occupational health and safety from construction and operation of reasonably foreseeable future actions would be limited. Nevertheless, with the unique occupational hazards associated with heavy construction (e.g., the use, storage, and transport of hazardous materials) and the electric power industry, fatalities and injuries from on-the-job accidents could occur.

Irreversible and Irretrievable Commitment of Resources

Resources committed to the proposed Project would be material and nonmaterial, including financial resources. For the purposes of this section, irreversible commitment of resources has been interpreted to mean that those resources once committed to the proposed Project would continue to be committed throughout the 50-year life of the Project. Irretrievable commitment of resources has been interpreted to mean that those resources used, consumed, destroyed, or degraded during construction, operation, and maintenance of the proposed Project and could not be retrieved or replaced for future use (refer to Section 4.4).

Summary Comparison of Alternatives

In context of the EIS, the alternative or alternatives which were considered to be environmentally preferable are to be specified. The environmentally preferred alternative is the alternative route that exhibits lower overall impact on the environmental resources and resource uses, on balance, as analyzed in preparing this EIS. The route that exhibits the least impact overall is a combination of Alternative N2 and Alternative S2. After implementation of measures to lessen impacts, significant long-term impacts resulting from implementation of the Project along this route are anticipated only in localized areas.

In the Draft EIS, Alternative N1 in the northern portion of the Project area exhibited the least impact on the environmental resources and resource uses analyzed. Since publication of the Draft EIS in May 2011, a private wind developer has obtained development rights on private lands crossed by Links 365 and 380 and intends to complete construction of a new wind facility prior to BLM's decision on the Project. Link 380 is located within the designated West-wide Energy Corridor containing the IPP; however, wind

turbines are planned for development on private land crossing the designated utility corridor thereby precluding use of the designated utility corridor for the proposed transmission line (Alternative N1). Since the release of the Draft EIS, both Beaver and Millard counties support the development of the wind farm and approved permit applications for the wind facility. In addition, Millard County has provided formal comments noting that they would not support amending the County General Plan to allow for a utility corridor along the alignment of Alternative N1. Based on the reasons outlined here, Alternative N1 is no longer a technically feasible and viable alternative for the transmission line. Therefore, the alternative route in the northern portion of the Project area that exhibits the least environmental impact overall is Alternative N2.

In response to agency and public comments received on the Draft EIS and additional information provided since the Draft EIS was published, one additional alternative route variation, Alternative S7 (which is a combination of two existing alternative routes, Alternatives S2 and S4) was developed for analysis in the southern area. The results of the comparison process, in conjunction with comments received from the public and agencies on the Draft EIS, also were used by the BLM and USFS to identify the Agency Preferred Alternative on federal lands. The Agency Preferred Alternative on federal lands includes Alternatives N2-A and S7-A (route variation of Alternative S7).

The Proponent identified the Proponent's Preferred Alternative: the combination of Alternatives N6 and S5. Alternative N6 was selected by the Proponent because it provides physical separation from other high-voltage transmission lines (e.g., IPP) and underground pipelines (e.g., Kern River). Similarly, Alternative S5 was selected by the Proponent because it best meets their need to provide safe, reliable, adequate, and efficient service to southwestern Utah by providing physical separation from other existing high-voltage transmission lines (e.g., IPP and Sigurd to Red Butte No. 1 – 345kV transmission line).

Consultation and Coordination

Agencies and organizations having jurisdiction and/or specific interest in the Project were contacted at the beginning of scoping, during the resource inventory, and prior to the publication of the EIS to inform them of the Project, verify the status and availability of existing environmental data, request data and comments, and solicit their input about the Project. Additional contacts were made throughout the process to clarify or update information. All conversations with agency personnel have been documented, were distributed to the appropriate Project personnel, and are maintained in the Project administrative record. Specific concerns and recommendations have been discussed and documented for further action. This section describes the consultation and coordination activities that have taken place throughout the EIS process.

Cooperating Agencies

In late July and early August 2009, the BLM sent formal letters inviting 19 federal and state agencies and local governmental entities to participate in the EIS as cooperating agencies. Of the 19 invited, 12 responded positively. The organizations participating as cooperating agencies in preparing the EIS are the USFS (Dixie and Fishlake National Forests), U.S. Army Corps of Engineers, and National Park Service (NPS); Utah Governor's Public Land Policy Coordination Office (PLPCO) and School and Institutional Trust Lands Administration (SITLA); and the local governments of Beaver, Iron, Millard, Sevier, and Washington counties and the cities of Enterprise and St. George.

Conference calls of the Agency Interdisciplinary Team, including the cooperating agencies, have been conducted twice each month to discuss the status of the Project and EIS and development of the POD. In addition, five in-person meetings were held at key milestones of the National Environmental Policy Act (NEPA) process. Coordination with the Agency Interdisciplinary Team will continue through the completion of the EIS and POD.

Biological Resources

Under provisions of Section 7(a)(2) of the Endangered Species Act, a federal agency that carries out, permits, licenses, funds, or otherwise authorizes an activity must consult with the U.S. Fish and Wildlife Service (FWS) as appropriate to ensure the action is not likely to jeopardize the continued existence of any species listed as threatened or endangered. The BLM initiated informal consultation with the FWS in September 2009 by requesting a list of federally threatened, endangered, and candidate species that may occur in the Project area. On November 2, 2009, the FWS attended an interagency meeting with the BLM, USFS, and Utah Division of Wildlife Resources to identify and discuss concerns regarding the potential effects of the Proposed Action on wildlife resources, including federally listed species.

At the direction of FWS, BLM obtained lists of federally threatened, endangered, and candidate species with the potential to occur in Sevier, Millard, Beaver, Iron, and Washington counties from the FWS Region 6 website in September 2009. The BLM requested a list of any federally listed, sensitive, endangered, and/or threatened species that may occur in the Project area. The species lists have been updated as new lists become available to reflect the current listing status of all federally listed and candidate species occurring in Utah counties potentially crossed by the Project.

The BLM formed the Biological Resources Task Group for the Project composed of the biologists from the BLM, USFS, FWS, and Utah Division of Wildlife Resources. The group meets via conference call once a month to discuss status of the Project, issues, and approach.

BLM has coordinated with FWS through the BRTG to determine the potential need for formal consultation under Section 7 of the ESA for the various action alternatives. FWS has indicated that formal consultation, including preparation of a Biological Assessment, would not be required if the selected route would not adversely affect listed species. The Agency Preferred Alternative would avoid occupied habitat for federally listed species that may occur in the Project area, including Utah prairie dog and southwestern willow flycatcher. BLM is preparing a letter to FWS documenting the occurrence of threatened, endangered, and candidate species along the Agency Preferred Alternative route and potential effects on each species, as well as requesting concurrence on the information presented from FWS. If FWS concurs with the BLM findings for each species, informal Section 7 consultation will be complete, and the concurrence letter will be included in the Project Record. If FWS does not concur with the findings, BLM will prepare and submit a Biological Assessment for the Project to FWS to initiate formal Section 7 consultation.

Cultural Resources

Section 106 (16 United States Code 470f) of the National Historic Preservation Act of 1966 (NHPA) requires federal agencies to take into account the effect of their undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP, historic properties, including those listed on, or eligible for, the NRHP. Regulations for the implementation of Section 106 are defined in 36 CFR Part 800 – Protection of Historic Properties. These regulations define how federal agencies meet their statutory responsibilities as required under the law. The Section 106 process seeks to

accommodate historic preservation concerns with the needs of federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking on historic properties (36 CFR 800.1). These parties include the Advisory Council on Historic Preservation (ACHP), SHPOs, American Indian tribes, Tribal Historic Preservation Offices, state and other federal agencies, and individuals or organizations with a demonstrated interest in the undertaking due to their legal or economic relation to the undertaking or affected properties, or their concern with the effects of undertakings on historic properties (36 CFR 800.2).

As lead federal agency for compliance with Section 106 of the NHPA, BLM initiated Section 106 consultation with the SHPO, PLPCO, SITLA, USFS, NPS, and the ACHP pursuant to 36 CFR Part 800.6 and 800.14 (b) of the ACHP's regulations implementing Section 106 of the NHPA in April 2010. The Section 106 process is separate from but often conducted parallel with the preparation of an EIS. Consultation under Section 106 of the NHPA is ongoing and will continue during post-EIS phases of Project implementation.

As part of the BLM's phased approach to fulfill its responsibilities to the Section 106 of the NHPA, the BLM must complete Class III cultural resource inventory (intensive pedestrian survey) of the route selected for construction of the transmission line, and the results of the survey must be presented in a technical report. To accommodate the Proponent's construction schedule and in-service date of June 2015, the Proponent funded the Class III inventory of nearly all alternative routes rather than waiting until a route is selected. The Class III inventory has been completed and the technical report is being prepared. The final Class III technical report will enable the BLM, in consultation with the SHPO, to identify historic properties and make determinations on potential effects on those properties. With approval from participating agencies and concurrence of the SHPO, a Historic Properties Treatment Plan (HPTP) comprehensively addressing effects of the Proposed Action on historic properties will be prepared and would be implemented in consultation with the BLM, SHPO and other participating agencies. The Class III inventory and all associated technical reports, including the HPTP, if needed, will be completed before construction of the Project begins.

The BLM in consultation with the SHPO agreed to develop a Programmatic Agreement among the various state and federal agencies and consulting parties with an interest in the Project. A Programmatic Agreement outlines the stipulations that will be followed concerning the identification, assessment, and treatment of cultural resources for the Project in accordance with 36 CFR 800.15(b). Signatories agree that the Project will be administered in accordance with stipulations and measures set forth in the Programmatic Agreement. The following parties have been participating in development of the Programmatic Agreement:

- Signatory Parties
  - BLM Color Country District
  - USFS Dixie National Forest
  - Utah SHPO
  - ACHP
  - NPS
  - SITLA
  - Utah Department of Transportation
- Invited Signatory Parties
  - PacifiCorp (Rocky Mountain Power) (Proponent)
- Concurring Parties
  - PLPCO
  - Paiute Indian Tribe of Utah
  - Church of Jesus Christ of Latter-Day Saints

- Milford Archaeological Research Institute
- Mountain Meadows Association
- Mountain Meadows Massacre Descendants
- Mountain Meadows Monument Foundation
- National Trust for Historic Preservation
- Old Spanish Trail Association
- Oregon California Trails Association
- Utah Rock Art Research Association
- We Nooch Society

Through the development of a Programmatic Agreement, BLM and cooperating agencies have outlined a phased approach to fulfill the four requirements of Section 106: initiate consultation, identify historic properties, assess adverse effects and resolve adverse effects. The first step (initiate consultation) requires BLM to establish the undertaking, identify the appropriate SHPO or Tribal Historic Preservation Office, plan to involve the public, and identify other consulting parties. This step is generally scheduled concurrently with the NEPA scoping efforts. The second step (identify historic properties) requires BLM to determine the scope of the efforts (e.g., the methodologies for each type of cultural resource study, the Project Area of Potential Effects for each study), identify historic properties (Class III intensive pedestrian inventories) and evaluate historic significance (i.e., apply the four NRHP criteria). During the third step, BLM assesses adverse effects on historic properties identified during the previous step. The second and third steps parallel the NEPA processes of drafting the EIS, conducting public hearings/workshops and finalizing the EIS. The final step in the Section 106 process is the resolution of adverse effects, which will be documented in the HPTP. A copy of the Programmatic Agreement is presented in Appendix G. The Section 106 process will be complete prior to issuance of the Record of Decision.

In addition, pursuant to 36 CFR Part 800.2, the lead federal agency also must consult with American Indian tribes that attach religious and cultural significance to historic properties that may be affected by an undertaking. This requirement applies regardless of the location of the historic property. In such cases, the federal agency must notify the tribes potentially affected by the undertaking and give those tribes the opportunity to participate in the Project as a concurring party should they wish to do so.

Early in the environmental process, BLM initiated contact with several American Indian tribes in accordance with various environmental laws and Executive Orders. While no American Indian reservations or lands owned in fee by tribes are within the Project area, the BLM identified several American Indian tribes whose traditional territories are within the Project area.

BLM initiated consultation meetings with the tribes in October 2009, meeting with the Navajo Nation, Hopi Tribe, Moapa Band of Paiute Indians, Paiute Indian Tribe of Utah, Northwestern Band of Shoshone Nation, and Confederated Tribes of the Goshute Nation. The tribes did not express specific concerns or objections to the Project. All requested to be kept informed of Project developments and updated on the EIS process.

As part of scoping, the BLM mailed letters, dated December 17, 2009, to the Navajo Utah Commission and the following 13 American Indian tribes to inform them of and determine their interest in the Project:

- Confederated Tribes of Goshute Nation
- Fallon Paiute-Shoshone Tribe
- Hopi Tribe
- Kaibab Band of Paiute Indians
- Moapa Band of Paiute Indians

- Navajo Nation
- Northwestern Band of Shoshone Nation
- Paiute Indian Tribe of Utah
- San Juan Southern Paiute Tribe
- Southern Ute Tribe
- Ute Indian Tribe
- Ute Mountain Ute Tribe
- White Mesa Ute Tribe (Band of the Ute Mountain Ute)

The tribes also were asked to determine the need for further study related to the identification of TCPs in the Project area that may be affected by the Project.

Through BLM's ongoing consultation, one tribe, the Paiute Indian Tribe of Utah, agreed to participate in development of the Programmatic Agreement as concurring party.

BLM continued ongoing consultation with the tribes in spring and summer of 2010, 2011, and 2012. Contacts and consultation efforts to date are described in Chapter 3 and results of the consultation efforts will be documented in the Project administrative record.

Government-to-Government Tribal Consultation

The United States has a unique legal relationship with American Indian tribal governments as set forth in the Constitution of the United States, treaties, Executive Orders (e.g., Executive Order 13175), federal statutes, federal policy, and tribal requirements, which establish the interaction that must take place between federal and tribal governments. An important basis for this relationship is the trust responsibility of the United States to protect tribal sovereignty, self-determination, tribal lands, tribal assets and resources, and treaty and other federally recognized and reserved rights. Government-to-government consultation is the process of seeking, discussing, and considering views on policy, and/or, in the case of this Project, environmental and cultural resource management issues. As part of the BLM's ongoing government-to-government consultation, tribal officials were informed of the Project and those who expressed interest in the Project were updated periodically on the status of the Project. For efficiency, government-to-government consultation often was combined with Section 106 tribal consultation activities (described in Chapter 5). Consultation efforts to date are presented in Chapter 3 and results of the consultation efforts will be documented in the Project administrative record.

Additional information on formal consultation conducted by BLM under the requirements of the NHPA and BLM's government-to-government tribal consultation is presented in Chapter 5.

Scoping Process

Scoping, a process open to the public and conducted early in the Project (February and March 2010), served to identify the range or scope of issues to be addressed during the environmental studies in the EIS. A Notice of Intent was published in the *Federal Register* on January 5, 2010, announcing preparation of the EIS for the proposed Project and the opportunity for the public to participate in the process and provide input. While the publication of the Notice of Intent initiated a 45-day public comment period, scoping comments were accepted until March 15, 2010, 15 days after the last public scoping meeting.

Activities associated with scoping included (1) agency and interagency meetings; (2) four public scoping meetings; (3) newsletter mailings (distributed to interested parties on the Project mailing list, which includes federal, state, and local government agencies, special interest groups, and individuals—a total of 5,322 parties), media releases, and legal notices to inform the public of the Project, EIS preparation; and (4) establishing a BLM Project website (**http://www.blm.gov/ut/st/en/fo/cedar_city/planning/sigurd_to_red_butte.html)** and posting Project information to the BLM Environmental Notification Bulletin Board (https://www.blm.gov/ut/enbb/index.php). In general, comments from both the public and agencies related to Project need, benefits, and impacts on the environment. These comments received during this early process are documented in the *Sigurd to Red Butte No. 2 – 345kV Transmission Line Project EIS Scoping Report*, which is available for viewing at the BLM field offices and on the BLM Project website.

Public Review Process

The BLM published a Notice of Availability of the Draft EIS for public review and comment in the *Federal Register* on May 27, 2011. The EPA published a Notice of Availability of the Draft EIS for public review and comment in the *Federal Register* on June 3, 2011, which initiated a 45-day public comment period. Approximately 90 hard copies and 135 electronic copies of the Draft EIS were distributed in May and June 2011 to federal agencies; tribal, state, and local governments; organizations; and individuals. The availability of the Draft EIS; deadline for public comments; and locations, dates, and times of public meetings on the Draft EIS were announced in paid newspaper legal notices, paid newspaper advertisements, and project newsletters that were mailed out to potentially affected property owners, agencies, and stakeholders. During the comment period, BLM held four public meetings, one each in Richfield, Milford, Enterprise, and St. George, Utah, to provide information and solicit public comments on the proposed Project and the Draft EIS. A total of 81 people attended the public open houses.

The comment period ended on July 11, 2011. BLM received 41 submittals containing comments from federal, state, and local agencies; public and private organizations; and individuals. The comments in each submittal were identified, recorded, and analyzed. Responses were prepared for all substantive comments. A description of the comment analysis, the comments received, and the responses to those comments are provided in the Final EIS.

Proponent-initiated Activities

In addition, the Proponent convened two Community Working Groups representing diverse interests within the Project area, including representatives from cities, counties, and stakeholders in the northern and southern portions of the Project area. While the Community Working Groups were not decision-making entities on the Project, the members of the Community Working Groups were asked to provide feedback on the Project and consider the views of the group, as well as the views of their respective organizations and/or communities. The Proponent also mailed a letter to landowners within 1 mile of the reference centerline with information regarding the alternative routes to be presented during public scoping for recommendation for detailed analysis in the EIS. The Proponent also posted a basic description the Project on their communications website, conducted briefings of community leaders to introduce and keep them informed about the Project, and conducted meetings with the landowners to discuss the Project and answer their questions prior to the BLM's public scoping meetings.

The Proponent provided updates and information regarding the Project to all counties and cities that required conditional use permits and general plan amendments, beginning in 2010. The application for the general plan amendment for Millard County was approved in February 2012 and all required conditional use permits have been approved.

Chapter 1 – Purpose and Need

CHAPTER 1 – PURPOSE AND NEED

1.1 Introduction

This Environmental Impact Statement (EIS) is being prepared in response to an Application for Transportation and Utility Systems and Facilities on Federal Lands (Standard Form 299), submitted by PacifiCorp (doing business as Rocky Mountain Power, the Proponent) to the Bureau of Land Management (BLM) and U.S. Forest Service (USFS) (UTU-83067) for the Sigurd to Red Butte No. 2 – 345-kilovolt (kV) Transmission Project (Project). The original application was submitted and received on December 19, 2008, and revised by the Proponent on September 11, 2009, and July 5, 2011, to reflect changes in the Project description. The BLM has prepared this EIS to evaluate and disclose the potential Project-related environmental impacts that could result from implementation of the Proposed Action and alternatives.

The Proponent proposes to construct, operate, and maintain a single-circuit, alternating-current (AC), overhead transmission line from the Sigurd Substation near Richfield in Sevier County, Utah, to the Red Butte Substation near the community of Central in Washington County, Utah, a distance of approximately 170 miles depending on the route selected (Maps 1-1 and 1-2). The Project also includes the addition of new substation equipment for interconnecting the transmission line at the existing Sigurd Substation. The Proponent's purpose and need for the Project is described further in Appendix A. Construction of the Project is planned to begin in December 2012. The critical in-service date for the Project is June 2015.

Approximately 470 miles of alternative routes, through Sevier, Millard, Beaver, Iron, and Washington counties are evaluated for the transmission line. Portions of the proposed transmission line cross land administered by three BLM field offices (Cedar City, Fillmore, and Richfield) and two national forests (Dixie and Fishlake). For this reason, the Proponent applied to the BLM and USFS for right-of-way across federal land for the Project. Under the Proposed Action (Chapter 2), the BLM would grant a right-of-way and the USFS would issue a special-use authorization to the Proponent for constructing, operating, and maintaining the proposed transmission line and associated facilities.

The BLM serves as the lead federal agency for preparing the EIS and published a Notice of Intent (NOI) to prepare the EIS in the *Federal Register* on January 5, 2010. Twelve agencies, including the USFS, are participating as cooperating agencies in preparation of the EIS (Chapter 5).

After reviewing the scope of the Project, the BLM and USFS determined that granting a right-of-way and special-use authorization, respectively, for the proposed transmission line and associated facilities is a major federal action and would require preparation of an EIS in compliance with the requirements of the National Environmental Policy Act of 1969 (NEPA), as amended (United States Code [U.S.C.]: Title 42, Chapter 55, § 4321 et seq. [42 U.S.C. 4321 et seq.]), and the Council on Environmental Quality (CEQ) regulations for implementing NEPA (Code of Federal Regulations [CFR]: Title 40, Parts 1500–1508).

The BLM published a Notice of Availability (NOA) of the Draft EIS for public review and comment in the *Federal Register* on May 27, 2011. The Environmental Protection Agency (EPA) published a NOA of the Draft EIS for public review and comment in the *Federal Register* on June 3, 2011, which initiated a 45-day public comment period that ended on July 11, 2011. The BLM received 41 submittals containing comments from federal agencies, state and local governments; public and private organizations; and individuals. The comments in each submittal were identified, analyzed, and addressed in this Final EIS.

This chapter is organized in the following sections:

- 1.2 – Agencies' Purpose and Need for the Federal Action: summarized the agencies' purpose and need in responding to the Proponent's application to the BLM and USFS for the Project across lands they administer.
- 1.3 – Decisions to be Made: describes the decisions to be made by the BLM and USFS.
- 1.4 – Proponent's Purpose and Need for the Project: summarizes the Proponent's statement of purpose and need for the Project.
- 1.5 – Scoping and Public Involvement: summarizes the scoping process and other public involvement, issues identified and where they are addressed in the EIS, and issues considered but eliminated from detailed analysis.
- 1.6 – Relationships to Policies, Programs, and Plans: describes law, regulation, and agency guidelines guiding the preparation of the EIS, the West-wide Energy Corridor (WWEC) Programmatic EIS, land use plans, and consultation and coordination.
- 1.7 – Relationship to Other Plans: describes conformance with land use plans of counties crossed by the alternative routes.
- 1.8 – Major Authorizing Laws and Regulations: lists the major authorizing laws and regulations relevant to the Project with which the federal agencies must comply.
- 1.9 – Federal, State, and Local Permits: lists the major federal, state, and local permits and approvals that could be required for the Project.

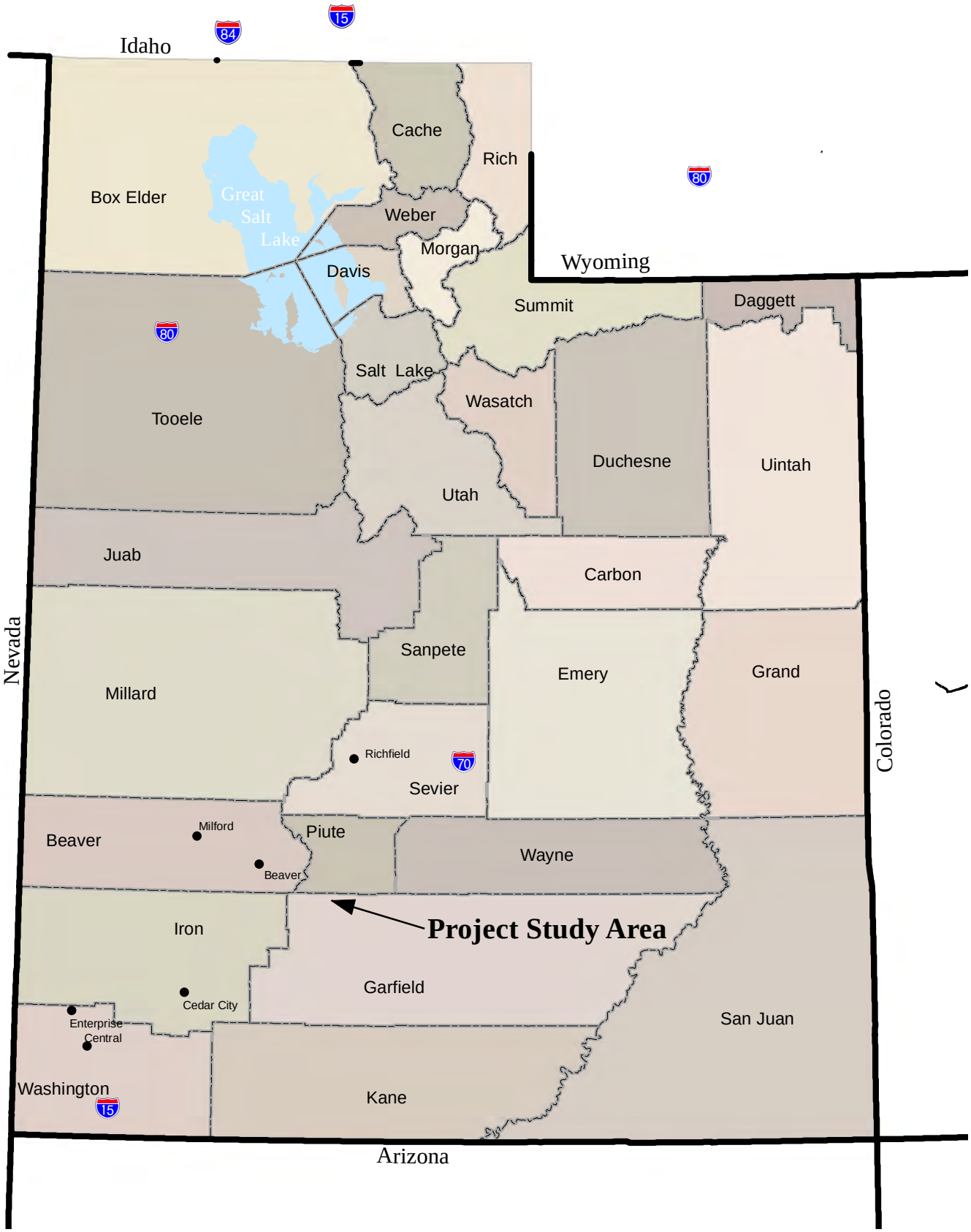
1.1.1 Summary of Changes from the Draft EIS

In this chapter, substantive changes include reorganization of the chapter to emphasize the agencies' purpose and need for the federal action (Section 1.2). Substantive changes made between the Draft EIS and the Final EIS are demarcated in the left margin of this chapter by a vertical black line.

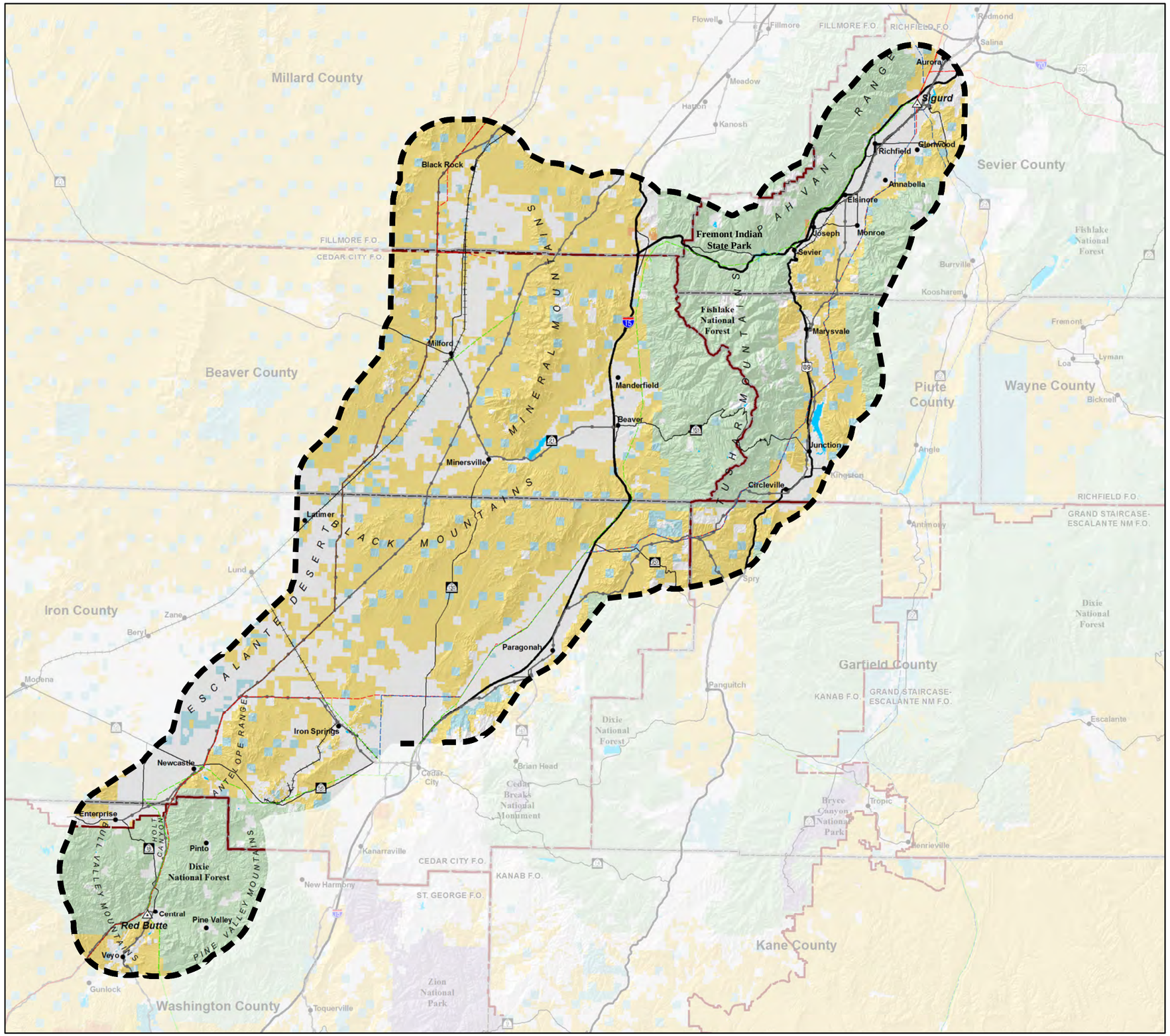
1.2 Agencies' Purpose and Need for the Federal Action

The purpose of this federal action is to respond to the Proponent's application to the BLM and USFS for right-of-way for the Project across the federal lands they administer.

The purpose and need of both the BLM and USFS stems from the overarching policy and direction in the Federal Land Policy and Management Act of 1976 (FLPMA), as amended, and its mission, which is multiple-use, sustained-yield management of the National System of Public Lands and National Forest System lands. The FLPMA also provides the BLM and USFS with discretionary authority to grant rights-of-way on lands they administer, taking into consideration impacts on natural and cultural resources (including historical resources). In doing so, the BLM and USFS must endeavor "to minimize damage to scenic and esthetic values and fish and wildlife habitat and otherwise protect the environment" through avoidance or mitigation (FLPMA Title V).



Project Vicinity
Map 1-1



MAP 1-2
PROJECT AREA

LAND OWNERSHIP

- Bureau of Land Management
- Indian Reservation
- National Park Service
- Private
- State of Utah Trust Lands
- State Park
- U.S. Forest Service

GENERAL REFERENCE FEATURES

- Project Study Area
- Substation
- 500kV +/- DC Transmission Line
- 345kV Transmission Line
- 230 to 287kV Transmission Line
- 138 to 161kV Transmission Line
- Pipeline
- BLM Field Office Boundary
- County Boundary
- Interstate & U.S. Highway
- State Highway
- Railroad
- Lake, Pond, or Reservoir

SOURCES:
Transportation: Streetmap 50K to 250K, 2008
Land Jurisdiction: BLM State Office Utah, 2009
POWERmap, powermap.platts.com
©2007 Platts, A Division of The McGraw-Hill Companies

0 6 12 24 Miles

October 2012

Final EIS

SIGURD TO RED BUTTE NO. 2
345kV TRANSMISSION PROJECT

Path: Q:\SRB\FEIS\Apps\FEIS_2_Apps\Volume_1_FEIS_SRB_Project_Area.mxd

The agencies' purpose and need is further guided by the Energy Policy Act of 2005, which recognized the need to improve domestic energy production, develop renewable energy resources, and enhance the infrastructure (e.g., transmission lines) for collection and distribution of energy resources across the nation. To this end, the BLM and USFS are charged with analyzing applications of utility and transportation systems on federal lands they administer. When analyzing applications, the agencies also must consider the recommendations in the 2011 Western Electricity Coordinating Council (WECC) 10-Year Regional Transmission Plan regarding future transmission needs (WECC 2011).

1.3 Decisions to be Made

The decision to be made by each agency is whether or not to grant the Proponent a right-of-way to construct, operate, and maintain the proposed facilities on lands they administer and under what terms and conditions. In so doing, the BLM (as lead agency) analyzes, through the EIS, the Proponent's plan for, and the potential environmental impacts of constructing, operating, and maintaining the Project. Based on the analysis presented in this EIS, the BLM will issue a Record of Decision (ROD) on whether or not to grant a right-of-way on land administered by the BLM, and the USFS will issue a ROD on whether or not to grant special-use authorization for a right-of-way on land administered by the USFS.

1.4 Proponent's Purpose and Need for the Project

As a regulated utility, the Proponent is responsible for providing its customers with safe, reliable, and adequate transmission capacity to meet short- and long-term projected load growth via connection to existing and new energy generation resources and through access to energy markets. As part of a forward-looking and long-range transmission plan to meet customer requirements, the Project addresses the Proponent's need to meet these obligations by adding facilities to its transmission system, which would improve reliability and increase the capacity required to serve forecasted loads in Utah. The Project would allow for potential access to new energy resources in the future, including renewable energy, and would provide increased capacity to export energy in the event of energy surpluses. These factors are summarized in this section and described in greater detail in Appendix A – Proponent's Purpose and Need for the Project.

1.4.1 Need to Improve Capacity

The full-rated capacity of the southwestern Utah electrical system, including the existing Sigurd to Red Butte No. 1 – 345kV transmission line, is expected to be exceeded by 2015. At that time, load growth in southwestern Utah will surpass the capability of the existing transmission system. New facilities must be constructed to provide sufficient and reliable capacity for load service.

1.4.2 Need to Allow Power Sales, Transfers, and Purchases

The Proponent proposes to augment the existing transmission system's capacity to meet the projected load demand of southwestern Utah. In addition, under its Open Access Transmission Tariff, the Proponent has transmission-service-contract obligations for firm transmission service into and out of southwestern Utah. The current system supports up to 300 megawatts (MW) of transfers (nonsimultaneous) between southwestern Utah and southern Nevada. The Proponent has contractual commitments to deliver 400 MW of additional service from Utah into Nevada beginning in 2013 and has

received requests for 600 MW of imported power beginning June 2012. Thus, the Proponent needs additional transfer capacity between the existing Sigurd and Red Butte substations to meet its contracted transmission obligations by 2014. To meet the projected demand, the Proponent must upgrade the total capacity of the existing transmission path. The proposed transmission line would meet this need by increasing the rated capacity of the transmission system in southwestern Utah to accommodate regional power transfers, as well as local load (i.e., electrical demand within the Proponent's service territory).

1.4.3 Need to Provide Reliable Transmission

The WECC[1], in conjunction with the North American Electric Reliability Corporation (NERC)[2], has established System Planning and Operating Criteria that all transmission providers within the Western Interconnection[3] must follow when planning and operating their transmission systems (NERC/WECC 2005; WECC 2008). These standards and criteria require transmission providers to evaluate expected normal and potential abnormal operating conditions and plan adequate redundancy in the system (i.e., provided through construction of multiple transmission lines and locating multiple lines in wide, geographically diverse transmission corridors) to meet expected system reliability performance. These standards and criteria define both the expected level of event severity (single and multiple lines out) and acceptable system performance requirements. In part, the standards require transmission providers to evaluate multiple adjacent line outages and, when applicable, the outage of all lines in a corridor to ensure the outage does not result in a cascading and uncontrolled loss of generation stations and outages of customer loads. While these standards and criteria exist for performance and reliability, it is the responsibility of the transmission provider, based on operational history and experience, to plan, design, and site transmission projects to meet system performance requirements and manage reliability, risks, and costs.

Without the new transmission line, peak load in southwestern Utah could not be served during line outage contingencies. If designed in a manner that meets the Proponent's system planning criteria (developed in response to NERC and WECC standards and criteria and based on history and experience), the Project would provide redundancy to the existing infrastructure (e.g., Sigurd to Red Butte No. 1 transmission line) and substantially improve the Proponent's ability to provide reliable electrical service to its customers as mandated by federal and state agencies.

1.4.4 Service Load

The Project would support future regional electrical load growth in southwestern Utah (described in Appendix A) and also would improve the ability of the Proponent's transmission system to transport energy into central Utah. Due to the interconnected nature of its transmission system, this Project would benefit the Proponent's system in a regional context.

[1] WECC is one of nine regional electric-reliability councils under NERC authority. The WECC region encompasses the entire Western Interconnection.

[2] NERC is a nonprofit corporation formed by the electrical utility industry to promote the reliability and adequacy of the bulk power transmission in the electrical utility systems of North America.

[3] One of the two AC power grids in North America, the electrical utilities in the Western Interconnection are tied together electrically during normal system conditions and operate at a synchronized frequency of 60 Hertz. The Western Interconnection stretches from western Canada south to northern Baja, California in Mexico and reaching eastward over the Rocky Mountains to the Great Plains.

1.4.5 Access to Potential Renewable Generation Sources

A new transmission line would provide improved access to existing and new generation sources and options to access other energy resources (e.g., renewable resources). While the Project is independent of, and would be built regardless of, any new generation project or other transmission lines, the enhancement of the existing transmission systems' geographic extent and system capacity would allow flexibility to use future generation and transmission facilities.

1.5 Scoping and Public Involvement

1.5.1 Process Summary

A NOI was published in the *Federal Register* on January 5, 2010, announcing preparation of the EIS for the proposed Project and the opportunity for the public to participate in the process and provide input. While the publication of the NOI initiated a 45-day public comment period, scoping comments were accepted until March 5, 2010, 15 days after the date of the last public scoping meeting. The purpose of these meetings was to identify the range, or scope, of issues to be addressed in the EIS. In addition, a comprehensive public involvement effort provided opportunities to receive comments on the Project at key milestones during preparation of the EIS.

The range of issues, summarized in Section 1.5.2 and addressed in the EIS, was derived from the ongoing public involvement and scoping process. Activities that assisted in identifying the issues related to the Project are listed in Section 5.3.1.

Verbal comments received during the scoping meetings were documented. Written comments were accepted by the BLM at the scoping meetings, by email, and by U.S. mail. All comments received were analyzed and assisted in defining the issues to be analyzed for the EIS. A more detailed description of the scoping process, comments received, and results is presented in the *Sigurd to Red Butte No. 2 – 345kV Transmission Line Project EIS Scoping Report* (BLM 2010a), which is available for review on the BLM Project website (**http://www.blm.gov/ut/st/en/fo/cedar_city/planning/sigurd_to_red_butte.html**) and at the three BLM field offices and two national forests participating in preparation of the EIS. More description of the public involvement efforts is presented in Chapter 5 – Consultation and Coordination.

The BLM published a NOA of the Draft EIS for public review and comment in the *Federal Register* on May 27, 2011 (Volume 76, Number 103, pages 30962 and 30963). The EPA published a NOA of the Draft EIS for public review and comment in the *Federal Register* on June 3, 2011, which initiated a 45-day public review and comment period. Public review of the Draft EIS, including comment submittals received, are discussed in Section 5.5.

The EPA's publication of the NOA of the Final EIS in the *Federal Register* will initiate a 30-day review period. While not a formal comment period, comments received during the 30-day period will be considered prior to a decision on the Proposed Action.

1.5.1.1 Proponent-Initiated Activities

The Proponent convened two Community Working Groups (CWGs), each representing diverse interests within the northern and southern portions of the Project area. The CWGs include representatives from Beaver, Sevier, Iron, Millard, and Washington counties; the cities and towns of St. George, Parowan,

Delta, Richfield, Fillmore; the Wildlife Association; Sevier Citizens for Clean Air and Water; Southern Utah Wilderness Alliance (SUWA); Paiute Indian Tribe of Utah; Six County Association of Governments; Fremont Indian State Park; and various landowners and ranchers. The CWGs were asked to provide input to the Proponent (i.e., issues, concerns, and data) as the siting process progressed. To date, the CWGs have met on four occasions at key points during the planning process. Issues raised by the CWGs were communicated to the BLM by the Proponent and addressed in the EIS.

In January 2009, the Proponent began briefing community leaders on the Project that continued periodically throughout the Project. In Fall 2009, the Proponent also initiated meetings with counties and cities that require conditional use permits or general plan amendments.

A summary of Proponent-initiated public outreach activities, including community leader briefings, meetings associated with conditional use permits, and the meetings of the CWGs, is presented in Appendix B.

1.5.2 Issues Addressed

The issues identified from scoping were used to identify, refine, and evaluate alternative routes, and to direct the level of detail needed for each of the environmental resource studies. The issues are related to the Project purpose and need, alternative routes, air quality, noise, geology, soils and paleontological resources, water resources, wildlife and vegetation, wildland fire ecology and management, cultural resources, visual resources, land use and recreation resources, social and economic conditions, health and safety, and electronic device reception interference. Table 1-1 is a list of the issues raised during scoping and where each issue is addressed in the EIS.

TABLE 1-1
ISSUES RAISED BY THE PUBLIC AND GOVERNMENT AGENCIES

Issue	Section(s) of the EIS Where Addressed[1]
Project Purpose and Need	
Is there a need for additional electrical transmission?	1.2, Appendix A
Alternative Routes	
What would be the effects of granting right-of-way or issuing a special-use authorization using corridors designated in the West-wide Energy Corridor Programmatic Environmental Impact Statement and other designated utility corridors? [2]	1.4.2, 2.4.1.1, 3.2.1.3, 3.2.2.3, 3.2.3.4, 3.2.3.5, 3.2.5.4, 3.2.6.4, 3.2.7.5, 3.2.9.5, 3.2.12.2, 3.2.13.5
What would be the effects of granting a right-of-way or issuing a special-use authorization outside a designated-utility corridor to address the Proponent's concern about separation of high-voltage transmission lines to maintain system reliability?[2]	3.2.1.3, 3.2.2.3, 3.2.3.4, 3.2.3.5, 3.2.5.4, 3.2.6.4, 3.2.7.5, 3.2.9.5, 3.2.12.2, 3.2.13.5
Air Quality	
How would fugitive dust generated by Project construction activities be controlled?	Table 2-6, 3.2.1
Noise	
What would be the potential effects of noise from Project construction activities on wildlife?	Table 2-6, 3.2.4, 3.2.13.1
Geology, Soils, and Paleontological Resources	
What would be effects of the Proposed Action on soils on steep slopes?	3.2.2.4
What would be effects of the Proposed Action on areas of unstable soils and fault lines?	3.2.2
What would be effects of the Proposed Action on paleontological resources?	3.2.7

TABLE 1-1
ISSUES RAISED BY THE PUBLIC AND GOVERNMENT AGENCIES

Issue	Section(s) of the EIS Where Addressed[1]
Water Resources	
What would be the effects of the Proposed Action on surface-water quality and on groundwater quantity and quality from Project construction activities?	Table 2-6, 3.2.3
What would be the effects of the Proposed Action on community water supplies?	Table 2-6, 3.2.3
Wildlife and Vegetation	
What would be the effects of the Proposed Action on fish and wildlife species and habitats, including the following:	3.2.4
■ Utah prairie dog colonies?	3.2.4
■ Sage-grouse areas and high-priority habitats?	3.2.4
■ Burrowing owl?	3.2.4
■ Deer (winter range)?	3.2.4
■ Habitat potentially occupied by raptors?	3.2.4
What would be the effects of the Proposed Action if timing limitations for a variety of wildlife species and habitats (e.g., critical seasonal ranges, crucial habitats, parturition areas, migration corridors, etc.) were implemented?	2.3.5.1
What would be the effects of the Proposed Action on riparian areas and wetlands and sensitive plant populations and potential habitats?	3.2.3
What would be effects of Project construction activities on the potential spread of noxious weeds and invasive species?	3.2.4
Wildland Fire Management	
What is the risk of potential fires caused by Project construction activities and/or presence of the transmission line?	3.2.11
What would be the effects on the Proposed Action considering the limited ability of the U.S. Forest Service and Bureau of Land Management to manage fire in remote areas?	3.2.11
Cultural Resources	
What would be the effects of the Proposed Action on archaeological and historic sites, cultural resources dependent on visual settings (e.g., National Historic Trails), and traditional cultural properties?	3.2.5
What would be the effects of the Proposed Action on the Old Spanish National Historic Trail, Fremont Indian ancient mine workings, and Cove Fort Historic Site?	3.2.5
Visual Resources	
What would be the effects of the Proposed Action on lands administered by Bureau of Land Management where visual resource management classifications have not been assigned and where background data are not available?	3.2.8
What would be the effects of the Proposed Action on the historic setting of sensitive cultural areas?	3.2.5.3
What would be the effects of the Proposed Action on sensitive viewing areas around Pine Valley?	3.2.8
Land Use and Recreation Resources	
What would be the effects of the Proposed Action on management of various designated recreation areas and management areas (e.g., inventoried roadless areas, wilderness study areas, state parks, and lands with wilderness qualities or attributes) within the Project area?	3.2.9
What would be the effects of the Proposed Action on private land uses and impacts from construction on permitted grazing operations on lands administered by the Bureau of Land Management?	3.2.9
What are the specific county planning and zoning restrictions that may affect Project siting?	3.2.9

TABLE 1-1
ISSUES RAISED BY THE PUBLIC AND GOVERNMENT AGENCIES

Issue	Section(s) of the EIS Where Addressed[1]
What would be the effects of the Proposed Action on recreation areas?	3.2.9
Would the Proposed Action affect unauthorized public access resulting in poaching and vandalism?	3.2, 3.2.6.3
What would be the effects of the Proposed Action on current land uses?	3.2.9
What would be the effects of the Proposed Action on livestock grazing?	3.2.9.4, 4.2, Appendix J, Table 3-71
What would be the effects of the Proposed Action on rangeland health standards?	3.2.9.4, Table 3-71
What would be the effects of the Proposed Action on wild horses?	3.2.4.5
What would be the effects of the Proposed Action on planned future development?	3.2.9
Would the Proposed Action affect unauthorized use of all-terrain vehicles along construction access roads?	3.2.9.5
What would be the effects of the Proposed Action on low-flying military aircraft?	3.2.9.1
Social and Economic Conditions	
What would be the indirect and qualitative effects of the Proposed Action on local tourism in affected areas?	3.2.12
What would be the availability of employment for the local workforce during Project construction, operation, and/or maintenance of the Proposed Action?	3.2.12
What would be the effects of the Proposed Action on electricity rates and ratepayers?	3.2.12.2
What would be the effects of the Proposed Action on environmental justice populations?	3.2.12.1
What would be the effects of the Proposed Action on property values?	3.2.12.2
What would be effects of the Proposed Action on businesses?	3.2.12
Health and Safety	
What would be the effects of electric and magnetic fields from the transmission line on humans (including those with pacemakers) and animals?	3.2.13
What would be the effects of "spark-gap" transmissions on health and safety?	3.2.13.1
Electronic Device Reception Interference	
What would be the effects of the Proposed Action on cellular phone reception in the areas of Minersville and Richfield?	3.2.13
What would be the effects of the Proposed Action on communication resources (radio and television)?	3.2.13

NOTES:
[1]Sections providing background information that assists in understanding issues, concerns, and/or impacts are listed in this column.
[2]The environmental effects of each alternative are discussed in the sections listed. Refer to Tables 3-73 and 3-74 for designated utility corridor mileage for each alternative.

1.5.3 Issues Considered but Eliminated from Detailed Analysis

The following resources were either not present in the Project area or were not relevant to the issues and concerns identified during scoping and, thus, were not analyzed in the EIS:

- Areas of critical environmental concern (ACEC)
- Wilderness study areas and lands with wilderness qualities or attributes
- National recreation areas
- Cave and karst resources
- Research natural areas

1.6 Relationship to Policies, Programs, and Plans

1.6.1 Law, Regulation, and Agency Guidelines

Major federal actions that may have significant impacts on the human environment require preparation of an EIS. To this end, consideration of the Project is pursuant to NEPA, and is consistent with federal guidelines for implementing NEPA, including the CEQ Regulations for Implementing the Procedural Provisions of NEPA outlined in 40 CFR Parts 1500-1508 and USFS NEPA procedures codified at 36 CFR 220; U.S. Department of the Interior (USDI) guidance in 43 CFR Part 46, BLM policies and manuals (BLM NEPA Handbook H-1790-1); and U.S. Department of Agriculture (USDA), USFS directives, manuals, and handbooks (USFS Handbook 1909.15; NEPA Handbook, July 2008).

1.6.2 West-wide Energy (Section 368) Corridors

In response to a requirement in Section 368 of the Energy Policy Act of 2005, a Programmatic EIS was prepared to identify corridors in 11 western states (Washington, Oregon, Idaho, Montana, Wyoming, California, Nevada, Utah, Colorado, Arizona, and New Mexico) to accommodate linear facilities (e.g., pipelines and transmission lines). A Draft Programmatic EIS (Department of Energy [DOE] EIS-0386) was published and a public comment period on the document closed February 14, 2008. The Final Programmatic EIS was issued on November 28, 2008 (DOE 2008), and the individual RODs by the BLM (BLM/Washington Office [WO]-GI-09-005-1800) and USFS were issued on January 14, 2009. Where the Programmatic EIS identifies new corridors across federally administered lands, the Programmatic EIS also amends the relevant land management plans to include the newly designated corridors. The Programmatic EIS designates corridors only on federally administered lands; therefore, no corridors are designated crossing lands of other jurisdictions or ownership.

The approved land management plan amendments and RODs for energy corridors on BLM- and USFS-administered lands in the 11 western states designate energy corridors and provide guidance, design features of the Proposed Action, and mitigation measures to be used where transmission lines are proposed across public lands. Designation of corridors does not preclude a Proponent from applying for a right-of-way or special uses outside of the federally designated energy corridors, as currently provided for in FLPMA. In this case, an agency's current process for authorizing rights-of-way across lands they administer would apply. Additionally, consideration of an action or alternative located within a designated energy corridor does not exempt the federal agencies from conducting an environmental review of that action or alternative (DOE 2008).

Although designation of corridors does not require their use for the Project, the BLM must consider transmission line alternative routes within or immediately adjacent to these corridors as part of the identification of the environmentally preferred alternative, as required under CEQ regulations, unless technical issues associated with the use of these corridors would preclude the Project from meeting the Proponent's purpose and need. BLM's consideration of alternative routes within these corridors also ensures compliance with NEPA and CEQ regulations for exploring all reasonable alternatives, and FLPMA requirements for using common rights-of-way to the extent practical.

1.6.3 Land Use Plans

BLM and USFS lands are administered with direction from land use plans that establish the goals and objectives for the management of the resources that would be affected by the Proposed Action. The

Project area includes lands administered by three BLM field offices (Cedar City, Fillmore, and Richfield) and two national forests (Dixie and Fishlake). The relevant approved management plans (and plan amendments) include the following:

- Cedar/Beaver/Garfield/Antimony Resource Area Resource Management Plan, as amended (BLM 1986a)—BLM Cedar City Field Office
- Warm Springs Resource Area: The Resource Management Plan, ROD Rangeland Program Summary (BLM 1987)—BLM Fillmore Field Office
- Pinyon Management Framework Plan (BLM 1983)—BLM Cedar City Field Office
- Richfield Field Office ROD and Approved Resource Management Plan (BLM 2008a)—BLM Richfield Field Office
- St. George Field Office ROD and Resource Management Plan (BLM 1999)
- Dixie National Forest Land and Resource Management Plan (LRMP), as amended (USFS 1986a)
- Fishlake National Forest LRMP, as amended (USFS 1986b)

The implementation of the Proposed Action would be conformance with these plans, as required by 43 CFR 1610.5-3 and of the USFS by 36 CFR 219.17(c).

At the time the Draft EIS was published, the USFS was operating under the transition provisions of the 2000 Planning Rule as an interim measure until a new planning rule was issued. On March 26, 2012, the Secretary of Agriculture announced its adoption of the final Planning Rule, effective on May 9, 2012. This planning rule sets forth process and content requirements to guide the development, amendment, and revision of LRMPs. Neither the Dixie nor Fishlake National Forests were selected as “early adopters” of the 2012 Planning Rule and will not yet be revising their LRMPs using the new rule. Thus, the 1986 LRMPs are the relevant approved management plans for USFS-administered lands crossed by the Project.

1.6.4 Consultation and Coordination

In conformance with CEQ regulations implementing NEPA, the BLM invited 19 federal and state agencies and local governmental entities to participate as cooperating agencies in the preparation of the EIS (40 CFR 1501.6). Of the19 invited, 12 accepted the invitation and are participating. Following is a list of the agencies invited and those participating are marked with an asterisk.

Federal Agencies

- USFS*
  - Dixie National Forest
  - Fishlake National Forest
- U.S. Army Corps of Engineers (USACE)*
- National Park Service (NPS)*

Utah State Agencies

- Utah Governor’s Public Lands Policy Coordination Office (PLPCO)*
- Utah School and Institutional Trust Lands Administration (SITLA)*

Local Governments

- Counties: Sevier*, Millard*, Beaver*, Washington*, and Iron*
- Municipalities: Aurora, Beaver, Elsinore, Enterprise*, Joseph, Milford, Minersville, Richfield, St. George*

The BLM formed an Agency Interdisciplinary (ID) Team, including all cooperating agencies, that meets every two weeks to discuss the status of the Project and any issues needing agency input. Also, the Agency ID Team has assembled for workshops at four key milestones of the process.

In addition, the BLM formed three Agency ID Team subgroups, the Biological Resources Task Group, Cultural Resource Task Group (CRTG), and Visual Resources Task Group to address specifically issues associated with, and needing to be addressed in, the EIS and through consultations. The BLM initiated consultation with the U.S. Fish and Wildlife Service (FWS) under Section 7 of the Endangered Species Act of 1973 (ESA) and with the Utah State Historic Preservation Office (SHPO) under Section 106 of the National Historic Preservation Act of 1966 (NHPA) that can be conducted concurrently and integrated with the EIS (i.e., ESA Section 7 and Historic Preservation Act Section 106). Also as part of government-to-government tribal consultation and in accordance with Section 106 of the NHPA, the BLM contacted American Indian tribes that may have an interest in the Project area to inform them and inquire about their interest in the Project. The BLM continued consultation with the tribe that expressed interest; that is the Paiute Indian Tribe of Utah.

A more detailed description of the consultation and coordination efforts is provided in Chapter 5 – Consultation and Coordination.

1.7 Relationship to Other Plans

The BLM reviewed the land use plans of the state of Utah, as well as Beaver, Iron, Millard, Sevier, and Washington counties, and considered the land management objectives and policies established in the plans.

There is no comprehensive State of Utah plan for the Project area. SITLA manages the majority of state land within the Project area, and its mandate is to produce funding for the state's school system. SITLA makes surface lands available for easements for roads, pipelines, power, and transmission lines. Easements generate funds for SITLA; therefore, construction and operation of the Project in an easement across state land is consistent with its objectives.

The *Beaver County General Plan* (1999) acknowledges federal land within the county, which is used for livestock grazing, mineral extraction, and open space. The USFS manages the majority of forest land within the county; these lands have multiple uses, which include recreation, timber cultivation and harvest, grazing, wildlife habitat, and watersheds. The plan also encourages cooperation with federal agencies in decisions affecting the management and use of recreational facilities and road improvements to federally administered lands. The Project is in conformance with the Beaver County General Plan since it would have minimal impact on livestock grazing, mineral extraction, recreation, wildlife habitat, watersheds, and timber sales.

The *Iron County General Plan* (1995) encourages coordination with federal agencies in decisions affecting the management of public land, which is used for livestock grazing, recreation, mineral extraction, and timber sales. The plan emphasizes the importance of allowing for grazing livestock and the need for recreation on federally administered lands. The *Iron County General Plan* also encourages federal land exchanges within the county. The Project is in conformance with the *Iron County General Plan*.

The *Millard County General Plan* (1998) supports federal land management plans that allow multiple uses of public land, which is used for livestock grazing, mineral extraction, rock hounding, recreation, wildlife habitat, telecommunications, water resource development, timber sales, and tourism. The plan emphasizes the importance for recreation on federally administered lands and supports the continued maintenance and preservation of adequate public access. The *Millard County General Plan* also encourages cooperation with federal agencies in decisions affecting the management of federal lands, including federal land exchanges within the County. Millard County recognizes the need for utilities and

requires utility facilities to be located within county-designated utility corridors. A general plan amendment would be required for the Project to be in conformance with the *Millard County General Plan*. The application for the general plan amendment for Millard County was approved in February 2012.

The *Sevier County General Plan* (1998) supports federal land management plans that allow multiple uses of public land, which is used for agriculture grazing, fishing and hunting, mineral extraction, recreation, wildlife habitat, and timber sales. The *Sevier County General Plan* also encourages cooperation with federal agencies in decisions affecting the management and use of public land. The Project is in conformance with the *Sevier County General Plan*.

The *Washington County General Plan* (1998) emphasizes the importance of public lands for scenery, recreation, environmental values, water preservation and water features, wildlife, and visual integrity. Washington County also encourages federal land exchanges for recreational and public purposes. The Project is in conformance with the *Washington County General Plan*.

This EIS also considers the relevant decisions or practices contained in other applicable federal, state, and local plans listed in, but not limited to, the reference section of the EIS.

1.8 Major Authorizing Laws and Regulations

This EIS is being prepared by the BLM in compliance with federal regulations and guidelines (Table 1-2), principally NEPA, CEQ regulations for implementing the procedural provisions of NEPA, and other applicable regulations.

TABLE 1-2
MAJOR FEDERAL AUTHORIZING LAWS, REGULATIONS, AND GUIDELINES

Law and Regulation	Reference
American Indian Religious Freedom Act of 1978	42 United States Code (U.S.C.) 1996
Antiquities Act of 1906	16 U.S.C. 431 et seq.
Archaeological Resources Protection Act of 1979, as amended	16 U.S.C. 470aa et seq.
Bald and Golden Eagle Protection Act of 1972	16 U.S.C. 668
Bureau of Land Management (BLM) right-of-way regulations	43 Code of Federal Regulations (CFR) 2800
BLM National Environmental Policy Act (NEPA) Handbook H-1790-1 (2008)	BLM Manual Release 1-1710
Clean Air Act of 1963	42 U.S.C. 7401 et seq.
Clean Water Act of 1972	33 U.S.C. 1251 et seq.
Comprehensive Environmental Response, Compensation, and Liability Act of 1980	42 U.S.C. 9601-9675
Consultation and Coordination with Indian Tribal Governments	Executive Order 13084
Consultation and Coordination with Indian Tribal Governments	Executive Order 13175
Council on Environmental Quality's Regulations for Implementing NEPA	40 CFR Parts 1500-1508
Departmental Responsibilities for Indian Trust Resources	512 Department Manual 2.1
Endangered Species Act of 1973	16 U.S.C. 1531 et seq.
Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations	Executive Order 12898
Federal Compliance with Pollution Control Standards	Executive Order 12088
Farmland Protection Policy Act of 1981	Public Law 97-98, Subtitle I of Title XV, Section 1539-1549

TABLE 1-2
MAJOR FEDERAL AUTHORIZING LAWS, REGULATIONS, AND GUIDELINES

Law and Regulation	Reference
Federal Land Policy and Management Act of 1976	U.S.C. 1701 et seq.
Floodplain management	42 U.S.C. 4321; Executive Order 11988
American Indian sacred sites	Executive Order 13007
Memorandum for the Heads of Executive Departments and Agencies on Government-to-Government Relations with Native American Tribal Governments of 1994	Signed by President Clinton on April 29, 1994
Migratory Bird Treaty Act of 1918	16 U.S.C. 703-711; Executive Order13186
NEPA	42 U.S.C. 4371 et seq.
National Forest Management Act of 1976	16 U.S.C. 1600-1614
Protection and Enhancement of the Cultural Environment	Executive Order 11593
National Historic Preservation Act of 1966 and regulations implementing	16 U.S.C. 470 et seq.
Native American Graves Protection and Repatriation Act of 1990	25 U.S.C. 3001-30013 et seq.
Noise Control Act of 1972, as amended	42 U.S.C. 4901 et seq.
Noxious weeds and invasive species	Executive Order 13112
Occupational Safety and Health Act of 1970	29 U.S.C. 651 et seq. (1970)
Paleontological Resources Preservation Act of 2009	16 U.S.C. 470aaa et seq.
Pollution Prevention Act of 1990	42 U.S.C. 13101 et seq.
Protecting Wilderness Characteristics on Lands Managed by BLM	Secretarial Order 3310, December 22, 2010
Protection of wetlands	42 U.S.C. 4321; Executive Order 11990
Rangeland Health and Standards and Guides for Grazing Administration	43 CFR 4180
Resource Conservation and Recovery Act of 1976	42 U.S.C. 6901-6992k
Responsibilities and the Endangered Species Act	Secretarial Order 3206, June 5, 1997
Rivers and Harbors Act of 1899	33 U.S.C. 401, 403, 407
Safe Drinking Water Act of 1974	42 U.S.C. s/s 300f et seq.
Standards for Rangeland Health and Guidelines for Grazing Management for BLM Lands in Utah	43 CFR 4180
U.S. Forest Service NEPA Procedures	36 CFR 220

1.9 Federal, State, and Local Permits

Table 1-3 is a list of the major federal, state, and local permits and approvals that could be required for construction, operation, and maintenance of the Project.

TABLE 1-3
SUMMARY OF POTENTIAL MAJOR FEDERAL, STATE, AND LOCAL PERMITS OR LICENSES REQUIRED AND OTHER ENVIRONMENTAL REVIEW REQUIREMENTS FOR TRANSMISSION LINE CONSTRUCTION AND OPERATION

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review	Relevant Laws and Regulations
Federal				
Right-of-way across land under federal management	Preconstruction surveys; construction, operation, maintenance, and abandonment	Bureau of Land Management (BLM)	Right-of-way grant and temporary use permit	Federal Land Policy and Management Act (FLPMA) of 1976 (Public Law [P.L.] 94-579+); 43 United States Code (U.S.C.) 1761-1771; 43 Code of Federal Regulations (CFR) 2800
	Preconstruction surveys; construction, operation, maintenance, and abandonment	U.S. Forest Service (USFS)	Special-use authorization	FLPMA, as amended
	"Conversion of use" for a use other than recreation on lands reserved with Land and Water Conservation Fund Act monies	National Park Service	Review of transmission line corridor to identify conflicts with recreational area	Land and Water Conservation Fund Act (P.L. 88-578, Section 6(f)(3))
	Construction, operation, maintenance, and abandonment of transmission line across or within highway rights-of-way	Federal Highway Administration	Permits to cross Federal Aid Highway	Department of Transportation Act (23 CFR 1.23 and 1.27; 23 U.S.C. 109 and 315); 23 CFR 645; 23 CFR 771
Biological resources	Grant right-of-way by federal land-management agency	U.S. Fish and Wildlife Service (FWS)	Endangered Species Act compliance by federal land management agency	Endangered Species Act, as amended (16 U.S.C. 1531 et seq.)
	Protection of migratory birds	FWS	Compliance	Migratory Bird Treaty Act (16 U.S.C. 703-712); 50 CFR 1
	Protection of bald and golden eagles	FWS	Compliance	Bald and Golden Eagle Protection Act of 1972 (16 U.S.C. 668), including the Final Eagle Permit Rule, or implementing regulations of September 11, 2009 (50 CFR 13 and 22)

TABLE 1-3
SUMMARY OF POTENTIAL MAJOR FEDERAL, STATE, AND LOCAL PERMITS OR LICENSES REQUIRED AND OTHER ENVIRONMENTAL REVIEW REQUIREMENTS FOR TRANSMISSION LINE CONSTRUCTION AND OPERATION

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review	Relevant Laws and Regulations
Biological resources	Protection of special status species	BLM and USFS	Compliance	BLM Policy Manual 6840; Forest Service Handbook 2670
Ground disturbance and water quality degradation	Construction sites with greater than 1 acre of land disturbed	Environmental Protection Agency (EPA) (In Utah, Administered by Utah Department of Environmental Quality)	Section 402 National Pollutant Discharge Elimination System General Permit for Storm Water Discharges from Construction Activities (In Utah, Utah Pollutant Discharge Elimination System)	Clean Water Act (CWA) (33 U.S.C. 1342)
	Construction across water resources	U.S. Army Corps of Engineers (USACE)	General easement	10 U.S.C. 2668 to 2669
	Crossing 100-year floodplain, streams, and rivers	USACE	Floodplain use permits	40 U.S.C. 961
	Construction in, or modification of, floodplains	Federal lead agency	Compliance	42 U.S.C. 4321; Executive Order 11988 Floodplains
	Construction in, or modification of, wetlands	Federal lead agency	Compliance	42 U.S.C. 4321; Executive Order 11990 Wetlands
	Potential discharge into waters of the state (including wetlands and washes)	USACE (In Utah, Administered by Utah Department of Environmental Quality)	Section 401 permit	CWA (33 U.S.C. 1344)
	Discharge of dredge or fill material into waters of the United States	USACE	Section 404 Permit (individual or nationwide)	CWA (33 U.S.C. 1344)
	Placement of structures and construction work in navigable waters of the United States	USACE	Section 10 permit	Rivers and Harbors Act of 1899 (33 U.S.C. 403)
	Protection of all rivers included in the National Wild and Scenic Rivers Systems	Affected land-management agencies	Review by permitting agencies	Wild and Scenic Rivers Act of 1968 (P.L. 90-542); 16 U.S.C. 1271-1287

TABLE 1-3
SUMMARY OF POTENTIAL MAJOR FEDERAL, STATE, AND LOCAL PERMITS OR LICENSES REQUIRED AND OTHER ENVIRONMENTAL REVIEW REQUIREMENTS FOR TRANSMISSION LINE CONSTRUCTION AND OPERATION

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review	Relevant Laws and Regulations
Ground disturbance and water quality degradation	Potential pollutant discharge during construction, operation, and maintenance	EPA	Spill Prevention Control and Countermeasure Plan for substations	Oil Pollution Act of 1990 (40 CFR 112)
Cultural resources	Disturbance of historic properties	Federal lead agency, State Historic Preservation Office, Advisory Council on Historic Preservation	Section 106 consultation	National Historic Preservation Act (16 U.S.C. 470; 36 CFR 800)
	Excavation of archaeological resources	Federal land-management agency	Permits to excavate	Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa to 470ee)
	Potential conflicts with freedom to practice traditional American Indian religions	Federal lead agency, federal land-management agency	Consultation with affected American Indians	American Indian Religious Freedom Act (42 U.S.C. 1996)
	Disturbance of graves, associated funerary objects, sacred objects, and items of cultural patrimony	Federal land-management agency	Consultation with affected Native American groups regarding treatment of remains and objects	Native American Graves Protection and Repatriation Act (25 U.S.C. 3001-3002)
	Investigation of cultural resources	Affected land-management agency	Permit for study of historical and archaeological resources	American Antiquities Act of 1906 (16 U.S.C. 432-433)
	Investigation of cultural resources	Affected land-management agency	Permits to excavate and remove archaeological resources on federal land; American Indian tribes with interests in resources must be consulted prior to issuance of permits	Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa to 470ee); 43 CFR 7
	Protection of segments, sites, and features related to national trails	Affected land-management agency	National Trails System Act compliance	National Trails System Act of 1968 (P.L. 90-543); 16 U.S.C. 1241 to 1249

TABLE 1-3
SUMMARY OF POTENTIAL MAJOR FEDERAL, STATE, AND LOCAL PERMITS OR LICENSES REQUIRED AND OTHER ENVIRONMENTAL REVIEW REQUIREMENTS FOR TRANSMISSION LINE CONSTRUCTION AND OPERATION

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review	Relevant Laws and Regulations
Paleontological resources	Ground disturbance on federal land or federal aid project	BLM and USFS	Compliance with BLM and USFS mitigation and planning standards for paleontological resources of public lands	FLPMA (43 U.S.C. 1701-1771); American Antiquities Act of 1906 (16 U.S.C. 431-433)
	Collection of paleontological resources from federal land	BLM and USFS	Permit to collect paleontological resources from federal land	Omnibus Public Lands Management Act – Paleontological Resources Preservation; (P.L. 111-11, Title VI, Subtitle D, Sections 6301-6312, 123 Stat. 1172); 16 U.S.C. 470aaa.
Air traffic	Location of towers and spans in relation to airport facilities and airspace	Federal Aviation Administration (FAA)	A "No-hazard Declaration" required if structure is more than 200 feet in height	FAA Act of 1958 (P.L. 85-726); 14 CFR 77
Rate regulation	Sales for resale and transmission services	Federal Energy Regulatory Commission	Federal Power Act compliance by power seller	Federal Power Act of 1935 (16 U.S.C. 792)
State of Utah				
Pesticide Use	Application of Herbicide	BLM	Pesticide Use Permit	BLM Management Policy (final Vegetation Treatment Using Herbicides Programmatic Environmental Impact Statement)
Permitting process	Proposed transmission line facility	Resource Development Coordinating Committee	Expedites review of permitting process for all state agencies	Utah Administrative Code (UAC) Sections 63J-4-501 and 63J-4-504

TABLE 1-3
SUMMARY OF POTENTIAL MAJOR FEDERAL, STATE, AND LOCAL PERMITS OR LICENSES REQUIRED AND OTHER ENVIRONMENTAL REVIEW REQUIREMENTS FOR TRANSMISSION LINE CONSTRUCTION AND OPERATION

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review	Relevant Laws and Regulations
Right-of-way encroachment	Encroachment on, through, or over state lands	Division of Forestry, Fire, and State Lands and Utah School and Institutional Trust Lands Administration (SITLA)	Application approval	UAC Title 65A
Project need	Project construction	Public Service Commission	Certificate of Public Convenience and Necessity	UAC Sections 54-4-25 and R 746-401
Ground surface disturbance	Project construction	Public Service Commission	Certificate of Public Convenience and Necessity; approve construction contracts	UAC Sections 54-4-25 and R 746-401
Ground surface disturbance	Crossing state lands	Division of Forestry, Fire, and State Lands and SITLA	Easement onto state lands; bond may be required	UAC Sections 65A-7-8 and 652-40
Cultural resources	Disturbance of historic properties	State Historic Preservation Office, Utah Division of State History	State Historic Preservation Officer will comment on state-funded undertakings	UAC Section 9-8-404
	Discovery of graves, associated funerary objects, sacred objects, and items of cultural patrimony on nonfederal-, nonstate-owned land	Antiquities Section, Utah Division of State History	Consultation with state agency regarding treatment of human remains and funerary objects	UAC Section 9-8-309
Paleontological resources	Excavation and collection of paleontological resources from state lands	Utah Geological Survey, Utah Museum of Natural History, SITLA	Permit to excavate and collect paleontological resources from state land	U.S.C. 63-73-11 through 63-73-19
Historical and cultural review	Impact on historical sites	Division of State History	Notification of planning stage and before construction	UAC Section 9-8-306
Archaeological resources	Survey or excavation of archaeological resources on lands owned or controlled by the state	Utah Governor's Public Lands Policy Coordination Office	Permit to survey or excavate	UAC Sections 9-8-305 and R 694-1

TABLE 1-3
SUMMARY OF POTENTIAL MAJOR FEDERAL, STATE, AND LOCAL PERMITS OR LICENSES REQUIRED AND OTHER ENVIRONMENTAL REVIEW REQUIREMENTS FOR TRANSMISSION LINE CONSTRUCTION AND OPERATION

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review	Relevant Laws and Regulations
Encroachment on state park lands	Utility easement on state park lands	Division of Parks and Recreation	Agreement for granting and maintenance of easements or rights-of-way across park lands	UAC Section 63-11-10.3
Air quality	Construction and operation	Air Quality Board	Notice of Construction	UAC Section 19-2-108
Ground disturbance and water quality degradation	Construction and operation	Water Quality Board	Discharge permit, spills	UAC Section 19-5-101 et. seq.
	Potential discharge into waters of the state (including wetlands and washes)	Utah Department of Environmental Quality	Section 401 permit	UAC R-317
Wildlife	Modification of habitat	Utah Division of Wildlife Resources	Easement for use of state wildlife resource lands	UAC Title 23
Local				
Land Use	Construction and operation of transmission lines	Beaver County	Conditional Use Permit	County rules and regulations
	Construction and operation of transmission lines	Elsinore	Conditional Use Permit	Town rules and regulations
	Construction and operation of transmission lines	Enterprise	Conditional Use Permit	City rules and regulations
	Construction and operation of transmission lines	Iron County	Conditional Use Permit	County rules and regulations
	Construction and operation of transmission lines	Milford	Conditional Use Permit	City rules and regulations
	Construction and operation of transmission lines	Millard County	Conditional Use Permit, General Plan Amendment	County rules and regulations
	Construction and operation of transmission lines	Minersville	Conditional Use Permit	Town rules and regulations
	Construction and operation of transmission lines	Richfield	Conditional Use Permit	City rules and regulations
	Construction and operation of transmission lines	Sevier County	Conditional Use Permit and Petition for Rezone	County rules and regulations

TABLE 1-3
SUMMARY OF POTENTIAL MAJOR FEDERAL, STATE, AND LOCAL PERMITS OR LICENSES REQUIRED AND OTHER ENVIRONMENTAL REVIEW REQUIREMENTS FOR TRANSMISSION LINE CONSTRUCTION AND OPERATION

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review	Relevant Laws and Regulations
Land use	Construction and operation of transmission lines	Washington County	Conditional Use Permit	County rules and regulations

Chapter 2 – Proposed Action and Alternatives

CHAPTER 2 – PROPOSED ACTION AND ALTERNATIVES

2.1 Introduction

Chapter 2 describes the Proposed Action to accommodate the Proponent's proposal to construct, operate, and maintain a 345kV transmission line and ancillary facilities. Also presented are (1) the Project description, (2) alternatives to the Proposed Action, (3) a summary comparison of alternatives, and (4) the preferred alternative(s). This chapter is organized in the following sections:

- 2.2 – Proposed Action: describes the agencies' Proposed Action in response to the Proponent's proposal for their Preferred Alternative.
- 2.3 – Project Description: describes the typical characteristics of the transmission line and ancillary facilities and anticipated construction activities, including regulatory requirements, standard operating procedures, and design features of the Proposed Action for environmental protection and selective mitigation measures to be implemented to minimize some potential significant impacts.
- 2.4 – Alternatives: describes transmission line alternative-route locations that could accommodate the 345kV transmission line evaluated in this EIS, including the alternative of taking no action.
- 2.5 – Alternatives Reviewed but Eliminated from Further Consideration: describes alternatives considered but eliminated from detailed study and discusses the reasons for their elimination.
- 2.6 – Summary Comparison of Alternatives: summarizes the results of the process of screening and comparing the alternative routes and identifies the Environmentally Preferred Alternative.

2.1.1 Summary of Changes from the Draft EIS

Chapter 2 has been updated to include modifications and additional information made in response to agency and public comments received on the Draft EIS or additional information received since the Draft EIS was published, including some minor alternative-route adjustments. Table 2-10 in Section 2.4.2 contains the links that were adjusted and the reasons for the adjustments. Also in response to agency and public comments received on the Draft EIS (refer to Appendix M) and additional information received since the Draft EIS was published, one additional alternative route (Alternative S7) was derived from a combination of two existing alternative routes and two additional alternative route variations (Alternatives N2-A and S7-A) were developed for analysis and are described in this chapter (refer to Section 2.4.2). The alternative-route comparison information presented in Tables 2-9, 2-11, and 2-12 has been updated to reflect these changes.

Standard engineering practices and procedures for environmental protection and design features addressing specific environmental policies and regulatory requirements incorporated by the Proponent as part of the Proposed Action (and applied to the entire Project) are described in the Final EIS as "design features of the Proposed Action" rather than "standard mitigation measures" as described in the Draft EIS (refer to Section 2.3.5.2). The change in terminology is aimed to provide distinction from site-specific (or "selective") mitigation measures applied to reduce or minimize potential adverse impacts and considered in the analysis of environmental effects (refer to Section 3.1.3). Further distinction is afforded by the

relocation of the discussion of the selective mitigation measures to Section 3.1.3. It is appropriate to relocate discussion of selective mitigation measures to Chapter 3 because they are a variable in the impact assessment and mitigation planning discussed in the chapter.

Clarifying information on construction activities, including helicopter construction in inventoried roadless areas (IRA), and design features of the Proposed Action for environmental protection also was added.

Substantive changes made between the Draft EIS and the Final EIS are demarcated in the left margin of this chapter by a vertical black line.

2.2 Proposed Action

The BLM and USFS are proposing to grant the Proponent right-of-way across the federal lands they administer to accommodate the Proponent's proposed Project for a lease term of 30 years (with a right for renewal). The agencies' purpose need for the Proposed Action is presented in Section 1.2.

The Proponent is proposing to construct, operate, and maintain a 345kV transmission line from the existing Sigurd Substation in Sevier County, Utah, located approximately 6 miles northeast of the community of Richfield, Utah, to the existing Red Butte Substation, located west of State Route (SR) 18 and the community of Central in Washington County, Utah (Figure 2-1). The needs stated in Appendix A – Proponent's Purpose and Need for the Project, would be met by the Proponent's Preferred Alternative.

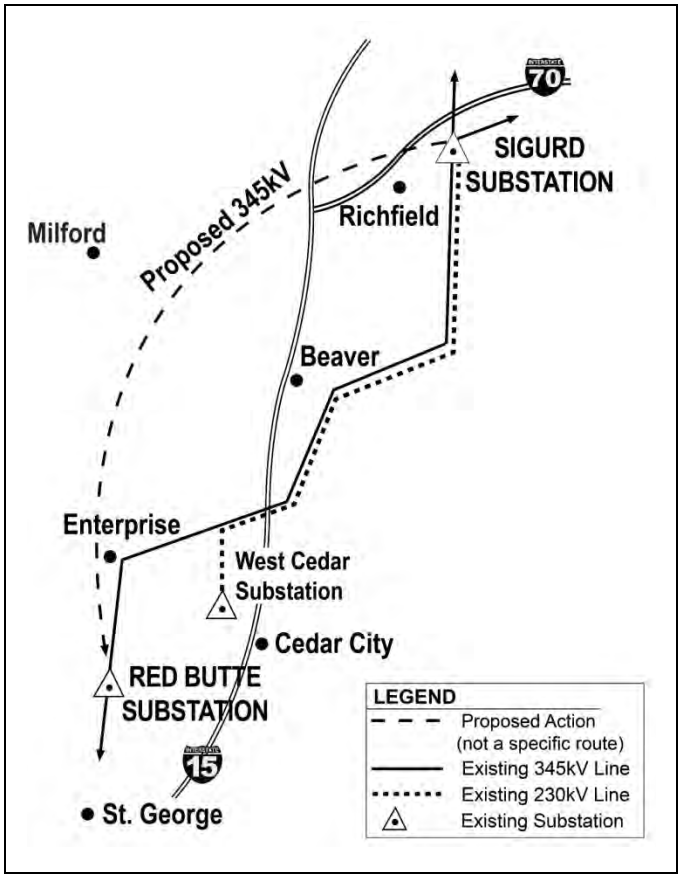
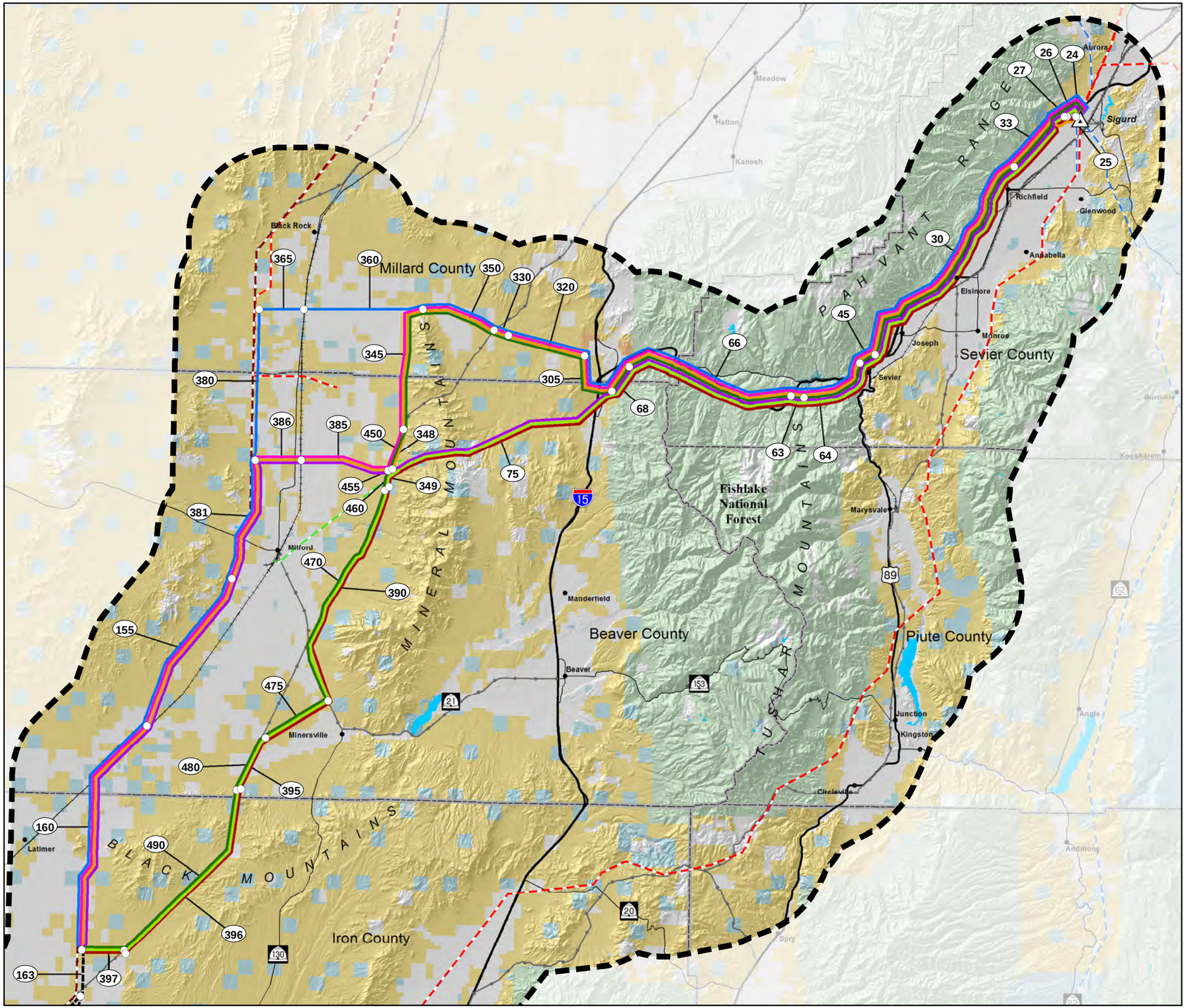


Figure 2-1 Schematic Diagram of the Project

Typical characteristics of the transmission line and ancillary facilities, substations, and access roads and anticipated construction activities, including design features of the Proposed Action and mitigation measures agreed to by the Proponent, are presented in Section 2.3. Alternatives are discussed in Section 2.4 and shown in Maps 2-1 and 2-2. The Project area, shown as a bold, dashed line on the maps, represents the study area of the Proponent's initial feasibility study to identify general corridors where transmission lines could be sited and constructed (documented in the *Draft Report, Corridor Study Sigurd to Red Butte Transmission Line, Southwest Utah* [GeoEngineers 2007]; described in Section 2.4.1.1).

To facilitate screening and comparison of the transmission line alternative routes, the Project area was divided into two segments: a northern segment from the existing Sigurd Substation to South of the Black Mountains and a southern segment from South of the Black Mountains to the existing Red Butte Substation near Central, Utah (Maps 2-1 and 2-2).



MAP 2-1
NORTHERN ALTERNATIVE ROUTES SIGURD SUBSTATION TO SOUTH OF THE BLACK MOUNTAINS

ALTERNATIVE ROUTES

- N1
- N2
- N2-A - Agency Preferred Alternative
- N3
- N4
- N5
- N6 - Proponent's Preferred Alternative
- Southern Alternatives

GENERAL REFERENCE FEATURES

- Project Study Area
- Link Number
- Link Node
- Bureau of Land Management
- Indian Reservation
- National Park Service
- Private
- State of Utah Trust Lands
- State Park
- U.S. Forest Service
- Substation
- 500kV +/- DC Transmission Line
- 345kV Transmission Line
- 230 to 287kV Transmission Line
- 138 to 161kV Transmission Line
- Pipeline
- County
- Interstate & U.S. Highway
- State Highway
- Railroad
- Lake or Reservoir

SOURCES:

Transportation: Streetmap 50K to 250K, 2008
Land Jurisdiction: BLM State Office Utah, 2009
POWERmap, powermap.platts.com
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NOTES:

Route colors are representative of the centerline, but multiple options are being considered.

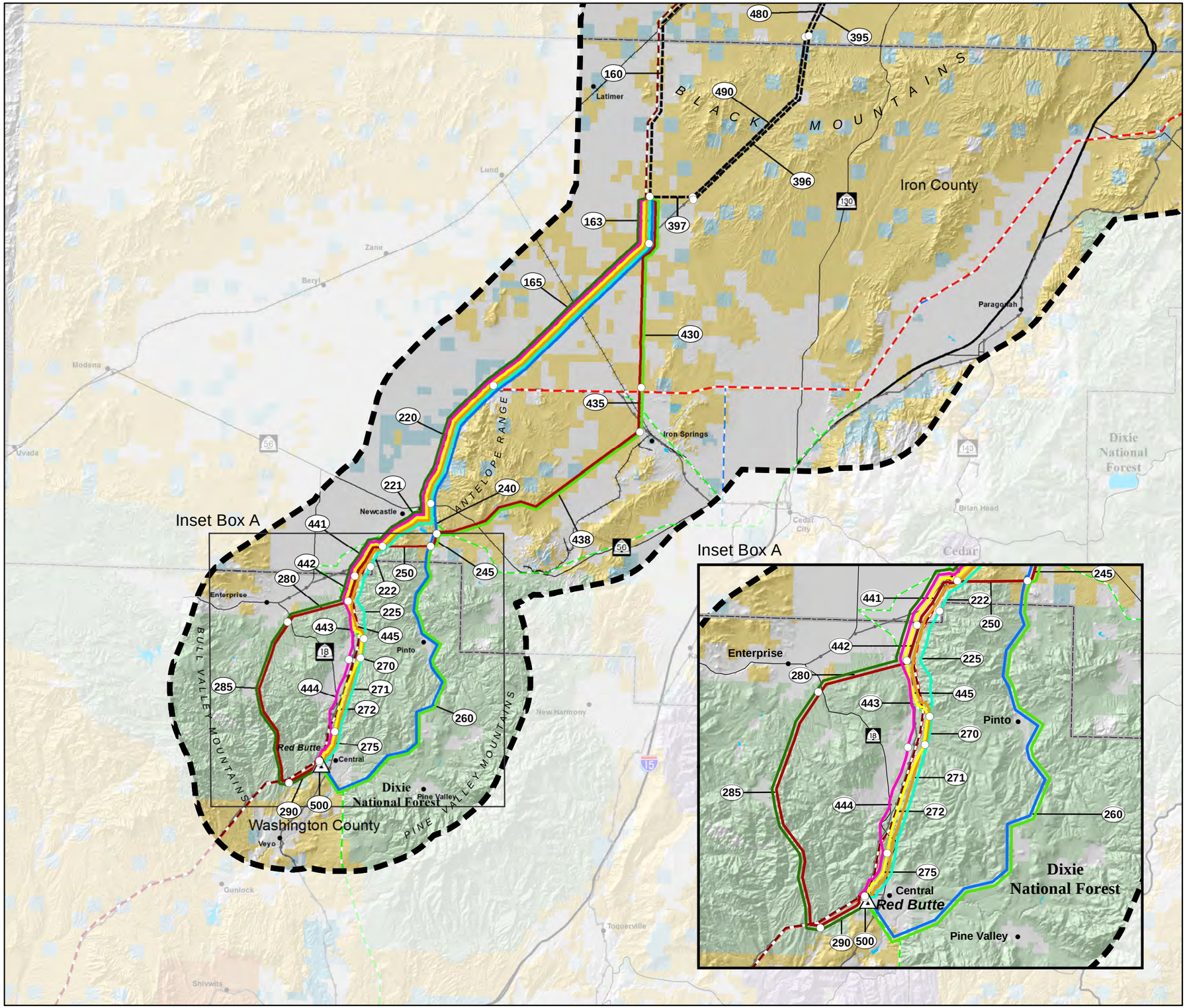
0 2.5 5 10 15 20 Miles

October 2012

Final EIS

SIGURD TO RED BUTTE NO. 2 345kV TRANSMISSION PROJECT

Path: Q:\SRB\FEIS\Apps\FEIS_2_Apps\Volume_1_Level3_Segments_North_1117.mxd



MAP 2-2
SOUTHERN ALTERNATIVE ROUTES SOUTH OF THE BLACK MOUNTAINS TO RED BUTTE SUBSTATION

ALTERNATIVE ROUTES

- S1
- S2
- S3
- S4
- S5 - Proponent's Preferred Alternative
- S6
- S7
- S7-A - Agency Preferred Alternative
- Northern Alternatives

GENERAL REFERENCE FEATURES

- Project Study Area
- Link Number
- Link Node
- Bureau of Land Management
- Indian Reservation
- National Park Service
- Private
- State of Utah Trust Lands
- State Park
- U.S. Forest Service
- Substation
- 500kV +/- DC Transmission Line
- 345kV Transmission Line
- 230 to 287kV Transmission Line
- 138 to 161kV Transmission Line
- Pipeline
- County
- Interstate & U.S. Highway
- State Highway
- Railroad
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SOURCES:

Transportation: Streetmap 50K to 250K, 2008
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NOTES:

Route colors are representative of the centerline, but multiple options are being considered.

0 2.5 5 10 15 20 Miles

October 2012

Final EIS

SIGURD TO RED BUTTE NO. 2 345kV TRANSMISSION PROJECT

Path: Q:\SRB\FEIS\Apps\FEIS_2_Apps\Volume_1_Level3_Segments_South_1117_Inset.mxd

2.2.1 Substations

New substation equipment would be needed at the terminus points to interconnect the proposed transmission line with the existing Sigurd and Red Butte substations.

At the existing Sigurd Substation, new 345kV circuit breakers, a shunt reactor, high-voltage switches, bus supports, and other equipment would be installed along with all associated site preparation, fencing, foundations, oil spill containment, steel substation structures, bus work, protection and control, and metering. The new Sigurd to Red Butte No. 2 – 345kV transmission line will enter the Sigurd 345kV yard from the north and terminate in the currently unused Bay 1 position. All substation additions made for this Project will be avian-safe and located within the existing perimeter fence line.

At the existing Red Butte Substation, new 345kV and 138kV circuit breakers, high-voltage switches, bus supports, a shunt reactor, a series capacitor, a shunt capacitor, and other equipment would be installed along with all associated site preparation, foundations, oil spill containment, steel substation structures, bus work, protection and control, and metering. All improvements to the substation to accommodate the Project would be avian-safe and made within the expanded portion of the substation. The substation is located on property administered by USFS and leased by the Proponent.

2.3 Project Description

The following sections provide descriptions of the typical characteristics of a 345kV transmission line and ancillary facilities and descriptions of the anticipated construction activities, including design features of the Proposed Action from land use plans that are part of the Proponent's Project description.

2.3.1 Overhead Transmission Line and Ancillary Facilities

As proposed, approximately 160 to 170 miles of 345kV overhead transmission line would be constructed for the Project. The typical design characteristics of the 345kV transmission line are presented in Table 2-1, which is followed by descriptions of the tower structures, foundations, conductors, insulators and associated hardware, overhead ground wire, regeneration facilities, work areas, and access roads.

TABLE 2-1
TYPICAL DESIGN CHARACTERISTICS OF THE 345-KILOVOLT TRANSMISSION LINE

Feature	Description
Line length	Approximately 160 to 170 miles
Types of structures	Tangent, steel-pole H-frame structures; angle/deadend, four-legged, steel-lattice structures; three-pole structures (typical)
Structure height	Typically 80 to 140 feet
Span length	Typically 800 to 1,200 feet
Structures per mile	5 to 7
Right-of-way width	150 feet
Land Temporarily Disturbed	
Structure work area (tangent structures)	150 by 200 feet per structure (excluding lattice)
Structure work area (angle structures)	250 by 250 feet per structure
Structure work area (temporary guard structures)	75 by 150 feet per structure; approximately one structure per 0.7 mile
Wire-pulling sites	250 by 250 feet per structure (lattice)
Wire-tensioning sites	150 x 750 feet per 2 to 4 miles

TABLE 2-1
TYPICAL DESIGN CHARACTERISTICS OF THE 345-KILOVOLT TRANSMISSION LINE

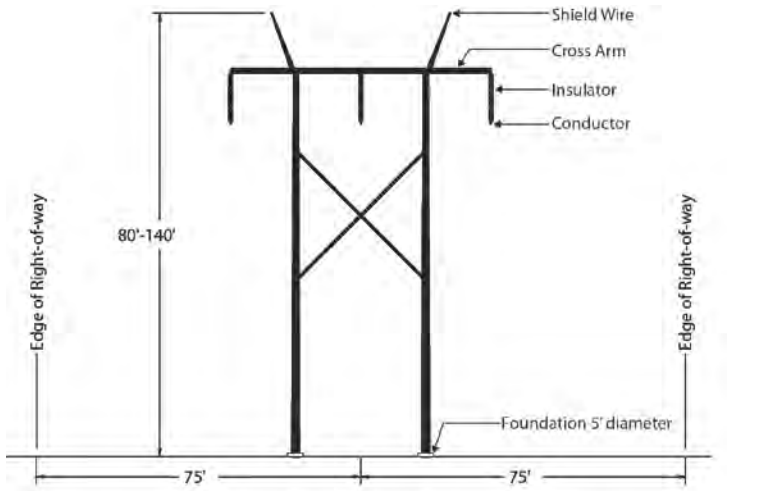
Feature	Description
Wire-splicing sites	100 by 100 feet per 2 miles
Multi-use construction yards	Five approximately 20-acre sites spaced or located approximately every 35 to 50 miles apart on private and/or public land (locations to be determined); refer to Section 2.3.5.2
Staging areas	Five 5-acre sites on private and/or public land (locations to be determined)
Helicopter refueling sites	10-acre sites (locations to be determined)[1]
Shoofly	One approximately 25-acre site
Access roads (improve existing, spur, and new)	Improved existing, spur, and new roads would be a minimum of 14 feet wide (total distance to be determined)
Land Permanently Required	
Structure foundations	Refer to Tables 2-2 and 2-3
Communication regeneration station	100- by 100-foot plot with a 75- by 75-foot fenced area and a 12- by 32-foot building (one station every 55 miles); three station locations have been designated; two stations are adjacent to existing substations; the third site is undeveloped
Access roads (improve existing, spur, and new)	Improved existing, spur, and new roads would typically have a 14-foot-wide travel surface (in steeper terrain the travel surface width could be a maximum of 22 feet for radius of curves) plus disturbance for grading and drainage features (total distance to be determined)
Electrical Properties	
Nominal voltage	345-kilovolt alternating current line-to-line
Capacity	600 megawatts
Circuit configuration	Single-circuit with three phases per structure, two subconductors per phase
Minimum ground clearance of conductor	30 feet minimum per PacifiCorp's standard practice

SOURCE: Rocky Mountain Power 2010
NOTE: [1]Refueling areas would be provided at the multi-use construction yards described in the table. However, additional dedicated space for refueling helicopters used to transport materials during construction could be required.

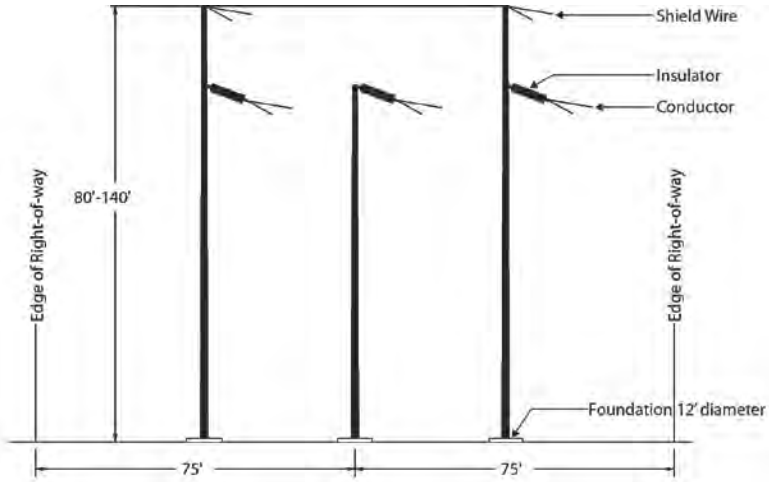
2.3.1.1 Tower Structures

The transmission line circuit would predominately be supported by single-circuit, steel-pole H-frame structures at tangent locations. Some H-frame or angle structures may include down guys (i.e., guy wires or cables anchoring structures to the ground) for additional stability. Structures located at points where the line terminates or changes direction abruptly (angles/deadends) would be lattice-steel or three-pole structures. Both the tangent and angle/deadend structures (Figure 2-2) typically would be 80 to 140 feet in height aboveground. Spacing between structures typically would be between 800 and 1,200 feet (or five to seven structures per mile). In some situations, taller structures or longer spans could be required.

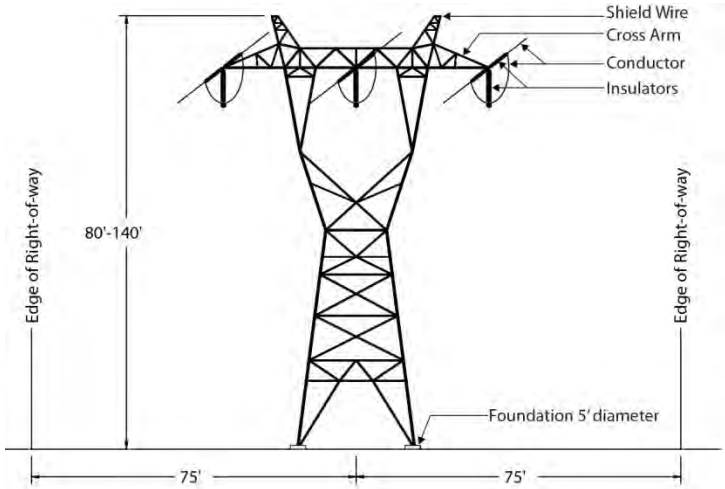
In some cases, alternative structure types would be used in response to specific design needs. These other potential alternative structures, which would be used only when conditions warrant, are shown in Appendix C. The design of both typical and alterative structures could vary depending on engineering requirements and/or mitigation prescribed. For example, some alternative H-frame or angle structures may include down guys for additional stability. The exact height of each structure would be governed by topography and safety requirements for conductor clearance.



Single-circuit H-frame
Tangent Structure (for angles 0 to 3 degrees)



Single-circuit Three-pole
Running-angle Structure (for angles 3 to 10 degrees)



Single-circuit Steel-lattice
Deadend Structure (for angles 10 to 90 degrees)

Figure 2-2 Typical Structures

2.3.1.2 Typical Structure Foundations

Depending on soil and structure type, the foundations would be installed either on drilled pier foundations or directly embedded. Each structure location would be evaluated individually during final engineering design to determine the exact foundation dimensions. Typical foundation parameters for primary structures are given in Tables 2-2 and 2-3. While the actual foundation footprint would vary depending on the structure type, for the purposes of analysis it is assumed the short-term disturbance associated with the construction of each lattice and H-frame tower would be approximately 150 by 200 feet, or 0.7 acre. Temporary disturbance associated with each angle structure is assumed to be 250 by 250 feet, or 1.4 acres. Permanent disturbance associated with H-frame towers is assumed to be 5 by 32 feet, or 0.004 acre. For lattice and three-pole structures, permanent disturbance is assumed to be 45 by 45 feet, or 0.05 acre.

TABLE 2-2
TYPICAL STRUCTURE TYPE FOUNDATIONS

Structure Type	Number of Foundations	Foundation Diameter (feet)	Foundation Depth (feet)	Maximum Area of All Foundations (square feet)
Single-circuit H-frame tangent structure (for angles 0 to 5 degrees)	2	4 to 5	20 to 30	39.3
Single-circuit three-pole running angle structure (for angles 5 to 10 degrees)	3	8 to 12	25 to 50	339.0
Single-circuit steel-lattice DS-24 deadend structure (for angles 10 to 35 degrees)	4	4 to 5	20 to 30	79.5
Single-circuit steel-lattice DS-25 deadend structure (for angles 35 to 90 degrees)	4	4 to 5	20 to 30	79.5

SOURCE: Rocky Mountain Power 2010

TABLE 2-3
ALTERNATIVE STRUCTURE TYPES

Structure Type	Number of Foundations	Foundation Diameter (feet)	Foundation Depth (feet)	Maximum Area of All Foundations (square feet)
Single-circuit H-frame deadend structure (for angles 0 to 15 degrees)	2	4 to 5	20 to 30	39.3
Single-circuit H-frame running angle structure with down guys (for angles 0 to 15 degrees)	2	2 to 4	15 to 25	25.1
Single-circuit H-frame deadend structure with down guys (for angles 5 to 15 degrees)	2	2 to 4	20 to 30	25.1
Single-circuit three-pole running-angle structure with down guys (for angles 5 to 10 degrees)	3	4 to 8	20 to 45	150.9
Single-circuit three-pole deadend structure with down guys (for angles 30 to 90 degrees)	3	4 to 8	25 to 50	150.9
Single-circuit mono-pole tangent structure (for angles 0 to 5 degrees)	1	5 to 10	20 to 30	78.5

TABLE 2-3
ALTERNATIVE STRUCTURE TYPES

Structure Type	Number of Foundations	Foundation Diameter (feet)	Foundation Depth (feet)	Maximum Area of All Foundations (square feet)
Single-circuit mono-pole deadend structure (for angles 5 to 90 degrees)	1	6 to 12	30 to 40	113.0
Double-circuit mono-pole tangent structure (for angles 0 to 5 degrees)	1	6 to 10	25 to 50	78.5
Double-circuit mono-pole deadend structure (for angles 5 to 90 degrees)	1	6 to 12	30 to 50	113.0
SOURCE: Rocky Mountain Power 2010				

2.3.1.3 Conductors

The 345kV single-circuit transmission line will consist of three phases with a double-conductor bundle (i.e., two subconductors) per phase installed in a vertical configuration with 18-inch spacing between subconductors. The conductor (the wire cable strung between transmission line towers through which the electric current flows) will consist of outer aluminum strands with a stranded steel reinforced core (i.e., Aluminum Conductor Steel Reinforced). The specified conductor (Aluminum Conductor Steel Reinforced 954 54/7 Cardinal), is about 1.2 inches in diameter, weighs approximately 1.23 pounds per foot, and will have a “nonspecular” finish to reduce surface glare.

Conductor phase-to-phase and phase-to-ground clearance parameters are determined in accordance with the National Electrical Safety Code (NESC), ANSI C2, produced by the American National Standards Institute (ANSI). This code provides guidelines for the minimum distances between the conductors and ground, crossing points of other lines and the transmission support structure and other conductors, and minimum working clearances for personnel during energized operation and maintenance activities (Institute of Electrical and Electronics Engineers [IEEE] 2007). Minimum conductor height aboveground for the 345kV line will be based on NESC requirements and the Proponent’s own standards. Typically, conductor clearance is a minimum of 30 feet aboveground for 345kV lines. During final engineering, conductor clearances may be increased in certain locations to account for site-specific conditions and for safe operation.

Based on Avian Power Line Interaction Committee (APLIC) recommendations (Edison Electric Institute and APLIC 2006), adequate three-conductor-phase spacing (60 inches or greater for avian protection [i.e., to reduce electrocution risk]) will be implemented.

As conductor is supplied on reels up to about 9,600 feet in length, splicing is required to make a continuous run. Splices may be either compression type or explosive charge type. If explosive type splices are used, the construction contractor(s) will incorporate appropriate references and requirements into the Blasting Plan Framework to be included in the Plan of Development (POD).

To reduce vibration fatigue on installed conductor and associated hardware, vibration dampers will be installed on the conductor as required by the Proponent’s standards and as specified in the final design.

Insulators and Associated Hardware

The assemblies of insulators are designed to maintain electrical clearances between the conductors, the structure, and the ground. Single-circuit H-frame tangent structures, typical three-pole running angle

structures, and lattice angle/deadend 345kV structures would have three I-shaped string insulators suspended from the structure, while deadend insulators will be oriented parallel to the conductors (refer to Appendix C, Figures C-1 to C-9). Other structures would have either V-shaped or I-shaped insulators.

Overhead Ground Wire

The overhead ground-wire shields the 345kV transmission line from direct lightning strikes. Each transmission structure would have two lightning protection overhead ground wires installed on the peak of the structure. One of the overhead ground wires would be a shield wire composed of extra-high-strength steel wire with a diameter of 0.495 inch and a weight of 0.517 pound per foot. The second overhead ground wire will be a fiber-core overhead optical ground wire (OPGW) for communication purposes constructed of aluminum and steel that carries 48 glass fibers in its core. The OPGW's would have a diameter of 0.465 inch and a weight of 0.290 pound per foot. Current from lightning strikes would be transferred through the ground wires and structures into the ground.

Grounding

Ground rods would be installed next to the structure foundations and would be bonded to the structure. Lattice towers (single-circuit angle or deadend structures) would have four grounds installed per structure, and H-frame and steel-pole structures would have two grounds installed per structure. After the ground rods have been installed, the grounding would be tested to determine the resistance to ground. If resistance to ground for each transmission structure is not acceptable with the use of ground rods, counterpoise would be installed to lower the resistance. Counterpoise consists of a bare copper-clad or galvanized-steel cable buried to a depth of 12 inches in noncultivated land and 19 inches in cultivated land, and extends away from one or more legs of the structure approximately 200 feet within the right-of-way. Conductive objects (e.g., metal fences, metal buildings, and other metal objects) would be grounded properly per PacifiCorp Transmission Construction Standard TD-310, on receipt of a request from a property owner (after proper investigation has been completed).

Induced Currents on Adjacent Facilities

AC transmission lines have the potential to induce currents on adjacent metallic structures, such as transmission lines, railroads, pipelines, fences, or structures parallel to, cross, or are adjacent to the transmission line. Induced currents on these facilities occur to some degree during steady-state operating conditions and during a fault condition on the transmission line. For example, during a direct lighting strike to the conductor on the transmission line, the insulators may flash over, causing a fault condition on the line, and current would flow down the structure through the grounding system (i.e., ground rod or counterpoise) and into the ground. The magnitude of the effects of the AC-induced currents on adjacent facilities is highly dependent on the magnitude of the current flows in the transmission line, the proximity of the adjacent facility to the line, and the distance (length) for which the two facilities parallel one another in proximity.

The methods and equipment needed to mitigate these conditions would be determined through electrical studies of the specific situation. Grounding actions (if needed) would take care of the majority of induced-current effects on metallic facilities adjacent to the line by shunting the induced currents to ground through ground rods, ground mats, and other grounding systems, thus reducing the step-and-touch potential a person may experience when touching a metallic object near the line (i.e., reducing electric shock potential).

In the case of a longer parallel facility (e.g., a pipeline parallel to the transmission line over many miles), additional electrical studies could be undertaken to (1) identify any additional mitigation measures (more than the standard grounding practices) that would need to be implemented to prevent damaging currents from flowing onto the parallel facility and (2) prevent electrical shock to a person that may come in contact with the parallel facility. Some of the typical mitigation measures that could be considered for implementation, depending on the degree of mitigation needed, can include the following (National Association of Corrosion Engineers International 2007):

- Fault shields: shallow grounding conductors connected to the affected structure adjacent to overhead electrical transmission towers, poles, substations, etc. They are intended to provide localized protection to the structure and pipeline coating during a fault event from a nearby electric transmission power system.

- Lumped grounding: localized conductor or conductors connected to the affected structure at strategic locations (e.g., at discontinuities). They are intended to protect the structure from both steady-state and fault AC conditions.

- Gradient control wires: a continuous and long-grounding conductor or conductors installed horizontally and parallel to a structure (e.g., pipeline section) at strategic lengths and connected at regular intervals. These are intended to provide protection to the structure and pipeline coating during steady-state and fault AC conditions from nearby electric transmission power systems.

- Gradient control mats: used for aboveground components of a pipeline system, these are buried ground mats bonded to the structure and are used to reduce electrical step-and-touch voltages in areas where people may come in contact with a structure subject to hazardous potentials.

Permanent mats bonded to the structure may be used at valves, metallic vents, cathodic protection test stations, and other aboveground metallic and nonmetallic appurtenances where electrical contact with the affected structure is possible. In these cases, there is no “standard” solution that would solve these issues every time. Instead, each case must be studied to determine a series of parameters, including (1) the magnitude of the induced currents and the most appropriate mitigation given the ground resistivity, distance paralleled, steady-state and fault AC currents, and fault clearing times expected on the transmission line and (2) the distance between the line and the pipeline. If the electrical studies indicate a need to install cathodic protection devices on a parallel pipeline facility, a distribution-supply-line interconnection may be needed to provide power to the cathodic protection equipment.

During final design of the transmission line segments, appropriate electrical studies would be conducted to identify (1) the issues associated with paralleling other facilities and (2) the types of equipment that would need to be installed (if any) to mitigate the effects of the induced currents.

Other Electrical Hardware

In addition to the conductors, insulators, and overhead shield wires, other associated hardware would be installed on the structure as part of the insulator assembly to support the conductors and shield wires. This hardware would include fasteners, clamps, shackles, links, plates, and various other hardware pieces composed mostly of galvanized steel and aluminum. To the extent possible, electrical hardware would be specified as corona-free in order to reduce the effects of audible noise and electrical stress caused by corona in high-voltage applications.

A grounding system would be installed at the base of each transmission structure that would consist of copper ground rods embedded into the ground in immediate proximity to the structure foundation and connected to the structure by a buried copper cable. When the resistance to ground for each transmission structure would be greater than 15 ohms with the use of ground rods, counterpoise would be installed to lower the resistance to 15 ohms or less (PacifiCorp Standard TD 300). Counterpoise consists of a bare copper-clad or galvanized-steel cable buried a minimum of 12 inches deep, extending away from the structures (from one or more legs of the structure) for approximately 200 feet in the right-of-way.

Other Nonelectrical Hardware

Other hardware not associated with the transmission of electricity may be installed as part of the Project. This hardware may include aerial marker spheres or aircraft warning lighting, as required for the conductors or structures in accordance with Federal Aviation Administration (FAA) regulations. Structure proximity to airports and structure height are the determinants of whether FAA regulations would apply based on an assessment of wire/tower strike risk. The Proponent does not anticipate structure lighting would be required because proposed structures are less than 200 feet tall and are not near airports that require structure lighting.

The use of down guys on transmission lines allows three-pole structures to be used for modest-to-sharp line angles for running-angle structures. These structures do not terminate the conductors and shield wires as on a more standard deadend structure, but allow the conductors and shield wires to remain contiguous through the structure. Since most of the mechanical loads imparted to structures with down guys are transferred to the guy anchors rather than directly to the structure and its foundation, the use of running angles structures with down guys usually will reduce the size of footings, but would often result in an increase in overall structure footprint, and in some cases may exceed the typical 150-foot-wide right-of-way.

2.3.2 Substations

New substation equipment would be needed at the terminus points to interconnect the transmission line with the existing Sigurd and Red Butte substations, as described in Section 2.2.1. Table 2-4 summarizes the typical design characteristics of a 345/138kV substation expansion.

TABLE 2-4
TYPICAL DESIGN CHARACTERISTICS OF THE 345/138-KILOVOLT SUBSTATION EXPANSION

Feature	Description
Site size (approximate)	No site expansion required at the Sigurd or Red Butte substations
Equipment	Shunt reactors, series reactors, series capacitors, station switches, voltage and current sensing devices, power transformers, power circuit breakers
Access road (width, road surface, and grading)	Existing access roads would be used
Fire protection facilities	Existing fire protection facilities would be expanded to include new equipment
Substation grounding	According to applicable codes
Land temporarily disturbed	A 20-foot-wide buffer zone along the perimeter of the substation expansion area estimated to be less than 1 acre
Voltage	345/138 kilovolt and below
SOURCE: Rocky Mountain Power 2010	

2.3.3 Access Roads and Overland Travel

In most areas, construction of the transmission line, substation upgrades, and ancillary facilities (e.g., staging areas, pulling and tensioning sites, etc.) would require vehicle, truck, and crane access to each new structure site for construction crews, materials, and equipment. Existing roads, existing roads that require improvements, and new access roads could be used for the Project. To the extent possible, existing roads would be used in their present condition without improvements. In areas where improvements were required or deemed to be in the best interest of the Project for future use, the roads would be graded and/or graveled to provide a smooth all-weather travel surface. Access on the right-of-way, other than in specific areas, would require a road with a minimum width of 14 feet (travel surface). In some cases, new roads that must be graded for access along steep slopes (side-hill roads) could exceed this width depending on the amount of displaced soil. These roads typically go directly from structure to structure, except on hillsides, ridgebacks, rock-outcrop areas, wash crossings, treed areas, or in areas where sensitive environmental resources could be avoided. In such cases, the road would follow suitable topography from structure to structure and would be built in areas that generally cause the least amount of overall disturbance, which may be outside the right-of-way. Specific plans for the construction, rehabilitation, and/or maintenance of roads, including the locations of access roads would be documented in the POD described in Section 2.3.5.1.

Accessing the right-of-way within IRAs for construction at structure sites would be accomplished via helicopter supported by overland travel using low-impact vehicles (i.e., transport vehicles with rubber treading, low pressure tires, or specialized mechanical movement to accommodate the terrain and landscape; all-terrain vehicles or utility terrain vehicle). No blade work would be performed to assist overland travel within IRAs.

2.3.4 Communication Systems

Reliable and secure communications for internal system control and monitoring of the transmission line is imperative to maintain the operational integrity of the transmission line and of the overall interconnected system. Primary communications for relaying and control would be provided via optical fibers in an OPGW shield wire, which would be installed on the transmission lines. Each transmission structure would have two lightning protection shield wires installed on the peaks of each of the structures. One of the shield wires would be composed of extra-high-strength steel wire with a diameter of 0.495 inch and a weight of 0.517 pound per foot. The second shield wire would be an OPGW constructed of aluminum and steel that carries 48 glass fibers in its core. The OPGWs would have a diameter of 0.465 inch and a weight of 0.290 pound per foot. The optical fibers inside the OPGW shield wires would facilitate internal data transfer between the Proponent’s facilities along the fiber path. The data transferred are required for system control and monitoring. A second internal communications path would be provided via the Proponent’s existing microwave system. No new microwave sites are anticipated for the Project. Updated microwave equipment may be installed at existing sites and at the substations.

2.3.4.1 Fiber Optic Regeneration Sites

As the data signal passes through the optical fibers in the OPGW, the signal degrades with distance. Consequently, signal regeneration stations (regeneration stations/sites) are required to amplify the signals if the distance between substations or regeneration sites exceeds 55 miles. Three regeneration sites would be required.

The primary siting criteria for a regeneration site located outside of a substation would be (1) adjacent to the transmission line right-of-way, (2) in proximity to existing low-voltage electric distribution lines that would power the facility, and (3) easily accessible by vehicle. A regeneration site may be housed in substation control houses where an existing substation is on the final transmission route; otherwise, land must be obtained. Where a new site is required, the typical site would be 100 by 100 feet, with a fenced area of 75 by 75 feet. A 12- by 32- by 9-foot-tall building or equipment concrete shelter would be placed on the site, and access roads to the site and power from the local electric distribution circuits would be required. An emergency generator with a 1,000-gallon liquid-petroleum gas fuel tank and containment liner as described in the POD would be installed at the site inside the fenced area. Two diverse cable routes (aerial and/or buried) from the transmission right-of-way to the equipment shelter would be required. Figure 2-3 illustrates the plan arrangement of a typical regeneration site.

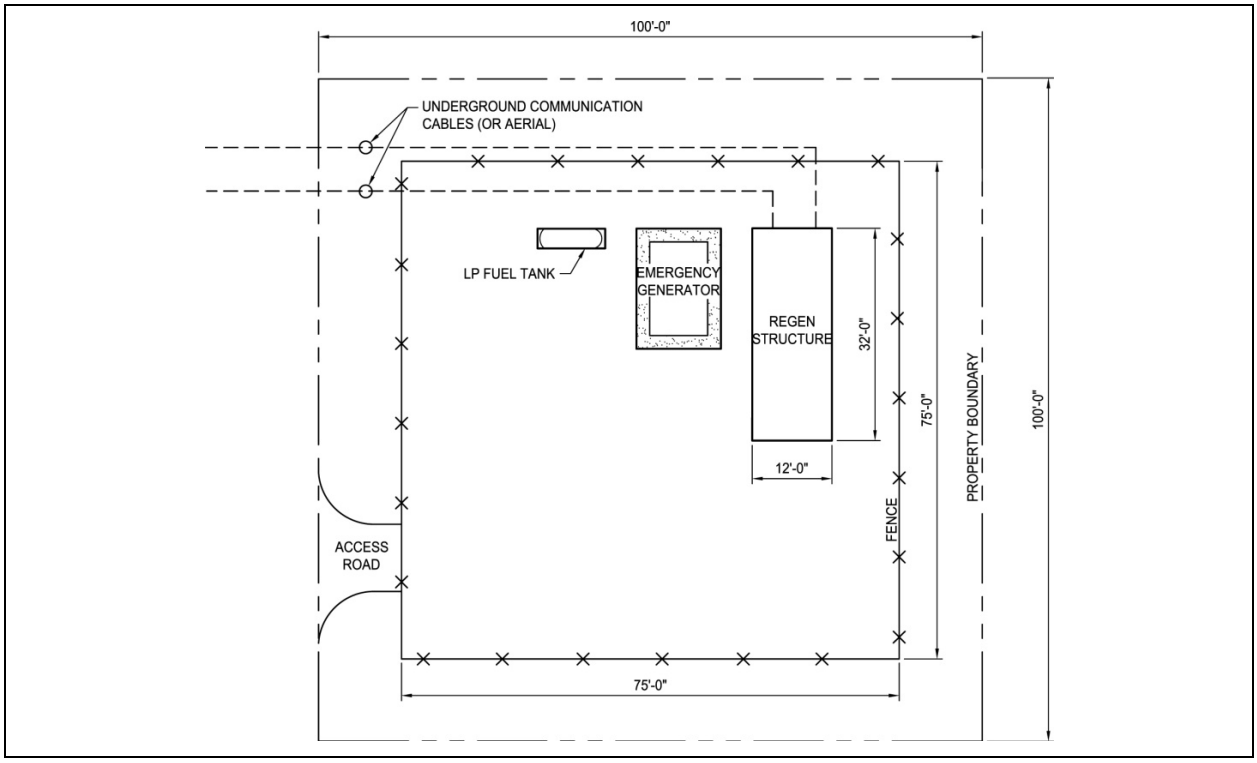


Figure 2-3 Typical Regeneration Site Layout

2.3.4.2 Communication Regeneration Station Distribution Supply Lines

Station service power would be required at each regeneration site. Station service power is provided from a local electric distribution line located in proximity to the regeneration site. The voltage of the distribution supply line is typically 12kV or lower and carried on wood poles. For all new sites, it would be necessary to extend the electric distribution line from a take-off point on the existing distribution line to the new site. The location and routing of the existing distribution lines to the new sites would be determined during the final design process.

2.3.4.3 Regeneration Site Maintenance

Regeneration site monitoring and control functions are performed remotely from the PacifiCorp central operations facilities located in Portland, Oregon. Unauthorized entry into regeneration sites is prevented with the provision of fencing and locked gates. Warning signs would be posted, entry to the operating facilities would be restricted to authorized personnel, and a remotely monitored security system would be installed. Several forms of security are planned for each of the locations, although the security arrangements at each of the regeneration sites may differ somewhat. Security measures may include (1) fire detection in the regeneration building via the remote monitoring system and alarms for forced entry and (2) a perimeter security system coupled with remote sensing infrared camera equipment in the fenced area of the station to provide visual observation/confirmation to the system operator of disturbances at the fence line.

Maintenance activities include equipment testing, equipment monitoring and repair, and emergency and routine procedures for service continuity and preventive maintenance. Regeneration sites would be visited every 2 to 3 months by one individual in a light truck to inspect the facilities. Annual maintenance would be performed by a two-man crew in a light truck over a 2- to 5-day period.

2.3.5 Construction, Operation, and Maintenance

This section describes the typical specifications for construction, operation, and maintenance of the Project. These specifications could be refined during detailed engineering and changes would be reflected in the POD for the Project, as needed. However, any refinements reflected in the POD would be bound by the outcomes of the impact analysis contained in this document, or else a supplemental NEPA review would be required.

The design, construction, operation, and maintenance of the Project would meet or exceed the requirements of the NESC, U.S. Department of Labor, Occupational Safety and Health Administration standards, and the Proponent's requirements for safety and protection of landowners and their property. Typical design characteristics of the transmission lines and substations are summarized in Section 2.3.1.

2.3.5.1 Plan of Development

The BLM requires a POD for the development and implementation of the Project. The POD details the methods and procedures that would be used in construction of the Project. The POD includes guidance to contractors, construction crews, agency personnel, resource inspectors, and monitors for construction, operation, and maintenance of the Project. The POD also contains a Project description, resource protection, and selective mitigation measures; specifies environmental compliance field activities; provides a description of construction and operation activities; specifies land use and access requirements; and provides mapping to facilitate the application of selective mitigation measures (such as avoidance of sensitive resources) during construction and operation. In addition, the following implementation documents would be appendices to the POD and describe the selective mitigation measures the Proponent and its construction contractor(s) will follow during construction, operation, and maintenance of the Project.

BLM and USFS expect that selective mitigation measures and other specific stipulations and methods identified in the POD would be implemented regardless of land ownership or jurisdiction. It should be noted that BLM and USFS do not have the authority to enforce mitigation measures on state and private land.

The POD and supporting plans (Rocky Mountain Power 2012), described in the following sections, would be developed by the Proponent in collaboration with the agency ID Team and incorporated by reference into the ROD and BLM right-of-way grant and USFS special-use authorization for the Project, if approved. The POD and other supporting documents containing details of Project construction and operation will be housed at the BLM Cedar City Field Office with the official case file record UTU 83067.

Traffic and Transportation Management Plan

The Traffic and Transportation Management Plan addresses regulatory compliance, traffic management practices, levels of right-of-way access, and selective mitigation measures to help reduce impacts related to transportation and the construction of temporary and long-term access within the vicinity of the Project. The purpose of the plan is to provide the BLM, USFS, and other public agencies; the agencies' compliance inspection contractor; and the Proponent's construction contractor(s) with a description of the type of access associated with the construction, operation, and maintenance of the Project and make evident the potential impacts that could be created by construction and operation of the Project. The goal of the plan is to ensure impacts from construction of the transmission line and any associated access are kept to a minimum through the use of management practices and mitigation measures described throughout the plan. These practices and measures are intended to mitigate the effects of transportation on environmental resources, roads, traffic, travel, and road safety.

Stormwater Pollution Prevention Plan

In compliance with criteria in the EPA Clean Water Act (CWA), all construction site operators engaged in clearing, grading, and excavating activities that disturb 1 acre or more must obtain a National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharges (CFR, Title 40, Parts 122 and 123). NPDES permits (also called Construction General Permits) are issued by EPA or similar authorized state entity (i.e., Utah Department of Environmental Quality) following submittal of a NOI for construction activities and preparation of a Stormwater Pollution Prevention Plan that describes how erosion and sediment transport will be minimized to adjacent waterbodies. Measures to ensure that construction activities comply with state and EPA requirements for stormwater management to be incorporated into the Stormwater Pollution Prevention Plan are outlined in the plan. The construction contractor(s) will be responsible for developing a Stormwater Pollution Prevention Plan and obtaining coverage under the NPDES General Permit by filing a NOI and appropriate fee with the Utah Department of Environmental Quality in accordance with NOI instructions.

Spill Prevention, Containment, and Countermeasures Plan

The Spill Prevention, Containment, and Countermeasures Plan Framework for the Project will provide preventive procedural actions, design features of the Proposed Action for environmental protection, and other specific stipulations and methods to minimize the environmental impact associated with spills or releases of fuel, lubricant, or hazardous materials during construction and refueling activities and special refueling activities within 100 feet of waterbodies, wetland boundaries, or within municipal watersheds.

Historic Properties Treatment Plan

In compliance with Section 106 of the NHPA and as required under the Programmatic Agreement, a Historic Properties Treatment Plan (HPTP) will be prepared for historic properties identified during the Class III inventory and determined adversely affected by the Project during Section 106 consultations. The purpose of the HPTP is to provide the methodology through which steps will be implemented to avoid, minimize, or mitigate impacts on historic properties. This will require consultation among the BLM, SHPO, tribes, and consulting parties to the Programmatic Agreement.

The HPTP is confidential. As identified in the Programmatic Agreement (described in Section 5.2.2.2 and presented in Appendix G), the HPTP will provide information on the following:

- A brief description of the Proposed Action
- A list of historic properties where data recovery is to be carried out
- A list of historic properties that will require archaeological monitoring during construction
- An archaeological construction monitoring plan
- Research questions to be addressed
- Methods to be used during fieldwork for data recovery
- A cultural resource unanticipated discovery plan
- Methods to be used during analysis
- Reporting and curation of artifacts
- Schedule for the submission of progress reports
- Recommendations for treatment of cultural resources during operation and maintenance of the Project
- Qualifications of consultants employed to undertake the work
- Training protocols for contractors

Blasting Plan Framework

The Blasting Plan Framework outlines methods to mitigate risks and potential impacts associated with blasting procedures that may be required for construction of the Project. Also included is a preliminary outline for the Blasting Plan to be prepared by the construction contractor(s) and submitted to the Proponent, if blasting is required. If blasting is to occur on federal lands, the Proponent will submit the Blasting Plan to the BLM and USFS for final review and approval. Once completed, the Blasting Plan will provide construction crews, the CIC, and environmental monitors with Project-specific information concerning blasting procedures (e.g., including the safe use and storage of explosives). The objective of the Blasting Plan is to prevent adverse impacts on human health and safety, property, and the environment that potentially could result from the use of explosives during Project construction.

Plant and Wildlife Species Conservation Measures Plan

The purpose of the Plant and Wildlife Species Conservation Measures Plan is to assist the BLM, USFS, and Project personnel in meeting their obligations to protect biological resources during the planning, design, and implementation of the Project. The plan includes information on (1) regulatory requirements and agency concerns pertaining to biological resources and (2) specific selective mitigation measures designed to reduce Project-related impacts on biological resources. The plan provides information on anticipated impacts on plant and wildlife resources associated with the Project and identifies selective mitigation measures, protocols, and/or techniques required to reduce these impacts. The plan is not

intended to provide comprehensive, location-specific restrictions within the Project area. However, these site-specific mitigation measures will be presented in the map volume to be included in the POD.

Erosion, Dust Control, and Air Quality Plan

This Erosion, Dust Control, and Air Quality Plan addresses regulatory compliance, environmental concerns, mitigation recommendations, and monitoring to ensure impacts associated with construction activities are minimized as they relate to soil conservation and air quality. This plan provides measures to be used by the BLM, USFS, CIC, and the construction contractor(s) to ensure protection of the soils and air quality that will be affected by the Project. The plan is to be implemented during the construction, operation, and maintenance phases of the Project. These measures are intended to address (1) soil erosion and sedimentation, and (2) minimize dust and emissions from construction-related activities. The plan describes a number of selective mitigation measures that can be applied to achieve these goals. Determination of the appropriate control measures to use in a particular area would depend on a variety of factors, including weather conditions, selected construction techniques, site characteristics, extent of area to be disturbed, and other factors.

Hazardous Materials Management Plan

The Hazardous Materials Management Plan Framework is intended to reduce the risks associated with the use, storage, transportation, production, and disposal of hazardous materials (including hazardous substances and wastes). The plan will identify selective mitigation measures and other specific stipulations and methods to address spill prevention, response, and clean-up procedures for the Project. This document provides a template for the development of a detailed Hazardous Materials Management Plan to be developed by the construction contractor(s).

The Hazardous Materials Management Plan will identify clearly which legal requirements apply to specific types of hazardous materials. It also will identify design features of the Proposed Action for environmental protection and selective mitigation measures that will be followed to reduce risks associated with hazardous materials. Nothing in this plan framework or in the Hazardous Materials Management Plan (once developed by the construction contractor(s)) shall be construed as an admission regarding the legal applicability of requirements or practices to any particular class of hazardous material.

Emergency Preparedness and Response Plan

The Emergency Preparedness and Response Plan Framework is intended to provide an overview of methods to be implemented if the need for emergency management is imminent. This document discusses the existing support structure, chain of command, and emergency communications protocols to be used as a guide for an Emergency Preparedness and Response Plan to be completed by the Proponent's construction contractor(s) and approved by the BLM and USFS. Emergency response procedures would be implemented for the following potential events, or similar events:

- Downed transmission lines, structures, or equipment failure
- Fires
- Sudden loss of power
- Natural disasters
- Serious personal injury

The purpose of an Emergency Preparedness and Response Plan is to provide clear procedures and information to enable the Proponent, the construction contractor(s), the CIC, and the BLM Project Manager to prepare for and effectively respond to emergency situations. The primary objective of this plan is to prevent adverse impacts on human health and safety, property, and the environment that potentially could occur as a result of the construction, operation, and maintenance of the Project.

Noxious Weed Management Plan

The format and content of the Noxious Weed Management Plan is based on the principles and procedures outlined in the BLM Integrated Weed Management Manual 9015 and Forest Service Noxious Weed Management Manual 2080. The plan includes a discussion on (1) the plan purpose and goals and objectives, (2) the noxious weed inventory, (3) management practices, (4) monitoring, and (5) the use of pesticides/herbicides.

The Utah Department of Agriculture and Food has identified noxious weeds that occur within the state of Utah. Some of these noxious weeds have the potential to occur on the Project right-of-way. The Noxious Weed Management Plan provides methods to control the potential occurrence of noxious weeds during and following construction of the Project. It is the responsibility of the Proponent and/or the construction contractor(s), working with the CIC and BLM and USFS Project Manager, to ensure noxious weeds are identified and controlled during construction, operation, and maintenance of Project facilities and all federal, state, county, and other local requirements are satisfied.

Fire Protection Plan

The Fire Protection Plan details measures that will be implemented to (1) reduce the risk of starting a fire, and (2) to suppress a fire in the event one does occur within the construction area during Project construction, operation, and maintenance. The risk of fire danger during construction of a transmission line is related largely to the use of vehicles and other motorized equipment operating off roadways, the handling and use of explosive materials and flammable liquids, and welding.

The purpose of the plan is to outline responsibilities, notification procedures, fire-prevention measures and precautions, fire-suppression equipment, initial-response procedures, and post-fire rehabilitation strategies related to the Project. The goal is to minimize the risk of Project-related fires and, in case of fire, provide for immediate suppression within the construction area.

Stream, Wetland, Well, and Spring Protection Plan

The purpose of the Stream, Wetland, Well, and Spring Protection Plan is to provide measures to protect these resources from potential impacts during construction, operation, and maintenance activities. This plan incorporates mitigation measures contained in the Project description and is intended as a guide to determine the appropriate site-specific measures to be implemented during construction activities. The goals of the plan are to:

- Control Project-related erosion and sedimentation from entering into streams and wetlands and minimize disturbance and erosion of streambeds and banks.
- Protect springs and wells in the Project area from impacts due to blasting and hazardous materials contamination.

Paleontological Resources Treatment Plan

The purpose of the Paleontological Resources Treatment Plan (PRTP) is to assist the BLM and USFS in planning and design efforts for the Project as it relates to paleontological resource issues. The PRTP describes in detail the specific mitigation measures needed to avoid or reduce Project-related impacts on paleontological resources, wherever feasible. The plan provides important background and contextual information useful for the paleontological resources mitigation program. The logistics, procedures, and methods outlined in this PRTP ensure compliance with federal and state regulations (BLM 2009a; BLM 2008b; BLM 1998; and 36 CFR 261.9i). The PRTP is a work plan for all of the paleontological-related activities that may ensue during the course of development of the Project. It is not the intent of the PRTP to present a comprehensive list of sites with discussions of all significant taxa found from the vicinity of the Project area. The PRTP offers a research-oriented framework and accompanying logistical guidelines to ensure significant nonrenewable paleontological resources unearthed by development of the Project would be managed appropriately and in a timely manner, thereby effectively mitigating adverse impacts on these fossil resources.

Reclamation, Revegetation, and Monitoring Plan

The Reclamation, Revegetation, and Monitoring Framework Plan is developed based on the principles and procedures established by the BLM and USFS. The plan is applicable to the construction of Project facilities, transmission structures, permanent and temporary access roads, staging areas, pulling and tensioning sites, and other work areas associated with the Project on lands managed by federal and state agencies. Requirements for reclamation, revegetation, and monitoring on private lands will be negotiated between the Proponent and the affected landowner. The intent of this plan is to provide a framework for reclamation treatments to be applied to the Project on identification of construction-related disturbance, prevent unnecessary degradation of the environment during construction, rehabilitate temporary use areas, and reclaim disturbed areas such that these areas are ecologically functional and visually compatible with the surrounding environment to the greatest extent practicable.

2.3.5.2 Typical Construction Specifications

This section describes typical construction specifications for the Project, including construction seasons, the right-of-way acquisition process, major construction activities, and design features of the Proposed Action for environmental protection.

Construction Seasons

Construction would take place year-round as weather and conditions allow. The cost of construction can be affected by the construction season. While construction during the summer season may be preferred, there are issues that may require winter construction. Weather conditions typically prohibit high-elevation construction during winter months. Project schedule, financing, design, and/or material delivery may not fit within the summer season. Outages associated with interconnecting facilities cannot necessarily be taken at times convenient for construction (e.g., outages that must be coordinated with peak-demand periods or outages scheduled for other projects). Environmental issues and soil conditions also may dictate construction of portions of the line during certain times of the year. Seasonal restrictions on construction activities would be implemented unless an exception to the stipulation is granted by agency personnel, in accordance with agency policy or land use plans, in certain areas to avoid or reduce impacts on wildlife. The potential seasonal restrictions vary by species and are described in Table 2-5. Avoidance

buffers and seasonal restrictions for nesting raptors are in accordance with the FWS *Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances* (Romin and Muck 2002). Biological surveys would be conducted for sensitive species prior to the initiation of construction activities, as required. Data obtained through these surveys would be used to determine the specific geographic locations where buffers and seasonal restrictions would be implemented.

TABLE 2-5
SEASONAL RESTRICTIONS IN SENSITIVE HABITATS

Common Name	Scientific Name	Buffer/Habitat	Seasonal Restriction
Big Game			
Mule deer	*Odocoileus hemionus*	Crucial winter range	November 1–May 15
		Crucial summer range	May 1–June 15
Raptors and Migratory Birds			
Bald eagle	*Haliaeetus leucocephalus*	0.5 mile winter roost site	November 1–March 31
Golden eagle	*Aquila chrysaetos*	0.5 mile from active nest	January 1–August 31
Ferruginous hawk	*Buteo regalis*	0.5 mile from active nest	March 1–August 1
Peregrine falcon	*Falco peregrinus anatum*	1.0 mile from active nest	February 1–August 31
Swainson's hawk	*Buteo swainsoni*	0.5 mile from active nest	March 1–August 31
Red-tailed hawk	*Buteo jamaicensis*	0.5 mile from active nest	March 15–August 15
Burrowing owl	*Athene cunicularia*	0.25 mile from active nest	March 1–August 31
Migratory birds	Not applicable	100-foot buffer on nest locations	February 15–July 31
Special Status Species			
Utah prairie dog	*Cynomys parvidens*	Delineated occupied and unoccupied habitat	August 31–April 1
Southwestern willow flycatcher	*Empidonax traillii extimus*	0.25 mile from occupied habitat	April 1–August 30
Greater sage-grouse	*Centrocercus urophasianus*	4.0 miles from active lek	February 15–July 31
		Utah Division of Wildlife Resources crucial winter habitat	November 15–March 15

Right-of-Way Acquisition Process

New permanent and temporary land rights are required for the transmission line facilities, such as the transmission line right-of-way, access roads, temporary work sites, and staging areas (e.g., right-of-way grant, easements, license agreement, and fee simple). Where the proposed transmission line would parallel existing 46kV and 138kV transmission lines, the right-of-way would be adjacent to, or overlap, the existing right-of-way. The right-of-way width must be sufficient to accommodate conductor blowout due to wind (which is the swinging of the conductor midway between tower structures) and maintenance clearances at the tower sites. Figure 2-4 is a diagram illustrating a typical configuration of the right-of-way.

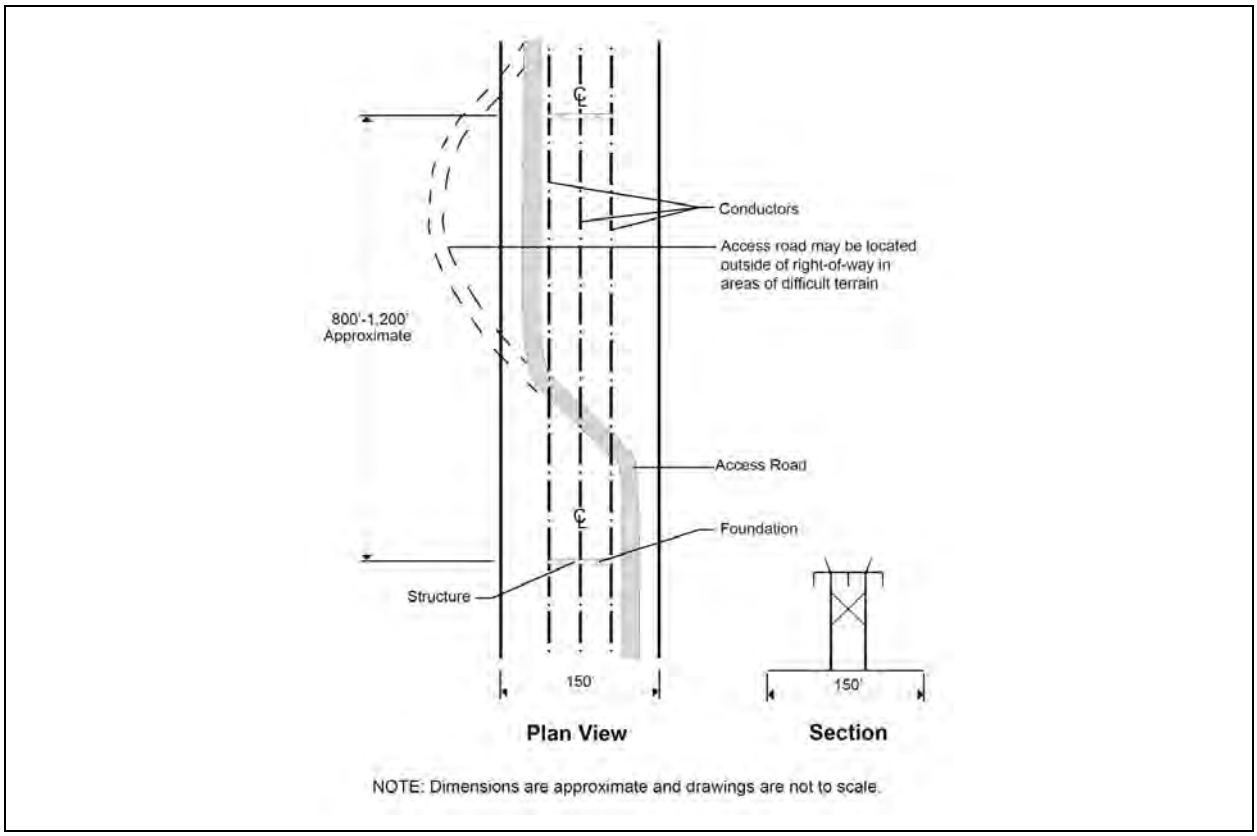


Figure 2-4 Typical Right-of-way Diagram

The preliminary right-of-way application, filed by the Proponent with the BLM and USFS, requested a 150-foot-wide right-of-way and duration of 50 years.

Additional right-of-way width may be required in areas where the proposed transmission line would turn at a sharp angle or anywhere additional guying is required. Access roads may be located outside of the transmission line right-of-way in areas of difficult terrain. Access roads would be identified in the POD and approved by the BLM and USFS in their RODs, as well as in the right-of-way grant and special-use authorization to be issued by the BLM and USFS, respectively. Also, areas used temporarily (e.g., roads, staging areas, temporary work site, batch plant) may require a short-term right-of-way grant from BLM and a temporary use authorization from USFS.

Construction Activities

Preconstruction meetings with each of the affected agencies would be conducted to introduce construction contractors (including the CIC) and their field representatives and agency points of contact, as well as to review mitigation measures and construction schedules. As construction proceeds, the construction engineer and/or agency inspectors would continue to monitor activities and right-of-way authorizations to ensure compliance or to initiate modifications, where necessary. In environmentally sensitive areas, an agency-approved environmental specialist with appropriate qualifications (e.g., biologist, archaeologist) would monitor construction activities to ensure compliance with specific protections and/or mitigation, as needed. Any modifications to the POD would need to be approved by the BLM and USFS. The protocol for variances to the POD would be described in the POD.

The Proponent has incorporated into the Project description of the Proposed Action design features that provide protective measures (e.g., altering the placement of access roads or towers, where practicable, to avoid identified sensitive habitat or resources) to reduce or minimize potentially significant environmental impacts associated with the Project's construction, operation, and maintenance. Presented in Table 2-6, these design features address specific environmental policies and regulatory requirements and would be applied to the entire Project.

Geotechnical Investigation

A separate Application for Transportation and Utility Systems and Facilities on Federal Land (Standard Form 299) was submitted in September 2009 by the Proponent to BLM for a grant of a short-term right-of-way, and to the USFS for a special-use authorization for temporary access to conduct a geotechnical investigation along the alternative routes of the Project. The geotechnical investigation was proposed to collect hydrogeologic and geotechnical soil properties and geophysical data to support the design of foundations and structures for the Project. The BLM reviewed and processed the application in accordance with all applicable federal laws and regulations.

A temporary right-of-way grant (UTU 83067-01) and a special-use authorization (BEA160) for the geotechnical investigation were granted by BLM and USFS on September 7, 2010, and September 3, 2010, respectively. Geotechnical drilling was accomplished using a variety of conventional drilling methods—including hollow-stem augers, mud rotary, continuous diamond coring, air hammer (e.g., overburden drilling with eccentric bit or ODEX [under-reamer-type drilling]), sonic drilling technologies, or by cone penetration testing equipment—with the chosen method depending on the type of soil and rock expected within the completion depth of the boring. In environmentally or culturally sensitive areas, the geotechnical investigation was carried out by geophysical survey using refraction micro-tremor (ReMi) technique, a minimally invasive technology for collecting geophysical data from the ground surface. The geotechnical investigation was conducted during the summer of 2011. Additional geotechnical investigation activities may be required as part of the final engineering design.

Surveying the Centerline

The engineering survey involves verifying and staking the centerline of the selected transmission line route, tower center hubs, right-of-way boundaries, access roads (where needed), spur roads to tower sites, and temporary work areas using existing roads or overland travel routes. Some engineering survey activities may begin as early as 2 years prior to the start of construction. Required cultural, paleontological, botanical, and biological resource surveys may begin once certain survey information is available. Depending on the route approved in the RODs, the centerline may be adjusted to accommodate engineering requirements and local modifications.

Helicopter Construction

Depending on the route selected, part of the Project could cross portions of IRAs on the Dixie National Forest. Within the IRAs, the Project would be constructed by helicopter-only construction methods and supported by overland travel. Helicopters would transport personnel, drilling equipment, towers, and other construction materials to and from the right-of-way and would be used for wire pulling and tensioning. Access to the right-of-way also could be accomplished by overland travel using low-impact vehicles (i.e., transport vehicles with rubber treading, low pressure tires, or specialized mechanical movement to accommodate the terrain and landscape, all-terrain vehicles, or utility terrain vehicle). No blade work would be performed to assist overland travel within IRAs.

TABLE 2-6
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

	Design Features	Application Phase			Effectiveness								
					Water Resources		Earth Resources		Biological Resources				
		Design and Engineering	Construction	Operation and Maintenance	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
	Biological Resources												
1.	In construction areas where recontouring is not required, vegetation would be left in place wherever possible, and original contour would be maintained to avoid excessive root damage and allow for resprouting. Vegetation not consistent with minimum clearance distances between trees and transmission lines must be maintained for line safety and reliability (required by North American Electric Reliability Corporation's Transmission Vegetation Management Program [2009; 2008; 2006]).	●	●	●			●					●	
2.	In temporary construction areas (e.g., marshalling yards, tower site work areas) where ground disturbance is significant or where recontouring is required, surface reclamation would occur as required by the landowner or land-management agency. The method of reclamation normally would consist of, but is not limited to, returning disturbed areas back to their natural contour, reseeding, installing cross drains for erosion control, placing water bars in the road, and filling ditches. All areas on lands administered by Bureau of Land Management (BLM) or U.S. Forest Service (USFS) disturbed as a part of the construction and/or maintenance of the proposed transmission line would be reseeded with a seed mixture appropriate for those areas. The BLM or USFS would prescribe a seed mixture that fits each range site. Seeding methods would typically include drill seeding, where practicable; however, the BLM or USFS may recommend broadcast seeding as an alternative method in some cases. Drill seeding for all Project areas outside the jurisdiction of the BLM Cedar City Field		●	●			●			●		●	

TABLE 2-6
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

	Design Features	Application Phase			Effectiveness								
					Water Resources		Earth Resources		Biological Resources				
		Design and Engineering	Construction	Operation and Maintenance	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
	Office would be performed during September 1 through December 15 to maximize the chance of success. Within the jurisdiction of the BLM Cedar City Field office, drill seeding would be performed October 15 through December 15. Where broadcast seeding is implemented, seed would be applied at 1.5 to 2 times the rate of drill seeding application, and the seed would be covered by a method such as harrowing or raking. A Reclamation, Revegetation, and Monitoring Framework Plan identifying reclamation stipulations would be developed and incorporated in the Plan of Development (POD), which would be approved by the BLM and USFS prior to the issuance of a right-of-way grant or special-use authorization, respectively.												
3.	Special status species, threatened and endangered species, or other species of particular concern would be considered in accordance with management policies set forth by appropriate land-management agencies (e.g., BLM, USFS, U.S. Fish and Wildlife Service, Utah Division of Wildlife Resources, etc.). This would entail conducting surveys for plant and wildlife species of concern along the proposed transmission line route and associated facilities (e.g., access and spur roads, staging areas, etc.) as agreed on by the agencies. In cases where such species are identified, appropriate action would be taken to avoid adverse impacts on the species and its habitat. These actions may include altering the placement of roads or towers, where practicable as approved by the landowner and compliance inspection contractor, as well as monitoring activities, implementation of Project speed limits, and other restrictions.	●	●						●	●			

TABLE 2-6
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

	Design Features	Application Phase			Effectiveness								
					Water Resources		Earth Resources		Biological Resources				
		Design and Engineering	Construction	Operation and Maintenance	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
4.	The Proponent designs and constructs all new or rebuilt transmission facilities to its raptor-safe design standards, including *Suggested Practices for Avian Protection on Power Lines; The State of the Art in 2006* (Avian Power Line Interaction Committee 2006); PacifiCorp's Bird Management Program Guidelines, updated June 2011 (PacifiCorp 2011). New substations or modified portions of the existing substations must incorporate animal protections in accordance with PacifiCorp standards.	●	●	●					●				
5.	To prevent the spread of noxious/invasive weeds, a Noxious Weed Management Plan would be developed and incorporated into the POD, which would be approved by the BLM and USFS prior to the issuance of a right-of-way grant or special-use authorization, respectively.		●	●					●	●			
6.	Avoid construction and maintenance activities during the migratory bird nesting season, typically between February 15 and July 31; however, dates may vary depending on species, current environmental conditions, results of preconstruction surveys, and approval by agency biologists or agency-approved environmental inspectors in coordination with agency biologists.		●	●		●							
7.	If construction and maintenance activities could not be avoided in the primary nesting season for migratory birds, migratory bird and nest surveys would be performed. A 100-foot construction buffer around each active nest would be implemented.		●	●					●				
8.	Follow U.S. Fish and Wildlife Service guidelines for raptor protection during the breeding season.	●	●	●					●				

TABLE 2-6
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

	Design Features	Application Phase			Effectiveness								
					Water Resources		Earth Resources		Biological Resources				
		Design and Engineering	Construction	Operation and Maintenance	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
9.	Based on preconstruction surveys, federally designated sensitive plants and/or habitat would be flagged and structures placed to allow spanning of these features, where feasible, within the limits of standard structure design.	●	●							●			
	Cultural Resources												
10.	In consultation with appropriate land-management agencies and the State Historic Preservation Office, and in accordance with the Programmatic Agreement (to comply with Section 106 of the National Historic Preservation Act) entered into by the Proponent, BLM, USFS, and the State of Utah (Section 5.2.2.2 and Appendix G), specific mitigation measures for cultural resources would be developed and documented in the Historic Property Treatment Plan. The Historic Property Treatment Plan will be implemented to mitigate any identified adverse impacts. These may include Project modifications to avoid adverse impacts, monitoring of construction activities, and data recovery studies. Project modifications for avoidance would be the preferred method for preventing adverse effects on historic properties.	●	●	●									●
	Design, Construction, Operation, and Maintenance												
11.	The Proponent would continue to follow studies performed on electric and magnetic field research. The Proponent relies on the findings of public health specialists and international scientific organizations for guidelines regarding electric and magnetic fields.		●	●									
12.	Transmission line materials that have been designed and tested to minimize corona would be used. A bundle configuration and larger conductors would be used to limit audible noise, radio interference, and television interference due to corona. Tension would be maintained on all insulator assemblies to ensure positive contact between insulators,	●	●	●									

TABLE 2-6
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

	Design Features	Application Phase			Effectiveness								
					Water Resources		Earth Resources		Biological Resources				
		Design and Engineering	Construction	Operation and Maintenance	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
	thereby avoiding sparking. Caution would be exercised during construction to avoid scratching or nicking the conductor surface, which may provide points for corona to occur.												
13.	The Proponent would apply grounding or other methods where possible to eliminate problems of induced currents and voltages onto conductive objects sharing the same right-of-way, to meet the appropriate codes.		●	●									
14.	A Fire Protection Plan would be developed and incorporated into the POD, which would be approved by the BLM and USFS prior to the issuance of a right-of-way grant or special-use authorization, respectively.		●	●									
15.	The transmission line would be patrolled regularly and properly maintained in compliance with applicable safety codes.			●									
16.	The right-of-way would be free of nonbiodegradable debris. Slash would be left in place or disposed of in accordance with requirements of the land-management agency or landowner.		●	●			●						
	Earth Resources												
17.	In newly disturbed temporary work areas, any soil removed would be salvaged and distributed and contoured evenly over the surface of the disturbed area after construction completion. The soil surface would be left rough to help reduce potential wind erosion.		●				●						
18.	Grading would be minimized by driving overland within pre-designated work areas whenever possible.	●	●				●					●	
19.	In consultation with appropriate land-management agencies, specific mitigation measures for paleontological resources would be developed and implemented to mitigate any identified adverse impacts. These measures would include: ▪ preparation of a Paleontological Resources Treatment Plan		●					●					

TABLE 2-6
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

	Design Features	Application Phase			Effectiveness								
					Water Resources		Earth Resources		Biological Resources				
		Design and Engineering	Construction	Operation and Maintenance	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
	▪ paleontological surveys ▪ education of construction personnel ▪ monitoring ground disturbance ▪ curation ▪ deposition in a paleontological repository.												
	Land Use												
20.	On agricultural land, the right-of-way would be aligned, insofar as is practicable, to reduce the impact on farm operations and agricultural production.	●									●		
21.	The Proponent would respond to complaints of line-generated radio or television interference by investigating the complaints and implementing appropriate mitigation measures where possible. The transmission lines would be patrolled by air or inspected on the ground on a periodic basis, in compliance with the Proponent's standards, so damaged insulators or other line materials that could cause interference are repaired or replaced.			●							●		
22.	Fences, gates, and walls would be replaced, repaired, or reclaimed to their original condition as required by the landowner or the land-management agency in the event they are removed, damaged, or destroyed by construction activities. Fences would be braced before cutting. Temporary gates or enclosures would be installed only with the permission of the landowner or the land-management agency and would be removed/reclaimed following construction. Cattle guards or permanent access gates would be installed where new permanent access roads cut through fences on BLM- and USFS-administered lands.		●	●							●		

TABLE 2-6
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

	Design Features	Application Phase			Effectiveness								
					Water Resources		Earth Resources		Biological Resources				
		Design and Engineering	Construction	Operation and Maintenance	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
23.	In cultivated agricultural areas, soil compacted by construction activities would be de-compacted. Construction activities would occur as practical to minimize impacts on agricultural operations.		●								●		
24.	Towers and/or conductors and/or shield wires would be marked with high-visibility devices (i.e., marker balls or other marking devices) where required by governmental agencies with jurisdiction (i.e., Federal Aviation Administration). Tower heights would be less than 200 feet to avoid the need for aircraft obstruction lighting.	●	●	●									
	Multiple Resources												
25.	All construction vehicle movement outside the right-of-way normally would be restricted to predesignated access, contractor-acquired access, or public roads.		●	●	●	●	●	●	●	●	●	●	●
26.	The spatial limits of construction activities would be predetermined with activity restricted to and confined within those limits. No paint or permanent discoloring agents indicating survey or construction limits would be applied to rocks, vegetation, structures, fences, etc.		●		●	●	●	●	●	●	●	●	●
27.	Prior to construction, the compliance inspection contractor would instruct all personnel on the protection of cultural, ecological, and other natural resources such as: (a) federal and state laws regarding antiquities and plants and wildlife, including collection and removal; (b) the importance of these resources; and (c) the purpose and necessity of protecting them.		●	●	●	●		●	●	●			●
28.	All requirements of those entities having jurisdiction over air quality matters would be adhered to. Any necessary dust control plans would be developed and permits for construction activities would be obtained. Open burning of construction trash would not be allowed, unless permitted by appropriate authorities.		●				●				●		

TABLE 2-6
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

	Design Features	Application Phase			Effectiveness								
					Water Resources		Earth Resources		Biological Resources				
		Design and Engineering	Construction	Operation and Maintenance	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
29.	Hazardous material would not be drained onto the ground or into streams or drainage areas. Totally enclosed containment would be provided for all trash. All construction waste, including trash and litter, garbage, other solid waste, petroleum products, concrete curing fluid, and other potentially hazardous materials would be removed to a disposal facility authorized to accept such materials.		●	●	●	●	●		●	●			
	Visual Resources												
30.	Dull-galvanized steel for lattice towers and either dull-galvanized steel or self-weathering steel for H-frames, along with nonspecular conductors, would be used to reduce visual impacts.	●		●							●	●	
	Water Resources												
31.	Watering facilities (tanks, natural springs and/or developed springs, water lines, wells, etc.) would be repaired or replaced if they are damaged or destroyed by construction activities to their predisturbed condition. If livestock are displaced during Project construction, temporary water facilities would be provided until the water facilities have been repaired or replaced as required by the landowner or land-management agency.		●		●	●							
32.	Refueling and storing potentially hazardous materials would not occur within a 100-foot radius of a water body, a 200-foot radius of all identified private water wells, and a 400-foot radius of all identified municipal or community water wells. Spill preventive and containment measures or practices would be incorporated as needed.		●	●	●	●							

Within an IRA, structure foundations could be constructed by several methods, depending on soil conditions, terrain conditions, and final engineering design. Examples of construction options for installing tower foundations include using micro-piles transported into the IRA by helicopter, by low-impact ground equipment transported to the structure sites via overland travel, and/or hand excavation. Tower structure sections would be preassembled at approved construction fly yards located outside of the IRAs and airlifted to tower site locations by helicopter for erection. After completion of construction activities, any temporary disturbance, including that associated with overland travel to access the right-of-way within an IRA, would be reclaimed according to the procedures specified in the POD.

Access Roads

This section describes the types of access roads needed to construct and operate the Project, design characteristics of new and improved access roads, types of access road construction to be implemented throughout the Project, as well as the methodology used to evaluate resource impacts for the environmental analysis.

Roads enable access to the right-of-way and tower sites for both construction and long-term maintenance of the transmission lines. Access roads must be sufficient to bear the weight and endure heavy construction vehicle use. All roads would be upgraded or constructed in accordance with the Proponent's published standards for road construction, or according to BLM (BLM Manual 9113), USFS, state, and/or local requirements for road construction, or private landowner agreements, to be outlined in the final POD. In the event PacifiCorp's published standards for road construction conflict with BLM, USFS, state, or local requirements, the construction contractor(s) will coordinate with the CIC (or appropriate land-management agency representative in areas where the CIC does not have authority) to resolve the conflicting standards. However, existing paved and unpaved highways and roads would be used, where possible, for the transportation of materials and equipment from the storage yards to the areas where they would be needed along the transmission line right-of-way. Private landowners and affected agencies would be consulted before road construction begins. Specific plans for the construction, rehabilitation, and/or maintenance of roads, including the locations of access roads, would be documented in the final POD.

Section 2.3.1.1 identifies an average typical transmission tower span of 800 to 1,200 feet. To limit the amount of new road construction for the Project, existing roads within 500 feet of the Project centerline are proposed to be used for access to the Project right-of-way and Project facilities, where practicable. Where existing roads could be used for construction, operation, and maintenance purposes, only spur roads to transmission tower sites may be needed. Beyond 500 feet from the Project centerline, constructing a new road from tower to tower typically would result in less ground disturbance than building spur roads from existing roads to each tower site or Project work area. The number of new spur roads would be held to a minimum, consistent with their intended use (e.g., structure construction or conductor stringing and tensioning). Some existing roads could require upgrading to meet the PacifiCorp, BLM, or USFS published standards for road construction. All existing roads would be left in a condition equal to, or better than, their condition prior to construction, in accordance with BLM, USFS, state, and/or local road standards or private landowner agreements.

Where required to meet the access needs of the Project, roads may be built as either temporary or permanent access. Where required for construction purposes only, or in temporary work areas (e.g., wire pulling-and-tensioning sites, concrete batch plants, etc.), temporary roads may be needed. Temporary roads serve the needs for Project access during the construction phase, but are not anticipated to be necessary for operation and maintenance purposes. On completion of construction activities, temporary access roads would be reclaimed according to the procedures specified in the POD. Conversely, where

required for operation and maintenance purposes, or where landowners or land-management agencies require, access roads would be constructed for permanent use.

All new and improved access roads, temporary or permanent, would be built with a travel-surface width of at least 14 feet, with final size depending on site-specific conditions and as specified in the POD. The road travel surface will typically be an unpaved, native surface. Curves would require a wider surface (e.g., 16 to 22 feet wide). Additionally, it is anticipated turnout areas (100 by 10 feet with 50-foot tapers on each end) would be required for every 1,000 feet of new access road during the construction phase of the Project. On completion of construction, these turnout areas would be reclaimed according to the procedures specified in the POD as approved by the agencies.

New roads that must be graded for access along steep slopes (side-hill roads) could exceed a 14-foot width, with the total disturbed width varying depending on the amount of displaced soil. In addition, roads may be routed around specific areas due to topography or to avoid sensitive resources. Helicopters may be used for structure placement in limited areas where there are environmental constraints (i.e., where access is difficult due to rough terrain), or where it is economically practical; however, access roads to each structure location would be required. Typically, an improved ditch drainage system would not be required for new or improved access roads.

Erosion- and sedimentation-control measures such as water bars, culverts, sediment basins, or perimeter control would be installed for new and improved roads as required to minimize erosion during, and subsequent to, construction of the Project. These features would be constructed in accordance with the Proponent's standards (PacifiCorp TA 503 and TA 504), as approved by the agencies and included in the final POD. To the maximum extent possible, drainages would be crossed at grade. Where such crossings are not feasible, culverts may be constructed (some of which may be temporary).

To reduce permanent Project disturbance where operation and maintenance access would be required, temporary road construction methods (i.e., overland drive-and-crush; clear-and-restore) may be implemented where feasible. Overland drive-and-crush is vehicular travel to access a site without significantly modifying the landscape. Vegetation is crushed but not cropped, thereby minimizing disturbance to root mass and organics in the soil. Soil may be compacted but no surface soil is removed. Overland clear-and-cut is the removal of all vegetation at or near ground level to improve or provide suitable access for equipment. All vegetation is removed using aboveground cutting methods that leave the root crown intact. Soil is compacted but no surface soil is removed.

Construction of new and improved access roads potentially would generate excessive dust during the construction process, as well during pass-through Project access use. Appropriate dust-control measures would be implemented at locations along the route, as needed, based on federal, state, and/or county requirements. Methods to minimize dust and erosion control associated with existing and new access also would be approved by the agencies and provided in the POD.

In certain areas, it could be necessary to close roads after construction to restrict future access for general and undesired use. Such areas would be identified through negotiations with the landowner or land-management agency. Methods for road closure or management may include implementing signs and physical barriers (e.g., locking gates, obstructing the path with earthen berms or boulders, ripping the road bed, planting vegetation, and/or depositing construction material or slash on the road surface) in a manner consistent with reclamation practices to be identified in the POD. Closed access routes would have to be reopened where right-of-access is impeded for maintenance and emergency restoration repairs.

Access Levels

To support environmental analysis, five levels of access were identified and the amount of ground disturbance associated with each level of access was estimated (Table 2-7). This information was combined with slope data to provide an estimate of the potential ground disturbance that could result from using existing access roads, upgrading existing roads, or constructing new roads.

The consideration of surface disturbance related to access roads necessary to construct and maintain the Project achieved by incorporating Project description information and additional data gathered during the inventory phase of the EIS including (1) the presence of existing roads that would likely be used for construction of the Project, (2) the slope of the terrain traversed by the reference center line for the alternative routes (refer to Section 3.1.2.1), (3) the vegetation communities crossed by the alternative routes, and (4) access road construction and operation standards (e.g., cut and fill criteria, travel surface requirements and hydrology [berming and/or ditching]). Using GIS and professional knowledge of agency and contractor resource staff, this information was distilled into a model that accurately estimates likely levels of access road disturbance, or "access levels", to 0.01-mile segments of the reference centerlines for the alternative routes being assessed in the EIS. Access levels range from Level 1, which represents locations along an alternative route that would result in minimal surface disturbance, to Level 5, which would likely result in large areas of surface disturbance. Table 2-7 describes each access level, including acres of estimated ground disturbance.

Access levels have been organized numerically, beginning with the access level of least disturbance. Existing roads suitable for Project construction access were mapped (refer to Map Volume [MV]-1, Volume II), and areas of the Project alternative routes within 500 feet of these roads were designated as Level 1. Existing roads requiring improvements also were mapped, and areas of Project alternative routes within 500 feet of these roads were designated as Level 2. Areas of Project alternative routes greater than 500 feet from existing roads were designated as Levels 3, 4, and 5, dependent on slope conditions, as described in Table 2-7. In addition, access levels were combined with vegetation data to identify areas of potential temporary disturbance, thus minimizing impacts on environmental resources as a result of Project construction.

TABLE 2-7
GROUND DISTURBANCE/ACCESS TYPES

Access Levels	Description	Estimated Disturbance per Mile (acres)
Level 1	**Use existing roads** Existing roads would be used if they are located within 500 feet of the reference centerline, are paved or graded gravel roads with a travel surface at least 14 feet wide, and are approved for use by the applicable right-of-way holder. Typically, construction of spur roads would be required to access each of the towers. Approximately five spur roads per mile would be required, with a typical disturbance width of 16 feet and length dependent on distance from the reference centerline and slope. Spur roads typically would have a 14-foot-wide travel surface and require an average of 2 feet of disturbance for necessary grading and drainage features, resulting in a total disturbance width of approximately 16 feet. In areas of steeper terrain, spur road surface width could be a maximum of 22 feet, depending on radius of curves and corners and slope of terrain, and total disturbance could exceed 22 feet due to requirements for drainage features and grading (e.g., cut-and-fill). Estimated disturbance associated with this access level assumes 0.5 mile of spur roads would be required for each mile of transmission line route.	1.0

TABLE 2-7
GROUND DISTURBANCE/ACCESS TYPES

Access Levels	Description	Estimated Disturbance per Mile (acres)
Level 2	**Improve existing roads** Existing roads within 500 feet of the reference centerline would be improved if they do not meet Proponent, Bureau of Land Management, or U.S. Forest Service standards to accommodate the vehicles and traffic flows necessary to construct the Project. This would include single- and two-track roads typically used by recreational vehicles and/or agricultural equipment, but not for regular commercial traffic. Some of these roads may not be recognized by the appropriate land-management agency as an authorized access route, and would need agency approval prior to their use and improvement for Project access needs. This assessment assumes 6 feet of improvement width would be required for existing roads requiring improvements to meet Proponent, Bureau of Land Management, and U.S. Forest Service standards for road construction. In addition to road improvements, construction of spur roads would be required to access each of the towers. Approximately five spur roads per mile would be required, with a typical disturbance width of 16 feet and length dependent on distance from the transmission structures and slope. Improved roads and spur roads typically would have a 14-foot-wide travel surface and require an average of 2 feet of disturbance for grading (e.g., cut-and-fill slopes) and drainage features, resulting in a typical disturbance width of approximately 16 feet. In areas of steeper terrain, road travel surface width could be a maximum of 22 feet, depending on radius of curves and corners and slope of terrain, and total disturbance could exceed 22 feet due to requirements for drainage features and grading (e.g., cut-and-fill). Estimated disturbance associated with this access level assumes 0.5 mile of spur roads would be required for each mile of transmission line route.	1.7
Level 3	**Construct new access, flat to rolling terrain (0 to 8 percent slopes)** New access roads constructed on flat to rolling terrain should not require switchbacks. Approximately 1.0 mile of new road with periodic pullouts of approximately 100 feet long by 10 feet wide with a 50-foot taper on both ends would be required for each 1.0 mile of transmission line in flat- to-rolling terrain. However, in areas where environmentally sensitive features occur (e.g., archaeological sites, biological or paleontological resources, etc.), up to 1.5 miles of new roads with periodic pullouts, approximately 100 feet long by 10 feet wide, may be required to avoid sensitive resources. New roads in flat to rolling terrain typically would have a 14-foot-wide travel surface and require an average of 6 feet of disturbance for grading and drainage features, resulting in a typical disturbance width of approximately 20 feet.	2.5
Level 4	**Construct new access, rolling terrain (8 to 15 percent slopes)** It is anticipated new access roads constructed on moderately steep, rolling terrain would require occasional switchbacks to accommodate construction vehicles. Approximately 1.5 miles of new road with periodic pullouts, approximately 100 feet long by 10 feet wide with a 50-foot taper on both ends, would be required for each 1.0 mile of transmission line in rolling terrain. New roads in moderately steep, rolling terrain typically would have a 14-foot-wide travel surface and require an average of 10 feet of disturbance for grading (e.g., cut-and-fill slopes) and drainage features, resulting in a typical disturbance width averaging 24 feet. In areas of steeper terrain, road travel surface width	4.5

TABLE 2-7 GROUND DISTURBANCE/ACCESS TYPES		
Access Levels	**Description**	**Estimated Disturbance per Mile (acres)**
	could be a maximum of 22 feet, depending on radius of curves and corners and slope of the terrain and total disturbance could exceed 24 feet due to cut-and-fill requirements.	
Level 5	**Construct new access, steep terrain (greater than 15 percent slopes)** New access roads constructed in steep terrain would require a substantial number of switchbacks to accommodate construction vehicles. Approximately 2.0 miles of new road with periodic pullouts, approximately 100 feet long by 10 feet wide with a 50-foot taper on both ends, would be required for each 1.0 mile of transmission line in steep terrain. New roads in steep terrain typically would have a 14-foot-wide travel surface and require an average of 15 feet of disturbance for grading (e.g., cut-and-fill slopes) and drainage features, resulting in a typical disturbance width of approximately 29 feet. In areas of steeper terrain, road travel surface width could be a maximum of 22 feet, depending on radius of curves and corners and slope of terrain and total disturbance could exceed 29 feet due to cut-and-fill requirements.	7.3

Tower/Site Clearing

Clearing of natural vegetation would be required for construction purposes (access, spur roads, and structure sites), clearances for electrical safety, long-term maintenance, and reliability of the transmission line. In or adjacent to the right-of-way, mature vegetation would be removed under or near the conductors to provide adequate electrical clearance as required by the NESC and DOE. Clearing activities would be in compliance with the Proponent's Vegetation Management Specification Manual and the Standard FAC-003-1 Transmission Vegetation Management Program.

Typical Structure Site and Work Area

At each structure site, work areas are required to facilitate the safe operation of equipment and construction operations. In typical work areas in flat terrain, an area 150 by 200 feet of temporary disturbance would be required for equipment and construction tasks. In that work area, the permanent disturbance associated with the structure footings would be up to 40 by 40 feet. The work area would be cleared of vegetation only to the extent needed. Access in the work area would be overland travel with minimal grading required in the work site. After construction, all temporary work areas would be restored.

Specific structure sites and work areas would be approved by the agencies and identified in the POD once a final route has been determined.

Structure Site and Work Areas in Steep or Rough Terrain

At each structure site in rough and steep terrain, work areas required would vary depending on the site conditions. Work areas may be larger and permanent structure sites may require additional clearing and grading to accommodate crane pads used by construction and maintenance crews. Extensive grading along steep slopes would be required to accommodate some tower sites. Any crane pads developed for

construction would be left in place. Removed topsoil would be replaced and seeded. Erosion control measures would be implemented in a manner consistent with reclamation practices to be identified in the POD as needed to maintain soils until new vegetation can take effect. However, these site-specific mitigation measures will be included in the final POD mapping volume.

Structure Foundation Installation

Excavations for structure foundations would be made using power equipment or blasting techniques, where required. Where the site conditions permit, a vehicle-mounted power auger or backhoe would be used to excavate the foundation holes. In rocky areas, the foundation holes could be excavated by drilling and blasting or special rock anchors could be installed. In extremely sandy areas, soil stabilization by water or a gelling agent could be used during excavation. The CIC and the BLM or USFS would be notified in advance of any required blasting so the area can be cleared. A blasting plan would be developed, approved by the agencies, and incorporated into the POD.

H-frame tangent structures would be used predominantly. The poles would be embedded directly into excavated holes at a depth based on geological data resulting from the geotechnical investigations. If soils are determined unsuitable for direct embedment, a drilled pier could be required with the depth and diameter of the pier excavation determined from the geotechnical investigation.

For lattice towers, footings would be cast in place by placing reinforcing steel and a tower stub into the foundation hole, positioning the stub, and encasing it in concrete. Spoil material would be used for fill where suitable or disposed, as specified in the POD and approved by the agencies. The excavation and installation of the foundation would require access to the site by a power auger or drill, a crane, material trucks, and concrete trucks using the access roads.

Drilled pier foundations would be used for tubular steel structures.

Foundation holes left open or unguarded would be covered to protect the public and wildlife. If practical, fencing could be used. Soil removed from foundation holes would be stockpiled on the work area. These piles would be used to backfill holes, and the remainder with topsoil spread on top would be distributed over the work area.

Structure Assembly and Erection

H-frame tangent structure and single-pole materials would be hauled to the structure location via flatbed truck and assembled onsite. The entire structure would be framed on the ground and erected as one unit using a crane (Figure 2-5).

Lattice-frame structure material would be assembled onsite or preassembled of convenient size and weight in the staging areas. These subsection assemblies and associated hardware would be shipped to each structure site by truck. The subsections would be assembled at the site and hoisted into place by a large crane and then fastened together to form a complete structure.

If drilled-pier foundations are necessary, H-frame and single-pole structures would be fastened to foundations using appropriately sized anchor bolts.

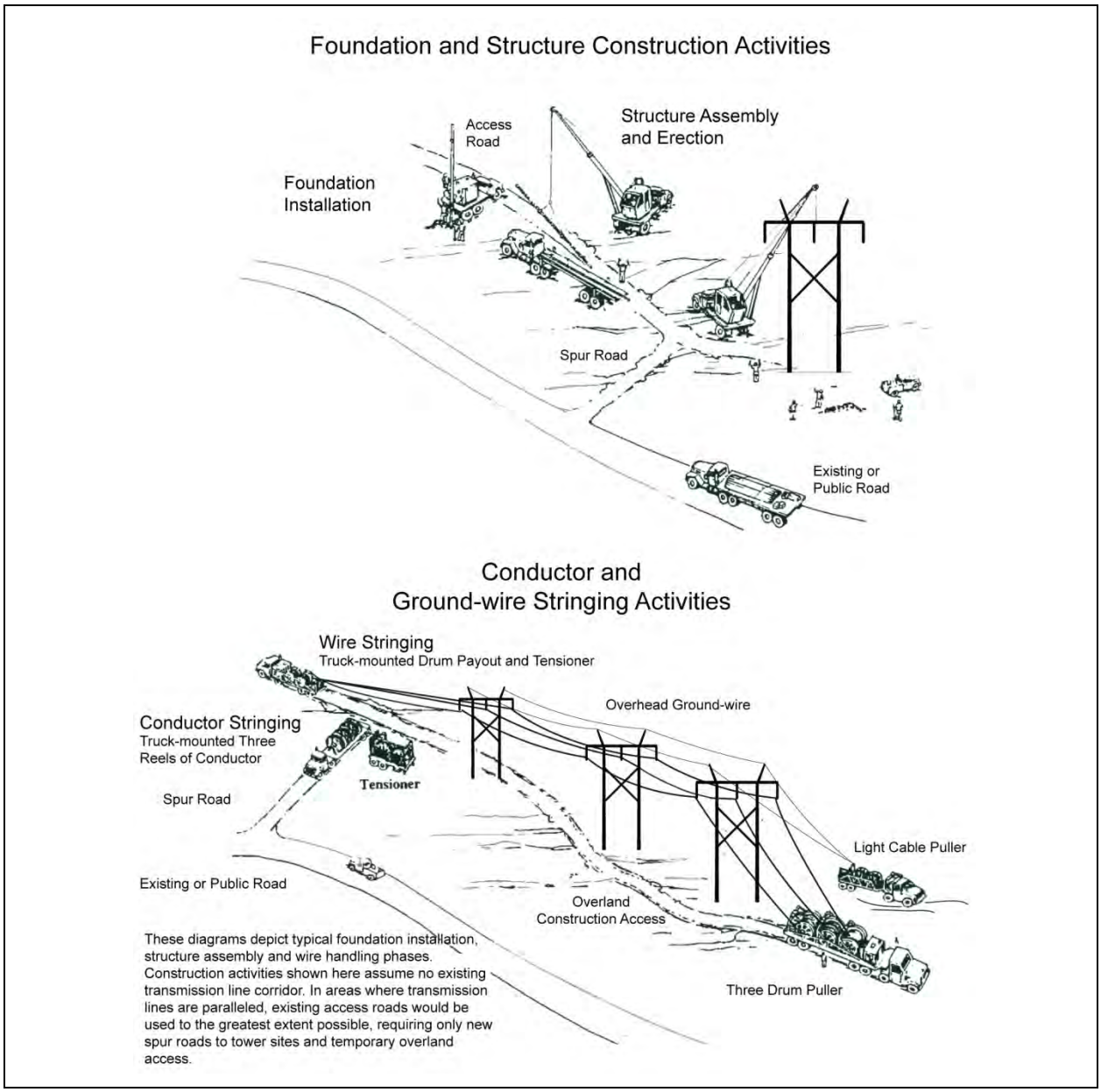


Figure 2-5 Typical Construction Activities

Multi-use Construction Yards and Equipment Staging

Construction would begin with establishment of five multi-use construction yards to be used for material laydown and storage, tower staging, helicopter landing, storage, and refueling, housing construction personnel trailers, and vehicle parking. Five multi-use construction yards are anticipated. Four of these yards would include temporary concrete batch plants for mixing concrete for tower foundations and storing aggregate and potable water. Each batch plant would comprise approximately 5 acres of the construction yard and would be powered by either a diesel generator or local distribution line. No more than two batch plants (and associated generators) would be operating at any one time.

In addition to the multi-use construction yards, up to five smaller staging areas would be established for storing materials, construction equipment, and vehicles. Each staging area would occupy approximately 5 acres. Additional helicopter refueling areas (i.e., in addition to the refueling areas provided at the multi-use construction yards), approximately 10 acres in size, could be needed to provide additional dedicated space for refueling helicopters used to transport materials during construction.

All facilities would be fenced and their gates locked. Security guards would be stationed where needed. Locations of multi-use construction yards and staging areas would be determined following discussion with the land-management agency or negotiations with landowners. In some areas, the construction yards or staging areas may need to be scraped by a bulldozer and a temporary layer of rock laid to provide an all-weather surface. Any bladed soil would be salvaged and used in reclamation activities. Unless otherwise directed by the landowner or land-management agency, the rock would be removed from the construction yards or staging areas on completion of construction, and the area would be restored as approved by the agencies and identified in the POD.

In locating the construction yards and staging areas, the preference would be to select relatively level areas with easy existing access to minimize site grading and new road construction. The construction yards and staging areas would be located on private land to the extent possible and in previously disturbed areas or in areas of minimal vegetative cover, where possible.

Detailed maps would be developed to show proposed locations of construction yards and staging areas once they are identified during the design phase.

Shoofly Area

Adjacent to the north side of the Red Butte Substation, the existing Sigurd to Red Butte No. 1 – 345kV transmission line would have to be rerouted temporarily when constructing the proposed transmission line as it approaches the substation. The conductors of the existing transmission line would be strung on temporary wood-pole structures; referred to as a “shoofly.” The temporary area required to construct the shoofly would be approximately 1.25 miles long and 150 feet wide. The number of temporary structures for the shoofly is currently estimated to be 16, seven H-frame and nine guyed structures. The guyed structures may require more area to accommodate the guys.

Conductor Installation

Conductors, insulators, hardware, and stringing sheaves would be delivered to each tower site for installation. The towers and poles would be rigged with insulator strings and stringing sheaves at each shield wire and conductor position (refer to Figure 2-5); however, some structures could be erected with insulators and travelers already installed. For all public protection during wire installation, guard structures would be erected over highways, railroads, transmission lines, structures, and other obstacles. Guard structures consist of H-frame poles and aerial equipment placed on either side of an obstacle. These structures prevent shield wire, conductors, or equipment from falling on an obstacle. All guard structures will be located within the Project right-of-way. The temporary disturbance associated with installation of guard structures would consist of an approximately 150-foot by 250-foot work area at the base of each structure and two holes approximately 3 feet in diameter.

Equipment for erecting guard structures includes augers, line trucks, pole trailers, and small cranes. Guard structures may not be required for small roads or may be accommodated by line trucks. On such occasions, other safety measures such as barriers, flagmen, or other traffic control would be used.

Sites for pulling and tensioning equipment measure approximately 150 by 750 feet every 2 to 4 miles. However, when construction occurs in steep and rough terrain, these sites may require larger, less symmetrical pulling and tensioning areas. Likewise, sites for pulling and tensioning equipment on either side of a large angle structure may be off the right-of-way. A short-term right-of-way grant (BLM) or temporary use authorization (USFS) would be obtained for these sites, as needed.

A pilot line would be pulled (strung) from tower to tower (or pole to pole) by helicopter, truck, or four-wheel-drive vehicle and threaded through the stringing sheaves at each structure. A stronger line that is larger in diameter would then be attached to the pilot line and strung. This is called the pulling line. This process is repeated until the shield wire and conductor are pulled through all sheaves. Shield wire and conductor would be strung using powered pulling equipment at one end and powered braking or tensioning equipment at the other end.

Sites for pulling and tensioning equipment are areas approximately 150 by 700 feet. However, when construction occurs in the steep and rough terrain, these sites may require larger, less symmetrical pulling and tensioning areas. Once a final route has been determined, pulling and tensioning sites would be identified in the POD.

Ground Rod Installation

As a part of standard construction practices, prior to wire installation tower-footing resistance along the route would be measured. Where the resistance to remote earth for each transmission tower would be greater than 15 ohms, counterpoise (grounds) would be installed within the right-of-way to lower the resistance to 15 ohms or less.

Cleaning Up and Reclaiming Affected Land Areas

Right-of-way construction sites, material storage yards, and access roads would be kept orderly. Refuse and trash would be removed from the sites and disposed of in an approved landfill. In remote areas, trash and refuse would be removed to a construction staging area until proper disposal can be facilitated. No open burning of construction trash would occur without appropriate approval.

The right-of-way would be reclaimed through methods described in the reclamation plan, as specified in the POD. All practical means would be made to reclaim the land to its original contour and natural drainage patterns. Revegetation activities along the right-of-way would conform to the Proponent's vegetation management standards as approved by the agencies. Reclamation seed mixture would conform to BLM or USFS requirements and approval.

Construction Workforce

Table 2-8 shows the types of equipment and estimated number of workers required to construct the proposed transmission line. The Project would consist of several phases of construction at various locations. Regular field meetings would be held with the CIC and environmental monitors to review the process and its implementation.

TABLE 2-8
ESTIMATED PERSONNEL AND EQUIPMENT FOR CONSTRUCTION

Activity	Equipment Type	Quantity of Equipment	Number of Workers
Survey	Pickup truck	3	6
Support equipment	4 x 4 pickup	3	8 to 16
	1-ton mechanic service truck	2	
	Equipment fuel truck	2	
	5-ton truck tractor	1	
	40-ton lowboy rig	2	
	45-ton cherry picker	2	
	10-ton forklift	2	
	4,000-gallon water truck	2	
Road maintenance, building, and restoration equipment	4 x 4 pickup	2	12 to 24
	D8 crawler tractor	1	
	4,000-gallon 6 x 6 water truck	2	
	Self-propelled water wagon	2	
	Road grader	2	
	Backhoe	2	
Guard pole equipment	4 x 4 pickup	2	5 to 10
	Flatbed boom truck	1	
	Auger truck	2	
Foundation installation	4 x 4 pickup	4	30 to 48
	Crewcab pickup	2	
	Air compressor	4	
	25-ton flatbed boom truck	2	
	15-ton flatbed boom truck	4 to 8	
	Rock drill	2 to 4	
	Excavator	3	
	Auger truck	3	
	10-cubic-yard dump truck	2	
	1.5-cubic-yard front-end loader	2	
	Backhoe	2	
	Concrete mixing truck	2 to 8	
	18-ton crane	2	
	30-ton crane	2	
Yard and material hauling equipment	4 x 4 pickup	2	10
	10-ton forklift	3	
	8-ton forklift	2	
	4-ton forklift	2	
	22-ton crane	1	
	6 x 4 truck tractor	1	
	15-ton flatbed boom truck	2	
Structure assembly and erection	4 x 4 pickup	2	40 to 60
	Crewcab pickup	2	
	100-ton hydraulic crane	2	
	70-ton hydraulic crane	1	
	D-8 crawler tractor	2	
	Air compressor	2	
	4 x 4 flatbed truck	2	

TABLE 2-8
ESTIMATED PERSONNEL AND EQUIPMENT FOR CONSTRUCTION

Activity	Equipment Type	Quantity of Equipment	Number of Workers
Wire stringing and ground cleanup equipment	120-ton crane	2	20 to 48
	30-ton crane	2	
	19-ton crane	2	
	6 x 6 truck tractor	2	
	2-ton truck	2	
	5-ton truck	2	
	Auger truck	1	
	Backhoe	2	
	High-reach boom truck	2	
	15-ton flatbed boom truck	1	
	Pickup truck	4	
	4 x 4 pickup	2	
	Crewcab pickup	2	
Wire installation	Wire reel trailer	6	25
	Diesel tractor	2	
	3-drum pulling machine	3	
	Single-drum puller (large)	1	
	Double bull-wheel tension machine (heavy)	3	
	Sagging equipment (D-8 cat, tracked)	2	
	Helicopter and fly ropes	1	
	Carryall	4	
	Static wire reel trailer	2	
	Air compressor	1	
Overhead optical ground wire installation	Overhead optical ground wire splicing trailer	2	6
	Overhead optical ground wire bucket truck	2	

SOURCE: Pike Engineers 2010

Maintenance

The transmission lines would be patrolled three times per year for maintenance: twice by helicopter and once by driving patrol. Overflight line maintenance by helicopter would be critical during the spring and the fall of each year dependent on weather conditions, helicopter availability, and statutory requirements of the states served by the Proponent. The spring and fall overflight maintenance activities are conducted to identify conditions that pose an immediate hazard to the public or employees, or that risk immediate loss of supply or damage to the electrical system to get those conditions resolved prior to peak demand in the summer and winter months. The Proponent's employees are trained and adhere to PacifiCorp bird management policies and avian protection plans for all maintenance activities. Overflight maintenance activities would be conducted at a frequency, duration, and speed that would not result in disturbance to avian species or nests. Potential impacts on significant cultural resources (i.e., sites eligible for the National Register of Historic Places [NRHP]) would be addressed as directed in the HPTP (described in Sections 2.3.5.1 and 3.2.5) through coordination among the Proponent, BLM, State Historic Preservation Officer, other involved agencies, and consulting parties.

Monitoring and maintenance would be done using approved or existing access roads. When access to the tower/pole locations needs improvement, a tracked bulldozer or other heavy equipment would be used (after notifying the BLM or USFS Authorized Officer). As needed, maintenance crews would be required

to re-scarify and reclaim to pre-existing conditions any newly disturbed areas outside of the permanent access road. Any closed access roads would be secured at the conclusion of maintenance activities.

Emergency Maintenance

The implementation of routine operation and maintenance activities on the transmission line would minimize the need for most emergency repairs; however, emergency maintenance activities are often necessary to repair natural hazard, fire, or man-caused damages to a line. In the event of an emergency, the Proponent would notify the BLM or USFS Authorized Officer and respond as quickly as possible to restore power. The necessary equipment required for emergency repairs would be similar to that needed for regular maintenance. However, on occasion, additional equipment could be required. Although restoration of the line would have priority, an effort would be made to protect crops, plants, wildlife, and resources of importance. Reclamation procedures following completion of repair work would be similar to those prescribed for construction and would be provided in the POD.

Decommissioning

At the end of the useful life of the transmission line (projected to be about 50 years), if the facilities were no longer required, the transmission lines and associated facilities would be decommissioned. Subsequently, a plan for dismantling and removing conductors, insulators, concrete pads, and hardware from the right-of-way would be developed and approved by the permitting agencies. Tower and pole structures would be removed and foundations broken off at least 2 feet below ground surface. All permanent disturbances would be restored in accordance with a Termination and Reclamation Plan approved by the BLM or USFS Authorized Officer, as appropriate.

2.4 Alternatives

A number of alternative transmission line routes were developed for detailed study in the EIS. This section provides a summary of the process used to develop the alternative routes (Section 2.4.1) and provides a general description of the alternative routes (Section 2.4.2). Alternative routes reviewed but eliminated from detailed study are discussed in Section 2.5.

2.4.1 Process

The following text summarizes the process for developing, studying, analyzing, and comparing the alternative routes developed in response to the need for the Project and the need for the BLM and USFS to respond to the Proponent's application for a right-of-way grant and special-use authorization, respectively, on lands they administer. Consistent with Section 102(2)(A) of NEPA, the process described uses "a systematic interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision making, which may have an impact on man's environment" (as specified in 40 CFR 1507.2).

The summary begins with an explanation of the development of the preliminary alternative routes and initial review of those routes by federal, state, and local agencies; tribal representatives; and the public. It is followed by a description of baseline data collection (also explained in more detail in Section 3.1.2); the method for assessing impacts and applying measures to reduce or eliminate those impacts (also explained in more detail in Section 3.1.2); and the method for comparing the alternative routes, from

which an environmentally preferred route emerges. The process is summarized in Figure 2-6. In concert with environmental results, administrative and management factors are considered by the participating agencies to derive the Agency Preferred Alternative (Section 2.6.2). System planning and reliability, engineering, costs, safety, schedule, and constructability are among the factors the Proponent considers to identify their preferred alternative (Section 2.6.3).

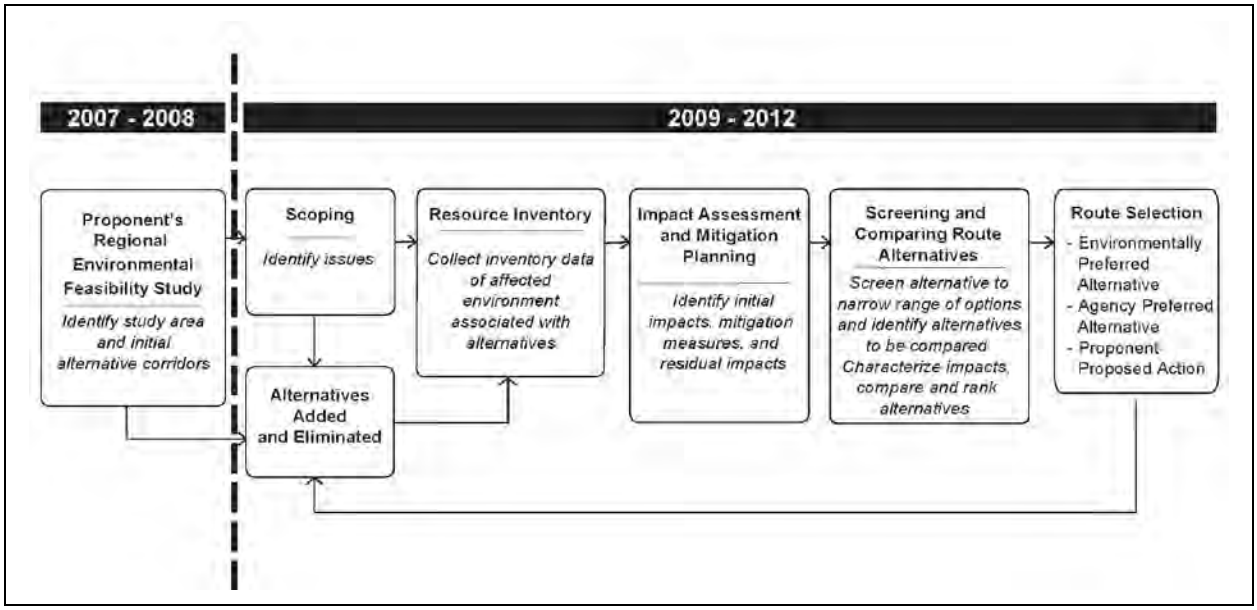


Figure 2-6 Environmental Study Process

2.4.1.1 Proponent's Feasibility Study

In 2007, the Proponent conducted a regional feasibility study to identify corridors within which transmission lines could be sited and constructed to meet the needs of the Project (refer to Appendix A). The study results were documented in the *Draft Report, Corridor Study Sigurd to Red Butte Transmission Line, Southwest Utah* (GeoEngineers 2007).

The large regional study area encompassed the existing Sigurd Substation in the northern end and the existing Red Butte Substation in the southern end (Map 1-2). Using macro-scale existing data for land use and recreation, biological resources, cultural resources, and visual resources obtained from federal and state agencies, areas of constraints to and opportunities for siting a transmission line were identified. Siting opportunities generally included linear facilities (e.g., existing and planned overhead transmission lines, designated utility corridors, highways and roads, pipelines, and railroads) and were used where reasonable and feasible and to the extent possible. The Proponent then reviewed the preliminary corridors considering the following criteria:

- Use existing utility corridor containing:
  - Overhead transmission line (parallel 138kV or smaller)
  - Underground pipeline
  - Both
- Parallel existing linear facilities, including:
  - Pipelines (most preferred)
  - Lower-voltage transmission lines (115kV, 138kV)
  - 230kV transmission lines
  - 345kV transmission lines (least preferred)

  - Combined
- Planning criteria for line separation:
  - Miles of parallel facility conditions
  - Route mileage
- Identify new overland route if the described criteria cannot be achieved (e.g., based on topography, avoidance of sensitive resources and land use, engineering constraints, etc.)

The result of the feasibility study was a set of preliminary, reasonable, and feasible alternative routes that were submitted in December 2008 in a preliminary application for a grant of right-of-way across federal land from the BLM and for a special-use authorization from the USFS. The BLM determined the Project is a major federal action requiring preparation of an EIS.

2.4.1.2 Scoping

Early in the process, the Proposed Action, the Proponent's objectives, the BLM's purpose and need, and preliminary alternative routes that could accommodate the Proponent's Preferred Alternative were reviewed by the relevant agencies and the interested public through the scoping process. The scoping process and results are documented in the *Sigurd to Red Butte No. 2 – 345kV Transmission Line Project EIS Scoping Report* (BLM 2010a), available on the BLM Project website and at the three BLM field offices and two national forests participating in EIS preparation. The scoping process is also summarized in Chapter 5.

As a result of issues identified during scoping, the preliminary routes were refined to establish the set of alternative transmission line routes to be studied and analyzed for the EIS.

2.4.1.3 Resource Inventory

Law, policy, and the issues identified through the scoping process guide what studies of the natural, human, and cultural environments federal agencies must conduct and address in an interdisciplinary manner in the EIS. The studies for this Project were designed to develop an inventory of environmental data reflecting the existing condition of the environment in sufficient detail to:

- Predict potential or probable impacts on the environment brought about by the construction, operation, and maintenance of the proposed transmission line, access roads, and ancillary facilities along each of the alternative transmission line routes.
- Prepare realistic recommendations to reduce or eliminate impacts identified during the analysis.
- Compare the alternative routes and identify the least-impact or environmentally preferred route for each environmental resource category studied, as well as for the environment as a whole.
- Meet the environmental reporting requirements of the BLM, in coordination with cooperating federal and state agencies and county and local governments.

A more detailed explanation and a list of the resource categories studied and analyzed are provided in Section 3.1.2.

2.4.1.4 Impact Assessment and Mitigation Planning

Once the environmental inventory (baseline data) was compiled for each alternative route and the data were reviewed by the lead and cooperating agencies, potential effects of the proposed Project were assessed and measures were recommended, where appropriate, to reduce or eliminate the impacts. The process of assessing impacts and applying measures to reduce impacts is a systematic interdisciplinary analysis that first identifies initial impacts based on a comparison of the proposed Project (i.e., the predicted types and amounts of disturbance) and the existing condition of the environment (pre-Project). Then, measures may be applied selectively on a case-by-case basis and often in localized areas to effectively reduce impacts further (Section 2.3.5.2), thereby resulting in residual impacts, or the impacts remaining after the application of the selective measures. Figure 2-7 provides an overview of the impact assessment and mitigation planning process. The process is described in greater detail in Section 3.1.3.

2.4.1.5 Screening and Comparing Alternatives

Through a systematic analysis, as shown in Figure 2-7, the alternative routes were screened and compared to narrow the number of alternative routes (as described in the following) and determine the most environmentally acceptable routes to be addressed in the EIS.

Once the impacts along each of the alternative routes had been analyzed, they were screened and compared to identify which were most environmentally preferable and to eliminate from further consideration less preferable ones (in accordance with 40 CFR 1502.14). Screening and comparing the routes was conducted progressively in three levels, as illustrated in Figure 2-8, for all of the alternative routes shown on Map 2-3. Level 1 screening focused on comparison of segments of alternative routes in localized areas. Level 2 screening focused on larger subregional areas. Level 3 screening involved combining the suitable segments of routes from the first two levels of screening to form complete routes. The Level 3 comparison is presented in Section 2.4.2.

The results of the screening and comparison establishes the basis for (1) characterizing the impacts of remaining, complete alternative routes; (2) comparing those alternative routes; and (3) determining the alternative route(s) emerging from this process as exhibiting the least impact on the environment overall. The results of the comparison of alternative routes are presented in Section 2.6.

2.4.2 Transmission Line Alternative Routes

The Project consists of a single-circuit, 345kV overhead transmission line between the Sigurd Substation, located approximately 6 miles north of Richfield, Utah, and the Red Butte Substation, located west of Central, Utah. Figures 2-9 and 2-10 present route schematics that illustrate numerous alternative routes located between the two substations studied in detail in the EIS.

The transmission line alternative routes consist of interconnecting links that form entire routes for each of the Project alternative routes. These alternatives, including the Agency Preferred Alternative and the Proponent’s Preferred Alternative are listed in Table 2-9 (by link), are illustrated in Maps 2-1 through 2-2, and represent the most environmentally acceptable alternative routes determined through the environmental study process described in Section 2.4.1. A description of each alternative route is presented in Sections 2.4.2.1 and 2.4.2.2. Information about engineering issues associated with each alternative route, including system reliability, is presented in Section 2.6.

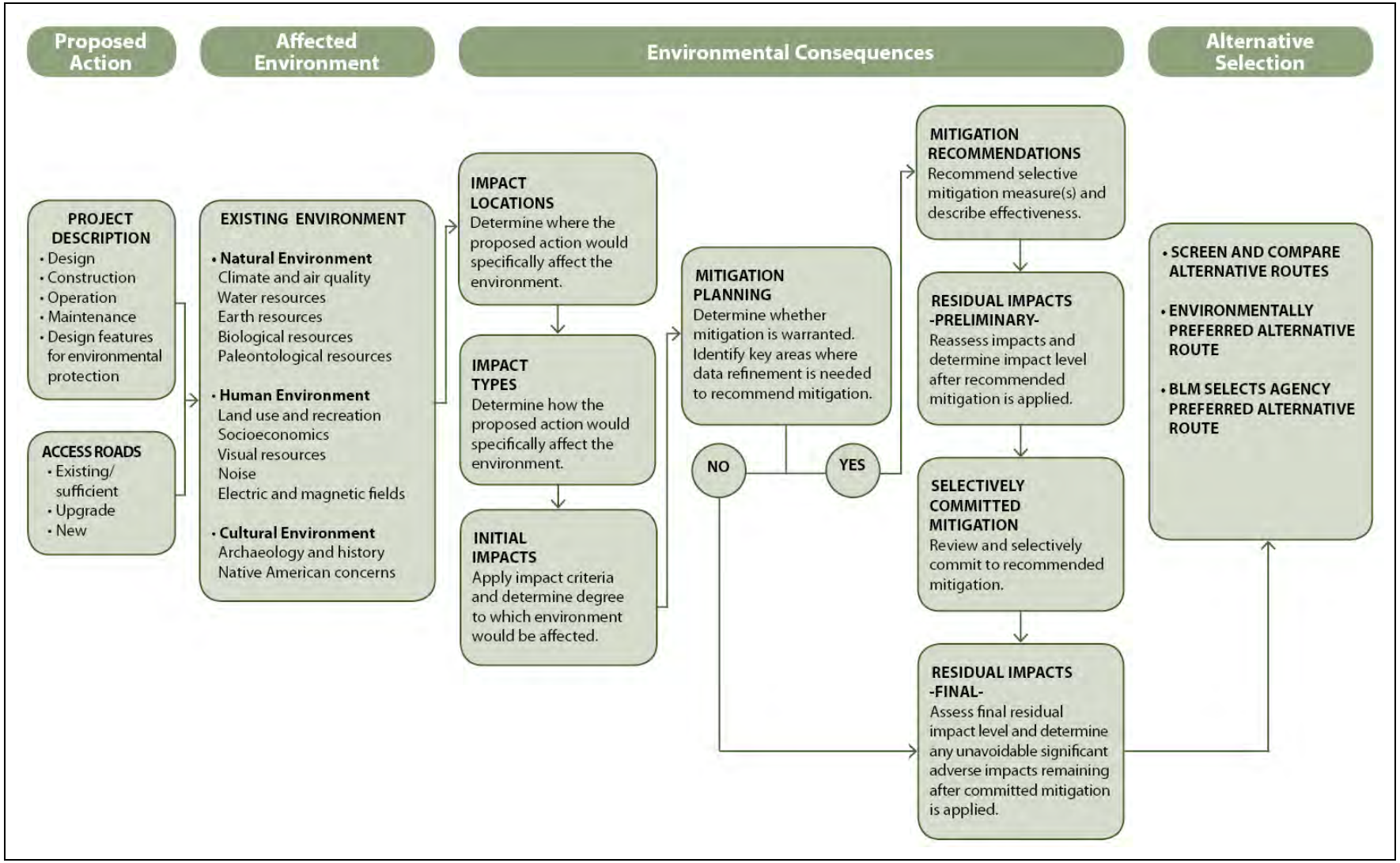


Figure 2-7 Impact Assessment and Mitigation Planning Process

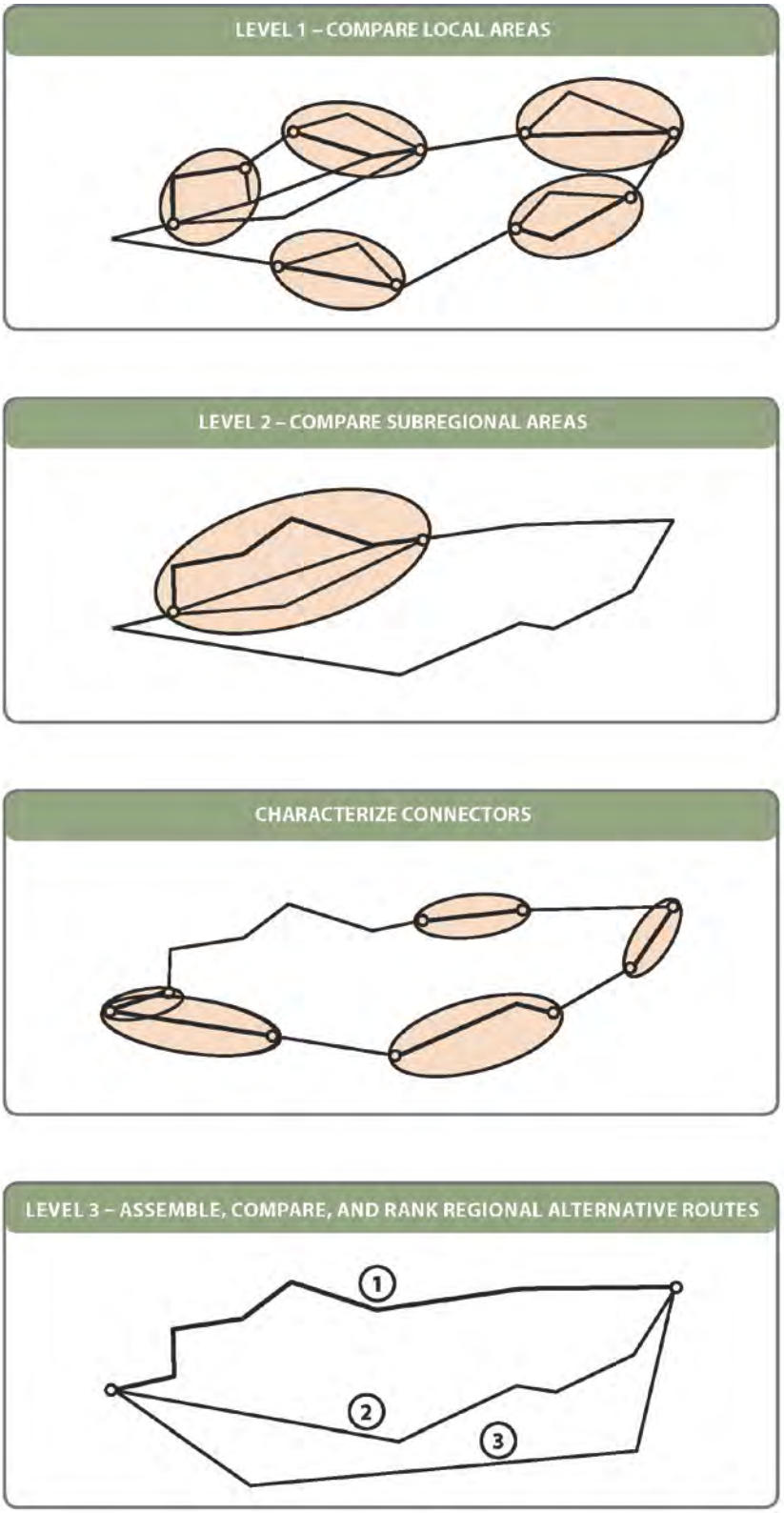
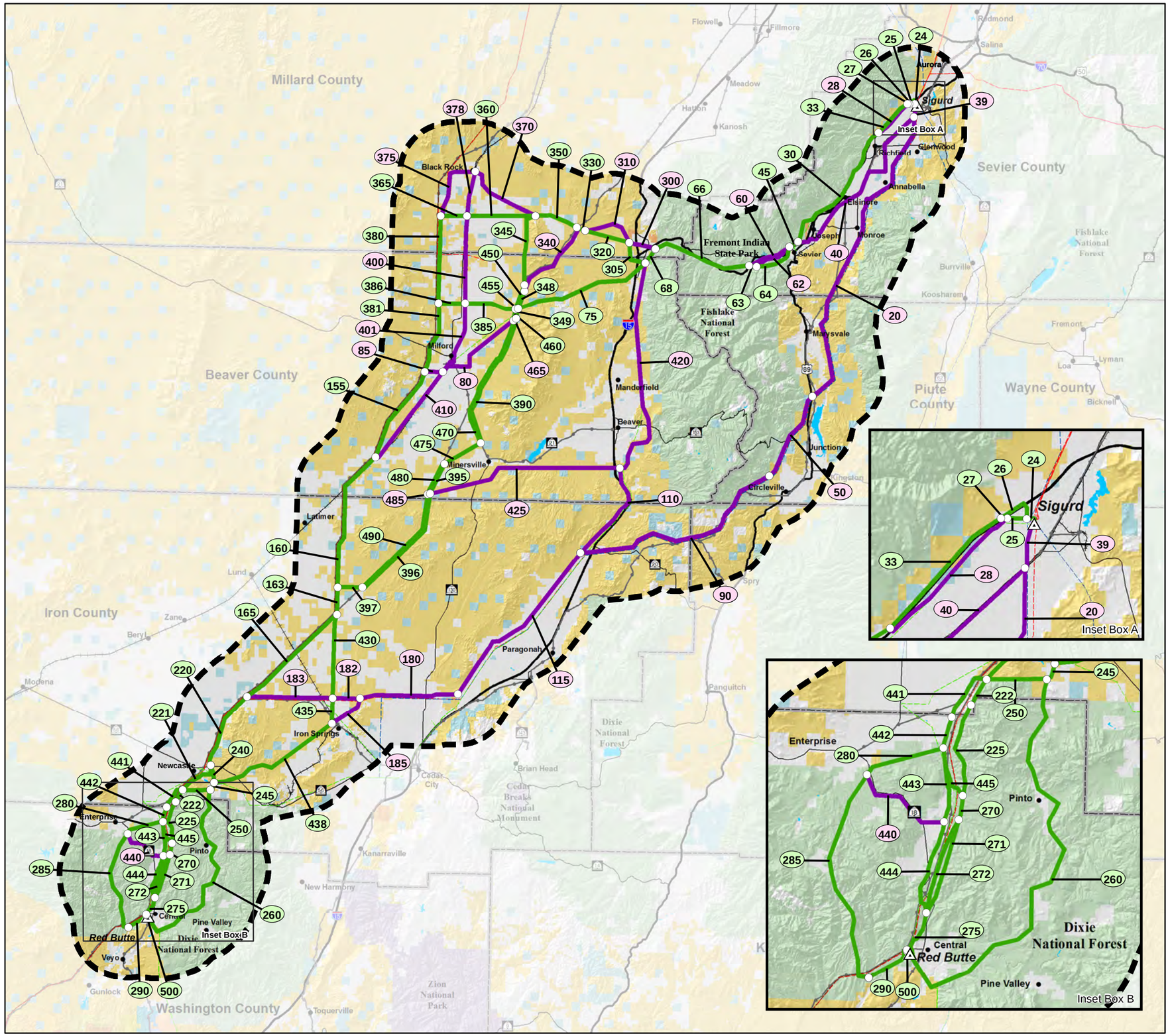


Figure 2-8 Alternative Routes Screening and Comparison Approach



MAP 2-3
ALTERNATIVE ROUTES CONSIDERED AND ELIMINATED

PROJECT FEATURES

- Alternative Route
- Alternative Route Link Number
- Alternative Route Considered and Eliminated
- Alternative Route Considered and Eliminated Link Number

GENERAL REFERENCE FEATURES

- Project Study Area
- Link Node
- Bureau of Land Management
- Indian Reservation
- National Park Service
- Private
- State of Utah Trust Lands
- State Park
- U.S. Forest Service
- Substation
- 500kV +/- DC Transmission Line
- 345kV Transmission Line
- 230 to 287kV Transmission Line
- 138 to 161kV Transmission Line
- Pipeline
- County
- Interstate & U.S. Highway
- State Highway
- Railroad
- Lake or Reservoir

SOURCES:
Transportation: Streetmap 50K to 250K, 2008
Land Jurisdiction: BLM State Office Utah, 2009
POWERmap, powermap.platts.com
©2007 Platts, A Division of The McGraw-Hill Companies

0 6 12 24 Miles

October 2012 **Final EIS**

SIGURD TO RED BUTTE NO. 2 345kV TRANSMISSION PROJECT

Path: Q:\SRB\FEIS\Apps\FEIS_2_Apps\Volume_1_SRB_Considered_Eliminated_Inset.mxd

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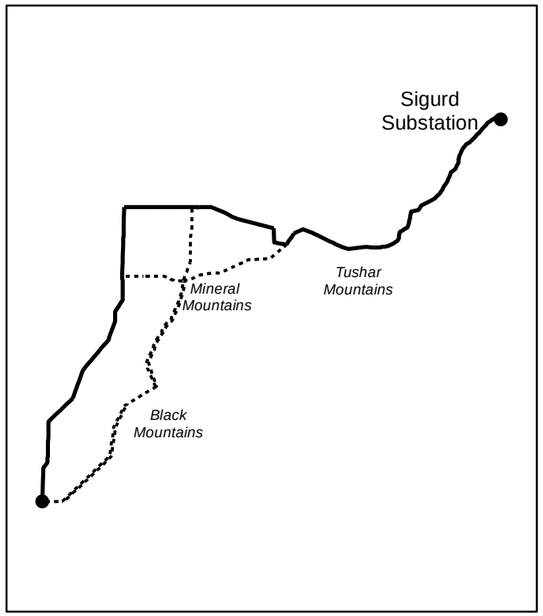
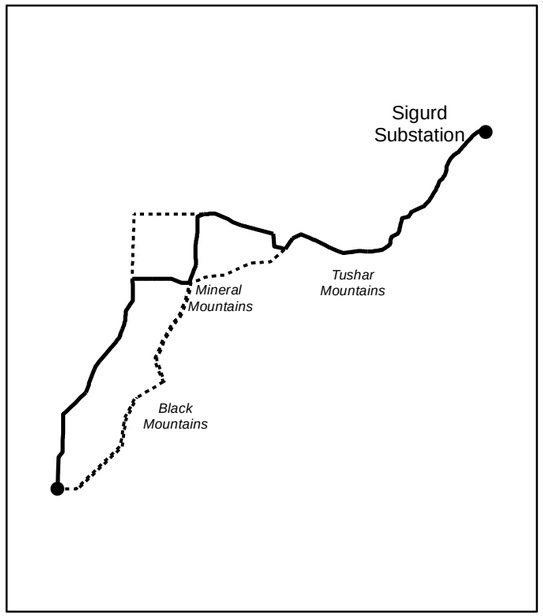
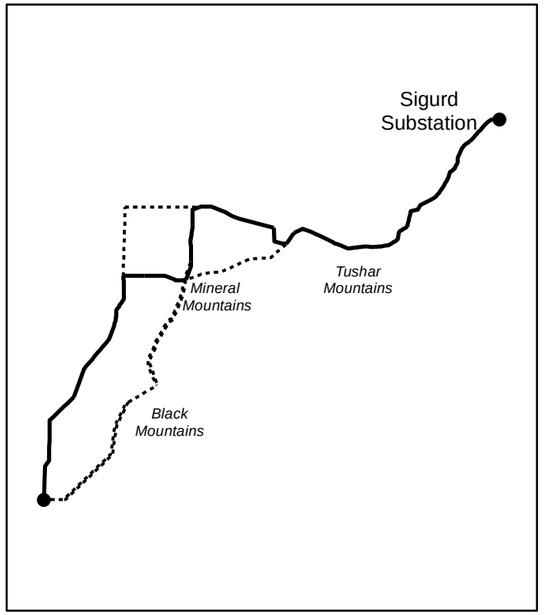
Alternative N1
Black Rock Road to IPP
North of Milford Wind Farm



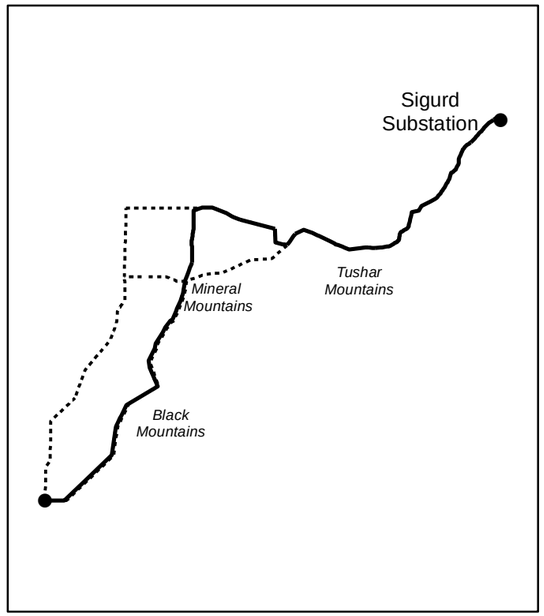
Alternative N2
Black Rock Road to IPP
South of Milford Wind Farm



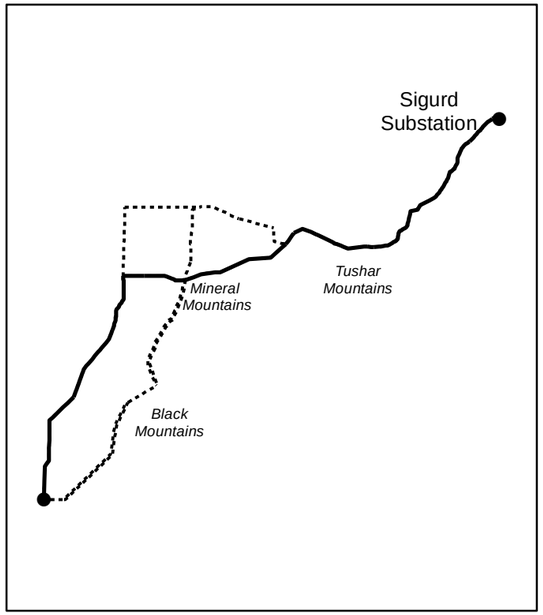
Alternative N2-A (Route Variation of Alternative N2)
Black Rock Road to IPP South of Milford Wind Farm
(1,500 Feet East of Kern River Pipeline)
(Agency Preferred Alternative)



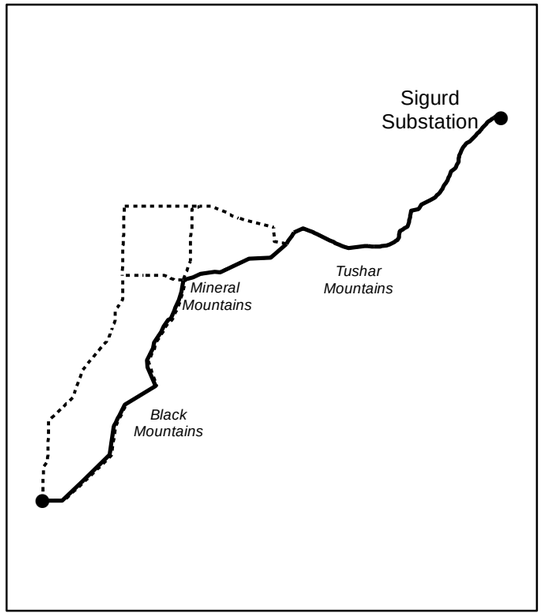
Alternative N3
Black Rock Road Parallel
to Kern River Pipeline



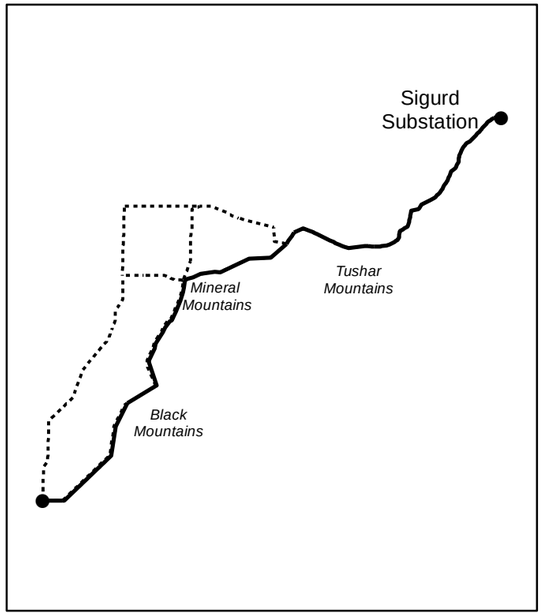
Alternative N4
Mineral Mountains to IPP
South of Milford Wind Farm



Alternative N5
Mineral Mountains Parallel
to Kern River Pipeline



Alternative N6
Mineral Mountains 1,500 Feet East of Kern River Pipeline
(Proponent's Preferred Alternative)



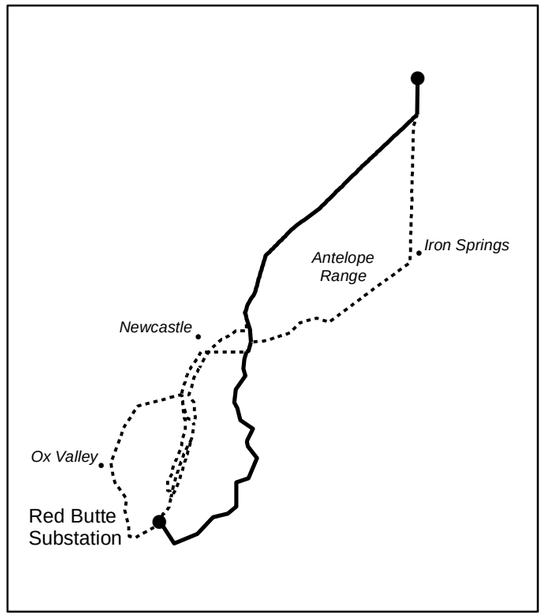
LEGEND

Main Alternative

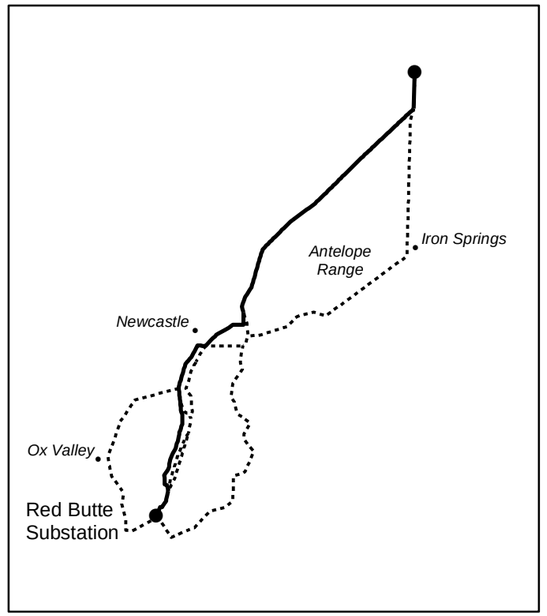
All Other Alternatives

Sigurd Substation to South of the Black Mountains
Alternative Route Schematics
Figure 2-9

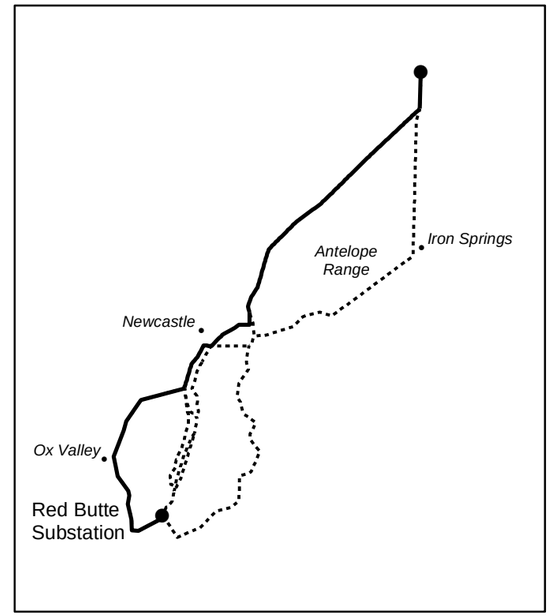
Alternative S1
Pinto Creek



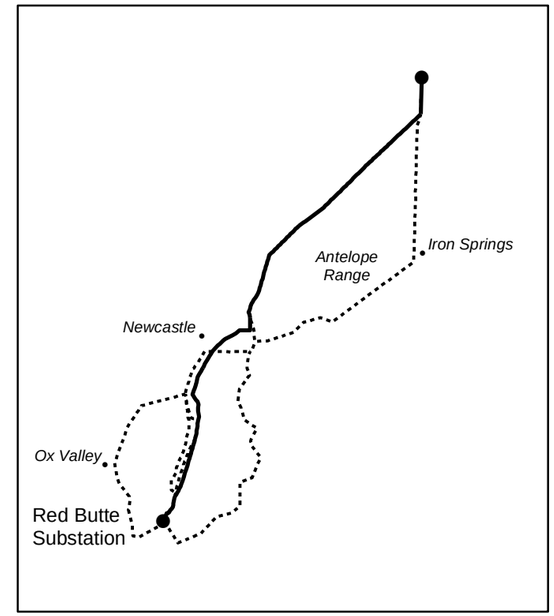
Alternative S2
IPP West



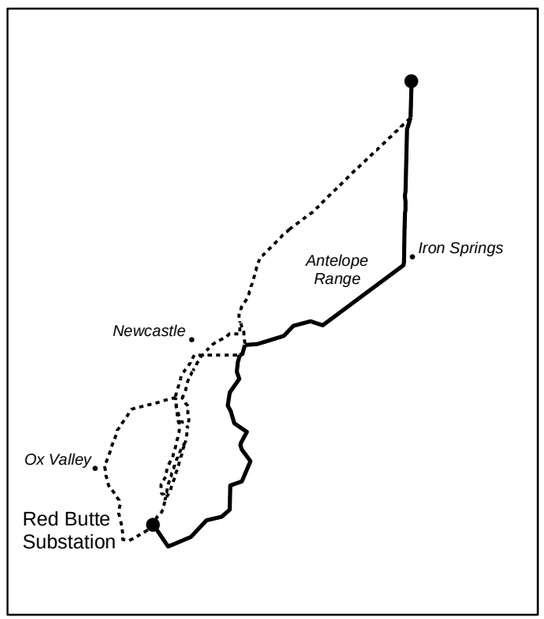
Alternative S3
Ox Valley



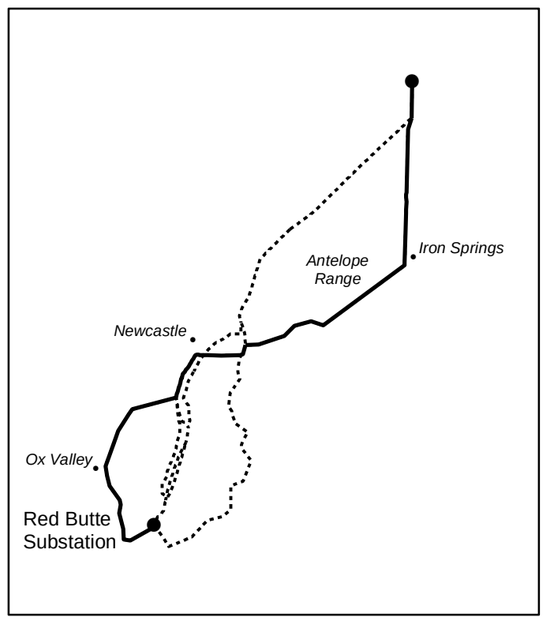
Alternative S4
IPP East



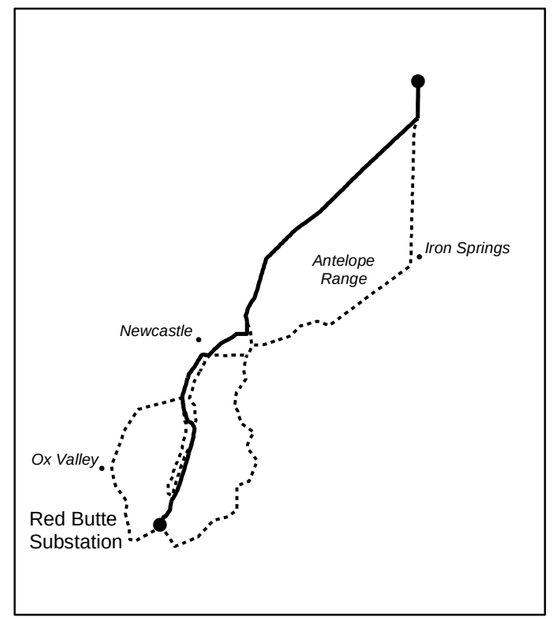
Alternative S5
Iron Springs and Pinto Creek
(Proponent's Preferred Alternative)



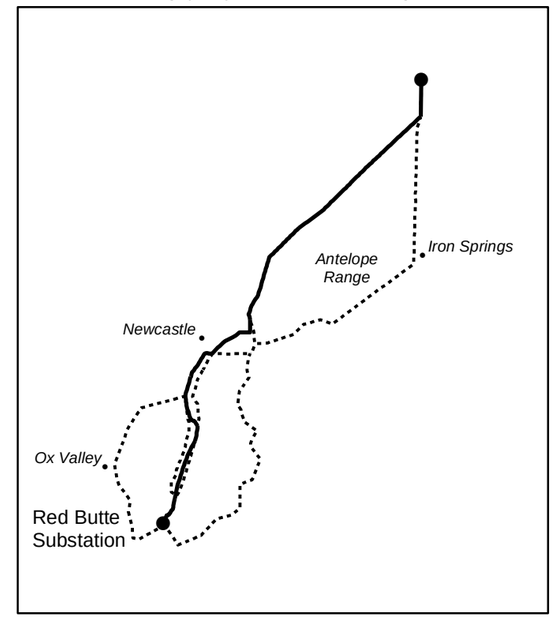
Alternative S6
Iron Springs and Ox Valley



Alternative S7
Middle Hybrid Route



Alternative S7-A (Route Variation of Alternative S7)
Middle Hybrid Route (300 Feet East of Sigurd to Red Butte No. 1 Transmission Line Adjacent to Atchinson IRA)
(Agency Preferred Alternative)



LEGEND

Main Alternative

All Other Alternatives

South of the Black Mountains To Red Butte Substation
Alternative Route Schematics
Figure 2-10

TABLE 2-9
ALTERNATIVE ROUTES BY LINK

Alternative Route	Length (miles)	Links
Northern – Sigurd Substation to South of the Black Mountains		
Alternative N1 Black Rock Road to Intermountain Power Project 500kV transmission line (IPP) north of Milford Wind Farm	120.6	24, 26, 33, 30, 45, 64, 63, 66, 68, 305, 320, 330, 350, 360, 365, 380, 381, 155, 160
Alternative N2 Black Rock Road to IPP south of Milford Wind Farm	120.4	24, 26, 33, 30, 45, 64, 63, 66, 68, 305, 320, 330, 350, 345, 450, 385, 386, 381, 155, 160
Alternative N2-A (route variation of Alternative N2) Black Rock Road to IPP south of Milford Wind Farm 1,500 feet east of Kern River Pipeline (Agency Preferred Alternative)	120.0	24, 25, 27, 33, 30, 45, 64, 63, 66, 68, 305, 320, 330, 350, 345, 348, 455, 385, 386, 381, 155, 160
Alternative N3 Black Rock Road parallel to Kern River Pipeline	117.2	24, 26, 33, 30, 45, 64, 63, 66, 68, 305, 320, 330, 350, 345, 450, 460, 470, 475, 480, 490, 397
Alternative N4 Mineral Mountains to IPP south of Milford Wind Farm	109.4	24, 26, 33, 30, 45, 64, 63, 66, 68, 75, 455, 385, 386, 381, 155, 160
Alternative N5 Mineral Mountains parallel to Kern River Pipeline	106.2	24, 26, 33, 30, 45, 64, 63, 66, 68, 75, 455, 460, 470, 475, 480, 490, 397
Alternative N6 Mineral Mountains 1,500 feet east of Kern River Pipeline (Proponent's Preferred Alternative)	105.4	24, 25, 27, 33, 30, 45, 64, 63, 66, 68, 75, 349, 390, 475, 395, 396, 397
Southern – South of the Black Mountains to Red Butte Substation		
Alternative S1 Pinto Creek	55.9	163, 165, 220, 240, 245, 260, 500
Alternative S2 IPP West	49.6	163, 165, 220, 221, 441, 442, 443, 444, 275, 500
Alternative S3 Ox Valley	57.4	163, 165, 220, 221, 441, 442, 280, 285, 290, 500
Alternative S4 IPP East	48.9	163, 165, 220, 221, 222, 225, 270, 271, 275, 500
Alternative S5 Iron Springs and Pinto Creek (Proponent's Preferred Alternative)	59.0	163, 430, 435, 438, 245, 260, 500
Alternative S6 Iron Springs and Ox Valley	61.8	163, 430, 435, 438, 245, 250, 441, 442, 280, 285, 290, 500
Alternative S7 Middle Hybrid Route	49.8	163, 165, 220, 221, 441, 442, 445, 270, 271, 275, 500
Alternative S7-A (route variation of Alternative S7) Middle Hybrid Route 300 feet east of Sigurd to Red Butte No. 1 transmission line adjacent to Atchinson Inventoried Roadless Area (Agency Preferred Alternative)	49.8	163, 165, 220, 221, 441, 442, 445, 270, 272, 275, 500

NOTE: A link is a segment of the route between two nodes. Links are displayed on Maps 2-1 and 2-2.

Engineering design has been ongoing in parallel with the preparation of the EIS. Since the Draft EIS was published, several modifications were made along approximately 103 miles of the reference centerline described and analyzed in the Draft EIS. Most of the modifications are slight adjustments required to refine the location of the centerline after obtaining improved survey data and completing more detailed

design (e.g., adjust the position of angle points). Other modifications were implemented to avoid certain areas of environmental sensitivity. Table 2-10 is a current summary (as of the date of this Final EIS) of modifications made to the reference centerline; provided are the location of each modification by link and milepost, and description and reason for each modification. Maps 2-4 and 2-5 show the modifications.

TABLE 2-10
MODIFICATIONS TO THE CENTERLINES ANALYZED IN THE DRAFT EIS

Link No.	From Milepost	To Milepost	Miles	Description of Modification[1, 2] (maximum number of feet moved)	Direction of Modification	Reason for Modification to Referenced Centerline
24	0.0	0.1	0.1	26	West	Revised based on improved data on future substation location
24	0.1	0.3	0.3	16	North	Adjusted to address landowner concerns
25	0.0	0.6	0.6	16	North	Adjusted to address landowner concerns
27	0.0	0.2	0.2	16	North	Adjusted to address landowner concerns
30	0.0	0.7	0.7	313	North	Adjusted to avoid conflicts with Utah Department of Transportation (UDOT) right-of-way
30	0.7	1.0	0.3	277	West	Adjusted to avoid UDOT right-of-way
30	1.0	4.4	3.7	430	West	Removed angle point in route
30	4.5	4.8	0.3	152	East	Moved to avoid need to build bridge to cross existing canal
30	6.6	7.1	0.5	28	East	Removed angle point in route
30	7.4	8.4	1.0	102	West	Removed angle point in route
30	8.5	12.0	3.5	216	North and west	Removed angle point in route
30	13.4	14.7	1.3	731	North and west	Adjusted to avoid conflict with possible municipal water tank
30	14.9	17.2	2.3	93	West	Adjusted to avoid conflict with environmentally sensitive area
30	17.2	17.2	0	209	North	Adjusted to avoid conflict with environmentally sensitive area
33	0.7	1.3	0.6	16	West	Adjusted to avoid UDOT right-of-way
33	2.1	2.3	0.2	15	East	Adjusted to avoid UDOT right-of-way
33	2.5	5.0	2.5	99	West and north	Adjusted to avoid UDOT right-of-way
45	0.0	0.6	0.6	209	North	Adjusted to avoid conflict with environmentally sensitive area
45	0.6	1.2	0.6	252	West	Adjusted to avoid conflict with environmentally sensitive area
64	0.0	0.5	0.5	252	West	Adjusted to avoid conflict with environmentally sensitive area
64	0.5	1.3	0.8	234	East	Modified span lengths in steep terrain
64	1.6	1.7	0.1	12	North	Removed angle point in route

TABLE 2-10
MODIFICATIONS TO THE CENTERLINES ANALYZED IN THE DRAFT EIS

Link No.	From Milepost	To Milepost	Miles	Description of Modification[1, 2] (maximum number of feet moved)	Direction of Modification	Reason for Modification to Referenced Centerline
64	3.2	5.2	2.0	57	North and south	Removed angle point in route and changed span length
66	0.0	0.1	0.1	11	South	Removed angle point in route
66	3.8	5.4	1.6	32	South	Adjusted to maintain separation from existing transmission line(s)
66	8.8	8.9	0.1	33	South	Removed angle point in route and maintain separation from existing transmission line(s)
66	11.0	12.0	1.0	37	South	Removed angle point in route
68	0.0	0.4	0.4	42	South and east	Removed angle point in route
68	0.6	2.1	1.5	90	West	Adjusted span length to avoid environmentally sensitive area
75	11.2	14.2	3.0	1,568	North	Adjusted to navigate steep terrain and maintain separation from existing transmission line(s)
155	0.0	1.7	1.7	278	East	Adjusted to avoid environmentally sensitive area
155	3.1	4.2	1.1	20	East	Removed angle point in route
155	5.2	7.2	2.0	21	East	Removed angle point in route
155	7.8	8.6	0.8	22	East	Removed angle point in route
155	8.7	10.1	1.4	13	East	Removed angle point in route
160	3.3	3.9	0.6	12	South	Removed angle point in route
160	10.3	11.0	0.7	23	East	Removed angle point in route
165	1.5	3.0	1.5	23	South	Adjusted to cross existing transmission line(s)
165	3.4	4.6	1.2	17	South	Adjusted to cross existing transmission line(s)
165	12.3	14.6	2.3	206	South	Removed angle point in route
220	0.0	0.8	0.8	247	South	Affected by removal of angle point from Link 165
220	1.3	7.2	5.9	232	South and west	Adjusted centerline to avoid environmentally sensitive area and maintain separation from existing transmission line(s)
220	8.4	9.7	1.3	217	East	Adjusted centerline to avoid excessively steep terrain
221	2.2	2.6	0.4	63	South	Removed angle point in route and adjusted to maintain separation from existing line(s)
222	0.1	1.6	1.5	165	West	Adjusted centerline to avoid excessively steep terrain
225	0.0	1.0	1.0	91	West	Adjusted to maintain separation from existing transmission line(s) (formerly Link 270)
225	1.0	2.5	1.5	415	East	Adjusted to address visual and other concerns (formerly Link 270)

TABLE 2-10
MODIFICATIONS TO THE CENTERLINES ANALYZED IN THE DRAFT EIS

Link No.	From Milepost	To Milepost	Miles	Description of Modification[1, 2] (maximum number of feet moved)	Direction of Modification	Reason for Modification to Referenced Centerline
225	2.5	5.2	2.7	1845	East	Adjusted to avoid environmentally sensitive area and address visual concerns (formerly Link 270)
260	25.0	25.3	0.3	122	North	Adjusted to enter substation from the north and account for new transmission lines built in the area
270	0.0	1.4	1.4	360	East	Adjusted to address visual and other concerns
271	0.0	5.4	5.4	610	East	Adjusted to address visual and other concerns (formerly Link 270)
272	0.0	5.4	5.4	New Link		Requested by U.S. Forest Service to minimize impacts on Atchinson Inventoried Roadless Area
275	0.0	2.4	2.4	688	East and west	Adjusted to address visual concerns as the transmission line approaches the Red Butte Substation in the town of Central and maintain separation from existing line(s)
290	0.0	0.2	0.2	101	West and north	Adjusted to enter substation from the north and account for new transmission lines built in the area
348	0.0	2.9	2.9	New Link		Adjusted to maintain separation from existing pipeline
380	4.5	5.5	1.0	39	West	Removed angle point in route
381	1.7	3.8	2.1	709	East	Maintain separation from existing line(s)
381	3.8	7.1	3.3	133	East	Maintain separation from existing line(s)
381	7.1	8.6	1.5	273	East	Maintain separation from existing line(s)
385	1.1	2.0	0.9	301	South	Adjusted centerline to avoid environmentally sensitive area and adjust to topography
385	2.2	3.2	1.0	339	North	Adjusted centerline to avoid environmentally sensitive area and adjust to topography
441	0.0	1.1	1.1	325	North and west	Maintain separation from existing line(s)
441	1.9	3.1	1.2	161	West	Maintain separation from existing line(s)
442	0.0	0.1	0.1	27	West	Maintain separation from existing line(s)
442	0.3	1.8	1.5	219	West	Maintain separation from existing line(s)
443	0.4	2.4	2.0	82	East and west	Maintain separation from existing line(s)

TABLE 2-10
MODIFICATIONS TO THE CENTERLINES ANALYZED IN THE DRAFT EIS

Link No.	From Milepost	To Milepost	Miles	Description of Modification[1, 2] (maximum number of feet moved)	Direction of Modification	Reason for Modification to Referenced Centerline
443	2.9	4.3	1.4	468	West	Maintain separation from existing line(s)
444	0.0	5.2	5.2	718	West, north, and east	Maintain separation from existing line(s)
445	0.0	3.0	3.0	New link		Requested by U.S. Forest Service to minimize impacts on Cove Mountain Inventoried Roadless Area
455	0.0	0.4	0.4	22	South	Moved angle point further from existing pipeline
500	0.0	0.2	0.2	233	West	Maintain separation from existing line(s) as the transmission line approaches the Red Butte Substation in the town of Central
Total miles modified			102.7			

NOTES:
[1]The number reported here is the maximum distance the centerline was moved.
[2]Calculations are approximate.

2.4.2.1 Northern Area – Sigurd Substation to South of the Black Mountains

Alternative N1 – Black Rock Road to IPP North of Milford Wind Farm

Alternative N1 would be 120.6 miles in length (Map 2-1). As proposed, the alternative route exits the existing Sigurd Substation to the north and crosses Interstate 70 (I-70) approximately 1.0 mile west of the substation. The alternative route then turns south and parallels I-70 to the west for approximately 23.8 miles before crossing I-70 west of Fremont Indian State Park. The alternative route then crosses west through Sage Flat (a narrow mountain valley), south of Fremont Indian State Park, before paralleling the existing Cameron to Sigurd 138kV transmission line through the Fishlake National Forest for approximately 14.0 miles before turning west, approximately 2.6 miles south of the historic Cove Fort.

From the Cove Fort area, the alternative route continues west and crosses Interstate 15 (I-15) before turning northwest to parallel Black Rock Road. The alternative route parallels Black Rock Road for approximately 6.3 miles before heading west at the north end of the Mineral Mountains. From the Mineral Mountains it continues west, crossing SR 257 before turning south to parallel the Intermountain Power Project 500kV transmission line (IPP). The alternative route parallels the transmission line 1,500 feet to the east for approximately 48.1 miles before terminating south of the Black Mountains. Notable features or places in proximity to the alternative route include Richfield, Elsinore, Joseph, Fremont Indian State Park, Fish Creek, Cove Fort, and Milford.

Alternative N2 – Black Rock Road to IPP South of Milford Wind Farm

Alternative N2 is 120.4 miles in length and would follow the same route as Alternative N1 to the north end of the Black Mountains. From the north end of the Mineral Mountains the alternative route turns

south and parallels the west bench of the Mineral Mountains for approximately 11.8 miles. Near the Blundell Geothermal Plant, the alternative route turns west for approximately 9.1 miles before turning south to parallel the IPP. The alternative route parallels the transmission line 1,500 feet to the east for approximately 37.8 miles before terminating south of the Black Mountains. Notable features or places in proximity to the alternative route include Richfield, Elsinore, Joseph, Fremont Indian State Park, Fish Creek, Cove Fort, Blundell Geothermal Plant, and Milford.

Alternative N2-A (Route variation of Alternative N2) – Black Rock Road to IPP south of Milford Wind Farm 1,500 feet east of Kern River Pipeline (Agency Preferred Alternative)

Alternative N2-A, a route variation of Alternative N2, was developed in response to agency and public comments received on the Draft EIS (refer to Appendix M). Alternative N2-A is 120.0 miles in length and would follow the same route as Alternative N2 with a slight variation using Links 25 and 27 as the route exits the Sigurd Substation on the west side. The route would use Links 348 and 455, instead of Link 450. The route is located 1,500 feet east of the Kern River Pipeline corridor near the Blundell Geothermal Plant, then turns west for approximately 9.1 miles before turning south to parallel the IPP. The alternative route parallels the transmission line 1,500 feet to the east for approximately 37.8 miles before terminating south of the Black Mountains. Notable features or places within proximity to the alternative route include Richfield, Elsinore, Joseph, Fremont Indian State Park, Fish Creek, Cove Fort, Blundell Geothermal Plant, and Milford.

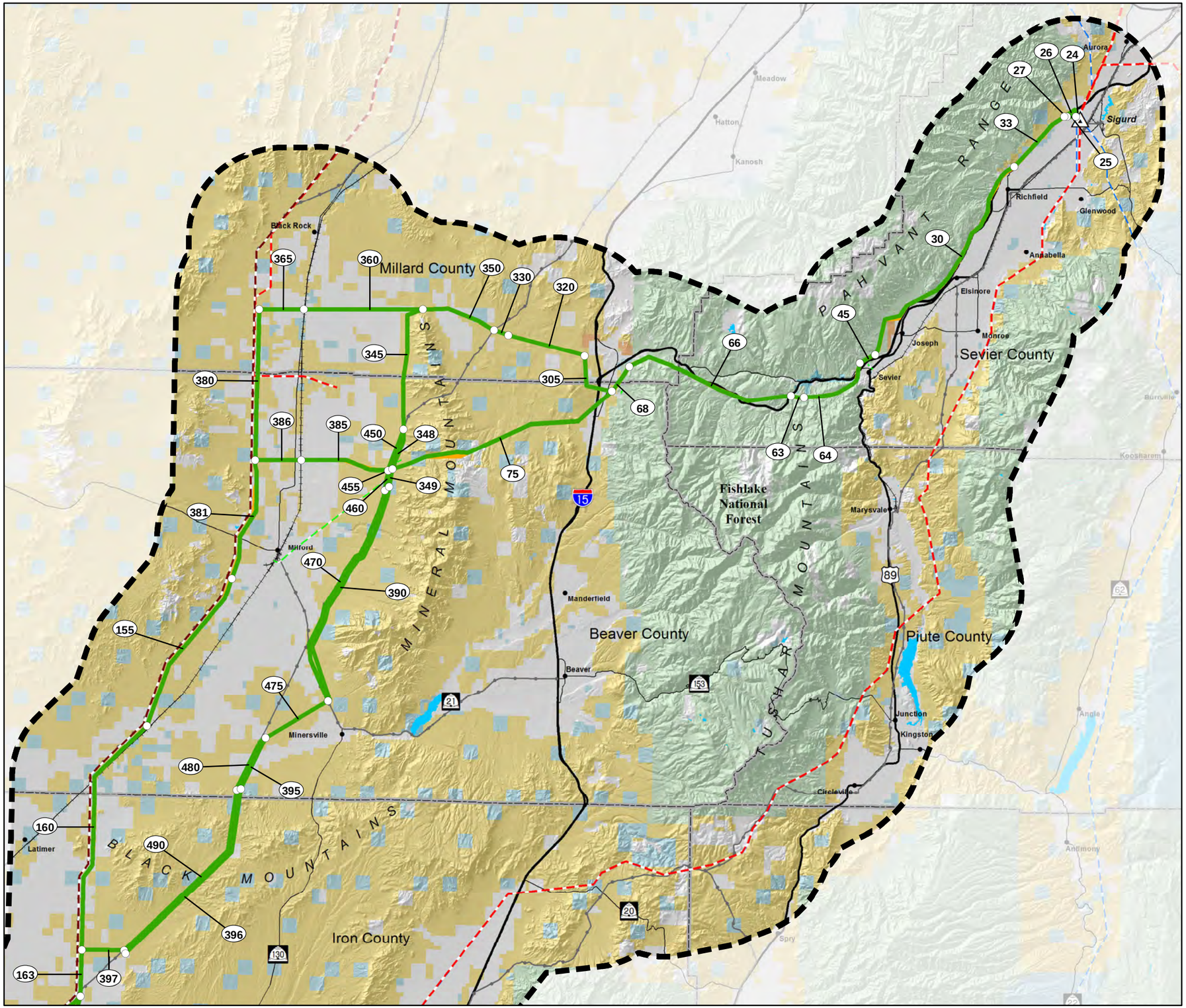
Alternative N3 – Black Rock Road Parallel to Kern River Pipeline

Alternative N3 is 117.2 miles in length and is similar to Alternative N1 from the Sigurd Substation to near the Blundell Geothermal Plant. From the geothermal plant the alternative route parallels the Kern River Pipeline approximately 100 feet to the east before turning south at SR 21 to avoid center-pivot-irrigated agriculture. It parallels SR 21 for approximately 4.2 miles before crossing the highway and rejoining the pipeline west of Minersville. The alternative route continues to parallel the pipeline to the south of the Black Mountains. Notable features or places in proximity to the alternative route include Richfield, Elsinore, Joseph, Fremont Indian State Park, Fish Creek, Cove Fort, Blundell Geothermal Plant, and Minersville.

Alternative N4 – Mineral Mountains to IPP South of Milford Wind Farm

Alternative N4 is 109.4 miles in length and follows the same route as Alternative N1 between the Sigurd Substation and Cove Fort area. From the Cove Fort area, the alternative route would parallel an existing 46kV transmission line over the Mineral Mountains north of Bailey Mountain to the Blundell Geothermal Plant. The alternative is also similar to Alternative N2 from the geothermal plant to south of the Black Mountains. Notable features or places in proximity to the alternative route include Richfield, Elsinore, Joseph, Fremont Indian State Park, Fish Creek, Cove Fort, Blundell Geothermal Plant, and Milford.

As a design alternative, the transmission line could be colocated with the existing Cove Fort to Blundell 46kV transmission line. If implemented, the right-of-way of the Cove Fort to Blundell 46kV transmission line would be increased to 150 feet to accommodate this design alternative.



MAP 2-4
ROUTE REVISIONS AND MODIFICATIONS SIGURD SUBSTATION TO SOUTH OF THE BLACK MOUNTAINS

ALTERNATIVE ROUTES

- Alternative Route analyzed in Final EIS
- Modification to Alternative Routes since Draft EIS[1]

GENERAL REFERENCE FEATURES

- Project Study Area
- Link Number
- Link Node
- Bureau of Land Management
- Indian Reservation
- National Park Service
- Private
- State of Utah Trust Lands
- State Park
- U.S. Forest Service
- Substation
- 500kV +/- DC Transmission Line
- 345kV Transmission Line
- 230 to 287kV Transmission Line
- 138 to 161kV Transmission Line
- Pipeline
- County
- Interstate & U.S. Highway
- State Highway
- Railroad
- Lake or Reservoir

SOURCES:
Transportation: Streetmap 50K to 250K, 2008
Land Jurisdiction: BLM State Office Utah, 2009
POWERmap, powermap.platts.com
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NOTES:
[1]Route centerline modified to address agency and public comments on the Draft EIS.

0 2.5 5 10 15 20 Miles

October 2012 **Final EIS**

SIGURD TO RED BUTTE NO. 2 345kV TRANSMISSION PROJECT

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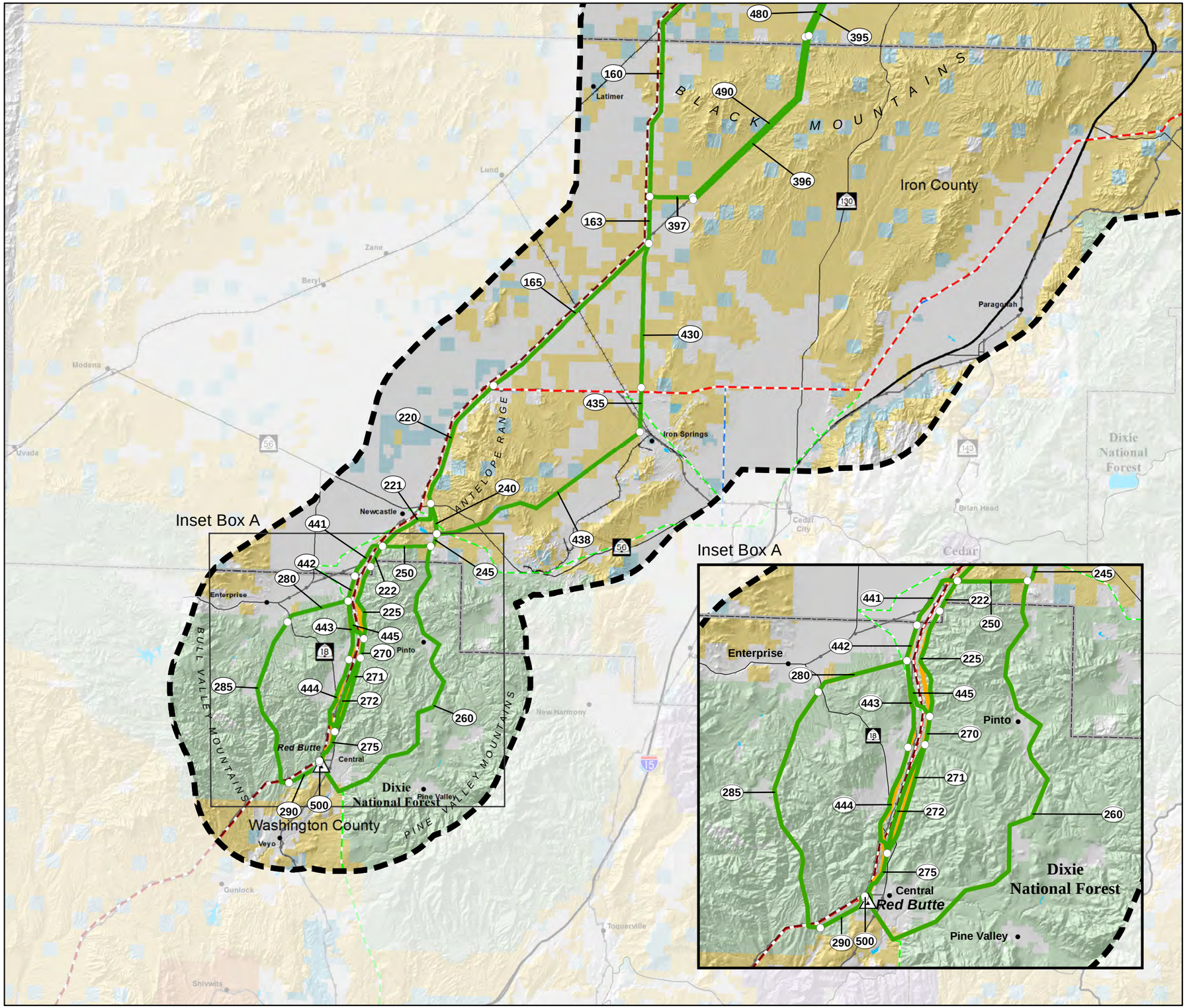

MAP 2-5
ROUTE REVISIONS AND MODIFICATIONS SOUTH OF THE BLACK MOUNTAINS TO RED BUTTE SUBSTATION

ALTERNATIVE ROUTES

- Alternative Route analyzed in Final EIS
- Modification to Alternative Routes since Draft EIS[1]

GENERAL REFERENCE FEATURES

- Project Study Area
- Link Number
- Link Node
- Bureau of Land Management
- Indian Reservation
- National Park Service
- Private
- State of Utah Trust Lands
- State Park
- U.S. Forest Service
- Substation
- 500kV +/- DC Transmission Line
- 345kV Transmission Line
- 230 to 287kV Transmission Line
- 138 to 161kV Transmission Line
- Pipeline
- County
- Interstate & U.S. Highway
- State Highway
- Railroad
- Lake or Reservoir

SOURCES:
Transportation: Streetmap 50K to 250K, 2008
Land Jurisdiction: BLM State Office Utah, 2009
POWERmap, powermap.platts.com
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NOTES:
[1]Route centerline modified to address agency and public comments on the Draft EIS.

0 2.5 5 10 15 20 Miles

October 2012 **Final EIS**

SIGURD TO RED BUTTE NO. 2 345kV TRANSMISSION PROJECT

Path: Q:\SRB\FEIS\Apps\FEIS_2_Apps\Volume_1_FEIS_vs_DEIS_South_Inset.mxd

Alternative N5 – Mineral Mountains Parallel to Kern River Pipeline

Alternative N5 is 106.2 miles in length and is similar to Alternative N4 from the Sigurd Substation to the Blundell Geothermal Plant. From the geothermal plant, the alternative route follows the same route as Alternative N3. Notable features or places in proximity to the alternative route include Richfield, Elsinore, Joseph, Fremont Indian State Park, Fish Creek, Cove Fort, Blundell Geothermal Plant, and Minersville.

Alternative N6 – Mineral Mountains 1,500 Feet East of Kern River Pipeline (Proponent's Preferred Alternative)

Alternative N6 is 105.4 miles in length and is similar to Alternative N5, except the alternative route is located approximately 1,500 feet east of the Kern River Pipeline. This alternative was selected by the Proponent because it provides physical separation from other high-voltage transmission lines (e.g., IPP) and underground pipelines (e.g., Kern River Pipeline). Notable features or places in proximity to the alternative route include Richfield, Elsinore, Joseph, Fremont Indian State Park, Fish Creek, Cove Fort, Blundell Geothermal Plant, and Minersville.

2.4.2.2 Southern Area – South of the Black Mountains to Red Butte Substation

Alternative S1 – Pinto Creek

Alternative S1 is 55.9 miles in length. From the Black Mountains it parallels the IPP approximately 1,500 feet to the east for approximately 14.9 miles before paralleling the Sigurd to Red Butte No. 1 – 345kV transmission line for approximately 8.8 miles along the east bench of the Antelope Range. The alternative route continues east of Newcastle Reservoir and follows Pinto Creek, turning southwest after passing the community of Pinto. The alternative route then turns northwest approximately 2.2 miles south of Central to parallel two existing 345kV and 138kV transmission lines and enters the north side of the Red Butte Substation. Notable features or places in proximity to the alternative route include Newcastle Reservoir, Pinto, Pine Valley, Santa Clara River, and Central.

Alternative S2 – IPP West

Alternative S2 is 49.6 miles in length and is similar to Alternative S1 from the Black Mountains to north of the Newcastle Reservoir. North of the Newcastle Reservoir, the alternative route continues west of the reservoir and continues to parallel the Sigurd to Red Butte No. 1 – 345kV transmission line to the east for approximately 3.1 miles. The alternative route then turns west, south of Newcastle, and parallels the IPP approximately 1,500 to 2,500 feet to the west. The alternative route crosses back to the east side of the IPP and Sigurd to Red Butte No. 1 transmission lines north of the community of Central and enters the north side of the Red Butte Substation. Notable features or places in proximity to the alternative route include Newcastle, Newcastle Reservoir, Holt Canyon, Mountain Meadows Massacre Site National Historic Landmark (NHL) and Mountain Meadows Historic Site, and Central.

Alternative S3 – Ox Valley

Alternative S3 is 57.4 miles in length and is similar to Alternative S2 from the Black Mountains to crossing the IPP and Sigurd to Red Butte No. 1 transmission lines. The alternative route continues to

parallel the IPP until turning west along the north bench of Gum Hill. After crossing SR 18, the alternative route turns south and passes near Ox Valley. The alternative route continues south for approximately 6.4 miles before crossing the IPP and Harry Allen to Red Butte 345kV transmission lines. After crossing the transmission lines, the alternative route turns northeast to parallel the Harry Allen to Red Butte 345kV transmission line approximately 1,500 feet to the east before entering the north side of the Red Butte substation. Notable features or places in proximity to the alternative route include Newcastle, Newcastle Reservoir, Enterprise, Ox Valley, and Central.

Alternative S4 – IPP East

Alternative S4 is 48.9 miles in length and is similar to Alternative S2, with the exception that the alternative route parallels the Sigurd to Red Butte No. 1 – 345kV transmission line approximately 1,500 feet to the east. The alternative route is also parallel to the UNEV Pipeline through Holt Canyon. Notable features or places within proximity to the alternative route include Newcastle, Newcastle Reservoir, Holt Canyon, Mountain Meadows Massacre NHL and Mountain Meadows Historic Site, and Central. Because the alternative route is located east of the existing transmission lines, it is farther away from the Mountain Meadows Massacre NHL and Mountain Meadows Historic Site than Alternative S2, but crosses 7.5 miles of IRAs.

Alternative S5 – Iron Springs and Pinto Creek (Proponent's Preferred Alternative)

Alternative S5 would be 59.0 miles in length. The alternative route runs south from the Black Mountains for approximately 16.2 miles before turning southwest at Iron Springs. From Iron Springs, the alternative route crosses through the Neck of the Desert (a narrow mountain valley between the Antelope Range and Granite Mountains) and along the southern bench of the Antelope Range before crossing SR 56. After crossing SR 56, the alternative route turns south at the Newcastle Reservoir and follows Pinto Creek, turning southwest after passing the community of Pinto. The alternative route then turns northwest approximately 2.2 miles south of Central to parallel two existing 345kV and 138kV transmission lines and enters the north side of the Red Butte Substation. Notable features or places in proximity to the alternative route include Iron Springs, Newcastle Reservoir, Pinto, Pine Valley, Santa Clara River, and Central.

This alternative was selected by the Proponent because it best meets their need to provide safe, reliable, adequate, and efficient service to southwestern Utah by providing physical separation from existing high-voltage transmission lines (e.g., IPP and Sigurd to Red Butte No. 1 – 345kV transmission line) and would require the least cost for permitting and construction to be passed on to ratepayers.

Alternative S6 – Iron Springs and Ox Valley

Alternative S6 is 61.8 miles in length and is similar to Alternative S5 between the Black Mountains and Newcastle Reservoir. South of the reservoir the alternative route turns west for approximately 3.3 miles and follows the same alignment as Alternative S3. Notable features or places in proximity to the route include Iron Springs, Newcastle Reservoir, Newcastle, Enterprise, Ox Valley, and Central.

Alternative S7 – Middle Hybrid Route

Alternative S7 is 49.8 miles in length and combines segments of Alternatives S2 and S4. This alternative route was developed in response to agency and public comments received on the Draft EIS (refer to Appendix M). The alternatives route would follow Alternative S2 to a point north of the Mountain Meadows Massacre Site NHL boundary, cross back east across the existing transmission lines and pipeline to follow Alternative S4, and continue south to the Red Butte Substation. Using segments of Alternative S2 to the point of crossover of the existing transmission lines would avoid about 5.2 miles of the Cove Mountain IRA. Crossing over to segments of Alternative S4 north of the Mountain Meadows Massacre Site NHL would mitigate cultural, historical, and visual impacts by placing more distance between the proposed transmission line and the NHL and would locate the Project behind (i.e., to the east of) the existing transmission lines. The crossover would require the transmission line to cross the existing direct-current (DC) IPP, which is a major transmission line delivering up to 1,800 MW of power to Southern California, and the existing Sigurd to Red Butte No. 1 transmission line. In a letter dated August 11, 2011, the Proponent responded to an earlier request from BLM to evaluate the middle hybrid alternative against its system planning criteria. The Proponent noted that the transmission line could be built using this Alternative S7 alignment, but it would not be prudent to cross the transmission lines and risk the reliability of the system. BLM requested an independent review from DOE (Mills 2011). The DOE concurred with the Proponent that multiple line crossings could affect reliability of the system but did not discount the technical feasibility of the alternative route. In a letter dated September 28, 2011, responding to BLM regarding questions posed by DOE during their independent review, the Proponent stated they would prefer to avoid line crossings of the IPP and Sigurd to Red Butte No. 1 transmission line due to ongoing safety issues and additional ongoing risk to reliability, the Proponent would be willing to construct the Project using the Alternative S7 alignment.

Alternative S7-A (route variation of Alternative S7) – Middle Hybrid Route 300 Feet East of Sigurd to Red Butte No. 1 Transmission Line Adjacent to Atchinson IRA (Agency Preferred Alternative)

Alternative S7-A, a route variation of Alternative S7, was also developed in response to agency and public comments received on the Draft EIS (refer to Appendix M). This alternative route variation is 49.8 miles in length and follows Alternative S7 to a point north of the Atchinson IRA boundary, where it crosses back west across the existing transmission lines (the IPP and Sigurd to Red Butte No. 1 transmission lines) and pipeline corridor, and follows the existing Sigurd to Red Butte No. 1 transmission line at a 300-foot offset on the eastern side of the transmission line for approximately 1.8 miles to just south of the Atchinson IRA boundary. From there it returns to the alignment of Alternative S7 to the Red Butte Substation. Following the existing Sigurd to Red Butte No. 1 transmission line 300 feet east of the line would reduce impacts on the Atchinson IRA while also mitigating cultural, historical, and visual impacts on the Mountain Meadows Massacre Site NHL and the Mountain Meadows Historic Site by placing distance between the proposed transmission line and the NHL (but lesser distance than under Alternative S7), locating the Project behind (i.e., to the east of) the existing transmission lines, and concentrating the linear utilities into a narrower corridor. The concerns of the Proponent about effects on reliability of the system associated with Alternative S7 also would be relevant to this route variation.

2.4.3 No Action Alternative

If no action is taken, the BLM right-of-way and USFS special-use authorization for the Project to cross federal lands would not be granted and the transmission line and ancillary facilities would not be constructed.

2.5 Alternatives Reviewed But Eliminated from Further Consideration

In the preparation of this document, an initial evaluation was made of a full range of alternatives. All reasonable alternatives were given further consideration, including alternatives to the transmission line option, new generation facilities, reliance on the existing transmission system, and alternative transmission technologies. Alternatives that were (1) ineffective (i.e., did not meet the agencies' purpose and need), (2) technically or economically infeasible, (3) inconsistent with the basic policy objectives of the management of an area (e.g., land use plans), (4) remote or speculative (i.e., could not be analyzed), or (5) substantially similar in design or effects to another alternative being analyzed were eliminated from further consideration.

2.5.1 Alternatives to a Transmission Line Option

Alternatives to constructing new transmission lines and substations, which would reduce the electrical load requirements of the system or provide additional capacity to the system, were considered but did not meet the purpose and need of the Project.

2.5.1.1 Electrical Load and Demand-Side Management and Energy Conservation

Load-management programs are designed to achieve reductions in load (i.e., the amount of power needed), primarily at the time of peak load. For example, by agreement with their customers, utilities can have direct control over loads that can be interrupted by the utility system operator during periods of peak demand by directly interrupting power supply to individual appliances or equipment. This method usually involves consumers allowing the utility to periodically interrupt service to water or space-heating units during the hours of peak load.

Another type of load-management program makes use of interruptible loads. An interruptible load is a load that can be separated from the system during periods of peak load or system disturbances, either by direct control of the utility system operator, or by action of the consumer at the direct request of the system operator. For example, large commercial and industrial consumers are candidates for interruptible load management, depending on the type of business.

Other load-management programs that limit peak loads shift peak load from on-peak to off-peak hours or encourage consumers to respond to changes in the utility's cost of providing power. This includes technologies that primarily shift all or part of a load from one time of day to another and may affect overall energy consumption. Examples include space- and water-heating storage systems, cool-storage systems, and load-limiting devices in energy management systems.

Demand-side management consists of electric utilities planning, implementing, and monitoring activities designed to encourage consumers to modify their levels and patterns of energy consumption. While demand-side management affects only a small percentage of the system load, utilities implement demand-side management programs to achieve two basic objectives: energy efficiency and load management.

Energy efficiency (or energy conservation) is achieved primarily through programs that reduce the overall energy consumption of specific end-user devices and systems by promoting high-efficiency equipment and building design. Energy-efficiency programs typically reduce energy consumption over many hours

during the year. Examples include energy-saving appliances and lighting, high-efficiency heating, ventilating, and air-conditioning systems or control modification, efficient building design, advanced electric motors and drive systems, and heat recovery systems.

The Proponent has implemented the following energy-efficiency and load-management programs:

- Since 2003, the Proponent has offered a residential/small commercial air conditioning load control program along the Wasatch Front. Currently, the initiative has approximately 80,000 participating customers. The system is dispatched during summer peak periods and yields approximately 70 MW of peak load relief. There is no energy savings associated with this initiative.

- Additionally since 2003, the Proponent has offered an irrigation-load-control program in southeast Idaho. The system is dispatched during peak periods (2 p.m. to 8 p.m.), and the Proponent currently has 208 MW of participating load. The Proponent also offers an irrigation-load-control program in Utah, although agriculture is much smaller in Utah. Currently, the Proponent realizes 5 MW of irrigation load control benefit in Utah on a scheduled-forward initiative. This was expected to grow in 2009, as the Proponent planned to offer an initiative beginning in 2009. It is anticipated the program will grow to approximately 30 MW of avoided peak demand in Utah.

Energy-efficiency and load-management programs are valuable tools that the Proponent is using and will continue to use to manage the demand for and consumption of energy. However, these programs do not address any of the need categories of the Project. While demand-side management programs focus on managing a very small part of the load on the system; two of the Project's primary needs are to increase transmission capacity and improve the ability of the Proponent's transmission system to transport energy into central Utah and to growth areas along the Wasatch Front, facilitating better operational management of the existing interconnected system. Further, energy-efficiency and load-management programs do not meet the BLM's purpose and need, which is to analyze the Proponent's application for a utility-scale transportation system across federal lands and enhance transportation infrastructure for collection and distribution of energy resources across the nation. Thus, these alternatives were eliminated from further consideration and detailed analysis.

2.5.1.2 New Generation Facilities or Other Types of Generation

The Proponent assesses electric generation needs and transmission expansion requirements on a long-term basis. An electrical system model is established to analyze different transmission and generation options geographically to deliver electricity to customers while evaluating electrical generation alternatives (i.e., natural gas, wind, geothermal, etc.) to assess financial requirements and risk. One of the Proponent's models studies various combinations of electrical generation alternatives and/or transmission to determine the mix of generation sources and transmission options and timing that minimizes investment and operating costs. These studies include electrical system reliability constraints, loads, generation/transmission costs and operating characteristics, transmission system configuration, electricity markets, fuel price variations, and emissions.

Electrical system modeling has indicated the optimal portfolio includes a mix of generation alternatives (i.e., base load generation, intermediate generations, and seasonal peaking generation) that can be delivered to the Proponent's customers. Additionally, market purchases from the Desert Southwest are particularly important for supporting northern and southern Utah loads prior to when generating facilities can be acquired and enabled by the Project.

Other types of generation, including distributed (local) generation resources, were also considered. Based on responses to the previous Proponent request for potential new generation resources, none of the current proposed facilities would meet the load growth demands in southern and central Utah and, therefore, would not meet the Project's purpose and need. Construction of the Project would provide flexibility to match customer load requirements in varying locations.

Distributed generation resources can be differentiated from centralized generation resources, primarily in terms of size, multiple units dispersed throughout an area, and they are usually installed at or near customer loads where the generated power is used. Distributed generation generally ranges in size from about 5,000 watts to 10 MW, in contrast to centralized generation resources that are typically hundreds of megawatts per site. Distributed generation is also more expensive per watt than central generation due to the types of technology used. Distributed generation resources technologies include solar photovoltaics, energy storage devices (e.g., batteries), micro turbines, mini wind turbines, and fuel cells. For the reasons described, it is most effective for the Proponent to use a centrally located generation unit, in addition to supporting seasonal or regional energy exchanges.

New and distributed generation resources did not meet the agencies' purpose and need, which is to analyze the Proponent's application for a utility-scale transportation system across federal lands, and therefore were eliminated from further consideration for this Project.

2.5.1.3 Existing Transmission Systems

Transmission capacity of the existing transmission paths within the Project area is fully allocated to meet native load obligations or point-to-point transmission service. The existing 345kV transmission line (Sigurd to Red Butte No. 1), as part of the electric supply grid, is currently being operated at full capacity. Therefore, the use of the existing transmission system was eliminated from further consideration for this Project.

2.5.1.4 Alternative Transmission Technologies

Alternative Voltage Levels

To provide the Project's needed capacity in the most cost effective manner, a 345kV line was chosen to match the existing voltage infrastructure of the local bulk transmission facilities. If a 345kV line is not built, then multiple 230kV lines or a 500kV line would be needed to meet the Project's needed capacity. However, multiple 230kV lines would be more costly and result in greater surface disturbance and resource impacts. Likewise, because there is no existing 500kV infrastructure in the area, the existing substation facilities would need to be greatly expanded or a new substation site would be required, thereby also resulting in greater cost, surface disturbance, and resource impacts than a single 345kV line. This alternative was dismissed because the effects would be substantially similar to or greater than those predicted to occur under the Proponent's Preferred Alternative.

Direct or Alternating Current Transmission

The main benefit of a DC system is better control of power flows over very long distances (i.e., more than 400 miles); whereas, line construction cost savings may be able to offset the high costs of DC terminal substations. To interconnect with an AC system, the DC must be converted to AC. Converter substations require more land than a typical AC substation, and costs for one 500kV DC converter station can be up

to $350 million (a potential total of $700 million for the two new substations) (Rocky Mountain Power 2008). The AC system selected allows for multiple substation interconnections necessary for load centers and for generation resources while being more economical than DC. A DC system also has limited ability for future expansion where additional future transmission capacity is needed and therefore requires a higher upfront cost. For these reasons, the AC design was chosen for the Project over a DC design.

Underground Transmission

Extra-high-voltage underground lines (345kV and 500kV) have been constructed in some parts of the United States, but only for short distances, and usually where circumstances dictated overhead lines were not feasible (e.g., in the vicinity of airports and urban centers).

High-voltage underground transmission lines have markedly different technological requirements than lower-voltage underground distribution lines. Underground high-voltage transmission lines require extensive cooling systems to dissipate the heat generated by the transmission of bulk energy. Cooling systems are complex and expensive. The extremely high cost of large cooling systems and other special design requirements are prohibitive for long-distance underground transmission and are estimated to be 10 times greater, or more, than the cost of constructing a 345kV overhead transmission line (National Grid 2009; Rocky Mountain Power 2008).

Operational problems are greater and the duration of outages is normally longer for underground transmission lines. When an outage of an underground line occurs, determining the cause and location of the damage, the replacement parts needed to repair the line, and actually repairing the line takes much more time than for an overhead line. Repairs to an underground line are also more expensive. If an underground line is damaged during the winter at a high elevation, the presence of snow would increase the length of time required and the degree of difficulty to repair the facility. The potential long-term outages associated with the 345kV transmission line would be unacceptable for a circuit carrying bulk power to a large area of south central/southern Utah.

The environmental impacts from construction of an underground transmission line would be similar to those for major pipeline construction. Typical construction would require a continuous trench between endpoints, resulting in ground disturbance along an entire right-of-way. By comparison, overhead transmission line construction typically results in partial disturbances of the right-of-way, primarily at individual tower sites, pulling and tensioning sites, staging areas, and in areas providing access to the right-of-way.

Because this alternative was not economically feasible, it was eliminated from further consideration.

New Transmission Technologies

Other technologies considered as alternatives for economical bulk-power transmission of electric energy to load centers included microwave, laser, and superconductors. Current research and development indicate some of these technologies eventually may become viable alternatives to overhead transmission systems; however, none of them are currently available for commercial use. Because they are remote and speculative and not technically feasible at this time, alternatives associated with new transmission technologies were eliminated from further consideration.

2.5.2 Transmission Line Routes Considered and Eliminated

Transmission line alternative routes and segments considered and eliminated based on Level 1 and Level 2 screening (described in Section 2.4.1.5) are shown on Map 2-3 and briefly described in the following sections. These alternative routes and segments did not perform as well as other routes and segments in the same general vicinity. Several segments that were eliminated prior to Level 1 and Level 2 screening are also described.

2.5.2.1 Pre Level 1 and Level 2 Screening

- **Links 39, 20, 50, 90, 115, 180, 182, 183.** This route segment would conflict with the Proponent's system planning and reliability criteria and purpose and need for the Project because it parallels a high-voltage transmission line (the Sigurd to Red Butte No. 1 – 345kV transmission line), which shares the same purpose and connection points as the Project. Therefore, an alternative route including this route segment was eliminated from further consideration in that it would pose a high risk to system planning and reliability criteria and thus does not meet the Proponent's purpose and need for the Project.

- **Link 185.** This route segment was no longer relevant after Links 39, 20, 50, 90, 115, 180, 182, and 183 were eliminated from consideration. In addition, the route segment crosses over a rifle shooting range and is in proximity to the Three Peaks Recreation Area. An alternative route including this route segment was eliminated from further consideration because its implementation does not meet the Proponent's purpose and need for the Project.

- **Link 110.** This link was no longer needed after Links 115, 180, 182, and 183 were eliminated from further consideration. An alternative route including this route segment was eliminated from further consideration because its implementation would not be technically feasible.

- **Link 40.** This route segment would conflict with several existing land uses, including residential, commercial, and agricultural. Since it generally was an option to Links 33 and 30, but would substantially have greater environmental effects on these land uses (e.g., impairing current agriculture activities), an alternative route including this route segment was eliminated from further consideration because it was substantially similar in design to an alternative that was analyzed.

- **Links 60, 62.** This route segment crosses through Fremont Indian State Park. Since an alternative route including this route segment was substantially similar in design to an alternative that was analyzed (Link 64), but would have substantially greater environmental effects, this route was eliminated from further consideration.

- **Link 300.** This route segment would potentially cause visual impacts on viewers at Cove Fort. Link 305 was added further to the south to mitigate visual impacts and address concerns raised by Millard County. An alternative route including Link 300 was eliminated because it was substantially similar in design to another alternative that was analyzed.

- **Link 310.** This route segment parallels Black Rock Road. Link 320 was added to provide a shorter, more direct route that would be less costly to construct. Link 310 would have been a longer and more indirect route, which equates to increased costs and increased environmental effects. An alternative route including this route segment was eliminated because it was substantially similar in design to another alternative that was analyzed.

- **Link 340.** This route segment would have paralleled an alternative route that was, at the time of analysis, being considered for the Energy Gateway South 500kV Transmission Line Project and would have conflicted with system planning and reliability criteria stated in the Proponent's purpose and need. The Gateway South 500kV segment within this Project study area has since been eliminated. Link 340 would have greater environmental effects than a route along Links 350 and 345. An alternative route including Link 340 was eliminated from further consideration because it was substantially similar in design to another alternative that was analyzed.

- **Links 370, 375.** This route segment parallels Black Rock Road. Links 360 and 365 were added to provide a shorter, more direct route that would be less costly to construct. Links 370 and 375 would have been a longer and more indirect route segment, which equates to increased costs and increased environmental effects. An alternative route including this route segment was eliminated from further consideration because it was substantially similar in design to another alternative that was analyzed.

- **Links 378, 400, 401, and 410.** This route segment would conflict with residential and agricultural land uses near Milford and the planned expansion of the Milford Wind Farm. Because of potential conflict with Milford Wind Farm expansion plans, Millard County stated they could not consider a request by the Proponent to amend the Millard County General Plan to allow granting of a conditional use permit for this alternative route. Other alternatives parallel to the IPP were determined to be adequate alternatives to this route segment and avoided the identified land use conflicts. FWS also expressed concern about the potential impacts on raptor species (such as golden eagles) related to the attraction of individuals to perching opportunities provided by transmission structures and carrion provided by road kills along State Highway 257. This route segment was eliminated from further consideration because it was substantially similar in design to another alternative that was analyzed.

2.5.2.2 Northern Area – Sigurd Substation to South of the Black Mountains

Level 1 Screening

Sigurd Substation to Blundell

- **Link 28.** This route segment would conflict with existing and future land uses, primarily agriculture. Since an alternative including this link would be substantially similar in design to another alternative being analyzed (an alternative including Link 33), but would have greater environmental effects, it was eliminated from further consideration.

Blundell to Milford

- **Links 80, 85, and 465.** This route segment would conflict with existing and future land uses near Milford. The Beaver County Commission expressed concerns with this route and recommended an alternative route north of Milford (Links 385, 386) to avoid these conflicts. Because an alternative route including Links 80, 85, 465 would be substantially similar in design to another alternative analyzed, but would have greater environmental effects than Links 385 and 386, an alternative route including this segment was eliminated from further consideration.

Level 2 Screening

Cove Fort to South of the Black Mountains

- **Links 420, 425, and 485.** This route segment would conflict with irrigated agriculture and would be in proximity to residences north of Beaver City. The route segment crosses potential Utah prairie dog habitat as well as a greater sage-grouse lek and brooding habitat. In addition, this route alignment was not supported by Beaver County Commissioners, and the agency ID Team determined several viable alternatives exist through or around the Mineral Mountains. This route was eliminated from further consideration.

2.5.2.3 Southern Area – South of the Black Mountains to Red Butte Substation

Level 1 Screening

- **Link 440.** This route segment, when compared to Link 443, was longer and had greater impacts on recreation resources, future land use, and high scenic integrity objectives (SIO) on the Dixie National Forest. Link 443 was added as an alternate route to Link 440 and provided a shorter and more direct route that would be less costly to construct and have lower impacts; therefore, Link 440 was eliminated from consideration because it was substantially similar in design to another alternative route being analyzed.

Level 2 Screening

- No links were eliminated from consideration as a result of Level 2 screening.

2.6 Summary Comparison of Alternatives

This section summarizes the alternatives comparison process and results, including determination of the route exhibiting the least impact on the environment overall and the selection of the Agency Preferred Alternative on federal lands. This section also identified the Proponent's Preferred Alternative.

Tables 2-11a through 2-11d provide a detailed comparative analysis of the resources for each alternative route. For each resource, the table identifies key resource elements and associated impacts. A determination of potential significant impacts remaining after mitigation and cumulative effects (if present) also are identified. The basis for the information summarized for each resource in Table 2-12 (located at the end of this chapter) is contained in Chapter 3.

The comparison process resulted in the determination of the route exhibiting the least impact on the environment overall (described in Section 2.6.1) and informed the Authorized Officers in making the selection of an Agency Preferred Alternative on federal lands (refer to Section 2.6.2).

2.6.1 Environmentally Preferred Alternative

In an EIS, the alternative or alternatives that are considered to be environmentally preferable are identified. In this EIS, the environmentally preferred alternative is the alternative route that, on balance,

appears to have the lowest overall impact on the natural, human, and cultural environment, including resource uses.

The route that exhibits the least impact overall is a combination of Alternative N2 and Alternative S2. After implementation of measures to lessen impacts, significant long-term impacts resulting from implementation of the Project along this route, are anticipated only in localized areas. These areas include 2.1 miles of moderate-to-high impacts on views from the Fremont State Park and other recreation and travel-corridor views, on views from the Mountain Meadows Massacre Site NHL and Mountain Meadows Historic Site and views from portions of the Old Spanish National Historic Trail (NHT), and some residences.

In the Draft EIS, Alternative N1 in the northern portion of the Project area exhibited the least impact on the environmental resources and resource uses analyzed. Since publication of the Draft EIS in May 2011, a private wind developer has obtained development rights on private lands crossed by Links 365 and 380 and intends to complete construction of a new wind facility prior to BLM's decision on the Project. Link 380 is located within the designated WWEC containing the IPP; however, wind turbines are planned for development on private land within the designated utility corridor, thereby precluding use of the designated utility corridor for the proposed transmission line (Alternative N1). Both Beaver and Millard counties support the development of the wind farm and have approved permit applications for the wind farm since the release of the Draft EIS. In addition, Millard County provided formal comments noting that they would not support amending the County General Plan to allow for a utility corridor along the alignment of Alternative N1. Based on the reasons outlined here, Alternative N1 is no longer a technically feasible and viable alternative for the transmission line. Therefore, the alternative route in the northern portion of the Project area that exhibits the least environmental impact overall is Alternative N2.

The IRAs, identified and mapped by the USFS, are undeveloped and meet the minimum criteria for potential future wilderness consideration by the USFS (USDA 2001); therefore, development in these areas should be avoided. In the southern portion of the Project area, Alternative S2 avoids crossing through IRAs on the Dixie National Forest. Alternative S2 is, however, located within approximately 1,458 feet (0.25 mile) of the northern parcel of the Mountain Meadows Massacre Site NHL and less than 700 feet (0.13 mile) of the southern parcel of the Mountain Meadows Massacre Site NHL. The Mountain Meadows Massacre Site NHL was given landmark status on June 30, 2011 (after the Draft EIS was published). In accordance with the Secretary of the Interior's Standards and Guidelines for Federal Agency Historic Preservation Programs and associated guidelines, an agency evaluating an undertaking that could affect directly or indirectly and adversely an NHL should consider all "prudent and feasible alternatives to avoid an adverse effect on the NHL."

2.6.2 Agency Preferred Alternative on Federal Lands

The Agency Preferred Alternative on federal lands is the alternative the BLM in coordination with the cooperating agencies believe would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors. USDI regulations at 43 CFR 46.20(d) allows the responsible official to render a decision on a proposed action as long as it is within the range of alternatives discussed in the relevant environmental document. The responsible official's decision may combine elements of alternatives discussed, in the relevant environmental document, if the effects of such combined elements of alternatives are reasonably apparent from the analysis. The Agency Preferred Alternative for this Project is the combination of Alternative N2-A (a route variation of Alternative N2) and Alternative S7-A (a route variation of Alternative S7).

2.6.3 Proponent's Preferred Alternative

Alternative N6 and Alternative S5 represent the Proponent's proposed alternative routes. Alternative N6 was selected by the Proponent because it provides physical separation from other high-voltage transmission lines (e.g., IPP) and underground pipelines (e.g., Kern River Pipeline). Similarly, Alternative S5 was selected by the Proponent because it best meets their need to provide safe, reliable, adequate, and efficient service to southwestern Utah by providing physical separation from existing high-voltage transmission lines (e.g., IPP and Sigurd to Red Butte No. 1 – 345kV transmission line).

TABLE 2-11a
ALTERNATIVE ROUTE COMPARISON
WATER RESOURCES, GEOLOGY AND SOILS, PALEONTOLOGY, AIR QUALITY, AND BIOLOGY

Alternative Route	Length (miles)	Water Resources	Geology and Soils	Paleontology	Air Quality	Biology	
						Wildlife	Vegetation
Northern – Sigurd Substation to South of the Black Mountains							
Alternative N1 Black Rock Road to Intermountain Power Project 500kV transmission line (IPP) north of Milford Wind Farm	120.6	**Inventory** ▪ 6 perennial streams/rivers ▪ 23 named intermittent streams ▪ 39 unnamed intermittent or ephemeral streams ▪ 3 canals ▪ 4 wells within 600 feet of centerline ▪ 3 springs within 600 feet of centerline ▪ 7.8 miles of rivers/streams ▪ 12.8 miles of shallow groundwater ▪ 0.7 mile of springs ▪ 0.1 mile of wells **Impacts** ▪ 1,099.5 acres of temporary disturbance ▪ 352.6 acres of permanent disturbance ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 120.6 miles of low impact	**Inventory** ▪ 5.3 miles of designated farmland soils ▪ 14.1 miles of high potential for water erosion ▪ 6.6 miles of active mines, producing wells, or mining claims ▪ 18.0 miles of potential mineral resources, inactive mining claims, or geothermal areas ▪ 14.0 miles of high sensitivity from geologic hazards ▪ 24.9 miles of moderate sensitivity from geologic hazards **Impacts** ▪ 18.4 miles of moderate impact on soils ▪ 0.0 mile of high impact on mineral resources ▪ 5.1 miles of moderate impact on mineral resources ▪ 22.9 miles of low-to-moderate impact from geologic hazards	**Inventory** ▪ 7 localities within 1.0 mile ▪ 10.4 miles of PFYC[1] of 4 or 5 **Impacts** ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact1 ▪ 120.6 miles of low impact	**Inventory** ▪ NO_x – 158 tons ▪ SO_2 – 0.5 tons ▪ CO – 156 tons ▪ VOC – 14 tons ▪ PM_{10} – 492 tons ▪ $PM_{2.5}$ – 58 tons ▪ CO_2e – 33,075 tons **Impacts** ▪ NO_2, CO, SO_2, $PM_{10}/PM_{2.5}$ within standards for all averaging periods	**Inventory** ▪ 69.9 miles of crucial pronghorn habitat north, west, and southwest of Milford ▪ 33.4 miles of crucial winter mule deer habitat primarily in and around the Mineral and Pahvant ranges ▪ 7.4 miles of sage-grouse brooding habitat ▪ 7.4 miles of crucial winter habitat ▪ 21.3 miles of high and 32.7 miles of medium quality raptor habitat in and around the Mineral and Pahvant ranges and 66.6 miles of low quality raptor habitat along Black Rock Road and the IPP ▪ 25.4 miles of suitable pygmy rabbit habitat **Impacts** ▪ 99.8 miles of low residual impact on big game ▪ 7.4 miles of high impacts resulting from federally listed species ▪ 30.3 miles of moderate residual impact on sensitive habitats ▪ 90.3 miles of low residual impact on sensitive habitats	**Inventory** ▪ 5.1 miles of habitat for sensitive plant species Elsinore buckwheat, Ward's beardtongue, and Utah phacelia ▪ 352.6 acres of permanent disturbance ▪ 364.6 acres of vegetation clearing **Impacts** ▪ 5.1 miles of moderate residual impact on sensitive plant species Elsinore buckwheat, Ward's beardtongue, and Utah phacelia ▪ 10.6 miles of low residual impact on vegetation communities ▪ 110.0 miles of moderate impact on vegetation

TABLE 2-11a
ALTERNATIVE ROUTE COMPARISON
WATER RESOURCES, GEOLOGY AND SOILS, PALEONTOLOGY, AIR QUALITY, AND BIOLOGY

Alternative Route	Length (miles)	Water Resources	Geology and Soils	Paleontology	Air Quality	Biology	
						Wildlife	Vegetation
Alternative N2 Black Rock Road to IPP south of Milford Wind Farm	120.4	**Inventory** ▪ 6 perennial streams/rivers ▪ 19 named intermittent streams ▪ 61 unnamed intermittent or ephemeral streams ▪ 3 canals ▪ 5 wells within 600 feet of centerline ▪ 9.3 miles of rivers/streams ▪ 6.7 miles of shallow groundwater ▪ 0.9 mile of springs ▪ 0.1 mile of wells **Impacts** ▪ 1,103.0 acres of temporary disturbance ▪ 344.0 acres of permanent disturbance ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 120.4 miles of low impact	**Inventory** ▪ 4.7 miles of designated farmland soils ▪ 16.5 miles of high potential for water erosion ▪ 6.4 miles of high potential for wind erosion ▪ 7.0 miles of active mines, producing wells, or mining claims ▪ 21.1 miles of potential mineral resources, inactive mining claims, or geothermal areas ▪ 14.4 miles of high sensitivity from geologic hazards ▪ 25.9 miles of moderate sensitivity to geologic hazards **Impacts** ▪ 26.6 miles of moderate impact on soils ▪ 0.0 mile of high impact on mineral resources ▪ 5.5 miles of moderate impact on mineral resources ▪ 24.1 miles of low-to-moderate impact from geologic hazards	**Inventory** ▪ 7 localities within 1.0 mile ▪ 10.4 miles of PFYC[1] of 4 or 5 **Impacts** ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact[1] ▪ 120.4 miles of low impact	**Inventory** ▪ NO_x – 158 tons ▪ SO_2 – 0.5 tons ▪ CO – 156 tons ▪ VOC – 14 tons ▪ PM_{10} – 491 tons ▪ $PM_{2.5}$ – 58 tons ▪ CO_2e – 33,075 tons **Impacts** ▪ NO_2, CO, SO_2, $PM_{10}/PM_{2.5}$ within standards for all averaging periods	**Inventory** ▪ 69.7 miles of crucial pronghorn habitat north, west, and southwest of Milford ▪ 43.2 miles of crucial winter mule deer habitat primarily in and around the Mineral and Pahvant ranges ▪ 7.4 miles of sage-grouse brooding habitat northeast and west of the Mineral Range ▪ 7.4 miles of sage-grouse crucial winter habitat ▪ 33.5 miles of high and 32.7 miles of medium quality habitat primarily in and around the Mineral and Pahvant ranges and 54.2 miles of low quality raptor habitat along Black Rock Road and the IPP ▪ 34.9 miles of suitable pygmy rabbit habitat **Impacts** ▪ 99.6 miles of low impacts on big game ▪ 7.4 miles of high impacts resulting from federally listed species ▪ 39.8 miles of moderate residual impact on sensitive habitats ▪ 80.6 miles of low residual impact on sensitive habitats	**Inventory** ▪ 5.1 miles of habitat for sensitive plant species Elsinore buckwheat, Ward's beardtongue, and Utah phacelia ▪ 344.0 acres of permanent disturbance ▪ 364.6 acres of vegetation clearing **Impacts** ▪ 5.1 miles of moderate residual impact on sensitive plant species Elsinore buckwheat, Ward's beardtongue, and Utah phacelia ▪ 10.6 miles of low residual impact on vegetation communities ▪ 110.5 miles of moderate impact on vegetation

TABLE 2-11a
ALTERNATIVE ROUTE COMPARISON
WATER RESOURCES, GEOLOGY AND SOILS, PALEONTOLOGY, AIR QUALITY, AND BIOLOGY

Alternative Route	Length (miles)	Water Resources	Geology and Soils	Paleontology	Air Quality	Biology	
						Wildlife	Vegetation
Alternative N2-A (route variation of Alternative N2) Black Rock Road to IPP south of Milford Wind Farm 1,500 feet east of Kern River Pipeline (Agency Preferred Alternative)	120.0	**Inventory** ▪ 6 perennial streams/rivers ▪ 19 named intermittent streams ▪ 61 unnamed intermittent or ephemeral streams ▪ 3 canals ▪ 6 wells within 600 feet of centerline ▪ 1 spring within 600 feet of centerline ▪ 9.2 miles of rivers/streams ▪ 6.7 miles of shallow groundwater ▪ 1.1 miles of springs ▪ 0.2 mile of wells **Impacts** ▪ 1,099.8 acres of temporary disturbance ▪ 344.0 acres of permanent disturbance ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 120.0 miles of low impact	**Inventory** ▪ 4.7 miles of designated farmland soils ▪ 16.5 miles of high potential for water erosion ▪ 6.5 miles of high potential for wind erosion ▪ 8.0 miles of active mines, producing wells, or mining claims ▪ 20.2 miles of potential mineral resources, inactive mining claims, or geothermal areas ▪ 14.8 miles of high sensitivity from geologic hazards ▪ 26.2 miles of moderate sensitivity to geologic hazards **Impacts** ▪ 26.7 miles of moderate impact on soils ▪ 0.0 mile of high impacts on mineral resources ▪ 6.4 miles of moderate impact on mineral resources ▪ 24.5 miles of low-to-moderate impact from geologic hazards	**Inventory** ▪ 7 localities within 1.0 mile ▪ 10.4 miles of PFYC[1] of 4 or 5 **Impacts** ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 120.0 miles of low impact	**Inventory** ▪ NO_x – 158 tons ▪ SO_2 – 0.5 tons ▪ CO – 156 tons ▪ VOC – 14 tons ▪ PM_{10} – 491 tons ▪ $PM_{2.5}$ – 58 tons ▪ CO_2e – 33,075 tons **Impacts** ▪ NO_2, CO, SO_2, $PM_{10}/PM_{2.5}$ within standards for all averaging periods	**Inventory** ▪ 69.9 miles of crucial pronghorn habitat north, west, and southwest of Milford ▪ 44.2 miles of crucial winter mule deer habitat primarily in and around the Mineral and Pahvant ranges ▪ 7.4 miles of sage-grouse brooding habitat ▪ 7.4 miles of sage-grouse crucial winter habitat ▪ 33.7 miles of high and 32.1 miles of medium quality habitat primarily in and around the Mineral and Pahvant ranges and 54.2 miles of low quality raptor habitat along Black Rock Road and the IPP ▪ 34.0 miles of suitable pygmy rabbit habitat **Impacts** ▪ 99.8 miles of low impacts on big game ▪ 7.4 miles of high impacts resulting from federally listed species ▪ 38.9 miles of moderate residual impact on sensitive habitats ▪ 81.1 miles of low residual impact on sensitive habitats	**Inventory** ▪ 5.1 miles of habitat for sensitive plant species Elsinore buckwheat, Ward's beardtongue, and Utah phacelia ▪ 344.4 acres of permanent disturbance ▪ 362.7 acres of vegetation clearing **Impacts** ▪ 5.1 miles of moderate residual impact on sensitive plant species Elsinore buckwheat, Ward's beardtongue, and Utah phacelia ▪ 10.0 miles of low residual impact on vegetation communities ▪ 110.0 miles of moderate impact on vegetation

TABLE 2-11a
ALTERNATIVE ROUTE COMPARISON
WATER RESOURCES, GEOLOGY AND SOILS, PALEONTOLOGY, AIR QUALITY, AND BIOLOGY

Alternative Route	Length (miles)	Water Resources	Geology and Soils	Paleontology	Air Quality	Biology	
						Wildlife	Vegetation
Alternative N3 Black Rock Road Parallel to Kern River Pipeline	117.2	**Inventory** ▪ 6 perennial streams/rivers ▪ 23 named intermittent streams ▪ 57 unnamed intermittent or ephemeral streams ▪ 6 canals ▪ 5 wells ▪ 9.9 miles of rivers/streams ▪ 0.6 mile of springs ▪ 0.2 mile of wells **Impacts** ▪ 1,077.3 acres of temporary disturbance ▪ 303.8 acres of permanent disturbance ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 117.2 miles of low impact	**Inventory** ▪ 5.5 miles of designated farmland soils ▪ 7.9 miles of high potential for water erosion ▪ 15.8 miles of high potential for wind erosion ▪ 5.9 miles of active mines, producing wells, or mining claims ▪ 24.7 miles of potential mineral resources, inactive mining claims, or geothermal areas ▪ 15.4 miles of high sensitivity from geologic hazards ▪ 27.5 miles of moderate sensitivity to geologic hazards **Impacts** ▪ 28.2 miles of moderate impact on soils ▪ 0.0 mile of high impact on mineral resources ▪ 4.4 miles of moderate impact on mineral resources ▪ 26.3 miles of moderate impact from geologic hazards	**Inventory** ▪ 5 localities within 1.0 mile ▪ 11.7 miles of PFYC[1] of 4 or 5 **Impacts** ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 117.2 miles of low impact	**Inventory** ▪ NO_x – 158 tons ▪ SO_2 – 0.5 tons ▪ CO – 156 tons ▪ VOC – 14 tons ▪ PM_{10} – 484 tons ▪ $PM_{2.5}$ – 57 tons ▪ CO_2e – 33,075 tons **Impacts** ▪ NO_2, CO, SO_2, $PM_{10}/PM_{2.5}$ within standards for all averaging periods	**Inventory** ▪ 1.6 miles of occupied Utah prairie dog habitat ▪ 58.7 miles of crucial pronghorn habitat north, west, and southwest of Milford ▪ 55.3 miles of crucial winter mule deer habitat primarily in and around the Mineral and Pahvant ranges ▪ 8.2 miles within 2.0 miles of sage-grouse lek and 20.3 miles of sage-grouse crucial brooding habitat ▪ 7.3 miles of sage-grouse crucial winter habitat ▪ 60.0 miles of high and 43.9 miles of medium quality raptor habitat primarily in and around the Mineral and Pahvant ranges and 13.3 miles of low quality raptor habitat along Black Rock Road and the IPP ▪ 53.7 miles of suitable pygmy rabbit habitat **Impacts** ▪ 94.4 miles of low impacts on big game ▪ 21.1 miles of high impact resulting from federally listed species ▪ 58.6 miles of moderate residual impact on sensitive habitats ▪ 58.6 miles of low residual impact on sensitive habitats	**Inventory** ▪ 5.1 miles of habitat for sensitive plant species Elsinore buckwheat, Ward's beardtongue, and Utah phacelia ▪ 303.8 acres of permanent disturbance ▪ 418.1 acres of vegetation clearing **Impacts** ▪ 5.0 miles of moderate residual impact on sensitive plant species Elsinore buckwheat, Ward's beardtongue, and Utah phacelia ▪ 10.2 miles of low residual impact on vegetation communities ▪ 107.0 miles of moderate impact on vegetation

TABLE 2-11a
ALTERNATIVE ROUTE COMPARISON
WATER RESOURCES, GEOLOGY AND SOILS, PALEONTOLOGY, AIR QUALITY, AND BIOLOGY

Alternative Route	Length (miles)	Water Resources	Geology and Soils	Paleontology	Air Quality	Biology	
						Wildlife	Vegetation
Alternative N4 Mineral Mountains to IPP south of Milford Wind Farm	109.4	**Inventory** ▪ 6 perennial streams/rivers ▪ 24 named intermittent streams ▪ 45 unnamed intermittent or ephemeral streams ▪ 3 canals ▪ 7 wells within 600 feet of centerline ▪ 9.0 miles of rivers/streams ▪ 6.7 miles of shallow groundwater ▪ 0.9 mile of springs ▪ 0.4 mile of wells **Impacts** ▪ 1,010.6 acres of temporary disturbance ▪ 351.2 acres of permanent disturbance ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 109.4 miles of low impact	**Inventory** ▪ 0.7 mile of designated farmland soils ▪ 13.9 miles of high potential for water erosion ▪ 4.9 miles of high potential for wind erosion ▪ 6.4 miles of active mines, producing wells, or mining claims ▪ 21.7 miles of potential mineral resources, inactive mining claims, or geothermal areas ▪ 14.5 miles of high sensitivity from geologic hazards ▪ 28.8 miles of moderate sensitivity to geologic hazards **Impacts** ▪ 19.4 miles of moderate impact on soils ▪ 0.0 mile of high impact on mineral resources ▪ 5.3 miles of moderate impact on mineral resources ▪ 24.4 miles of moderate impact from geologic hazards	**Inventory** ▪ 7 localities within 1.0 mile ▪ 10.4 miles of PFYC[1] of 4 or 5 **Impacts** ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 109.4 miles of low impact	**Inventory** ▪ NO_x – 158 tons ▪ SO_2 – 0.5 tons ▪ CO – 156 tons ▪ VOC – 14 tons ▪ PM_{10} – 488 tons ▪ $PM_{2.5}$ – 57 tons ▪ CO_2e – 33,075 tons **Impacts** ▪ NO_2, CO, SO_2, $PM_{10}/PM_{2.5}$ within standards for all averaging periods	**Inventory** ▪ 48.3 miles of crucial pronghorn habitat north, west, and southwest of Milford ▪ 41.1 miles of crucial winter mule deer habitat primarily in and around the Mineral and Pahvant ranges ▪ 7.4 miles of sage-grouse brooding habitat northeast of Milford ▪ 7.4 miles of sage-grouse crucial winter habitat ▪ 35.8 miles of high and 32.7 miles of medium quality raptor habitat primarily in and around the Mineral and Pahvant ranges; 40.9 miles of low quality raptor habitat along Black Rock Road and the IPP ▪ 19.0 miles of suitable pygmy rabbit habitat **Impacts** ▪ 88.6 miles of low impacts on big game ▪ 7.4 miles of high impacts resulting from federally listed species ▪ 23.9 miles of moderate residual impact on sensitive habitats ▪ 85.5 miles of low residual impact on sensitive habitats	**Inventory** ▪ 5.1 miles of habitat for sensitive plant species Elsinore buckwheat, Ward's beardtongue, and Utah phacelia ▪ 351.2 acres of permanent disturbance ▪ 370.4 acres of vegetation clearing **Impacts** ▪ 5.1 miles of moderate residual impact on sensitive plant species Elsinore buckwheat, Ward's beardtongue, and Utah phacelia ▪ 12.1 miles of low residual impact on vegetation communities ▪ 97.3 miles of moderate impact on vegetation

TABLE 2-11a
ALTERNATIVE ROUTE COMPARISON
WATER RESOURCES, GEOLOGY AND SOILS, PALEONTOLOGY, AIR QUALITY, AND BIOLOGY

Alternative Route	Length (miles)	Water Resources	Geology and Soils	Paleontology	Air Quality	Biology	
						Wildlife	Vegetation
Alternative N5 Mineral Mountains to Kern River Pipeline	106.2	**Inventory** ▪ 6 perennial streams/rivers ▪ 23 named intermittent streams ▪ 52 unnamed intermittent or ephemeral streams ▪ 7 wells within 600 feet of centerline ▪ 3 canals ▪ 9.6 miles of rivers/streams ▪ 0.6 mile of springs ▪ 0.5 mile of wells **Impacts** ▪ 985.4 acres of temporary disturbance ▪ 311.0 acres of permanent disturbance ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 106.2 miles of low impact	**Inventory** ▪ 1.5 miles of designated farmland soils ▪ 5.3 miles of high potential for water erosion ▪ 14.3 miles of high potential for wind erosion ▪ 5.3 miles of active mines, producing wells, or mining claims ▪ 25.3 miles of potential mineral resources, inactive mining claims, or geothermal areas ▪ 15.5 miles of high sensitivity from geologic hazards ▪ 30.4 miles of moderate sensitivity to geologic hazards ▪ Impacts ▪ 21.0 miles of moderate impact on soils ▪ 0.0 mile of high impact on mineral resources ▪ 4.2 miles of moderate impact on mineral resources ▪ 26.6 miles of moderate impact from geologic hazards	**Inventory** ▪ 5 localities within 1.0 mile ▪ 11.7 miles of PFYC[1] of 4 or 5 **Impacts** ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 106.2 miles of low impact	**Inventory** ▪ NO_x – 158 tons ▪ SO_2 – 0.5 tons ▪ CO – 156 tons ▪ VOC – 14 tons ▪ PM_{10} – 481 tons ▪ $PM_{2.5}$ – 57 tons ▪ CO_2e – 33,075 tons **Impacts** ▪ NO_2, CO, SO_2, $PM_{10}/PM_{2.5}$ within standards for all averaging periods	**Inventory** ▪ 1.6 mile of occupied Utah prairie dog habitat ▪ 37.3 miles of crucial pronghorn habitat north and southwest of Milford ▪ 53.2 miles of crucial winter mule deer habitat primarily in and around the Mineral and Pahvant ranges ▪ 8.2 miles within 2.0 miles of sage-grouse lek and 20.3 miles of sage-grouse crucial brooding habitat ▪ 7.3 miles of sage-grouse crucial winter habitat ▪ 62.3 miles of high and 43.9 miles of medium quality raptor habitat primarily in and around the Mineral and Pahvant ranges ▪ 38.1 miles of suitable pygmy rabbit habitat **Impacts** ▪ 83.4 miles of low impacts on big game ▪ 21.1 miles of high impacts resulting from federally listed species ▪ 42.7 miles of moderate residual impact on sensitive habitats ▪ 63.5 miles of low residual impact on sensitive habitats	**Inventory** ▪ 5.1 miles of habitat for sensitive plant species Elsinore buckwheat, Ward's beardtongue, and Utah phacelia ▪ 311.0 acres of permanent disturbance ▪ 423.8 acres of vegetation clearing **Impacts** ▪ 5.1 miles of moderate residual impact on sensitive plant species Elsinore buckwheat, Ward's beardtongue, and Utah phacelia ▪ 12.4 miles of low residual impact on vegetation communities ▪ 93.8 miles of moderate impact on vegetation

TABLE 2-11a
ALTERNATIVE ROUTE COMPARISON
WATER RESOURCES, GEOLOGY AND SOILS, PALEONTOLOGY, AIR QUALITY, AND BIOLOGY

Alternative Route	Length (miles)	Water Resources	Geology and Soils	Paleontology	Air Quality	Biology	
						Wildlife	Vegetation
Alternative N6 Mineral Mountains 1,500 feet east of Kern River Pipeline (Proponent's Preferred Alternative)	105.4	**Inventory** ▪ 6 perennial streams/rivers ▪ 23 named intermittent streams ▪ 42 unnamed intermittent or ephemeral streams ▪ 2 canals ▪ 1 well within 600 feet of centerline ▪ 10.8 miles of rivers/streams ▪ 0.4 mile of wells **Impacts** ▪ 977.3 acres of temporary disturbance ▪ 371.2 acres of permanent disturbance ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 105.4 miles of low impact	**Inventory** ▪ 0.8 mile of designated farmland soils ▪ 5.4 miles of high potential for water erosion ▪ 15.5 miles of high potential for wind erosion ▪ 5.6 miles of active mines, producing wells, or mining claims ▪ 26.0 miles of potential mineral resources, inactive mining claims, or geothermal areas ▪ 16.2 miles of high sensitivity from geologic hazards ▪ 33.1 miles of moderate sensitivity to geologic hazards **Impacts** ▪ 21.6 miles of moderate impact on soils ▪ 0.0 mile of high impact on mineral resources ▪ 4.5 miles of moderate impact on mineral resources ▪ 27.5 miles of moderate impact from geologic hazards	**Inventory** ▪ 5 localities within 1.0 mile ▪ 12.3 miles of PFYC[1] of 4 or 5 **Impacts** ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 105.4 miles of low impact	**Inventory** ▪ NO_x – 158 tons ▪ SO_2 – 0.5 tons ▪ CO – 156 tons ▪ VOC – 14 tons ▪ PM_{10} – 490 tons ▪ $PM_{2.5}$ – 58 tons ▪ CO_2e – 33,075 tons **Impacts** ▪ NO_2, CO, SO_2, $PM_{10}/PM_{2.5}$ within standards for all averaging periods	**Inventory** ▪ 1.5 miles of occupied Utah prairie dog habitat ▪ 36.7 miles of crucial pronghorn habitat north and southwest of Milford ▪ 56.6 miles of crucial winter mule deer habitat primarily in and around the Mineral and Pahvant ranges ▪ 8.3 miles within 2.0 miles of sage-grouse lek buffer ▪ 20.7 miles of sage-grouse crucial brooding habitat ▪ 7.4 miles of sage-grouse crucial winter habitat ▪ 61.7 miles of high and 43.7 miles of medium quality raptor habitat primarily in and around the Mineral and Pahvant ranges ▪ 36.6 miles of suitable pygmy rabbit habitat **Impacts** ▪ 83.1 miles of low impacts on big game ▪ 21.3 miles of high impacts resulting from federally listed species ▪ 41.5 miles of moderate residual impact on sensitive habitats ▪ 63.9 miles of low residual impact on sensitive habitats	**Inventory** ▪ 5.1 miles of habitat for sensitive species Elsinore buckwheat, Ward's beardtongue, and Utah phacelia ▪ 371.2 acres of permanent disturbance ▪ 481.1 acres of vegetation clearing **Impacts** ▪ 5.1 miles of moderate residual impact on sensitive plant species Elsinore buckwheat, Ward's beardtongue, and Utah phacelia ▪ 11.5 miles of low residual impact on vegetation communities ▪ 93.9 miles of moderate impact on vegetation

TABLE 2-11a
ALTERNATIVE ROUTE COMPARISON
WATER RESOURCES, GEOLOGY AND SOILS, PALEONTOLOGY, AIR QUALITY, AND BIOLOGY

Alternative Route	Length (miles)	Water Resources	Geology and Soils	Paleontology	Air Quality	Biology	
						Wildlife	Vegetation
Southern – South of the Black Mountains to Red Butte Substation							
Alternative S1 Pinto Creek	55.9	**Inventory** ▪ 3 perennial stream/river crossings ▪ 10 named intermittent stream crossings ▪ 20 unnamed intermittent or ephemeral stream crossings ▪ 2 springs within 600 feet of centerline ▪ 3.6 miles of rivers/streams ▪ 0.1 mile of springs ▪ 0.2 mile of wells **Impacts** ▪ 526.0 acres of temporary disturbance ▪ 195.6 acres of permanent disturbance ▪ 0.2 mile of high impact ▪ 0.0 mile of moderate impact ▪ 55.7 miles of low impact	**Inventory** ▪ 11.5 miles of designated farmland soils ▪ 7.0 miles of high potential for water erosion ▪ 0.0 mile of active mines, producing wells, or mining claims ▪ 7.9 miles of potential mineral resources, inactive mining claims, or geothermal areas ▪ 4.8 miles of high sensitivity from geologic hazards ▪ 14.9 miles of moderate sensitivity to geologic hazards **Impacts** ▪ 15.9 miles of moderate impact on soils ▪ 7.9 miles of low impacts on mineral resources ▪ 13.3 miles of low impact from geologic hazards	**Inventory** ▪ 1 locality within 1.0 mile ▪ 3.2 miles of PFYC[1] of 4 or 5 ▪ 1.3 miles of PFYC[1] of 3 **Impacts** ▪ 0.0 miles of high impact ▪ 0.0 miles of moderate impact ▪ 55.9 miles of low impact	**Inventory** ▪ NO_x – 158 tons ▪ SO_2 – 0.5 tons ▪ CO – 156 tons ▪ VOC – 14 tons ▪ PM_{10} – 449 tons ▪ $PM_{2.5}$ – 53 tons ▪ CO_2e – 33,075 tons **Impacts** ▪ NO_2, CO, SO_2, $PM_{10}/PM_{2.5}$ within standards for all averaging periods	**Inventory** ▪ 0.2 mile of southwestern willow flycatcher occupied habitat ▪ 21.7 miles of crucial pronghorn habitat south of Lund Road ▪ 8.7 miles of crucial winter mule deer habitat primarily in the Harmony and Pine Valley mountains ▪ 9.0 miles of crucial summer mule deer habitat ▪ 24.4 miles of high and 31.5 miles of medium quality raptor habitat primarily in the Harmony and Pine Valley mountains ▪ 4.2 miles of sage-grouse brooding habitat ▪ 4.3 miles of sage-grouse crucial winter habitat ▪ 16.3 miles of suitable pygmy rabbit habitat **Impacts** ▪ 4.5 miles of high impacts resulting from federally listed species ▪ 39.4 miles of low impact on big game ▪ 16.3 miles of moderate residual impacts on sensitive habitats ▪ 39.6 miles of low residual impact on sensitive habitats	**Inventory** ▪ 195.6 acres of permanent disturbance ▪ 330.3 acres of vegetation clearing **Impacts** ▪ 4.1 miles of low residual impact on vegetation communities ▪ 51.8 miles of moderate impact on vegetation

TABLE 2-11a
ALTERNATIVE ROUTE COMPARISON
WATER RESOURCES, GEOLOGY AND SOILS, PALEONTOLOGY, AIR QUALITY, AND BIOLOGY

Alternative Route	Length (miles)	Water Resources	Geology and Soils	Paleontology	Air Quality	Biology	
						Wildlife	Vegetation
Alternative S2 IPP West	49.6	**Inventory** ▪ 1 perennial streams/rivers ▪ 8 named intermittent streams ▪ 28 unnamed intermittent or ephemeral streams ▪ 2 springs ▪ 1 water body ▪ 3.4 miles of rivers/streams ▪ 0.4 mile of springs **Impacts** ▪ 499.3 acres of temporary disturbance ▪ 157.9 acres of permanent disturbance ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 49.6 miles of low impact	**Inventory** ▪ 12.8 miles of designated farmland soils ▪ 7.0 miles of high potential for water erosion ▪ 0.0 mile of active mines, producing wells, or mining claims ▪ 8.5 miles of potential mineral resources, inactive mining claims, or geothermal areas ▪ 3.1 miles of high sensitivity from geologic hazards ▪ 10.1 miles of moderate sensitivity to geologic hazards **Impacts** ▪ 17.2 miles of moderate impact on soils ▪ 0.3 mile of moderate impacts on mineral resources ▪ 8.5 miles of low impacts on mineral resources ▪ 7.8 miles of low impact from geologic hazards	**Inventory** ▪ 4 localities within 1.0 mile ▪ 0.5 mile of PFYC[1] of 4 or 5 ▪ 1.1 miles of PFYC[1] of 3 **Impacts** ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 49.6 miles of low impact	**Inventory** ▪ NO_x – 158 tons ▪ SO_2 – 0.5 tons ▪ CO – 156 tons ▪ VOC – 14 tons ▪ PM_{10} – 440 tons ▪ $PM_{2.5}$ – 53 tons ▪ CO_2e – 33,075 tons **Impacts** ▪ NO_2, CO, SO_2, $PM_{10}/PM_{2.5}$ within standards for all averaging periods	**Inventory** ▪ 21.7 miles of crucial pronghorn habitat south of Lund Road ▪ 10.8 miles of crucial winter mule deer habitat between Central and Newcastle ▪ 5.6 miles of crucial summer mule deer habitat primarily in the Dixie National Forest ▪ 4.2 miles of sage-grouse brooding habitat ▪ 4.3 miles of sage-grouse crucial winter habitat ▪ 49.6 miles of medium quality raptor habitat primarily between Central and Newcastle ▪ 20.6 miles of suitable pygmy rabbit habitat **Impacts** ▪ 4.3 miles of high impacts resulting from federally listed species ▪ 38.1 miles of low impact on big game ▪ 20.6 miles of moderate residual impact on sensitive habitats ▪ 29.0 miles of low residual impact on sensitive habitats	**Inventory** ▪ 157.9 acres of permanent disturbance ▪ 184.2 acres of vegetation clearing **Impacts** ▪ 4.4 miles of low residual impact on vegetation communities ▪ 45.2 miles of moderate impact on vegetation

TABLE 2-11a
ALTERNATIVE ROUTE COMPARISON
WATER RESOURCES, GEOLOGY AND SOILS, PALEONTOLOGY, AIR QUALITY, AND BIOLOGY

Alternative Route	Length (miles)	Water Resources	Geology and Soils	Paleontology	Air Quality	Biology	
						Wildlife	Vegetation
Alternative S3 Ox Valley	57.4	**Inventory** ▪ 1 perennial stream/river ▪ 13 named intermittent streams ▪ 26 unnamed intermittent or ephemeral streams ▪ 3.8 miles of rivers/streams **Impacts** ▪ 536.9 acres of temporary disturbance ▪ 223.4 acres of permanent disturbance ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 57.4 miles of low impact	**Inventory** ▪ 12.8 miles of designated farmland soils ▪ 7.0 miles of high potential for water erosion ▪ 0.3 mile of active mines, producing wells, or mining claims ▪ 8.5 miles of potential mineral resources, inactive mining claims, or geothermal areas ▪ 3.1 miles of high sensitivity from geologic hazards ▪ 10.1 miles of moderate sensitivity to geologic hazards **Impacts** ▪ 17.2 miles of moderate impact on soils ▪ 0.3 mile of moderate impacts on mineral resources ▪ 8.5 miles of low impacts on mineral resources ▪ 16.1 miles of low impact from geologic hazards	**Inventory** ▪ 1 locality within 1.0 mile ▪ 0.9 mile of PFYC[1] of 4 or 5 ▪ 7.6 miles of PFYC[1] of 3 **Impacts** ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 57.4 miles of low impact	**Inventory** ▪ NO_x – 158 tons ▪ SO_2 – 0.5 tons ▪ CO – 156 tons ▪ VOC – 14 tons ▪ PM_{10} – 453 tons ▪ $PM_{2.5}$ – 54 tons ▪ CO_2e – 33,075 tons **Impacts** ▪ NO_2, CO, SO_2, $PM_{10}/PM_{2.5}$ within standards for all averaging periods	**Inventory** ▪ 21.7 miles of crucial pronghorn habitat south of Lund Road ▪ 9.1 miles of crucial winter mule deer habitat west of Central and Newcastle ▪ 8.0 miles of crucial summer mule deer habitat primarily in the Dixie National Forest ▪ 4.2 miles of sage-grouse brooding habitat ▪ 4.3 miles of sage-grouse crucial winter habitat ▪ 12.2 miles of high and 45.2 miles of medium quality raptor habitat primarily in the Bull Valley Mountains ▪ 19.9 miles of suitable pygmy rabbit habitat **Impacts** ▪ 4.3 miles of high impacts resulting from federally listed species ▪ 38.8 miles of low impact on big game ▪ 19.9 miles of moderate residual impact on sensitive habitats ▪ 37.5 miles of low residual on sensitive habitats	**Inventory** ▪ 223.4 acres of permanent disturbance ▪ 339.8 acres of vegetation clearing **Impacts** ▪ 4.6 miles of low residual impact on vegetation communities ▪ 52.8 miles of moderate impact on vegetation

TABLE 2-11a
ALTERNATIVE ROUTE COMPARISON
WATER RESOURCES, GEOLOGY AND SOILS, PALEONTOLOGY, AIR QUALITY, AND BIOLOGY

Alternative Route	Length (miles)	Water Resources	Geology and Soils	Paleontology	Air Quality	Biology	
						Wildlife	Vegetation
Alternative S4 IPP East	48.9	**Inventory** ▪ 1 perennial stream/river ▪ 8 named intermittent streams ▪ 25 unnamed intermittent or ephemeral streams ▪ 2.5 miles of rivers/streams **Impacts** ▪ 547.9 acres of temporary disturbance ▪ 147.0 acres of permanent disturbance ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 48.9 miles of low impact	**Inventory** ▪ 11.3 miles of designated farmland soils ▪ 7.0 miles of high potential for water erosion ▪ 0.9 mile of active mines, producing wells, or mining claims ▪ 8.5 miles of potential mineral resources, inactive mining claims, or geothermal areas ▪ 6.8 miles of high sensitivity from geologic hazards ▪ 16.6 miles of moderate sensitivity to geologic hazards **Impacts** ▪ 15.7 miles of moderate impact on soils ▪ 0.8 mile of moderate impacts on mineral resources ▪ 8.6 miles of low impacts on mineral resources ▪ 0.1 mile of moderate impact from geologic hazards ▪ 16.1 miles of low impact from geologic hazards	**Inventory** ▪ 4 localities within 1.0 mile ▪ 1.0 mile of PFYC[1] of 4 or 5 ▪ 4.5 miles of PFYC[1] of 3 **Impacts** ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 48.9 miles of low impact	**Inventory** ▪ NO_x – 158 tons ▪ SO_2 – 0.5 tons ▪ CO – 156 tons ▪ VOC – 14 tons ▪ PM_{10} – 444 tons ▪ $PM_{2.5}$ – 53 tons ▪ CO_2e – 33,075 tons **Impacts** ▪ NO_2, CO, SO_2, $PM_{10}/PM_{2.5}$ within standards for all averaging periods	**Inventory** ▪ 21.7 miles of crucial pronghorn habitat south of Lund Road ▪ 11.1 miles of crucial winter mule deer habitat between Central and Newcastle ▪ 5.6 miles of crucial summer mule deer habitat primarily in the Dixie National Forest ▪ 4.2 miles of sage-grouse brooding habitat ▪ 4.3 miles of sage-grouse crucial winter habitat ▪ 48.9 miles of medium quality raptor habitat primarily between Central and Newcastle ▪ 14.6 miles of suitable pygmy rabbit habitat **Impacts** ▪ 4.3 miles of impacts resulting from federally listed species ▪ 38.4 miles of low impact on big game ▪ 19.4 miles of moderate residual impact on sensitive habitats ▪ 29.5 miles of low residual impact on sensitive habitats	**Inventory** ▪ 5.1 miles of habitat for sensitive plant species pinyon penstemon ▪ 147.0 acres of permanent disturbance ▪ 320.3 acres of vegetation clearing **Impacts** ▪ 5.1 miles of moderate residual impact on sensitive plant species pinyon penstemon ▪ 4.1 miles of low residual impact on vegetation communities ▪ 44.8 miles of moderate impact on vegetation

TABLE 2-11a
ALTERNATIVE ROUTE COMPARISON
WATER RESOURCES, GEOLOGY AND SOILS, PALEONTOLOGY, AIR QUALITY, AND BIOLOGY

Alternative Route	Length (miles)	Water Resources	Geology and Soils	Paleontology	Air Quality	Biology	
						Wildlife	Vegetation
Alternative S5 Iron Springs and Pinto Creek (Proponent's Preferred Alternative)	59.0	**Inventory** ▪ 3 perennial streams/rivers ▪ 9 named intermittent streams ▪ 16 unnamed intermittent or ephemeral streams ▪ 1 well within 600 feet of centerline ▪ 3 springs within 600 feet of centerline ▪ 4.3 miles of rivers/streams ▪ 0.5 mile of springs ▪ 0.2 mile of wells **Impacts** ▪ 553.2 acres of temporary disturbance ▪ 197.1 acres of permanent disturbance ▪ 0.2 mile of high impact ▪ 0.0 mile of moderate impact ▪ 58.8 miles of low impact	**Inventory** ▪ 6.9 miles of designated farmland soils ▪ 4.3 miles of high potential for water erosion ▪ 0.5 mile of active mines, producing wells, or mining claims ▪ 11.0 miles of potential mineral resources, inactive mining claims, or geothermal areas ▪ 3.7 miles of high sensitivity from geologic hazards ▪ 13.3 miles of moderate sensitivity to geologic hazards **Impacts** ▪ 10.2 miles of moderate impact on soils ▪ 0.5 miles of moderate impacts on mineral resources ▪ 11.0 miles of low impacts on mineral resources ▪ 12.7 miles of low impact from geologic hazards	**Inventory** ▪ 1 locality within 1.0 mile ▪ 6.0 miles of PFYC[1] of 4 or 5 ▪ 1.5 miles of PFYC[1] of 3 **Impacts** ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 59.0 miles of low impact	**Inventory** ▪ NO_x – 158 tons ▪ SO_2 – 0.5 tons ▪ CO – 156 tons ▪ VOC – 14 tons ▪ PM_{10} – 450 tons ▪ $PM_{2.5}$ – 54 tons ▪ CO_2e – 33,075 tons **Impacts** ▪ NO_2, CO, SO_2, $PM_{10}/PM_{2.5}$ within standards for all averaging periods	**Inventory** ▪ 0.2 mile of southwestern willow flycatcher occupied habitat ▪ 18.4 miles of crucial pronghorn habitat south of Lund Road ▪ 3.1 miles of crucial winter mule deer habitat primarily in the Harmony and Pine Valley mountains ▪ 9.0 miles of crucial summer mule deer habitat primarily in the Dixie National Forest ▪ 4.1 miles of sage-grouse brooding habitat ▪ 4.1 miles of sage-grouse crucial winter habitat ▪ 32.2 miles of high and 26.8 miles of medium quality raptor habitat primarily in the Harmony and Pine Valley mountains ▪ 19.3 miles of suitable pygmy rabbit habitat **Impacts** ▪ 30.5 miles of low impact on big game ▪ 4.3 miles of high impacts resulting from federally listed species ▪ 22.8 miles of moderate residual impact on sensitive habitats ▪ 36.2 miles of low residual impact on sensitive habitats	**Inventory** ▪ 5.1 miles of habitat for sensitive plant species pinyon penstemon ▪ 197.1 acres of permanent disturbance ▪ 423.8 acres of vegetation clearing **Impacts** ▪ 5.1 miles of moderate residual impact on sensitive plant species pinyon penstemon ▪ 3.4 miles of low residual impact on vegetation communities ▪ 55.6 miles of moderate impact on vegetation

TABLE 2-11a
ALTERNATIVE ROUTE COMPARISON
WATER RESOURCES, GEOLOGY AND SOILS, PALEONTOLOGY, AIR QUALITY, AND BIOLOGY

Alternative Route	Length (miles)	Water Resources	Geology and Soils	Paleontology	Air Quality	Biology	
						Wildlife	Vegetation
Alternative S6 Iron Springs and Ox Valley	61.8	**Inventory** ▪ 3 perennial streams/river ▪ 11 named intermittent streams ▪ 1 springs within 600 feet of centerline ▪ 1 well within 600 feet of centerline ▪ 23 unnamed intermittent or ephemeral streams crossings ▪ 4.5 miles of rivers/streams ▪ 0.4 mile of springs **Impacts** ▪ 573.5 acres of temporary disturbance ▪ 228.3 acres of permanent disturbance ▪ 0.2 mile of high impact ▪ 0.0 mile of moderate impact ▪ 61.6 miles of low impact	**Inventory** ▪ 8.1 miles of designated farmland soils ▪ 4.3 miles of high potential for water erosion ▪ 0.7 mile of active mines, producing wells, or mining claims ▪ 10.8 miles of potential mineral resources, inactive mining claims, or geothermal areas ▪ 6.1 miles of high sensitivity from geologic hazards ▪ 20.9 miles of moderate sensitivity to geologic hazards **Impacts** ▪ 11.4 miles of moderate impact on soils ▪ 0.7 mile of moderate impact on mineral resources ▪ 10.8 miles of low impacts on mineral resources ▪ 16.4 miles of low impact from geologic hazards	**Inventory** ▪ 1 locality within 1.0 mile ▪ 3.9 miles of PFYC[1] of 4 or 5 ▪ 8.5 miles of PFYC[1] of 3 **Impacts** ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 61.8 miles of low impact	**Inventory** ▪ NO_x – 158 tons ▪ SO_2 – 0.5 tons ▪ CO – 156 tons ▪ VOC – 14 tons ▪ PM_{10} – 456 tons ▪ $PM_{2.5}$ – 54 tons ▪ CO_2e – 33,075 tons **Impacts** ▪ NO_2, CO, SO_2, $PM_{10}/PM_{2.5}$ within standards for all averaging periods	**Inventory** ▪ 0.2 mile of southwestern willow flycatcher occupied habitat ▪ 18.4 miles of crucial pronghorn habitat south of Lund Road ▪ 1.9 miles of crucial winter mule deer habitat primarily in the Harmony and Bull Valley mountains ▪ 8.0 miles of crucial summer mule deer habitat primarily in the Dixie National Forest ▪ 23.5 miles of high and 38.3 miles of medium quality raptor habitat primarily in the Harmony and Bull Valley mountains ▪ 23.5 miles of suitable pygmy rabbit habitat **Impacts** ▪ 28.3 miles of low impact on big game ▪ 4.3 mile of high impacts resulting from federally listed species ▪ 27.0 miles of moderate residual impact on sensitive habitats ▪ 34.8 miles of low residual impact on sensitive habitats	**Inventory** ▪ 5.1 miles of habitat for sensitive plant species pinyon penstemon ▪ 228.3 acres of permanent disturbance ▪ 460.1 acres of vegetation clearing **Impacts** ▪ 5.1 miles of moderate residual impact on sensitive plant species pinyon penstemon ▪ 3.9 miles of low residual impact on vegetation communities ▪ 57.9 miles of moderate impact on vegetation

TABLE 2-11a
ALTERNATIVE ROUTE COMPARISON
WATER RESOURCES, GEOLOGY AND SOILS, PALEONTOLOGY, AIR QUALITY, AND BIOLOGY

Alternative Route	Length (miles)	Water Resources	Geology and Soils	Paleontology	Air Quality	Biology	
						Wildlife	Vegetation
Alternative S7 Middle Hybrid Route	49.8	**Inventory** ▪ 1 perennial streams/rivers ▪ 8 named intermittent streams ▪ 26 unnamed intermittent or ephemeral streams ▪ 2.3 miles of rivers/stream **Impacts** ▪ 518.7 acres of temporary disturbance ▪ 162.6 acres of permanent disturbance ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 49.8 miles of low impact	**Inventory** ▪ 12.8 miles of designated farmland soils ▪ 7.0 miles of high potential for water erosion ▪ 0.4 mile of active mines, producing wells, or mining claims ▪ 8.5 miles of potential mineral resources, inactive mining claims, or geothermal areas ▪ 4.1 miles of high sensitivity from geologic hazards ▪ 11.6 miles of moderate sensitivity to geologic hazards **Impacts** ▪ 17.2 miles of moderate impact on soils ▪ 0.3 mile of moderate impact on mineral resources ▪ 8.6 miles of low impacts on mineral resources ▪ 0.1 mile of moderate impact from geologic hazards ▪ 11.6 miles of low impacts from geologic hazards	**Inventory** ▪ 4 localities within 1.0 mile ▪ 0.5 mile of PFYC[1] of 4 or 5 ▪ 1.1 miles of PFYC[1] of 3 **Impacts** ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 49.8 miles of low impact	**Inventory** ▪ NO_x – 158 tons ▪ SO_2 – 0.5 tons ▪ CO – 156 tons ▪ VOC – 14 tons ▪ PM_{10} – 444 tons ▪ $PM_{2.5}$ – 53 tons ▪ CO_2e – 33,075 **Impacts** ▪ NO_2, CO, SO_2, $PM_{10}/PM_{2.5}$ within standards for all averaging periods	**Inventory** ▪ 21.7 miles of crucial pronghorn habitat ▪ 10.8 miles of crucial winter mule deer habitat primarily in the Harmony and Bull Valley mountains ▪ 5.6 miles of crucial summer mule deer habitat primarily in the Dixie National Forest ▪ 4.2 miles of sage-grouse brooding habitat ▪ 4.3 miles of sage-grouse crucial winter habitat ▪ 49.8 miles of medium quality raptor habitat primarily in the Harmony and Bull Valley mountains ▪ 19.2 miles of suitable pygmy rabbit habitat **Impacts** ▪ 38.1 miles of low impact on big game ▪ 4.3 miles of high impacts resulting from federally listed species ▪ 19.2 miles of moderate residual impact on sensitive habitats ▪ 30.6 miles of low residual impact on sensitive habitats	**Inventory** ▪ 162.6 acres of permanent disturbance ▪ 234.4 acres of vegetation clearing **Impacts** ▪ 4.4 miles of low residual impact on vegetation communities ▪ 45.4 miles of moderate impact on vegetation

TABLE 2-11a
ALTERNATIVE ROUTE COMPARISON
WATER RESOURCES, GEOLOGY AND SOILS, PALEONTOLOGY, AIR QUALITY, AND BIOLOGY

Alternative Route	Length (miles)	Water Resources	Geology and Soils	Paleontology	Air Quality	Biology	
						Wildlife	Vegetation
Alternative S7-A (route variation of Alternative S7) Middle Hybrid Route 300 feet east of Sigurd to Red Butte No. 1 transmission line adjacent to Atchinson Inventoried Roadless Area (Agency Preferred Alternative)	49.8	**Inventory** ▪ 1 perennial streams/rivers ▪ 8 named intermittent streams ▪ 26 unnamed intermittent or ephemeral streams ▪ 2.4 miles of rivers/stream **Impacts** ▪ 506.2 acres of temporary disturbance ▪ 161.7 acres of permanent disturbance ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 49.8 miles of low impact	**Inventory** ▪ 12.8 miles of designated farmland soils ▪ 7.0 miles of high potential for water erosion ▪ 0.3 mile of active mines, producing wells, or mining claims ▪ 8.5 miles of potential mineral resources, inactive mining claims, or geothermal areas ▪ 3.9 miles of high sensitivity from geologic hazards ▪ 10.9 miles of moderate sensitivity to geologic hazards **Impacts** ▪ 17.2 miles of moderate impact on soils ▪ 0.3 mile of moderate impact on mineral resources ▪ 8.5 miles of low impacts on mineral resources ▪ 0.5 mile of moderate impact from geologic hazards ▪ 9.6 miles of low impacts from geologic hazards	**Inventory** ▪ 4 localities within 1.0 mile ▪ 0.9 mile of PFYC[1] of 4 or 5 ▪ 1.1 miles of PFYC[1] of 3 **Impacts** ▪ 0.0 mile of high impact ▪ 0.0 mile of moderate impact ▪ 49.8 miles of low impact	**Inventory** ▪ NO_x – 158 tons ▪ SO_2 – 0.5 tons ▪ CO – 156 tons ▪ VOC – 14 tons ▪ PM_{10} – 442 tons ▪ $PM_{2.5}$ – 53 tons ▪ CO_2e – 33,075 **Impacts** ▪ NO_2, CO, SO_2, PM_{10}/$PM_{2.5}$ within standards for all averaging periods	**Inventory** ▪ 21.7 miles of crucial pronghorn habitat ▪ 10.8 miles of crucial winter mule deer habitat primarily in the Harmony and Bull Valley mountains ▪ 5.6 miles of crucial summer mule deer habitat primarily in the Dixie National Forest ▪ 4.2 miles of sage-grouse brooding habitat ▪ 4.3 miles of sage-grouse crucial winter habitat ▪ 49.8 miles of medium quality raptor habitat primarily in the Harmony and Bull Valley mountains ▪ 19.0 miles of suitable pygmy rabbit habitat **Impacts** ▪ 38.1 miles of low impact on big game ▪ 4.3 miles of high impacts resulting from federally listed species ▪ 19.0 miles of moderate residual impact on sensitive habitats ▪ 30.8 miles of low residual impact on sensitive habitats	**Inventory** ▪ 161.7 acres of permanent disturbance ▪ 226.8 acres of vegetation clearing **Impacts** ▪ 4.4 miles of low residual impact on vegetation communities ▪ 45.4 miles of moderate impact on vegetation

NOTE: [1]Potential fossil yield classification (PFYC) numbers represent class levels of potential (1 = very low, 2 = low, 3 = moderate or unknown, 4 = high, and 5 = very high). For more information, refer to Section 3.2.7.3.

CO = Carbon monoxide
CO_2e = Carbon dioxide equivalent
NO_x = Nitrogen oxides
NO_2 = Nitrogen dioxide
PM_{10} = Particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers in diameter
SO_2 = Sulfur dioxide
VOC = Volatile organic compounds

TABLE 2-11b
ALTERNATIVE ROUTE COMPARISON
SOCIOECONOMIC, CULTURAL RESOURCES, AND VISUAL RESOURCES

Alternative Route	Length (miles)	Socioeconomic	Cultural Resources	Visual Resources				
				Landscape Scenery (miles crossed)	Sensitive Viewers: High Sensitivity Viewers (miles crossed)	Sensitive Viewers: Moderate Sensitivity Viewers (miles crossed)	Federal Agency Visual Management Objectives	Summary of Residual Impacts
Northern – Sigurd Substation to South of the Black Mountains								
Alternative N1 Black Rock Road to Intermountain Power Project 500kV transmission line (IPP) north of Milford Wind Farm (Environmentally Preferred	120.6	**Impacts** ▪ Minimal impact on employment, population, housing, government services ▪ Increased property taxes of $2.16 million year 1 and $210,000 remaining years ▪ No disproportionate impact on environmental justice population	**Inventory** ▪ 781 sites identified by the Class I and Class II ▪ 43 sites within the areas of potential effects (APE) **Impacts** ▪ 11.6 miles of high cultural resource sensitivity	Class B Scenery – 32.9	**Views within 0.25 mile –** 10.6 **Views between 0.25 and 0.5 mile –** 16.2	**Views within 0.25 mile –** 35.4 **Views between 0.25 and 0.5 mile –** 19.0	▪ In compliance with visual resource management (VRM) Class III[1] and IV objectives ▪ Not consistent with moderate and high scenic integrity objective (SIO)	**Landscape Scenery** ▪ Moderate impact on the Pahvant Range, Tushar Mountains, and Juniper Hills landscapes **Residential Views** ▪ Moderate impact on residential viewers in Sigurd, Richfield, Elsinore, Joseph, and Milford **Recreation/Travel Corridor Views** ▪ Moderate/high impact on views from the Fremont Indian State Park ▪ Moderate impact on views from the Jens Larson Lime Kiln, Kimberly/Big John Road Scenic Backway, Fish Creek, Paiute All-terrain Vehicle Trail System, Interstate 70, Escalante Trail, and American Discovery Trail **Impacts** ▪ 1.2 miles of moderate/high impact

TABLE 2-11b
ALTERNATIVE ROUTE COMPARISON
SOCIOECONOMIC, CULTURAL RESOURCES, AND VISUAL RESOURCES

Alternative Route	Length (miles)	Socioeconomic	Cultural Resources	Visual Resources				
				Landscape Scenery (miles crossed)	Sensitive Viewers: High Sensitivity Viewers (miles crossed)	Sensitive Viewers: Moderate Sensitivity Viewers (miles crossed)	Federal Agency Visual Management Objectives	Summary of Residual Impacts
Alternative N2 Black Rock Road to IPP south of Milford Wind Farm	120.4	**Impacts** ▪ Minimal impact on employment, population, housing, government services ▪ Increased property taxes of $2.19 million year 1 and $213,000 remaining years ▪ No disproportionate impact on environmental justice population	**Inventory** ▪ 1,064 sites identified by the Class I and Class II ▪ 57 sites within APE **Impacts** ▪ 17.7 miles of high cultural resource sensitivity	Class B Scenery – 34.2	**Views within 0.25 mile -** 10.6 **Views between 0.25 and 0.5 mile –** 16.2	**Views within 0.25 mile –** 35.4 **Views between 0.25 and 0.5 mile –** 19.0	▪ In compliance with VRM Class III[1] and IV objectives ▪ Not consistent with moderate and high SIO	**Landscape Scenery** ▪ Impact on scenery identical to N1 **Residential Views** ▪ Impact on residential viewers identical to N1 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers are identical to N1 **Impacts** ▪ 1.2 miles of moderate/high impact
Alternative N2-A (route variation of Alternative N2) Black Rock Road to IPP south of Milford Wind Farm 1,500 feet east of Kern River Pipeline (Agency Preferred Alternative)	120.0	**Impacts** ▪ Minimal impact on employment, population, housing, government services ▪ Increased property taxes of $2.17 million year 1 and $212,000 remaining years ▪ No disproportionate impact on environmental justice population	**Inventory** ▪ 1,066 sites identified by the Class I and Class II ▪ 57 sites within APE **Impacts** ▪ 17.7 miles of high cultural resource sensitivity	Class B Scenery – 34.6	**Views within 0.25 mile –** 11.2 **Views between 0.25 and 0.5 mile –** 15.3	**Views within 0.25 mile –** 34.7 **Views between 0.25 and 0.5 mile –** 19.1	▪ In compliance with VRM Class III[1] and IV objectives ▪ Not consistent with moderate and high SIO	**Landscape Scenery** ▪ Impact on scenery identical to N1 **Residential Views** ▪ Impact on residential viewers identical to N1 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to N1 **Impacts** ▪ 1.2 miles of moderate/high impact

TABLE 2-11b
ALTERNATIVE ROUTE COMPARISON
SOCIOECONOMIC, CULTURAL RESOURCES, AND VISUAL RESOURCES

Alternative Route	Length (miles)	Socioeconomic	Cultural Resources	Visual Resources				
				Landscape Scenery (miles crossed)	Sensitive Viewers: High Sensitivity Viewers (miles crossed)	Sensitive Viewers: Moderate Sensitivity Viewers (miles crossed)	Federal Agency Visual Management Objectives	Summary of Residual Impacts
Alternative N3 Black Rock Road Parallel to Kern River Pipeline	117.2	**Impacts** ▪ Minimal impact on employment, population, housing, government services ▪ Increased property taxes of $2.14 million year 1 and $208,000 remaining years ▪ No disproportionate impact on environmental justice population	**Inventory** ▪ 1,139 sites identified by the Class I and Class II ▪ 95 sites within APE **Impacts** ▪ 29.5 miles of high cultural resource sensitivity	Class B Scenery – 38.2	**Views within 0.25 mile –** 11.3 **Views between 0.25 and 0.5 mile –** 16.7	**Views within 0.25 mile –** 36.9 **Views between 0.25 and 0.5 mile –** 9.5	▪ In compliance with VRM Class III[1] and IV objectives ▪ Not consistent with moderate and high SIO	**Landscape Scenery** ▪ Impact on scenery identical to N1 with the addition of moderate impacts on the Foothills landscape **Residential Views** ▪ Impact on residential viewers identical to N1 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to N1 **Impacts** ▪ 1.2 miles of moderate/high impact
Alternative N4 Mineral Mountains to IPP south of Milford Wind Farm	109.4	**Impacts** ▪ Minimal impact on employment, population, housing, government services ▪ Increased property taxes of $2.04 million year 1 and $199,000 remaining years ▪ No disproportionate impact on environmental justice population	**Inventory** ▪ 815 sites identified by the Class I and Class II ▪ 43 sites within APE **Impacts** ▪ 11.9 miles of high cultural resource sensitivity	Class B Scenery – 39.8	**Views within 0.25 mile –** 10.6 **Views between 0.25 and 0.5 mile –** 16.2	**Views within 0.25 mile –** 35.8 **Views between 0.25 and 0.5 mile –** 19.3	▪ In compliance with VRM Class III[1] and IV objectives ▪ Not consistent with moderate and high SIO	**Landscape Scenery** ▪ Impact on scenery identical to N1 with the addition of moderate impact on the Mineral Mountains landscape **Residential Views** ▪ Impact on residential viewers identical to N1 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to N1 **Impacts** ▪ 1.2 miles of moderate/high impact

TABLE 2-11b
ALTERNATIVE ROUTE COMPARISON
SOCIOECONOMIC, CULTURAL RESOURCES, AND VISUAL RESOURCES

Alternative Route	Length (miles)	Socioeconomic	Cultural Resources	Visual Resources				
				Landscape Scenery (miles crossed)	Sensitive Viewers: High Sensitivity Viewers (miles crossed)	Sensitive Viewers: Moderate Sensitivity Viewers (miles crossed)	Federal Agency Visual Management Objectives	Summary of Residual Impacts
Alternative N5 Mineral Mountains to Kern River Pipeline	106.2	**Impacts** ▪ Minimal impact on employment, population, housing, government services ▪ Increased property taxes of $1.99 million year 1 and $194,000 remaining years ▪ No disproportionate impact on environmental justice population	**Inventory** ▪ 889 sites identified by the Class I and Class II ▪ 80 sites within APE **Impacts** ▪ 23.7 miles of high cultural resource sensitivity	Class B Scenery – 43.8	**Views within 0.25 mile –** 11.3 **Views between 0.25 and 0.5 mile –** 16.7	**Views within 0.25 mile –** 37.3 **Views between 0.25 and 0.5 mile –** 9.8	▪ In compliance with VRM Class III[1] and IV objectives ▪ Not consistent with moderate and high SIO	**Landscape Scenery** ▪ Impact on scenery identical to N1 with the addition of moderate impact on the Mineral Mountains and Foothills landscapes **Residential Views** ▪ Impact on residential viewers identical to N1 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to N1 **Impacts** ▪ 1.2 miles of moderate/high impact
Alternative N6 Mineral Mountains 1,500 feet east of Kern River Pipeline (Proponent's Preferred Alternative)	105.4	**Impacts** ▪ Minimal impact on employment, population, housing, government services ▪ Increased property taxes of $1.95 million year 1 and $190,000 remaining years ▪ No disproportionate impact on environmental justice population	**Inventory** ▪ 880 sites identified by the Class I and Class II ▪ 52 sites within APE **Impacts** ▪ 14.4 miles of high cultural resource sensitivity	Class B Scenery – 48.1	**Views within 0.25 mile –** 11.4 **Views between 0.25 and 0.5 mile –** 15.3	**Views within 0.25 mile –** 32.5 **Views between 0.25 and 0.5 mile –** 13.4	▪ In compliance with VRM Class III[1] and IV objectives ▪ Not consistent with moderate and high SIO	**Landscape Scenery** ▪ Impact on scenery identical to N1 with the addition of moderate impacts on the Mineral Mountains and Foothills landscapes **Residential Views** ▪ Impact on residential viewers identical to N1 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to N1 **Impacts** ▪ 1.2 miles of moderate/high impact

TABLE 2-11b
ALTERNATIVE ROUTE COMPARISON
SOCIOECONOMIC, CULTURAL RESOURCES, AND VISUAL RESOURCES

Alternative Route	Length (miles)	Socioeconomic	Cultural Resources	Visual Resources				
				Landscape Scenery (miles crossed)	Sensitive Viewers		Federal Agency Visual Management Objectives	Summary of Residual Impacts
					High Sensitivity Viewers (miles crossed)	Moderate Sensitivity Viewers (miles crossed)		
Southern – South of the Black Mountains to Red Butte Substation								
Alternative S1 Pinto Creek	55.9	**Impacts** ▪ Minimal impact on employment, population, housing, government services ▪ Increased property taxes of $1.11 million year 1 and $107,000 remaining years ▪ No disproportionate impact on environmental justice population	**Inventory** ▪ 143 sites identified by the Class I and Class II ▪ 19 sites within APE **Impacts** ▪ 2.5 miles of high cultural resource sensitivity	Class B Scenery – 24.1	**Views within 0.25 mile –** 7.8 **Views between 0.25 and 0.5 mile –** 10.1	**Views within 0.25 mile –** 11.2 **Views between 0.25 and 0.5 mile –** 3.6	▪ In compliance with VRM Class III[1] and IV objectives ▪ Consistent with moderate SIO; not consistent with high SIO ▪ Consistent with standard prohibition of unacceptably low SIO	**Landscape Scenery** ▪ Moderate impact on the Foothill, Juniper Hills, and Atchinson Mountain landscapes **Residential Views** ▪ Moderate/high impact on residential viewers along Pinto Creek and southeast of Central ▪ Moderate impact on residential views east of Newcastle **Recreation/Travel Corridor Views** ▪ Moderate impact on views from Forest Road (FR) 011, FR 035, and the Old Spanish National Historic Trail (NHT) **Impacts** ▪ 0.7 mile of moderate/high impact

TABLE 2-11b
ALTERNATIVE ROUTE COMPARISON
SOCIOECONOMIC, CULTURAL RESOURCES, AND VISUAL RESOURCES

Alternative Route	Length (miles)	Socioeconomic	Cultural Resources	Visual Resources				
				Landscape Scenery (miles crossed)	Sensitive Viewers: High Sensitivity Viewers (miles crossed)	Sensitive Viewers: Moderate Sensitivity Viewers (miles crossed)	Federal Agency Visual Management Objectives	Summary of Residual Impacts
Alternative S2 IPP West	49.6	**Impacts** ▪ Minimal impact on employment, population, housing, government services ▪ Increased property taxes of $960,000 year 1 and $94,000 remaining years ▪ No disproportionate impact on environmental justice population	**Inventory** ▪ 183 sites identified by the Class I and Class II ▪ 25 sites within APE, including the Old Spanish NHT and Mountain Meadows Historic Site listed on the National Register of Historic Places (NRHP) ▪ In proximity to the Mountain Meadows Massacre Site National Historic Landmark (NHL) ▪ Intersects the Old Spanish NHT **Impacts** ▪ 6.0 miles of high cultural resource sensitivity	Class B Scenery – 13.4	**Views within 0.25 mile –** 9.6 **Views between 0.25 and 0.5 mile –** 11.2	**Views within 0.25 mile –** 9.0 **Views between 0.25 and 0.5 mile –** 7.9	▪ In compliance with VRM Class IV[1] objective ▪ Not consistent with moderate and high SIOs ▪ Consistent with standard prohibition of unacceptably low SIO	**Landscape Scenery** ▪ Moderate impact on the Foothill and Juniper Hills landscapes **Residential Views** ▪ Moderate impact on residential viewers in Newcastle, Mountain Meadows, and Central **Recreation/Travel Corridor Views** ▪ Moderate/high impact on views from the Mountain Meadows Massacre Site NHL ▪ Moderate impact on views from the Old Spanish NHT ▪ Moderate impact on views from SR 18 ▪ 0.9 mile of moderate/high impact

TABLE 2-11b
ALTERNATIVE ROUTE COMPARISON
SOCIOECONOMIC, CULTURAL RESOURCES, AND VISUAL RESOURCES

Alternative Route	Length (miles)	Socioeconomic	Cultural Resources	Visual Resources				
				Landscape Scenery (miles crossed)	Sensitive Viewers		Federal Agency Visual Management Objectives	Summary of Residual Impacts
					High Sensitivity Viewers (miles crossed)	Moderate Sensitivity Viewers (miles crossed)		
Alternative S3 Ox Valley	57.4	**Impacts** ▪ Minimal impact on employment, population, housing, government services ▪ Increased property taxes of $1.19 million year 1 and $116,000 remaining years ▪ No disproportionate impact on environmental justice population	**Inventory** ▪ 210 sites identified by the Class I and Class II ▪ 5 sites within APE ▪ Intersects the Old Spanish NHT **Impacts** ▪ 1.0 mile of high cultural resource sensitivity	Class B Scenery – 25.9	**Views within 0.25 mile –** 8.2 **Views between 0.25 and 0.5 mile –** 7.8	**Views within 0.25 mile –** 10.7 **Views between 0.25 and 0.5 mile –** 6.3	▪ In compliance with VRM Class IV[1] objective ▪ Not consistent with moderate and high SIO ▪ Consistent with standard prohibition of unacceptably low SIO	**Landscape Scenery** ▪ Moderate impact on the Foothill, Juniper Hills, and Bull Valley Mountain landscapes **Residential Views** ▪ Moderate/high impact on residential viewers east of Enterprise ▪ Moderate impact on residential viewers in Newcastle, Enterprise, and Ox Valley **Recreation/Travel Corridor Views** ▪ Moderate impact on views from Old Spanish NHT, State Route 18, FR 007, and Hardscrabble Trail **Impacts** ▪ 0.3 mile of moderate/high impact

TABLE 2-11b
ALTERNATIVE ROUTE COMPARISON
SOCIOECONOMIC, CULTURAL RESOURCES, AND VISUAL RESOURCES

Alternative Route	Length (miles)	Socioeconomic	Cultural Resources	Visual Resources				
				Landscape Scenery (miles crossed)	Sensitive Viewers		Federal Agency Visual Management Objectives	Summary of Residual Impacts
					High Sensitivity Viewers (miles crossed)	Moderate Sensitivity Viewers (miles crossed)		
Alternative S4 IPP East	48.9	**Impacts** ▪ Minimal impact on employment, population, housing, government services ▪ Increased property taxes of $1.04 million year 1 and $101,000 remaining years ▪ No disproportionate impact on environmental justice population	**Inventory** ▪ 177 sites identified by the Class I and Class II ▪ 8 sites within APE ▪ Intersects the Old Spanish NHT **Impacts** ▪ 1.1 miles of high cultural resource sensitivity	Class B Scenery – 20.1	**Views within 0.25 mile –** 4.9 **Views between 0.25 and 0.5 mile –** 8.2	**Views within 0.25 mile –** 4.2 **Views between 0.25 and 0.5 mile –** 5.8	▪ In compliance with VRM Class IV[1] objective ▪ Not consistent with moderate and high SIOs ▪ Consistent with standard prohibition of unacceptably low SIO	**Landscape Scenery** ▪ Impact on scenery identical to S2 with the addition of moderate impact on the Atchinson Mountain landscape **Residential Views** ▪ Impact on residential viewers identical to S2 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to S2 except low/moderate impact expected on views from Mountain Meadows Massacre Site NHL and the Old Spanish NHT **Impacts** ▪ 0.0 mile of moderate/high impact

TABLE 2-11b
ALTERNATIVE ROUTE COMPARISON
SOCIOECONOMIC, CULTURAL RESOURCES, AND VISUAL RESOURCES

Alternative Route	Length (miles)	Socioeconomic	Cultural Resources	Visual Resources				
					Sensitive Viewers			
				Landscape Scenery (miles crossed)	High Sensitivity Viewers (miles crossed)	Moderate Sensitivity Viewers (miles crossed)	Federal Agency Visual Management Objectives	Summary of Residual Impacts
Alternative S5 Iron Springs and Pinto Creek (Proponent's Preferred Alternative)	59.0	**Impacts** ▪ Minimal impact on employment, population, housing, government services ▪ Increased property taxes of $1.08 million year 1 and $105,000 remaining years ▪ No disproportionate impact on environmental justice population	**Inventory** ▪ 152 sites identified by the Class I and Class II ▪ 23 sites within APE ▪ Intersects the Old Spanish NHT **Impacts** ▪ 3.1 miles of high cultural resource sensitivity	Class B Scenery – 29.1	**Views within 0.25 mile –** 4.6 **Views between 0.25 and 0.5 mile –** 8.9	**Views within 0.25 mile –** 11.3 **Views between 0.25 and 0.5 mile –** 3.9	▪ In compliance with VRM Class III[1] and IV objectives ▪ Consistent with moderate SIO; not consistent with high SIO ▪ Consistent with standard prohibition of unacceptably low SIO	**Landscape Scenery** ▪ Impact on scenery identical to S1 **Residential Views** ▪ Impact on residential viewers identical to S1 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to S1 **Impacts** ▪ 0.7 mile of moderate/high impact
Alternative S6 Iron Springs and Ox Valley	61.8	**Impacts** ▪ Minimal impact on employment, population, housing, government services ▪ Increased property taxes of $1.16 million year 1 and $113,000 remaining years ▪ No disproportionate impact on environmental justice population	**Inventory** ▪ 223 sites identified by the Class I and Class II ▪ 10 sites within APE ▪ Intersects the Old Spanish NHT **Impacts** ▪ 1.7 miles of high cultural resource sensitivity	Class B Scenery – 33.3	**Views within 0.25 mile –** 4.6 **Views between 0.25 and 0.5 mile –** 3.7	**Views within 0.25 mile –** 10.8 **Views between 0.25 and 0.5 mile –** 5.2	▪ In compliance with VRM Class IV[1] objective ▪ Not consistent with moderate and high SIOs ▪ Consistent with standard prohibition of unacceptably low SIO	**Landscape Scenery** ▪ Impact on scenery identical to S3 **Residential Views** ▪ Impact on residential viewers identical to S3 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to S3 **Impacts** ▪ 0.3 mile of moderate/high impact

TABLE 2-11b
ALTERNATIVE ROUTE COMPARISON
SOCIOECONOMIC, CULTURAL RESOURCES, AND VISUAL RESOURCES

Alternative Route	Length (miles)	Socioeconomic	Cultural Resources	Visual Resources				
				Landscape Scenery (miles crossed)	Sensitive Viewers: High Sensitivity Viewers (miles crossed)	Sensitive Viewers: Moderate Sensitivity Viewers (miles crossed)	Federal Agency Visual Management Objectives	Summary of Residual Impacts
Alternative S7 Middle Hybrid Route	49.8	**Impacts** ▪ Minimal impact on employment, population, housing, government services ▪ Increased property taxes of $1.0 million year 1 and $98,000 remaining years ▪ No disproportionate impact on environmental justice populations	**Inventory** ▪ 183 sites identified by the Class I and Class II ▪ 14 sites within APE ▪ Intersects the Old Spanish NHT **Impacts** ▪ 2.6 miles of high cultural resource sensitivity	Class B Scenery – 18.0	**Views within 0.25 mile –** 7.7 **Views between 0.25 and 0.5 mile –** 8.1	**Views within 0.25 mile –** 7.2 **Views between 0.25 and 0.5 mile –** 6.6	▪ In compliance with VRM Class IV[1] objective ▪ Not consistent with moderate and high SIOs ▪ Consistent with standard prohibition of unacceptably low SIO	**Landscape Scenery** ▪ Impact on scenery identical to S2 with the addition of moderate impact on the Atchinson Mountain landscape **Residential Views** ▪ Impact on residential viewers identical to S2 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to S2 except low/moderate impact expected on views from Mountain Meadows Massacre Site NHL and the Old Spanish NHT **Impacts** ▪ 0.0 mile of moderate/high impact

TABLE 2-11b
ALTERNATIVE ROUTE COMPARISON
SOCIOECONOMIC, CULTURAL RESOURCES, AND VISUAL RESOURCES

Alternative Route	Length (miles)	Socioeconomic	Cultural Resources	Visual Resources				
				Landscape Scenery (miles crossed)	Sensitive Viewers: High Sensitivity Viewers (miles crossed)	Sensitive Viewers: Moderate Sensitivity Viewers (miles crossed)	Federal Agency Visual Management Objectives	Summary of Residual Impacts
Alternative S7-A (route variation of Alternative S7) Middle Hybrid Route 300 feet east of Sigurd to Red Butte No. 1 transmission line adjacent to Atchinson Inventoried Roadless Area (IRA) (Agency Preferred Alternative)	48.9	**Impacts** ▪ Minimal impact on employment, population, housing, government services ▪ Increased property taxes of $*TBD* million year 1 and $*TBD* remaining years ▪ No disproportionate impact on environmental justice populations	**Inventory** ▪ 183 sites identified by the Class I and Class II ▪ 16 sites within APE, including the Mountain Meadows Historic Site listed on the NRHP ▪ In proximity to the Mountain Meadows Massacre Site NHL ▪ Intersects the Old Spanish NHT **Impacts** ▪ 3.7 miles of high cultural resource sensitivity	Class B Scenery – 16.9	**Views within 0.25 mile –** 7.7 **Views between 0.25 and 0.5 mile –** 9.3	**Views within 0.25 mile –** 6.8 **Views between 0.25 and 0.5 mile –** 8.3	▪ In compliance with VRM Class IV[1] objective ▪ Not consistent with moderate and high SIOs ▪ Consistent with standard prohibition of unacceptably low SIO	**Landscape Scenery** ▪ Impact on scenery identical to S7 except for low-moderate impact on the Atchinson Mountain landscape **Residential Views** ▪ Impact on residential viewers identical to S7 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to S7 except low/moderate impact expected on views from Mountain Meadows Massacre Site NHL and the Old Spanish NHT **Impacts** ▪ 0.0 mile of moderate/high impact

NOTE: [1]For descriptions of the four VRM classes, refer to Table 3-56 in Section 3.2.8.4.

TABLE 2-11c
ALTERNATIVE ROUTE COMPARISON
LAND USE AND RECREATION RESOURCES

Alternative Route	Length (miles)	Parallel Linear Facilities (within 1,500 feet) (miles)					Jurisdiction (miles)				Summary of Residual Impacts
		500kV	345kV	138kV	230kV	Pipeline	BLM	USFS	State	Private	
Northern – Sigurd Substation to South of the Black Mountains											
Alternative N1 Black Rock Road to Intermountain Power Project 500kV transmission line (IPP) north of Milford Wind Farm	120.6	34.9	5.6	36.5	–	2.4	46.3	30.8	5.1	38.4	**Inventory** ▪ 74 residences within 0.25 mile; crosses 7.8 miles of unroaded/undeveloped areas on lands administered by the U.S. Forest Service (USFS); proximity to Richfield and Milford airports ▪ Crosses 0.5 mile of future parks/preservation; 1.7 miles of proposed Mormon Mesa Wind Testing Area; 4.1 miles of Milford Wind Corridor, LLC Phase III and 8.3 miles of Milford Wind Corridor, LLC Phase IV; 5.8 miles of geothermal leases; and 14.5 miles of oil and gas leases ▪ Crosses 0.8 mile of an off-highway vehicle area; Paiute All-terrain Vehicle Trail System; Kimberly/Big John Road Scenic Backway; 1.4 miles of semi-primitive nonmotorized areas; and 10.1 miles of semi-primitive motorized areas **Impacts** ▪ High impact associated with semi-primitive nonmotorized areas and Milford Wind Corridor, LLC Phase III (due to potential operational conflicts) ▪ Moderate impact associated with unroaded/undeveloped areas on USFS-administered lands, proposed Milford Wind Corridor, LLC Phase IV, and semi-primitive motorized areas
Alternative N2 Black Rock Road to IPP south of Milford Wind Farm	120.4	29.7	0.7	36.5	–	6.7	56.1	30.8	3.9	29.6	**Inventory** ▪ Similar to Alternative N1 between Sigurd Substation and Cove Fort ▪ 74 residences within 0.25 mile; crosses 1.5 miles of Milford Wind Corridor, LLC Phase III and 4.2 miles of Milford Wind Corridor, LLC Phase IV; 9.1 miles of geothermal leases, 14.5 miles of oil and gas leases, and 2.1 miles of proposed Mormon Mesa Wind Testing Area ▪ Proximity to Milford Airport **Impacts** ▪ Similar to Alternative N1 between Sigurd Substation and Cove Fort ▪ Moderate impacts associated with the Milford Wind Corridor, LLC Phase III (no operational conflicts identified)

TABLE 2-11c
ALTERNATIVE ROUTE COMPARISON
LAND USE AND RECREATION RESOURCES

Alternative Route	Length (miles)	Parallel Linear Facilities (within 1,500 feet) (miles)					Jurisdiction (miles)				Summary of Residual Impacts
		500kV	345kV	138kV	230kV	Pipeline	BLM	USFS	State	Private	
Alternative N2-A (route variation of Alternative N2) Black Rock Road to IPP south of Milford Wind Farm 1,500 feet east of Kern River Pipeline (Agency Preferred Alternative)	120.0	29.7	0.3	38.1	–	6.9	56.0	30.8	3.9	29.3	**Inventory** ▪ 76 residences within 0.25 mile ▪ Alternative N2-A varies from Alternative N2 from the Sigurd Substation approximately one mile to the west; the remainder of Alternative N2-A is similar to Alternative N2 **Impacts** ▪ Similar to Alternative N2; lower impacts would occur in the northern most portion of the alternative, near the Sigurd Substation.
Alternative N3 Black Rock Road Parallel to Kern River Pipeline	117.2	0.1	0.7	37.5	–	41.6	64.5	30.8	6.6	15.3	**Inventory** ▪ 75 residences within 0.25 mile; crosses 9.8 miles of geothermal leases and 17.4 miles of oil and gas leases ▪ Similar to Alternative N2 between Sigurd Substation and the Blundell Geothermal Plant **Impacts** ▪ Similar to Alternative N2 between Sigurd Substation and the Blundell Geothermal Plant; low impacts would be anticipated on the remainder of the alternative route
Alternative N4 Mineral Mountains to IPP south of Milford Wind Farm	109.4	29.7	0.7	37.4	–	2.4	44.5	30.8	5.4	28.7	**Inventory** ▪ 74 residences within 0.25 mile; crosses 1.5 miles of Milford Wind Corridor, LLC Phase III; 9.3 miles of geothermal leases, 14.5 miles of oil and gas leases, 1.6 miles of proposed Mineral Mountain Wind Farm, and 2.2 miles of proposed Mormon Mesa Wind Testing Area ▪ Proximity to Milford Airport ▪ Similar to Alternative N1 between Sigurd Substation and Cove Fort **Impacts** ▪ Similar to Alternative N1 from the Sigurd Substation and Cove Fort

TABLE 2-11c
ALTERNATIVE ROUTE COMPARISON
LAND USE AND RECREATION RESOURCES

Alternative Route	Length (miles)	Parallel Linear Facilities (within 1,500 feet) (miles)					Jurisdiction (miles)				Summary of Residual Impacts
		500kV	345kV	138kV	230kV	Pipeline	BLM	USFS	State	Private	
Alternative N5 Mineral Mountains to Kern River Pipeline	106.2	0.1	0.7	38.4	–	37.3	52.9	30.8	8.1	14.4	**Inventory** ▪ Similar to Alternative N4 between Sigurd Substation and Blundell Geothermal Plant ▪ 75 residences within 0.25 mile ▪ Crosses 10.0 miles of geothermal leases, 17.4 miles of oil and gas leases, 0.7 mile Milford Flats South solar study area, 1.6 miles of proposed Mineral Mountain Wind Farm, and 2.6 miles of proposed Mormon Mesa Wind Testing Area **Impacts** ▪ Similar to Alternative N1 between Sigurd Substation to Cove Fort; similar to Alternative N4 between Cove Fort and Blundell Geothermal Plant
Alternative N6 Mineral Mountains 1,500 feet east of Kern River Pipeline (Proponent's Preferred Alternative)	105.4	0.1	0.3	38.5	–	33.5	52.5	30.8	7.9	14.2	**Inventory** ▪ 76 residences within 0.25 mile; crosses 10.6 miles of geothermal leases, 18.2 miles of oil and gas leases, 0.7 mile Milford Flats South solar study area, 1.6 miles of proposed Mineral Mountain Wind Farm, and 2.6 miles of proposed Mormon Mesa Wind Testing Area **Impacts** ▪ Similar to Alternative N1 between Sigurd Substation to Cove Fort; similar to Alternative N4 between Cove Fort and Blundell Geothermal Plant ▪ Impacts on existing land use would be slightly higher than Alternative N5 (e.g., crosses more geothermal leases, oil and gas leases, and transportation)
Southern – South of the Black Mountains to Red Butte Substation											
Alternative S1 Pinto Creek	55.9	19.7	10.0	4.2	–	4.1	12.6	20.7	0.4	22.2	**Inventory** ▪ 11 residences within 0.25 mile ▪ Crosses 11.7 miles of unroaded/undeveloped areas on USFS-administered lands; 7.7 miles of oil and gas leases,; 2.6 miles of semi-primitive nonmotorized areas, and 6.7 miles of semi-primitive motorized areas **Impacts** ▪ High impacts associated with semi-primitive nonmotorized areas ▪ Moderate impacts associated unroaded/undeveloped areas on USFS-administered lands and semi-primitive motorized areas

TABLE 2-11c
ALTERNATIVE ROUTE COMPARISON
LAND USE AND RECREATION RESOURCES

Alternative Route	Length (miles)	Parallel Linear Facilities (within 1,500 feet) (miles)					Jurisdiction (miles)				Summary of Residual Impacts
		500kV	345kV	138kV	230kV	Pipeline	BLM	USFS	State	Private	
Alternative S2 IPP West	49.6	25.3	15.3	7.0	–	17.7	13.0	9.9	0.9	25.8	**Inventory** ▪ 20 residences within 0.25 mile ▪ Crosses 0.1 mile of inventoried roadless area (IRA), crosses 0.7 mile unroaded/undeveloped areas on USFS-administered lands, 2.5 miles of future parks/preservation, 0.8 mile geothermal leases, 7.7 miles of oil and gas leases, 4.7 miles of semi-primitive motorized areas, and 2.5 miles of the Mountain Meadows Historic Site **Impacts** ▪ Moderate impacts associated with IRA on USFS-administered lands, unroaded/undeveloped areas on USFS-administered lands, and semi-primitive motorized areas
Alternative S3 Ox Valley	57.4	24.1	16.0	1.8	–	10.7	13.5	20.0	0.9	23.0	**Inventory** ▪ 8 residences within 0.25 mile ▪ Crosses 9.1 miles of unroaded/undeveloped areas on USFS-administered lands, 0.2 mile of future parks/preservation, 0.8 mile geothermal leases, 7.7 miles of oil and gas leases, Hardscrabble Trail, 4.2 miles of semi-primitive nonmotorized areas, and 14.7 miles of semi-primitive motorized areas **Impacts** ▪ High impacts associated with semi-primitive nonmotorized areas ▪ Moderate impacts associated with unroaded/undeveloped areas on USFS-administered lands, citizen proposed wilderness areas (not equivalent to lands with wilderness qualities or attributes), and semi-primitive motorized areas
Alternative S4 IPP East	48.9	21.9	16.5	2.2	–	5.7	12.3	15.2	0.4	21.0	**Inventory** ▪ 9 residences within 0.25 mile; crosses 10.4 miles of unroaded/undeveloped areas on USFS-administered lands; 8.4 miles of IRA, 0.8 mile geothermal leases, 7.7 oil and gas leases, 6.3 miles of semi-primitive nonmotorized areas, and 4.1 miles of semi-primitive motorized areas **Impacts** ▪ High impacts associated with semi-primitive nonmotorized areas ▪ Moderate impacts associated with IRA and unroaded/ undeveloped areas on USFS-administered lands and semi-primitive motorized areas

TABLE 2-11c
ALTERNATIVE ROUTE COMPARISON
LAND USE AND RECREATION RESOURCES

Alternative Route	Length (miles)	Parallel Linear Facilities (within 1,500 feet) (miles)					Jurisdiction (miles)				Summary of Residual Impacts
		500kV	345kV	138kV	230kV	Pipeline	BLM	USFS	State	Private	
Alternative S5 Iron Springs and Pinto Creek (Proponent's Preferred Alternative)	59.0	3.7	1.6	5.2	–	3.1	25.5	20.7	2.2	10.6	**Inventory** ▪ 11 residences within 0.25 mile ▪ Similar to Alternative S1 from Newcastle to Red Butte Substation ▪ Alternative S5 varies from S1 between the Black Mountains to Newcastle, crossing 10.8 miles of oil and gas leases; 55.5 miles of rangeland; ▪ Located within a designated utility corridor (0.2 mile less than Alternative S1) **Impacts** ▪ Similar to Alternative S1 from Newcastle to Red Butte Substation ▪ From Black Mountains to Newcastle crosses more oil and gas leases and rangeland than Alternative S1 ▪ More miles located outside of designated energy corridor than Alternative S1
Alternative S6 Iron Springs and Ox Valley	61.8	8.1	4.4	2.9	–	7.9	27.6	20.0	2.7	11.5	**Inventory** ▪ 7 residences within 0.25 mile ▪ Similar to Alternative S3 from Newcastle to Red Butte Substation ▪ From Alternative S3 from Black Mountains to Newcastle, crosses 10.8 miles of oil and gas leases ▪ Alternative S6 is located within a designated utility corridor for 10.8 miles (compared to 13.1 miles on Alternative S3); crosses more BLM and State land and less private land than Alternative S3 **Impacts** ▪ Similar to Alternative S3 from Newcastle to Red Butte Substation ▪ From the Black Mountains to Newcastle crosses more oil and gas leases and more miles outside of a designated utility corridor than Alternative S3

TABLE 2-11c
ALTERNATIVE ROUTE COMPARISON
LAND USE AND RECREATION RESOURCES

Alternative Route	Length (miles)	Parallel Linear Facilities (within 1,500 feet) (miles)					Jurisdiction (miles)				Summary of Residual Impacts
		500kV	345kV	138kV	230kV	Pipeline	BLM	USFS	State	Private	
Alternative S7 Middle Hybrid Route	49.8	25.0	15.7	5.3	–	12.7	13.0	13.1	0.9	22.8	**Inventory** ▪ 15 residences within 0.25 mile ▪ Crosses 5.3 miles of unroaded/undeveloped areas on USFS-administered lands; 0.8 mile of geothermal leases; and 7.7 miles of oil and gas leases ▪ Crosses 0.5 mile of semi-primitive nonmotorized areas; and 6.6 miles of semi-primitive motorized areas ▪ Crosses 2.7 miles of IRA and is within 16.4 miles of a designated utility corridor **Impacts** ▪ High impacts associated semi-primitive nonmotorized areas ▪ Moderate impacts associated with IRA on USFS-administered lands, unroaded/undeveloped areas on USFS-administered lands, and semi-primitive motorized areas
Alternative S7-A (route variation of Alternative S7) Middle Hybrid Route 300 feet east of Sigurd to Red Butte No. 1 transmission line adjacent to Atchinson IRA (Agency Preferred Alternative)	49.8	29.5	20.4	9.7	–	16.7	13.0	12.6	0.9	23.3	**Inventory** ▪ 15 residences within 0.25 mile ▪ Crosses the Mountain Meadows Historic Site for 1.6 miles ▪ Crosses 1.4 miles of IRA and is within 17.7 miles of a designated utility corridor Impacts ▪ Similar to Alternative S7 **Impacts** ▪ Moderate impact due to the IRA, but reduces effects on the IRA by consolidating the transmission lines in the designated utility corridor compared to Alternative S7 ▪ Moderate impacts due to the Mountain Meadows Historic Site

NOTE: kV = Kilovolt

TABLE 2-11d
ALTERNATIVE ROUTE COMPARISON
ENGINEERING ISSUES AND GROUND DISTURBANCE

Alternative Route	Length (miles)	System Reliability	Topography[1]	Construction Access and Design Issues	Ground Disturbance		
					Temporary (acres)[2, 3]	Permanent (acres)[2, 4]	Right-of-Way Vegetation Clearing (acres)[2, 5]
Northern – Sigurd Substation to South of the Black Mountains							
Alternative N1 Black Rock Road to Intermountain Power Project 500kV transmission line (IPP) north of Milford Wind Farm	120.6	▪ 34.9 miles parallel to 500kV transmission line and 5.6 miles parallel to 345kV transmission lines; 1,500-foot separation from lines ▪ System reliability issues associated with paralleling the existing transmission lines in an area susceptible to outages due to potential for wildfires ▪ Operational conflicts with Milford Wind Corridor, LLC Phase III turbine locations ▪ Potential operational conflicts with turbine locations of proposed wind farm (Milford Wind Corridor, LLC Phase IV)	▪ Approximately 11.2 miles of moderate terrain ▪ Approximately 18.6 miles of steep terrain	▪ 41.5 miles of existing access ▪ 79.1 miles of new access	1,099.5	352.6	364.6
Alternative N2 Black Rock Road to IPP south of Milford Wind Farm	120.4	▪ 29.7 miles parallel to 500kV transmission line and 0.7 mile parallel to 345kV transmission lines; 1,500-foot separation from lines ▪ System reliability issues associated with paralleling the existing transmission lines in an area susceptible to outages due to potential for wildfires ▪ Potential operational conflicts with turbine locations of proposed wind farm (Milford Wind Corridor, LLC Phase IV)	▪ Approximately 14.8 miles of moderate terrain ▪ Approximately 18.8 miles of steep terrain	▪ 50.9 miles of existing access ▪ 69.5 miles of new access	1,103.0	344.0	364.6
Alternative N2-A (route variation of Alternative N2) Black Rock Road to IPP south of Milford Wind Farm 1,500 feet east of Kern River Pipeline (Agency Preferred Alternative)	120.0	▪ 29.7 miles parallel to 500kV transmission line and 0.7 mile parallel to 345kV transmission lines; 1,500-foot separation from lines ▪ Potential operational conflicts with turbine locations of proposed wind farm (Milford Wind Corridor, LLC Phase IV)	▪ Approximately 15.3 miles of moderate terrain ▪ Approximately 19.2 miles of steep terrain	▪ 50.6 miles of existing access ▪ 69.4 miles of new access	1,099.8	344.4	362.7
Alternative N3 Black Rock Road Parallel to Kern River Pipeline	117.2	▪ No major reliability issues ▪ Potential operational conflicts with turbine locations of proposed wind farm (Milford Wind Corridor, LLC Phase IV)	▪ Approximately 17.6 miles of moderate terrain ▪ Approximately 20.1 miles of steep terrain	▪ 81.7 miles of existing access ▪ 35.5 miles of new access	1,077.3	303.8	418.1

TABLE 2-11d
ALTERNATIVE ROUTE COMPARISON
ENGINEERING ISSUES AND GROUND DISTURBANCE

Alternative Route	Length (miles)	System Reliability	Topography[1]	Construction Access and Design Issues	Ground Disturbance		
					Temporary (acres)[2, 3]	Permanent (acres)[2, 4]	Right-of-Way Vegetation Clearing (acres)[2, 5]
Alternative N4 Mineral Mountains to IPP south of Milford Wind Farm	109.4	▪ 29.7 miles parallel to 500kV transmission line and 0.7 mile parallel to 345kV transmission lines; 1,500-foot separation from lines ▪ System reliability issues associated with paralleling the existing transmission lines in an area susceptible to outages due to potential for wildfires ▪ Potential operational conflicts with turbine locations of proposed Mineral Mountains wind farm	▪ Approximately 14.3 miles of moderate terrain ▪ Approximately 22.7 miles of steep terrain	▪ 37.8 miles of existing access ▪ 71.6 miles of new access	1,010.6	351.2	370.4
Alternative N5 Mineral Mountains to Kern River Pipeline	106.2	▪ No major reliability issues ▪ Potential operational conflicts with turbine locations of proposed Mineral Mountains wind farm	▪ Approximately 17.1 miles of moderate terrain ▪ Approximately 24.0 miles of steep terrain	▪ 68.6 miles of existing access ▪ 37.6 miles of new access	985.4	311.0	423.8
Alternative N6 Mineral Mountains 1,500 feet east of Kern River Pipeline (Proponent's Preferred Alternative)	105.4	▪ No major reliability issues ▪ Potential operational conflicts with turbine locations of proposed Mineral Mountains wind farm	▪ Approximately 18.2 miles of moderate terrain ▪ Approximately 26.5 miles of steep terrain	▪ 34.4 miles of existing access ▪ 71.0 miles of new access	977.3	371.2	481.1
Southern – South of the Black Mountains to Red Butte Substation							
Alternative S1 Pinto Creek	55.9	▪ 19.7 miles parallel to 500kV transmission line and 10.0 miles parallel to 345kV transmission lines; 1,500-foot separation from lines ▪ Crosses Sigurd to Red Butte No. 1 – 345kV transmission line ▪ System reliability issues associated with paralleling the existing transmission lines in an area susceptible to outages due to potential for wildfires	▪ Approximately 10.9 miles of moderate terrain ▪ Approximately 12.0 miles of steep terrain	▪ 13.6 miles of existing access ▪ 42.3 miles of new access	526.0	195.6	330.3
Alternative S2 IPP West	49.6	▪ 25.3 miles parallel to 500kV transmission line and 15.2 miles parallel to 345kV transmission lines; 1,500-foot separation from lines ▪ Crosses IPP twice and Sigurd to Red Butte No. 1 – 345kV transmission line three times ▪ System reliability issues associated with paralleling the existing transmission lines in an area susceptible to outages due to potential for wildfires	▪ Approximately 8.0 miles of moderate terrain ▪ Approximately 7.8 miles of steep terrain	▪ 11.9 miles of existing access ▪ 37.7 miles of new access	499.3	157.9	184.2

TABLE 2-11d
ALTERNATIVE ROUTE COMPARISON
ENGINEERING ISSUES AND GROUND DISTURBANCE

Alternative Route	Length (miles)	System Reliability	Topography[1]	Construction Access and Design Issues	Ground Disturbance		
					Temporary (acres)[2, 3]	Permanent (acres)[2, 4]	Right-of-Way Vegetation Clearing (acres)[2, 5]
Alternative S3 Ox Valley	57.4	▪ 24.1 miles parallel to 500kV transmission line and 15.9 miles parallel to 345kV transmission lines; 1,500-foot separation from lines ▪ Crosses IPP twice, Sigurd to Red Butte No. 1 – 345kV transmission line twice, and Harry Allen to Red Butte 345kV transmission line once ▪ System reliability issues associated with paralleling the existing transmission lines in an area susceptible to outages due to potential for wildfires	▪ Approximately 8.8 miles of moderate terrain ▪ Approximately 15.6 miles of steep terrain	▪ 10.7 miles of existing access ▪ 46.7 miles of new access	536.9	223.4	339.8
Alternative S4 IPP East	48.9	▪ 21.9 miles parallel to 500kV transmission line and 16.4 miles parallel to 345kV transmission lines; 1,500-foot separation from lines ▪ Crosses Sigurd to Red Butte No. 1 – 345kV transmission line once ▪ System reliability issues associated with paralleling the existing transmission lines in an area susceptible to outages due to potential for wildfires	▪ Approximately 7.6 miles of moderate terrain ▪ Approximately 13.9 miles of steep terrain	▪ 5.1 miles of existing access ▪ 43.8 miles of new access	547.9	147.0	320.3
Alternative S5 Iron Springs and Pinto Creek (Proponent's Preferred Alternative)	59.0	▪ 3.7 miles parallel to 500kV transmission line and 1.6 miles parallel to 345kV transmission lines; 1,500-foot separation from lines ▪ Crosses Sigurd to Red Butte No. 1 – 345kV transmission line once ▪ System reliability issues associated with paralleling the existing transmission lines in an area susceptible to outages due to potential for wildfires	▪ Approximately 11.4 miles of moderate terrain ▪ Approximately 11.0 miles of steep terrain	▪ 16.9 miles of existing access ▪ 42.1 miles of new access	553.2	197.1	423.8
Alternative S6 Iron Springs and Ox Valley	61.8	▪ 8.1 miles parallel to 500kV transmission line and 4.4 miles parallel to 345kV transmission lines; 1,500-foot separation from lines ▪ Crosses IPP twice, Sigurd to Red Butte No. 1 – 345kV transmission line twice, and Harry Allen to Red Butte 345kV transmission line once ▪ System reliability issues associated with paralleling the existing transmission lines in an area susceptible to outages due to potential for wildfires	▪ Approximately 10.0 miles of moderate terrain ▪ Approximately 15.0 miles of steep terrain	▪ 16.8 miles of existing access ▪ 45.0 miles of new access	573.5	228.3	460.1

TABLE 2-11d
ALTERNATIVE ROUTE COMPARISON
ENGINEERING ISSUES AND GROUND DISTURBANCE

Alternative Route	Length (miles)	System Reliability	Topography[1]	Construction Access and Design Issues	Ground Disturbance		
					Temporary (acres)[2, 3]	Permanent (acres)[2, 4]	Right-of-Way Vegetation Clearing (acres)[2, 5]
Alternative S7 Middle Hybrid Route	49.8	▪ 25.0 miles parallel to 500kV transmission line and 15.6 miles parallel to 345kV transmission lines; 1,500-foot separation from lines ▪ Proponent letter to BLM dated August 2011 identifies system reliability issues of line crossings; BLM requested independent technical review from Department of Energy; Department of Energy response letter dated November 2011 concurred with Proponent but did not discount technical feasibility of the alternative route; Proponent letter dated September 2011 stated they would prefer to avoid crossing existing transmission lines but would construct the Project using this alternative	▪ Approximately 8.2 miles of moderate terrain ▪ Approximately 9.9 miles of steep terrain	▪ 8.9 miles of existing access ▪ 40.9 miles of new access	518.7	162.6	234.4
Alternative S7-A (route variation of Alternative S7) Middle Hybrid Route 300 feet east of Sigurd to Red Butte No. 1 transmission line adjacent to Atchinson Inventoried Roadless Area (Agency Preferred Alternative)	49.8	▪ 29.5 miles parallel to 500kV transmission line and 20.4 miles parallel to 345kV transmission lines; 1,500-foot to 300-foot separation from lines ▪ Concerns of the Proponent about effects on reliability of the system associated with Alternative S7 also would be relevant to this route variation	▪ Approximately 8.6 miles of moderate terrain ▪ Approximately 9.1 miles of steep terrain	▪ 11.7 miles of existing access ▪ 38.1 miles of new access	506.2	161.7	226.8

NOTES:
[1] Moderate terrain: 8 to 15 percent slope; steep terrain: greater than 15 percent slope
[2] Disturbance calculations include an additional 5 percent contingency.
[3] Temporary disturbance: Estimated area of disturbance associated with structure work areas, wire-splicing sites, wire-pulling sites, wire-tensioning sites, construction yards, and concrete batch plants (refer to Table 2-1).
[4] Permanent disturbance: Estimated area of disturbance associated with H-frame and lattice structure base areas and permanent access roads (refer to Table 2-2).
[5] Right-of-way vegetation clearing: Estimated area of vegetation clearing within the transmission line right-of-way (calculations include vegetation types with the potential to grow 12 feet tall: aspen, pinyon-juniper, mountain shrub, and riparian).
kV = Kilovolt

TABLE 2-12
SUMMARY OF ALTERNATIVE ROUTE COMPARISON

Alternative Route	Overall Length (miles)	Parallel to Existing Transmission Line (miles [percent])	New Transmission Line Route (miles [percent])	Jurisdiction (miles crossed)				Estimated Ground Disturbance			Access Roads	Summary of Stakeholder Comments
				Bureau of Land Management	U.S. Forest Service (USFS)	State	Private	Temporary (acres)[1, 2]	Permanent (acres)[1, 3]	Right-of-Way Clearing (acres)[1, 4]		
Northern – Sigurd Substation to South of the Black Mountains												
Alternative N1 Black Rock Road to Intermountain Transmission Project 500kV transmission line (IPP) north of Milford Wind Farm	120.6	76.6 (63.5%)	44.0 (36.5%)	46.3	30.8	5.1	38.4	1,099.5	352.6	364.6	▪ 41.5 miles of existing access ▪ 79.1 miles of new access	**Richfield City** ▪ Expressed concern with impact on water storage tanks, watershed, and fireworks launching pad **Town of Joseph** ▪ Expressed concern with proximity of the alternative route to the location of future water storage tanks **Millard County** ▪ Expressed concern with visual impacts on Cove Fort, potential wind erosion and air quality impacts from fugitive dust during construction, impacts on groundwater used by agricultural and ranching operations, and impacts on private lands and existing and planned wind energy facilities ▪ Opposed route due to concerns about impacts on proposed and approved wind farms; noted that a general plan amendment would not be approved **Beaver County** ▪ Opposed route due to concerns about impacts on approved wind farm **First Wind** ▪ Expressed concern about potential operational conflicts between the Project and operating and planned wind projects and cumulative impacts on perching raptors and eagles resulting in increased risk of liability to First Wind; Alternative N1 would route transmission line closer to more wind turbines than Alternatives N2 and N4 ▪ Opposed alternative route **Southern Utah Wilderness Alliance (SUWA)** ▪ Preferred alternative to avoid impacts on the area proposed as the Antelope Range citizen-proposed wilderness area

TABLE 2-12
SUMMARY OF ALTERNATIVE ROUTE COMPARISON

Alternative Route	Overall Length (miles)	Parallel to Existing Transmission Line (miles [percent])	New Transmission Line Route (miles [percent])	Jurisdiction (miles crossed)				Estimated Ground Disturbance			Access Roads	Summary of Stakeholder Comments
				Bureau of Land Management	U.S. Forest Service (USFS)	State	Private	Temporary (acres)[1, 2]	Permanent (acres)[1, 3]	Right-of-Way Clearing (acres)[1, 4]		
Alternative N2 Black Rock Road to IPP south of Milford Wind Farm	120.4	66.5 (55.2%)	53.9 (44.8%)	56.1	30.8	3.9	29.6	1,103.0	344.0	364.6	▪ 50.9 miles of existing access ▪ 69.5 miles of new access	**Richfield City** ▪ Expressed concern with impact on water storage tanks, watershed, and fireworks launching pad **Town of Joseph** ▪ Expressed concern with proximity of the alternative route to the location of future water storage tanks **Millard County** ▪ Expressed concern with visual impacts on Cove Fort and impacts on private lands; however, supports selection of the alternative **Beaver County** ▪ Opposed route due to concerns about impacts on planned wind project **First Wind** ▪ Expressed similar concern as presented for Alternative N1; however, route or turbine locations could be micro-sited to avoid direct location and operational conflicts between the two projects **National Trust for Historic Preservation** ▪ Expressed concern about impacts on cultural resources and historic sites and traditional cultural properties

TABLE 2-12
SUMMARY OF ALTERNATIVE ROUTE COMPARISON

Alternative Route	Overall Length (miles)	Parallel to Existing Transmission Line (miles [percent])	New Transmission Line Route (miles [percent])	Jurisdiction (miles crossed)				Estimated Ground Disturbance			Access Roads	Summary of Stakeholder Comments
				Bureau of Land Management	U.S. Forest Service (USFS)	State	Private	Temporary (acres)[1, 2]	Permanent (acres)[1, 3]	Right-of-Way Clearing (acres)[1, 4]		
Alternative N2-A (route variation of Alternative N2)Black Rock Road to IPP south of Milford Wind Farm 1,500 feet east of Kern River Pipeline (Agency Preferred Alternative)	120.0	67.8 (56.5%)	52.2 (43.5%)	56.0	30.8	3.9	29.3	1,099.8	344.4	362.7	▪ 50.6 miles of existing access ▪ 69.4 miles of new access	**Richfield City** ▪ Expressed concern with impact on water storage tanks, watershed, and fireworks launching pad **Town of Joseph** ▪ Expressed concern with proximity of the alternative route to the location of future water storage tanks **Millard County** ▪ Expressed concern with visual impacts on Cove Fort and impacts on private lands ▪ Identified Alternative N2-A as an acceptable alternative but stated preference for Alternative N4; approved a General Plan Amendment and conditional use permit for this alternative route on February 21, 2012 **Beaver County** ▪ Identified Alternative N2-A as an acceptable alternative but stated preference for Alternative N4; approved a conditional use permit for this alternative route on March 19, 2012 **First Wind** ▪ Expressed similar concern as presented for Alternative N1; however, route or turbine locations could be micro-sited to avoid direct location and operational conflicts between the two projects **National Trust for Historic Preservation** ▪ Concerns expressed for Alternative N2 would apply to this alternative

TABLE 2-12
SUMMARY OF ALTERNATIVE ROUTE COMPARISON

Alternative Route	Overall Length (miles)	Parallel to Existing Transmission Line (miles [percent])	New Transmission Line Route (miles [percent])	Jurisdiction (miles crossed)				Estimated Ground Disturbance			Access Roads	Summary of Stakeholder Comments
				Bureau of Land Management	U.S. Forest Service (USFS)	State	Private	Temporary (acres)[1, 2]	Permanent (acres)[1, 3]	Right-of-Way Clearing (acres)[1, 4]		
Alternative N3 Black Rock Road Parallel to Kern River Pipeline	117.2	37.9 (32.3%)	79.3 (67.7%)	64.5	30.8	6.6	15.3	1,077.3	303.8	418.1	▪ 81.7 miles of existing access ▪ 35.5 miles of new access	**Richfield City** ▪ Expressed concern with impact on water storage tanks, watershed, and fireworks launching pad **Town of Joseph** ▪ Expressed concern with proximity of the alternative route to the location of future water storage tanks **Millard County** ▪ Expressed concern with visual impact on Cove Fort ▪ Expressed concern about impacts on private lands and existing and planned wind energy facilities **Beaver County** ▪ Similar concerns as Alternative N2. **First Wind** ▪ Expressed similar concern as presented for Alternative N2 **National Trust for Historic Preservation** ▪ Expressed concern about impacts on cultural resources and historic sites and traditional cultural properties

TABLE 2-12
SUMMARY OF ALTERNATIVE ROUTE COMPARISON

Alternative Route	Overall Length (miles)	Parallel to Existing Transmission Line (miles [percent])	New Transmission Line Route (miles [percent])	Jurisdiction (miles crossed)				Estimated Ground Disturbance			Access Roads	Summary of Stakeholder Comments
				Bureau of Land Management	U.S. Forest Service (USFS)	State	Private	Temporary (acres)[1, 2]	Permanent (acres)[1, 3]	Right-of-Way Clearing (acres)[1, 4]		
Alternative N4 Mineral Mountains to IPP south of Milford Wind Farm	109.4	67.4 (61.6%)	42.0 (38.4%)	44.5	30.8	5.4	28.7	1,010.6	351.2	370.4	▪ 37.8 miles of existing access ▪ 71.6 miles of new access	**Richfield City** ▪ Expressed concern with impact on water storage tanks, watershed, and fireworks launching pad **Town of Joseph** ▪ Expressed concern with proximity of the alternative route to the location of future water storage tanks **Millard County** ▪ Expressed concern with visual impact on Cove Fort and impacts on private lands ▪ Preferred alternative to avoid potential wind erosion and air quality impacts from fugitive dust during construction, impacts on groundwater used by agricultural and ranching operations, and impacts on private lands and existing and planned wind energy facilities and for the county and general plan amendment process ▪ Identified Alternative N2-A as an acceptable alternative **Beaver County** ▪ Preferred alternative to avoid residential development near Milford and provide interconnection opportunities for future existing and planned renewable energy projects ▪ Recommended the Project transmission line be a double-circuit with the existing 46kV transmission line between Cove Fort and Blundell ▪ Identified Alternative N2-A as an acceptable alternative **First Wind** ▪ Concerns with route; acceptable biological and operational alternative

TABLE 2-12
SUMMARY OF ALTERNATIVE ROUTE COMPARISON

Alternative Route	Overall Length (miles)	Parallel to Existing Transmission Line (miles [percent])	New Transmission Line Route (miles [percent])	Jurisdiction (miles crossed)				Estimated Ground Disturbance			Access Roads	Summary of Stakeholder Comments
				Bureau of Land Management	U.S. Forest Service (USFS)	State	Private	Temporary (acres)[1, 2]	Permanent (acres)[1, 3]	Right-of-Way Clearing (acres)[1, 4]		
Alternative N5 Mineral Mountains to Kern River Pipeline	106.2	38.8 (36.5%)	67.4 (63.5%)	52.9	30.8	8.1	14.4	985.4	311.0	423.8	▪ 68.6 miles of existing access ▪ 37.6 miles of new access	**Richfield City** ▪ Expressed concern with impact on water storage tanks, watershed, and fireworks launching pad **Town of Joseph** ▪ Expressed concern with proximity of the alternative route to the location of future water storage tanks **Millard County** ▪ Expressed concern with visual impacts on Cove Fort and impacts on private lands ▪ Preferred alternative to avoid the county and general plan amendment process **Beaver County** ▪ Similar to Alternative N4. **First Wind** ▪ Preferred alternative to avoid operational and environmental conflicts with wind farm

TABLE 2-12
SUMMARY OF ALTERNATIVE ROUTE COMPARISON

Alternative Route	Overall Length (miles)	Parallel to Existing Transmission Line (miles [percent])	New Transmission Line Route (miles [percent])	Jurisdiction (miles crossed)				Estimated Ground Disturbance			Access Roads	Summary of Stakeholder Comments
				Bureau of Land Management	U.S. Forest Service (USFS)	State	Private	Temporary (acres)[1, 2]	Permanent (acres)[1, 3]	Right-of-Way Clearing (acres)[1, 4]		
Alternative N6 Mineral Mountains 1,500 feet east of Kern River Pipeline (Proponent's Preferred Alternative)	105.4	38.6 (36.6%)	66.7 (63.4%)	52.5	30.8	7.9	14.2	977.3	371.2	481.1	▪ 34.4 miles of existing access ▪ 71.0 miles of new access	**Richfield City** ▪ Expressed concern with impact on water storage tanks, watershed, and fireworks launching pad **Town of Joseph** ▪ Expressed concern with proximity of the alternative route to the location of future water storage tanks **Millard County** ▪ Expressed concern with visual impacts on Cove Fort and impacts on private lands **National Trust for Historic Preservation** ▪ Preferred alternative to avoid impacts on nationally significant historic properties **Beaver County** ▪ Similar to Alternative N4. **First Wind** ▪ Similar to Alternative N5

TABLE 2-12
SUMMARY OF ALTERNATIVE ROUTE COMPARISON

Alternative Route	Overall Length (miles)	Parallel to Existing Transmission Line (miles [percent])	New Transmission Line Route (miles [percent])	Jurisdiction (miles crossed)				Estimated Ground Disturbance			Access Roads	Summary of Stakeholder Comments
				Bureau of Land Management	U.S. Forest Service (USFS)	State	Private	Temporary (acres)[1, 2]	Permanent (acres)[1, 3]	Right-of-Way Clearing (acres)[1, 4]		
Southern – South of the Black Mountains to Red Butte Substation												
Alternative S1 Pinto Creek	55.9	29.7 (53.1%)	26.2 (46.9%)	12.6	20.7	0.4	22.2	526.0	195.6	330.3	▪ 13.6 miles of existing access ▪ 42.3 miles of new access	**SUWA** ▪ Expressed concern with impact on the area proposed as the Antelope Range citizen-proposed wilderness area **Washington County** ▪ Expressed concern about potential impact on Pine Valley area and conflict with Vision Dixie Principles for protecting visual aesthetics ▪ Opposed Alternative S1 and requested alternative be removed from further consideration
Alternative S2 IPP West	49.6	38.6 (77.8%)	11.0 (22.2%)	13.0	9.9	0.9	25.8	499.3	157.9	184.2	▪ 11.9 miles of existing access ▪ 37.7 miles of new access	**SUWA** ▪ Preferred alternative to avoid impact on the area proposed as the Antelope Range citizen proposed wilderness area **Iron County** ▪ Preferred alternative **Enterprise City** ▪ Preferred alternative to avoid impact on future development **Washington County** ▪ Preferred alternative because it parallels existing transmission lines and would mitigate visual impacts **National Trust of Historic Preservation** ▪ Expressed concern about impacts on the Mountain Meadows Massacre National Historic Landmark, segments of the Old Spanish Trail, other historical resources and cultural resources **National Park Service** ▪ Expressed concern about impacts on nationally significant historic properties ▪ Support of segment of the alternative

TABLE 2-12
SUMMARY OF ALTERNATIVE ROUTE COMPARISON

Alternative Route	Overall Length (miles)	Parallel to Existing Transmission Line (miles [percent])	New Transmission Line Route (miles [percent])	Jurisdiction (miles crossed)				Estimated Ground Disturbance			Access Roads	Summary of Stakeholder Comments
				Bureau of Land Management	U.S. Forest Service (USFS)	State	Private	Temporary (acres)[1, 2]	Permanent (acres)[1, 3]	Right-of-Way Clearing (acres)[1, 4]		
Alternative S3 Ox Valley	57.4	36.0 (62.7%)	21.4 (37.3%)	13.5	20.0	0.9	23.0	536.9	223.4	339.8	▪ 10.7 miles of existing access ▪ 46.7 miles of new access	**SUWA** ▪ Expressed concern with impact on proposed Antelope Range citizen-proposed wilderness area **Enterprise City** ▪ Opposed alternative due to effect on future development **City of St. George** ▪ Preferred alternative to provide adequate separation from the Sigurd to Red Butte No. 1 – 345kV and IPPs to improve reliability and redundancy **National Trust of Historic Preservation** ▪ Expressed concern about impacts on segments of the Old Spanish Trail and other historical resources and cultural resources
Alternative S4 IPP East	48.9	33.8 (69.1%)	15.1 (30.9%)	12.3	15.2	0.4	21.0	547.9	147.0	320.3	▪ 5.1 miles of existing access ▪ 43.8 miles of new access	**SUWA** ▪ Expressed concern with impact on proposed Antelope Range citizen-proposed wilderness area **Washington County** ▪ Expressed support for this alternative and approved conditional use permit on October 18, 2011 **Iron County** ▪ Approved the conditional use permit for Alternatives S4 and S7 on January 5, 2012 **National Trust of Historic Preservation** ▪ Expressed concern about impacts on segments of the Old Spanish Trail and other historical resources and cultural resources

TABLE 2-12
SUMMARY OF ALTERNATIVE ROUTE COMPARISON

Alternative Route	Overall Length (miles)	Parallel to Existing Transmission Line (miles [percent])	New Transmission Line Route (miles [percent])	Jurisdiction (miles crossed)				Estimated Ground Disturbance			Access Roads	Summary of Stakeholder Comments
				Bureau of Land Management	U.S. Forest Service (USFS)	State	Private	Temporary (acres)[1, 2]	Permanent (acres)[1, 3]	Right-of-Way Clearing (acres)[1, 4]		
Alternative S5 Iron Springs and Pinto Creek (Proponent's Preferred Alternative)	59.0	9.1 (15.4%)	49.9 (84.6%)	25.5	20.7	2.2	10.6	553.2	197.1	423.8	▪ 16.9 miles of existing access ▪ 42.1 miles of new access	**SUWA** ▪ Expressed concern with impact on proposed Antelope Range citizen-proposed wilderness area **Washington County** ▪ Expressed concern about potential impact on Pine Valley area and conflict with Vision Dixie Principles for protecting visual aesthetics **National Trust of Historic Preservation** ▪ Preferred alternative to avoid impacts on nationally significant historic properties
Alternative S6 Iron Springs and Ox Valley	61.8	12.3 (19.9%)	49.5 (80.1%)	27.6	20.0	2.7	11.5	573.5	228.3	460.1	▪ 16.8 miles of existing access ▪ 45.0 miles of new access	**SUWA** ▪ Expressed concern with impact on proposed Antelope Range citizen-proposed wilderness area **National Trust of Historic Preservation** ▪ Expressed concern about impacts on segments of the Old Spanish Trail and other historical resources and cultural resources

TABLE 2-12
SUMMARY OF ALTERNATIVE ROUTE COMPARISON

Alternative Route	Overall Length (miles)	Parallel to Existing Transmission Line (miles [percent])	New Transmission Line Route (miles [percent])	Jurisdiction (miles crossed)				Estimated Ground Disturbance			Access Roads	Summary of Stakeholder Comments
				Bureau of Land Management	U.S. Forest Service (USFS)	State	Private	Temporary (acres)[1, 2]	Permanent (acres)[1, 3]	Right-of-Way Clearing (acres)[1, 4]		
Alternative S7 Middle Hybrid Route	49.8	36.9 (74.1%)	12.9 (25.9%)	13.0	13.1	0.9	22.8	518.7	162.6	234.4	▪ 8.9 miles of existing access ▪ 40.9 miles of new access	**USFS** ▪ Requested analysis of a combination of Alternatives S2 and S4 to reduce the number of miles of the Cove Mountain Inventoried Roadless Area (IRA) crossed while placing more distance between the Mountain Meadows Massacre Site National Historic Landmark **National Park Service** ▪ Support the alternative to avoid impacts on nationally significant historic properties **Iron County** ▪ Approved the conditional use permit for Alternatives S4 and S7 on January 5, 2012 **Washington County** ▪ Expressed support for this alternative and approved conditional use permit on October 18, 2011

TABLE 2-12
SUMMARY OF ALTERNATIVE ROUTE COMPARISON

Alternative Route	Overall Length (miles)	Parallel to Existing Transmission Line (miles [percent])	New Transmission Line Route (miles [percent])	Jurisdiction (miles crossed)				Estimated Ground Disturbance			Access Roads	Summary of Stakeholder Comments
				Bureau of Land Management	U.S. Forest Service (USFS)	State	Private	Temporary (acres)[1, 2]	Permanent (acres)[1, 3]	Right-of-Way Clearing (acres)[1, 4]		
Alternative S7-A (route variation of Alternative S7) Middle Hybrid Route 300 feet east of Sigurd to Red Butte No. 1 transmission line adjacent to Atchinson IRA (Agency Preferred Alternative)	49.8	41.6 (83.5%)	8.2 (16.5%)	13.0	12.6	0.9	23.3	506.2	161.7	226.8	▪ 11.7 miles of existing access ▪ 38.1 miles of new access	**USFS** ▪ Requested analysis of a route variation of Alternative S7 to reduce the number of miles of the Atchinson IRA crossed while placing more distance between the Mountain Meadows Massacre Site National Historic Landmark and concentrating the linear utilities into a narrower corridor

NOTES:
[1] Disturbance calculations include an additional 5 percent contingency.
[2] Temporary disturbance: Estimated area of disturbance associated with structure work areas, wire-splicing sites, wire-pulling sites, wire-tensioning sites, construction yards, and concrete batch plants (refer to Table 2-1).
[3] Permanent disturbance: Estimated area of disturbance associated with H-frame and lattice structure base areas and permanent access roads (refer to Table 2-2).
[4] Right-of-way vegetation clearing: Estimated area of vegetation clearing within the transmission line right-of-way (calculations include vegetation types with the potential to grow 12 feet tall: aspen, pinyon-juniper, mountain shrub, and riparian).
kV = Kilovolt

Chapter 3 – Affected Environment and Environmental Effects

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

3.1 Introduction

This chapter describes (1) the existing condition of the environment that could be affected by implementing the Proposed Action and (2) the known and predicted effects on the existing environment that could result from the construction, operation, and maintenance of the proposed 345kV transmission line and associated facilities.

3.1.1 Summary of Changes from the Draft EIS

Chapter 3 was updated to include additional environmental baseline information suggested or provided in substantive agency and public comments received on the Draft EIS and additional data collected to address alternative route adjustments made since the publication of the Draft EIS (refer to Section 2.4.2). The analysis of environmental effects was updated to reflect the additional data.

To provide distinction from design features of the Proposed Action (refer to Section 2.3.5.2), the presentation of selective mitigation measures applied to reduce or minimize potential adverse impacts, and considered in the analysis of environmental effects, has been moved from Chapter 2 to Chapter 3 (refer to Section 3.1.3). Selective mitigation measures are more appropriate in Chapter 3 because they are a variable in the impact assessment and mitigation planning, which is presented in this chapter.

The potential impact of the Project on climate change was not raised as an issue during scoping. However, Draft EIS comments were received on this issue. There are no established thresholds to determine when quantitative analysis of climate change is required. Nonetheless, for disclosure purposes, estimated greenhouse gas (GHG) emissions related to Project-related activities have been added to Section 3.2.1, Climate and Air Quality.

Substantive changes made between the Draft EIS and the Final EIS are demarcated in the left margin of this chapter by a vertical black line.

3.1.2 Affected Environment

In accordance with NEPA regulations codified at 40 CFR 1502.15, this section presents a summary of the existing condition of the human and natural environment in the areas that could be affected by the Proposed Action. This information serves as a baseline from which the impacts anticipated to result from implementing the proposed Project were assessed. The affected environment is characterized for the following resources, land uses, and social and economic conditions.

- Climate and Air Quality
- Earth Resources
  - Geologic Hazards
  - Mineral Resources
  - Soil Resources
- Water Resources

- Biological Resources
  - Wildlife
  - Vegetation
  - Special Status Species
  - Wild Horses and Burros
- Cultural Resources
- Native American Concerns
- Paleontological Resources
- Visual Resources
- Land Use and Recreation Resources
- Special Designations
  - Scenic Byways
  - National Trails
  - Wild and Scenic Rivers
  - Wilderness
- Wildland and Fire Ecology and Management
- Social and Economic Conditions
  - Environmental Justice
- Public Health and Safety
  - Noise
  - Electric and Magnetic Fields

These topics were selected based on federal regulatory requirements and policies, concerns of the lead and cooperating agencies, and/or issues derived from comments expressed by agencies and the public during scoping.

3.1.2.1 Resource Inventory

Data on the existing condition of each resource were gathered and compiled, between April 2009 and September 2010, from the most recent data available—primarily literature, published and unpublished reports, land use plans, maps, and agency databases. Data gathered for land use and visual resources were verified by field reconnaissance. Also, cultural resource Class II sample surveys were conducted to supplement data for areas lacking secondary data (i.e., recorded historic properties). Following the initial inventory effort, BLM requested other federal, state, and land and resource management agencies to refine and verify the data collected and provide information regarding additional issues, concerns, policies, and regulations. The data were compiled in a Geographic Information System (GIS) at scales of 1:24,000 and 1:100,000.

For most of the resources, inventories were developed to describe the existing environment in the study corridors along the alternative routes in sufficient detail to assess potential impacts that could result from the proposed Project. The width of the study corridor varies for each resource, based on the area that potentially could be affected (Table 3-1). Analysis of air quality is based on regional data. Data used to assess potential impacts on social and economic conditions are countywide and statewide and are not extracted for study-corridor-level analysis.

TABLE 3-1
STUDY CORRIDORS BY RESOURCE

Resource	Study-Corridor Width (miles)[1]
Earth resources	2
Water resources	2
Biological resources	2
Cultural resources	4
Paleontological resources	2
Visual resources	6
Land use and recreation resources	2

NOTE: [1]Data and information used to assess potential social and economic impacts are based on countywide and statewide data and are not extracted for corridor-level assessment. Analysis of air quality is based on regional data.

The alternative routes (and study corridors) are centered on a line referred to as the "reference centerline." The reference centerlines were mapped and verified by aerial and field reconnaissance in detail sufficient for analysis for the EIS. Precise locations of the centerline would be refined through engineering surveys on the route selected for the transmission line prior to Project construction. The alternative routes are shown on the maps in "links," which are segments of a route sharing common endpoints determined by the point of intersection with other, adjacent links. To facilitate analysis and reference, mileposts are marked along the reference centerline of each link. Resource data collected for the area within a study corridor are input, stored, and retrieved by link number and milepost (to 0.1 mile). Where appropriate, resource discussions in this chapter refer to links and mileposts to provide a geographic reference to the resource data. Maps displaying resource inventory data are in Volume II – Maps.

3.1.3 Effects Analysis

The analysis of potential environmental effects predicts how a resource would be affected and the degree of change (impact) that could result from implementation of an action. Potential environmental effects on each resource were determined through a systematic analysis that included assessing the impacts of each alternative route on the environment and how the impacts could be mitigated most effectively. Figure 2-7 provides an overview of this process.

3.1.3.1 Methodology

The first step of the analysis was to determine the types and amount of ground disturbance that could occur based on the design and typical specifications of the proposed facilities, construction techniques (including design features of the Proposed Action for environmental protection [Table 2-6]) and equipment used, extent and duration of the construction, requirements for operation of the transmission line and associated facilities, activities associated with routine maintenance, and activities associated with decommissioning (if or when the facilities are no longer needed). The majority of potential impacts that could occur, including ground disturbance, would result from the following construction activities:

- Upgrading existing roads or constructing new roads for access where needed
- Preparing tower sites, multi-use construction yards, staging areas, helicopter refueling sites, and communication regeneration station sites
- Assembling and erecting tower structures
- Stringing conductors (e.g., wire-tensioning and wire-pulling sites and wire-splicing sites)

In addition, impacts on some resources would occur following construction from the presence of the transmission lines and access roads. Also, periodic maintenance activities could cause temporary impacts.

The amount of ground that could be disturbed as the result of implementation of the Project was estimated based on the typical design characteristics of the 345kV transmission line and ancillary facilities, including tower sites, multi-use construction yards, staging areas, helicopter refueling sites, communication regeneration station sites, etc. The estimated ground disturbance associated with using existing access roads or upgrading or constructing access roads (Table 2-7) also was considered. Table 3-2 summarizes the anticipated ground disturbance in acres associated with construction of each alternative, including an additional 5 percent contingency. Temporary ground disturbance during construction would be associated with structure work areas, wire-splicing sites, wire- tensioning and wire-pulling sites, multi-use construction yards, staging areas, helicopter refueling sites, and temporary access roads. Permanent ground disturbance would be associated with the presence of H-frame, lattice, and three-pole structure base areas, communication regeneration station sites, and permanent access roads.

Ground disturbance associated with upgrading existing roads or constructing new roads was estimated through the development of a predictive model that considered different types or levels of access required for construction of the Project. As described in Section 2.3.5.2, existing access roads would be used in their present condition without improvements, to the extent possible, in order to limit new disturbance from the Project. In areas where improvements are required or deemed to be in the best interest of the Project for future use, the roads would be graded and/or graveled to provide a smooth all-weather travel surface. In areas where it is not practicable to use existing roads to fulfill the access requirements of the Project, a new road would be constructed. The predictive model was developed to (1) consider where existing access roads can be used for project construction and operation and maintenance and where new or improved access roads are required; (2) estimate potential ground disturbance resulting from the construction of new spur roads, improvement of existing access roads, and construction of new access roads; and (3) establish a baseline condition for access to conduct initial impact assessments for each resource evaluated in the EIS (e.g., visual resources, biological resources, land use, etc.).

Access levels are predictions of the general type of access (i.e., use existing roads, improve existing roads, or construct new roads; refer to Section 2.3.5.2 and Table 2-7) that would be required for every mile of each Project route alternative, and the associated amount of disturbance the access level will create. Although the method incorporates road design criteria, it does not go to the level of actual road design. As a result, some variation is anticipated between the disturbance predictions generated from the access level modeling and the actual disturbance of designed/engineered access roads. Access level disturbance predictions have been developed to be conservative to ensure predictions for ground disturbance are not underestimated in relation to actual Project disturbance/impacts. For purposes of analyzing impacts on resources and assessing likely ground disturbance associated with the Project, the following five access levels were identified based on the Project description:

- Access Level 1: Use existing roads
- Access Level 2: Improve existing roads
- Access Level 3: Construct new access, flat to rolling terrain (0 to 8 percent slopes)
- Access Level 4: Construct new access, rolling terrain (8 to 15 percent slopes)
- Access Level 5: Construct new access, steep terrain (greater than 15 percent slopes)

In addition to ground disturbance, vegetation types that have the potential to grow 12 feet tall (e.g., aspen, pinyon-juniper, mountain shrub, and riparian) will be cleared from the transmission line right-of-way. Areas of the right-of-way were identified where these vegetation communities occur. Ground disturbance within the right-of-way associated with access roads, structure work areas, wire-splicing sites, wire-pulling sites, wire-tensioning sites, multi-use construction yards, and staging areas where these vegetative

communities occur would overlap with the areas of transmission line right-of-way vegetation clearing. Table 3-2 summarizes the anticipated clearing of vegetation types within the right-of-way that have the potential to grow 12 feet tall or taller.

TABLE 3-2
SUMMARY OF ESTIMATED GROUND DISTURBANCE AND VEGETATION CLEARING

Alternative	Temporary Disturbance (acres)[1, 4]	Permanent Disturbance (acres)[2, 4]	Total Disturbance (acres)	Transmission Line Right-of-way Vegetation Clearing (acres)[3, 4]
Alternative N1	1,099.5	352.6	1,452.1	364.6
Alternative N2	1,103.0	344.0	1,447.0	364.6
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	1,099.8	344.4	1,444.2	362.7
Alternative N3	1,077.3	303.8	1,381.1	418.1
Alternative N4	1,010.6	351.2	1,361.8	370.4
Alternative N5	985.4	311.0	1,296.4	423.8
Alternative N6 (Proponent's Preferred Alternative)	977.3	371.2	1,348.5	481.1
Alternative S1	526.0	195.6	721.6	330.3
Alternative S2	499.3	157.9	657.2	184.2
Alternative S3	536.9	223.4	760.4	339.8
Alternative S4	547.9	147.0	694.9	320.3
Alternative S5 (Proponent's Preferred Alternative)	553.2	197.1	750.4	423.8
Alternative S6	573.5	228.3	801.7	460.1
Alternative S7	518.7	162.6	681.3	234.4
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative)	506.2	161.7	667.9	226.8

SOURCE: Assumptions for the calculations are derived from the Proponent's Project description in Chapter 2.
NOTES:
[1] Temporary disturbance: Estimated area of disturbance associated with structure work areas, wire-splicing sites, wire-pulling sites, wire-tensioning sites, multi-use construction yards, staging areas, helicopter refueling sites, guard structures, the shoofly, and temporary access roads (refer to Table 2-1).
[2] Permanent disturbance: Estimated area of disturbance associated with H-frame and lattice structure base areas, communication regeneration stations and associated fiber optic and powerlines, and permanent access roads (refer to Table 2-2).
[3] Right-of-way vegetation clearing: Estimated area of vegetation clearing within the transmission line right-of-way only. Calculations include only vegetation types with the potential to grow 12 feet tall or taller (aspen, mountain shrub, pinyon-juniper, and riparian) and overlap with other disturbance within the Project right-of-way. Vegetation clearing was not calculated for access roads since access roads are not designed for the alternative routes at this time. Vegetation clearing is required to identify accurately locations of temporary and permanent access roads. Temporary and permanent disturbance calculations include estimated disturbance for all access roads.
[4] For estimating purposes, 5 percent added to the total acreage.
Acres in table are rounded to the nearest tenth of an acre and, therefore, columns may not sum exactly.

Assessment of Initial Impacts

Based on estimated ground disturbance associated with the Project description and resource inventory data reflecting the existing environment, each resource specialist determined the types and amounts of impacts that could occur on the resource (i.e., initial impacts). Computer-assisted models were developed to support this determination, which allowed the method used for each resource to be tailored to specific requirements and assumptions for analysis of each resource. Qualitative and quantitative variables of

resource sensitivity, resource quantity, and estimated ground disturbance were considered in predicting the intensity of initial impacts. In this analysis, the intensity of impacts was described in the following levels: high impact—that could cause substantial change or stress to an environmental resource or use (severe adverse or exceptional beneficial effects); moderate impact—that potentially could cause some change or stress to an environmental resource or use (readily apparent effects); low impact—that could be detectable but slight; and no identifiable impact. What constitutes a low, moderate, or high impact on a resource varies by resource and is described in the study methodology for each resource, as are the assumptions for analysis made regarding each resource.

Mitigation Planning and Effectiveness

After initial impacts were identified for each resource, selective measures (Table 3-3) were applied to reduce or minimize moderate or high impacts. Mitigation measures were developed in collaboration with the BLM and cooperating agencies and include measures or techniques recommended or required (depending on land ownership) by BLM and USFS after initial impacts were identified and assessed. As such, mitigation measures provide a planning tool for minimizing potential adverse impacts.

Once an alternative route is selected, the Proponent would coordinate with the BLM and other land-management agencies or landowners, as appropriate, to refine the implementation of mitigation at specific locations or areas. For example, if a road closure was recommended, the Proponent would work with the relevant land-management agency or landowner to determine the specific method of road closure most appropriate for the site or area (e.g., barricading with a locking gate, obstructing access on the road using an earthen berm or boulders, revegetating the roadbed, or obliterating the road and returning it to its natural contour and vegetation). Detailed mitigation will be incorporated into the POD prior to Project construction.

Residual Impacts

Residual impacts are the environmental effects that remain after measures to reduce initial impacts are applied. After the locations of potential residual impacts were identified, the intensities of such potential residual impacts anticipated to occur from implementation of an alternative along the reference centerline were assessed and mapped (Volume II). They are discussed in the environmental effects sections for each resource in this chapter.

The description of residual effects anticipated for each alternative should be reviewed in conjunction with the resource inventory maps provided in Volume II. Several of the alternative routes considered in this EIS share common links and would result in similar environmental effects. Rather than repeating information, in most cases the descriptions of alternative routes have been abbreviated, as appropriate, to focus on the effects unique to an alternative.

TABLE 3-3
SELECTIVE MITIGATION MEASURES

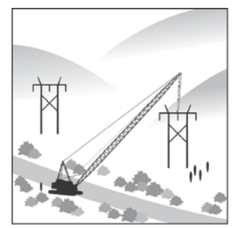
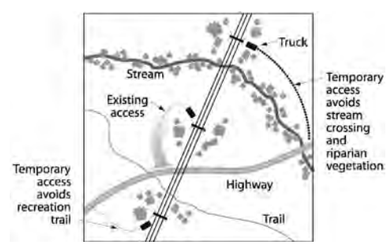
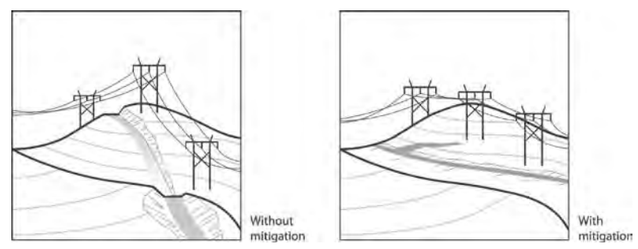
Mitigation Measure	Mitigation Examples	Mitigation Application Phase			Mitigation Effectiveness								
					Water Resources		Earth Resources		Biological Resources				
		Design And Engineering	Construction	Operation And Maintenance	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
1. <u>Disturbance to Sensitive Soils and Vegetation</u> Existing access roads/trails would not be widened or otherwise upgraded for construction and maintenance in areas determined by the land-management agency, where soils and vegetation are particularly sensitive to disturbance, except in areas where repairs are necessary to make existing roads/trails passable and safe.		●			●	●	●			●	●	●	●
					Avoiding unnecessary access road upgrades would limit the amount of habitat disturbed or removed. In addition, the avoidance of road upgrades would not allow for vehicular traffic to increase significantly, thereby reducing the potential for indirect effects such as damage or loss of vegetation, spread of noxious weeds, harassment of wildlife, vandalism of cultural resources, and disturbance to sensitive land uses (e.g., parks, preservation, and recreation areas).								
2. <u>Sensitive Resources Avoidance</u> There would be no blading of new access roads in select areas of sensitive resources (e.g., perennial streams, riparian areas, and trails) during construction (or maintenance). Existing crossings will be used at perennial streams, national recreational trails, and irrigation channels. Existing or overland access routes are to be used for construction and maintenance in these select areas. To minimize ground disturbance, overland routes must be flagged with easily seen markers, and the route must be approved in advance of use by the landowner or Authorized Officer.		●	●		●	●	●		●	●		●	●
					Mitigation Measure 2 is effective for the same reasons as Mitigation Measure 1. Minimizing ground-disturbing construction activities in the same vicinity as streams would limit disturbance to riparian areas and/or streambeds, therefore avoiding turbidity and sedimentation. In addition, it would limit land use conflicts with trails and/or disruption of sensitive views.								
3. <u>Minimize Slope Cut and Fill</u> The alignment of any new access roads or cross-country routes in designated areas would follow the landform contours where practicable to minimize ground disturbance and/or reduce scarring (visual contrast) of the landscape, providing that such alignment does not affect other resource values.		●					●			●		●	●
					Following the existing land contours and terrain, particularly in steep terrain, minimizes the cutting and filling of slopes, and ensures the form and line of the landscape is not visually interrupted. This results in reducing visual contrast between the exposed ground of the road and the surrounding environment. Also, water runoff is less likely to accelerate soil erosion (minimizing potential damage from rutting, drilling), which in turn protects adjacent vegetation.								

TABLE 3-3
SELECTIVE MITIGATION MEASURES

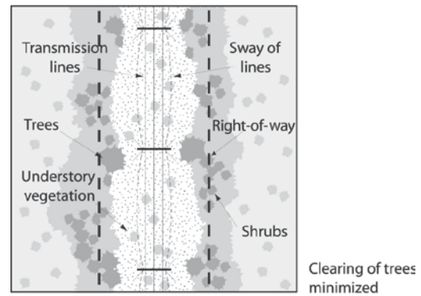
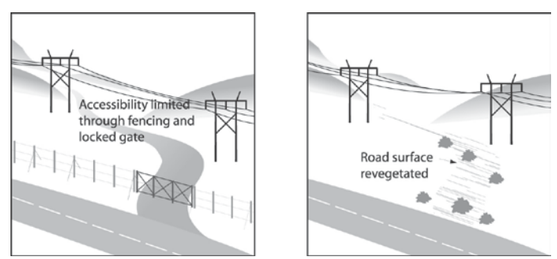
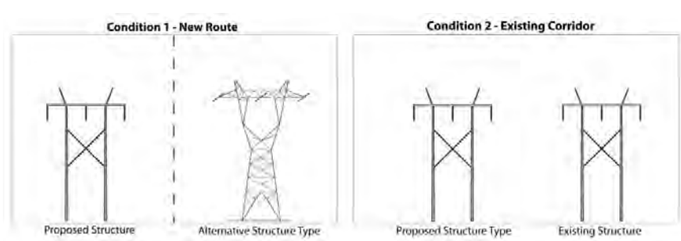
Mitigation Measure	Mitigation Examples	Mitigation Application Phase			Mitigation Effectiveness								
					Water Resources		Earth Resources		Biological Resources				
		Design And Engineering	Construction	Operation And Maintenance	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
4. <u>Minimize Tree Clearing</u> Clearing of trees in and adjacent to the right-of-way would be minimized to limit disturbance to timber resources, reduce visual contrast, and protect raptor nesting habitat, to the extent practicable to satisfy conductor-clearance requirements (i.e., PacifiCorp Vegetation Management Standards 2007). Trees and other vegetation would be removed selectively (e.g., edge feathering) to blend the edge of the right-of-way into adjacent vegetation patterns, as practicable and appropriate. Trees would be removed selectively in riparian habitats to protect biological resources, including raptor nesting habitat.			●						●		●	●	●
					Selectively removing vegetation (i.e., trees) within and along the edges of the right-of-way reduces disruption of habitat, minimizes removal of timber resources, and reduces the visual contrast between the right-of-way and the surrounding environment. Furthermore, "feathering" the edges of the right-of-way instead of cutting trees and vegetation in a straight line results in a more gradual modification to the environment.								
5. <u>Minimize New or Improved Accessibility</u> To limit new or improved access into the Project area, all new or improved access (e.g., blading and widening existing access) that would not be required for maintenance would be closed or rehabilitated using the most effective and least environmentally damaging methods, appropriate to that area and developed through consultation with the landowner or land-management agency. Methods for road closure or management include installing and locking gates, obstructing the path (e.g., earthen berms and boulders), revegetating the surface of the roadbed to make it less apparent, or restoring the road to its natural contour and vegetation.		●		●			●		●	●	●	●	
					Closing access roads where they are not needed after construction protects the resources in that area from further disturbance for the reasons described in Mitigation Measure 1.								
6. <u>Tower Design Modification</u> The tower design may be modified or an alternative tower type may be used to minimize visual contrast or to address site-specific constraints (e.g., terrain, airports, raptor perching, etc.), if practical and consistent with PacifiCorp standards.		●							●		●	●	●
					Flexibility in designing the tower or use of different tower types would allow tower structures to be more adapted to specific site situations (i.e., Condition 1 – New Route or Condition 2 – Existing Corridor). For example, in areas where there are sensitive views and an existing corridor, the proposed line would parallel an existing line and match the type of tower used along the existing line. This would minimize visual contrast and/or minimize poles with perching opportunities for aerial predators where sensitive grassland species occur.								

TABLE 3-3
SELECTIVE MITIGATION MEASURES

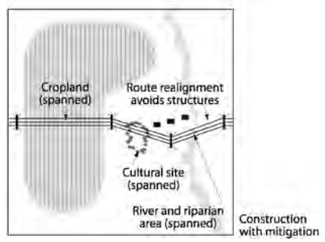
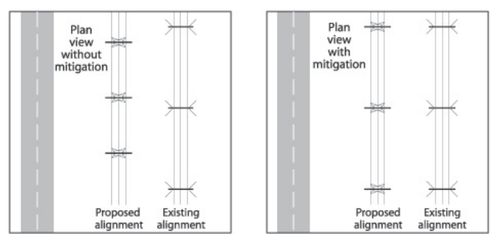
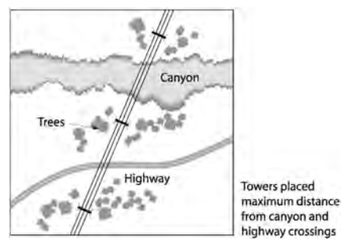
Mitigation Measure	Mitigation Examples	Mitigation Application Phase			Mitigation Effectiveness								
					Water Resources		Earth Resources		Biological Resources				
		Design And Engineering	Construction	Operation And Maintenance	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
7. <u>Span and/or Avoid Sensitive Features</u> Within the limits of standard tower design and in conformance with engineering and PacifiCorp requirements, structures would be located to allow conductors to clearly span identified sensitive features. Structures would be placed so as to avoid sensitive features (e.g., wetlands, riparian areas, water courses, hazardous substance remediation, noxious weeds, and cultural sites). Avoidance measures may include selective tower placement, spanning sensitive features, or realigning access routes.		●			●	●			●	●	●		●
					Flexibility in the placement of towers allows for sensitive features to be avoided. Realigning the towers along a route or realigning the route can result in avoiding or minimizing direct impacts on resources, such as cultural and biological resources, as well as land uses such as agriculture, parks, preservation, hazardous substance remediation, and recreation areas.								
8. <u>Match Transmission Line Spans</u> Standard tower design would be modified to correspond with spacing of existing transmission line structures of the same voltage, where feasible and within limits of standard tower design, to reduce visual contrast and/or potential operational conflicts. The normal span would be modified to correspond with existing towers, but not necessarily at every location.		●									●	●	●
					Matching tower spacing with existing parallel lines reduces the visual space occupied by the towers and minimizes the amount of contrast between the man-made structures and the landscape.								
9. <u>Maximum Span at Crossings</u> At highway, canyon, and trail crossings, towers would be placed at the maximum feasible distance from the crossing within limits of standard tower design and in conformance with engineering and PacifiCorp requirements to reduce visual impacts and potential impacts on recreation values and to increase safety at these locations.		●									●	●	●
					Placing towers at a maximum distance from major or sensitive crossings (i.e., roads and trails) would reduce visual impacts and potential safety hazards (i.e., vehicle collision with tower).								

TABLE 3-3
SELECTIVE MITIGATION MEASURES

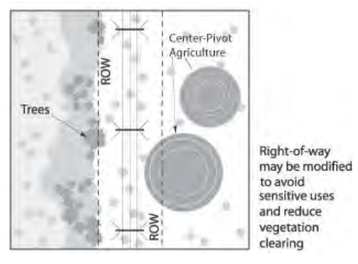
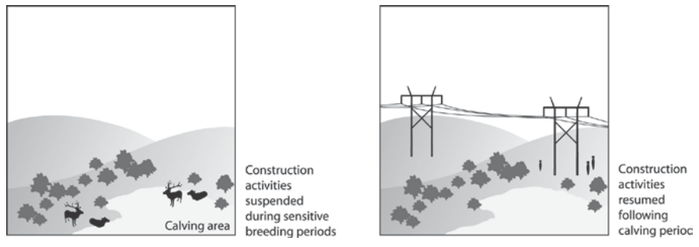
Mitigation Measure	Mitigation Examples	Mitigation Application Phase			Mitigation Effectiveness								
					Water Resources		Earth Resources		Biological Resources				
		Design And Engineering	Construction	Operation And Maintenance	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
10. <u>Helicopter Construction</u> Helicopter placement of towers during construction and helicopter patrol and maintenance could be used where practicable to reduce surface impacts in environmental constraint areas or steep terrain locations. For example, within the inventoried roadless areas, the Project would be constructed by helicopter-only construction methods and supported by overland travel. Helicopters would transport personnel, drilling equipment, towers, and other construction materials to and from the right-of-way and would be used for wire pulling and tensioning.			●	●			●	●	●	●	●	●	●
					Using helicopters to place towers in steep terrain or otherwise sensitive areas reduces land use and natural resource impacts as a result of construction activities. Using helicopters to transport personnel and construction equipment and materials instead of constructing access roads would reduce the loss of vegetation, potential damage to cultural resources, and visual impacts.								
11. <u>Minimize Right-of-Way Clearing</u> Clearing of the right-of-way would be minimized to reduce visual contrast and avoid sensitive features including, but not limited to, land uses, biological resources, and cultural sites. In select areas, the right-of-way width may be modified (within the limits of PacifiCorp Vegetation Management Standards and standard tower design) to protect sensitive resources, but current land uses would be allowed to continue unabated, provided the use meets applicable standards.		●	●						●	●	●	●	●
					Limiting the width of the area cleared in the right-of-way reduces the amount of vegetation (i.e., trees) removed at the edges of and within the right-of-way, minimizing the loss of habitat and reducing visual contrast between the cleared areas and the surrounding environment. In limited circumstances, the width of the right-of-way may be reduced to accommodate a land use (i.e., residential).								

TABLE 3-3
SELECTIVE MITIGATION MEASURES

Mitigation Measure	Mitigation Examples	Mitigation Application Phase			Mitigation Effectiveness								
					Water Resources		Earth Resources		Biological Resources				
		Design And Engineering	Construction	Operation And Maintenance	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
12. <u>Seasonal Wildlife Restrictions</u> To minimize disturbance to wildlife during sensitive periods, construction and maintenance activities would be restricted for the listed wildlife in designated areas unless exception to the stipulation is granted by the agencies in accordance with agency policy or land use plans (e.g., receiving clearance to proceed from a biological monitor): *Big Game* ▪ Coordinate with Utah Division of Wildlife Resources (UDWR) and Bureau of Land Management (BLM) when construction or maintenance activities are planned within pronghorn crucial year-long habitat between April 15 and June 15 ▪ No construction or maintenance activities within mule deer and elk winter ranges from November 1 to May 15 (UDWR 2010a) ▪ No construction or maintenance activities within mule deer crucial summer/fall range from May 1 to June 15 (UDWR 2010a) *Migratory Birds* ▪ Spatial buffers and seasonal restrictions for nesting raptors in accordance with U.S. Fish and Wildlife Service (FWS) Utah Field Office Guidelines for Raptor Protection From Human and Land Use Disturbances (construction restrictions range from December 1 to September 30, depending on the species) (Romin and Muck 2002) ▪ No construction or maintenance activities within the FWS's recommendation of 100 feet from nesting (nonraptor) migratory birds from February 15 to July 31 (FWS 2011a) ▪ Spatial buffers and seasonal restrictions for roosting bald eagles in accordance with FWS Utah Field Office Guidelines for Raptor Protection From Human and Land Use Disturbances will be followed from November 1 to March 31 (Romin and Muck 2002) *Southwestern willow flycatcher* ▪ No construction or maintenance activities in identified habitat for the southwestern willow flycatcher from April 1 to August 30 (BLM 1999) *Utah prairie dog* ▪ No construction or maintenance activities would occur in Utah prairie dog colonies between August 31 and April 1 (FWS 2010a) *Greater sage-grouse* ▪ No construction or maintenance activities within 4.0 miles of a lek between February 15 and July 31 ▪ No construction or maintenance activities within UDWR-mapped crucial winter habitat between November 15 and March 15			●	●				●				

Restricting construction activities or maintenance during breeding or nesting periods eliminates potential disturbance of wildlife during these critical periods of their life cycles.

TABLE 3-3
SELECTIVE MITIGATION MEASURES

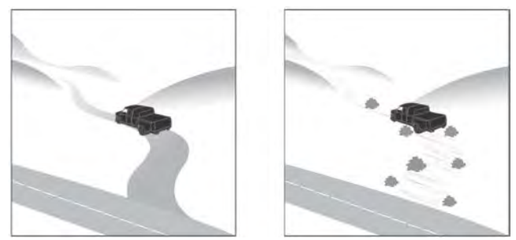
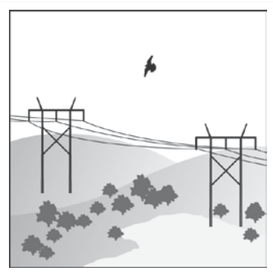
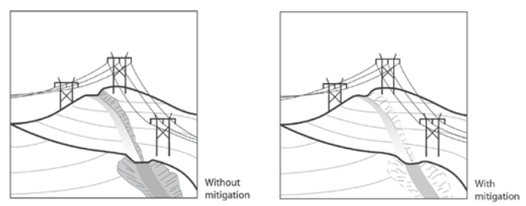
Mitigation Measure	Mitigation Examples	Mitigation Application Phase			Mitigation Effectiveness								
					Water Resources		Earth Resources		Biological Resources				
		Design And Engineering	Construction	Operation And Maintenance	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
13. <u>Overland Access</u> The Construction Contractor would use overland access to the greatest extent possible in areas where no grading would be needed to access work areas. Overland access would consist of drive-and-crush and/or clear-and-cut travel. Drive-and-crush is vehicular travel to access a site without significantly modifying the landscape. Vegetation is crushed but not cropped. Soil is compacted, but no surface soil is removed. Clear-and-cut is considered as brushing off (removal) of all vegetation to improve or provide suitable access for equipment. Methods for removal of vegetation would include mowing (brush hog flail-type mower), hand clearing with small tools such as loppers and chain saws, and back dragging a cat blade above the surface of the soil to remove surface vegetation. Soils could be compacted, but no surface soil would be removed. Prior to work beginning, overland access routes would be staked to a minimum width of 14 feet and as specified in the Plan of Development.			●	●			●		●		●	●	
					Overland access would avoid or minimize the removal of surface soil and vegetation, reducing the potential for erosion and loss of habitat. In addition, avoiding the construction of a new road would reduce the potential for increased traffic and the associated indirect effects.								
14. <u>Flight Diverters</u> Shield wires, guy wires, and overhead optical ground wire along portions of the transmission line that have a high potential for avian collisions would be marked with flight diverters or other BLM- or U.S. Forest Service-approved devices in accordance with agency requirements. Portions of the transmission line that cross through, or are adjacent to, waterfowl and general migratory pathways or habitat for high priority avian species (i.e., sage-grouse) may be marked to reduce the risk of avian collisions. The specific segments to be marked would be determined in consultation with the appropriate agencies.			●	●					●				
					Conductor markings on segments of the transmission lines that cross through, or are adjacent to, waterfowl and shorebird habitat would minimize the risk of avian collision.								
15. <u>Limit Accessibility in Sensitive Habitats</u> Where feasible, access roads that traverse sensitive habitats (e.g., crucial winter range) would be gated or otherwise blocked to limit public access.			●	●					●		●		
					Mitigation Measure 15 is effective for the same reasons as Mitigation Measure 12. Limiting access to sensitive areas would reduce the potential for indirect effects associated with increased traffic.								

TABLE 3-3
SELECTIVE MITIGATION MEASURES

Mitigation Measure	Mitigation Examples	Mitigation Application Phase			Mitigation Effectiveness								
					Water Resources		Earth Resources		Biological Resources				
		Design And Engineering	Construction	Operation And Maintenance	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
16. <u>Blend Road Cuts or Grading</u> To reduce visual contrast, mineral or asphalt emulsions (e.g., Permeon™ or approved equivalent) would be applied in rocky areas where newly-exposed rock color would create strong landscape contrasts.		●	●									●	●
					Similar to Mitigation Measure 3, the implementation of grading techniques (i.e., slope rounding and slope scarification) would reduce the visual contrast between exposed ground and the surrounding environment. The application of this mitigation would be determined in the field, during or after construction, by the compliance inspection contractor and BLM or U.S. Forest Service Authorized Officers.								

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3.1.3.2 Assumptions for Analysis

In this analysis, the study corridor established for a resource represents the geographic scope of analysis assumed for the resource.

Effects could be temporary (short-term), long-term, or permanent. The assumptions for each resource define temporal scope of analysis. In this analysis, temporary environmental effects predicted to occur during Project construction that would be anticipated to return to a preconstruction condition at or within 5 years of the end of construction were considered short-term impacts. Environmental effects that would be anticipated to remain for the life of the Project (approximately 50 years), were considered long-term impacts. Permanent impacts are those that would be anticipated to endure beyond the life of the Project, including irreversible and irretrievable commitment of resources.

The intensity of the environmental effect also can vary. What constitutes a low, moderate, or high impact on a resource varies by resource and assumptions were made regarding each. The impacts are portrayed in the effects analysis for each resource.

3.2 Resources Analyzed

This section describes the affected environment and known and predicted effects of implementing the Project on resources relevant to the issues and concerns identified during agency and public scoping. The affected environment and effects analysis area were assessed for each alternative. Generally, each resource discussion is organized as follows:

- Introduction – A description of the resource and the laws, regulations, and policies related or relevant to management or analysis of the resource
- Regional Setting – A brief description of the region likely to be affected by implementation of the Project
- Study Methodology – Resource-specific methods used to assess the affected environment and initial and residual environmental effects for each alternative
- Results by Alternative
  - Affected Environment
  - Environmental Effects
- Summary of Results – An overview of the results of the effects analysis and general description of how the alternatives compare

A summary of baseline resource inventory and results of the effects analysis is presented in each resource section. Table 2-11 presents a comparison of results of the effects analysis for the alternative routes and Table 2-12 presents a summary of the information presented in Tables 2-11a through 2-11d.

3.2.1 Climate and Air Quality

Issues raised by the public and agencies during Project scoping and preparation of the EIS related to potential effects on climate and air quality include emissions of pollutants from equipment and vehicles used in construction and the generation of fugitive dust during construction activities.

The Utah Air Conservation Act, Title 19, Section 2, of the Utah State Code; the Clean Air Act of 1963; and implementing regulations for both statutes regulate air pollutant emissions within the state. The EPA

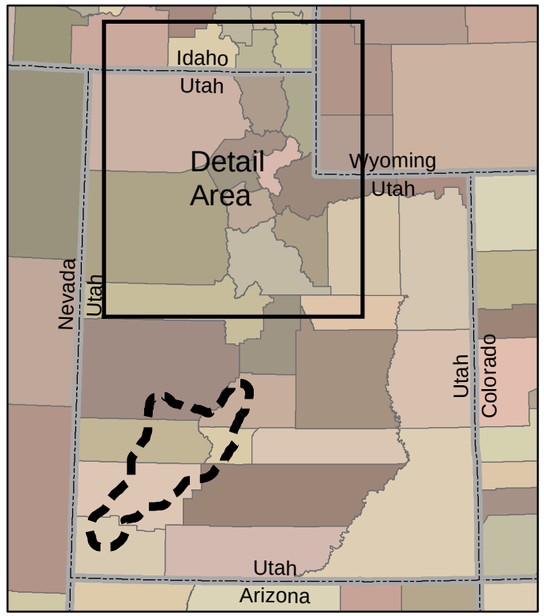
has set National Ambient Air Quality Standards (NAAQS) for air pollutants considered harmful to public health and the environment. Standards have been set for six primary pollutants, which are referred to as criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone, lead, and particulate matter (PM_{10}, less than 10 micrometers in diameter, and $PM_{2.5}$, less than 2.5 micrometers in diameter). There are two types of standards: (1) primary standards set to protect public health and (2) secondary standards set to protect public welfare, including damage to buildings, animals, and vegetation. The NAAQS are shown in Table 3-4.

An area is deemed an attainment area by EPA when the air quality is monitored and the resultant concentrations for criteria pollutants are consistently below the NAAQS. If an area is monitored and the resultant concentrations for criteria pollutants do not meet the NAAQS, the area is referred to as a nonattainment area. An area that previously was classified as nonattainment but has since reached attainment is referred to as a maintenance area. Areas that cannot be classified on the basis of available information as meeting or not meeting the NAAQS are referred to as unclassifiable. The Project area is designated attainment for the SO_2 NAAQS (excluding the 1-hour standard, for which designations are pending), unclassifiable for the PM_{10} NAAQS, and unclassifiable/attainment for the remainder of the NAAQS (CO, NO_2, ozone, $PM_{2.5}$, and lead). Thus, there are no current or former areas within the Project area that are designated as not meeting any of the NAAQS. Nonattainment and maintenance areas elsewhere in Utah are shown in Map 3-1.

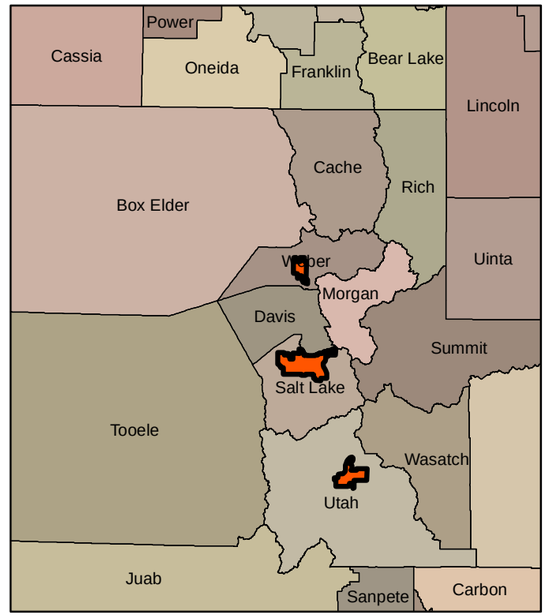
Certain lands where existing good air quality is deemed to be of national importance (e.g., national parks and certain wilderness areas) are designated by EPA as Class I areas for prevention of significant deterioration. The nearest Class I areas are Zion National Park (approximately 14 miles), Bryce Canyon National Park (approximately 55 miles), and Capitol Reef National Park (approximately 38 miles), which are not located in the Project area. These Class I areas are shown in Map 3-2.

In addition to the criteria pollutants for which the NAAQS are established, others, referred to as hazardous air pollutants, also are regulated. They are regulated on an emission basis using National Emission Standards for Hazardous Air Pollutants, which regulate emissions from specified emission units and source types. However, no equipment proposed for the construction, operation, and maintenance of the Project is subject to National Emission Standards for Hazardous Air Pollutants requirements.

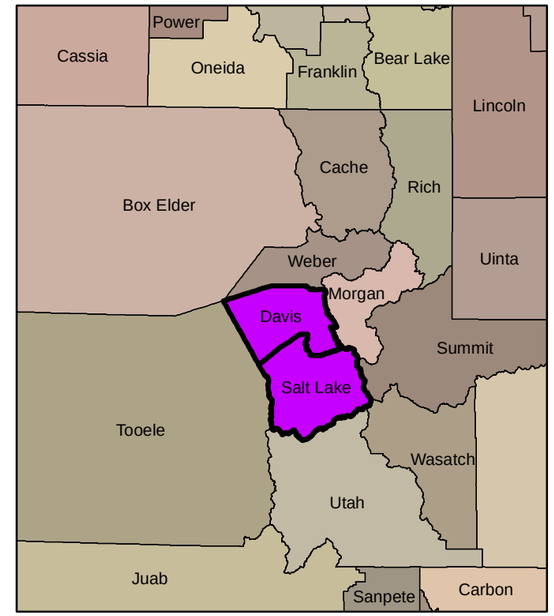
Key Map



Carbon Monoxide (CO) Mantenance



Ozone (O3) Maintenance



MAP 3-1
UTAH NONATTAINMENT AND MAINTENANCE AREAS

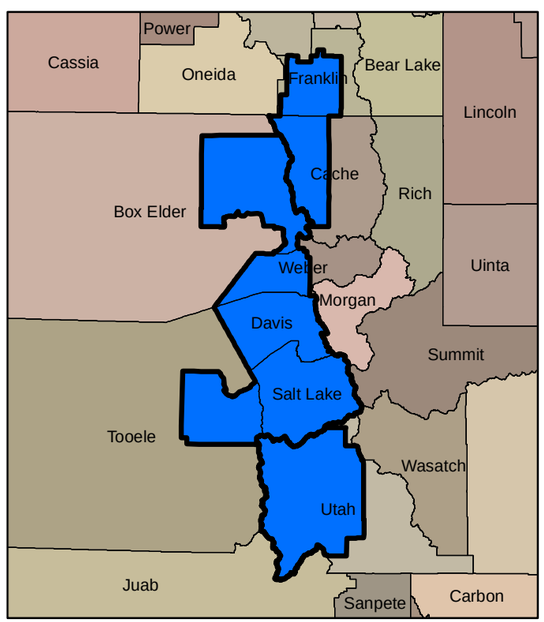
NON-ATTAINMENT AND MAINTENANCE

- Carbon Monoxide (CO) Maintenance
- Ozone (0_3) Maintenance
- Fine Particulate ($PM_{2.5}$) Nonattainment area
- Particulate (PM_{10}) Nonattainment area
- Sulfur Dioxide (SO_2) Nonattainment area

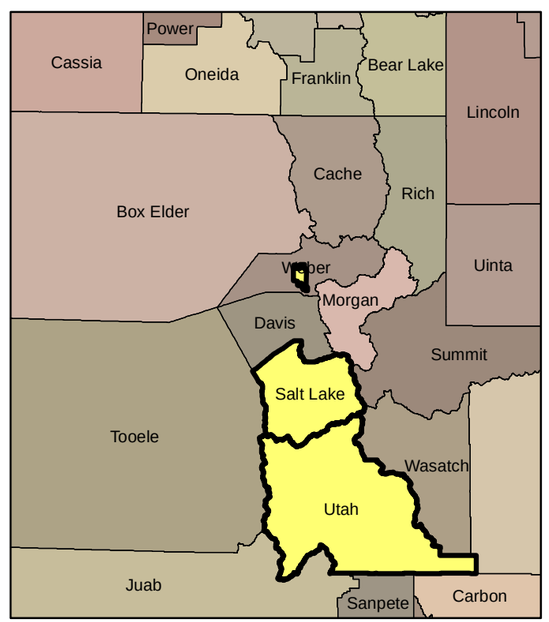
GENERAL REFERENCE FEATURES

- Project Study Area
- County

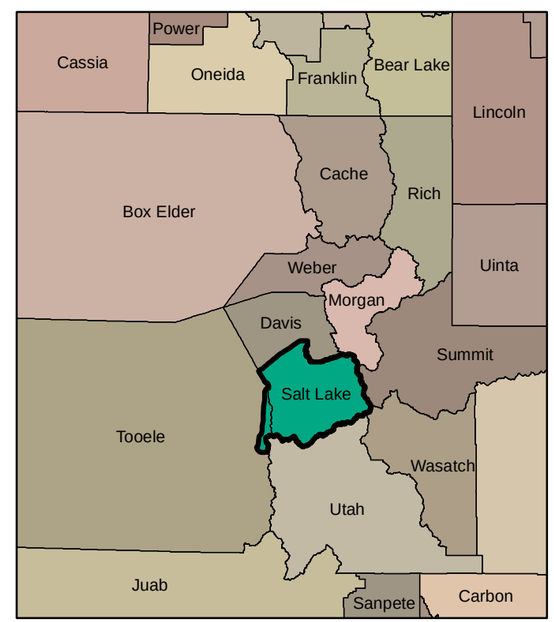
Particulate (PM2.5) Nonattainment



Particulate (PM10) Nonattainment



Sulfur Dioxide (SO2) Nonattainment



SOURCES:
Non-attainment and Maintenance: EPA, 2009
County and State Boundary: ESRI, 2008

0 25 50 100 150 200 Miles

October 2012

Final EIS

SIGURD TO RED BUTTE NO. 2
345kV TRANSMISSION PROJECT

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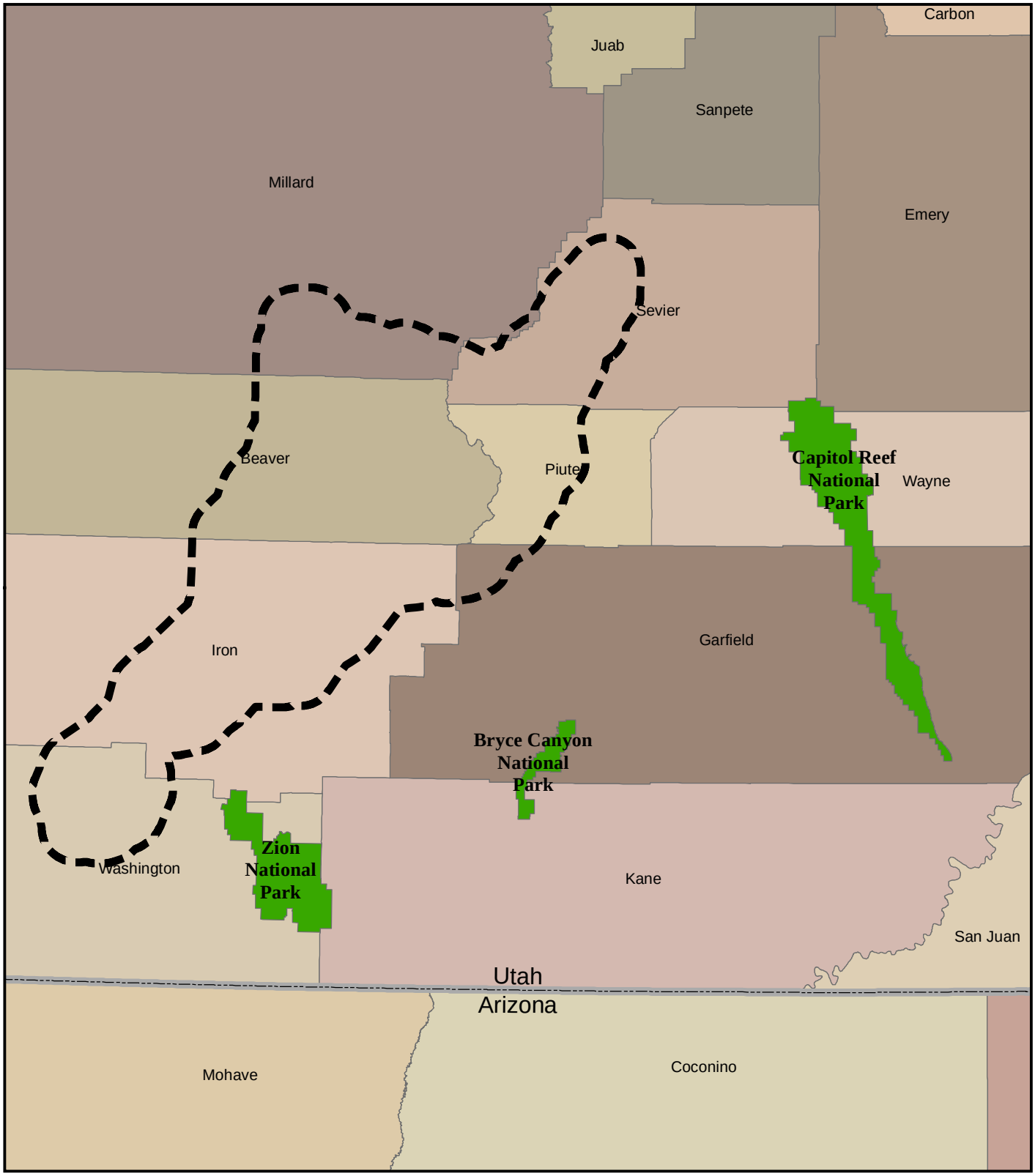

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Legend

Project Study Area

EPA Class I Areas

MAP 3-2
EPA CLASS I AREAS

SIGURD TO RED BUTTE NO. 2
345kV TRANSMISSION PROJECT

October 2012
Final EIS

SOURCES:
EPA Class I Area: NPS, 2010
County and State Boundary: ESRI, 2008

0 12.5 25 50 Miles

TABLE 3-4
NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Primary Standards		Secondary Standards	
	Standard	Averaging Time	Standard	Averaging Time
Carbon monoxide	9 ppm (10 milligrams per cubic meter)	8 hour [1]	None	
	35 ppm (40 milligrams per cubic meter)	1 hour[1]		
Nitrogen dioxide	0.053 ppb (100 μg/m^3)	Annual Arithmetic Mean	Same as Primary	
	0.100 ppb (188.7 μg/m^3)	1 hour[2]	None	
Sulfur dioxide	0.03 (80 μg/m^3)	Annual Arithmetic Mean	0.5 ppm (1,300 μg/m^3)	3 hour[1]
	0.14 (365 μg/m^3)	24 hour[1]		
	75 ppb (196.4 μg/m^3)	1 hour[3]	None	
Ozone	0.075 ppm (2008 standard)	8 hour[4]	Same as Primary	
	0.08 ppm (1997 standard)	8 hour[5]	Same as Primary	
	0.12 μg/m^3	1 hour[6]	Same as Primary	
Lead	0.15 μg/m^3	Rolling 3-Month Average[7]	Same as Primary	
	1.5 μg/m^3	Quarterly Average	Same as Primary	
PM_{10}	150 μg/m^3	24 hour[8]	Same as Primary	
$PM_{2.5}$	15.0 μg/m^3	Annual Arithmetic Mean[9]	Same as Primary	
	35 μg/m^3	24 hour[10]	Same as Primary	

SOURCE: Environmental Protection Agency 2010a

NOTES:

[1] Not to be exceeded more than once per year.

[2] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).

[3] Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

[4] To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective May 27, 2008).

[5] (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor, within an area over each year, must not exceed 0.08 ppm. (b) The 1997 standard, and the implementation rules for that standard, will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.

[6] (a) EPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard (anti-backsliding). (b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.

[7] Final rule signed October 15, 2008.

[8] Not to be exceeded more than once per year on average during a 3-year period.

[9] To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 μg/m^3.

[10] To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 μg/m^3 (effective December 17, 2006).

μg/m^3 = Micrograms per cubic meter
PM^{10} = Particulate matter less than 10 micrometers in diameter
$PM^{2.5}$ = Particulate matter less than 2.5 micrometers in diameter
ppm = Parts per million
ppb = Parts per billion

3.2.1.1 Environmental Setting

Climate

Climate refers to the long-term average and range of weather conditions that prevail at any given place. The Project area is located in the south-central and southwestern portions of the state of Utah, along the southeastern edge of the Great Basin. Pacific storms, before reaching Utah, must first cross the Sierra Nevada or the Cascade mountain ranges. As the moist air rises over these high mountains, a large portion of the moisture falls as precipitation. Thus, the prevailing westerly winds reaching Utah are comparatively dry, resulting in light precipitation over most of the state (Western Regional Climate Center [WRCC] 2010). There are definite variations in temperature with altitude and latitude. The mountains and elevated valleys have the cooler climates, with the lower areas of the state having higher temperatures. Weather stations in the southern counties generally have average annual temperatures 6 to 8 degrees higher than those at similar altitudes over the northern counties (WRCC 2010). Temperatures below zero during winter and early spring are uncommon in most areas of the state, and prolonged periods of extremely cold weather are rare. This is primarily due to the mountains east and north of the state, which act as a barrier to intensely cold continental Arctic air masses (WRCC 2010). Utah experiences relatively strong insulation during the day and rapid nocturnal cooling, resulting in wide daily ranges in temperature. Even after the hottest days, nights are usually cool over the state (WRCC 2010).

Precipitation varies with elevation. Precipitation over southern Utah ranges from around 30 to 35 inches on the windward mountain slopes to less than 10 inches over lower elevation portions of the Project area. Sunny skies prevail most of the year in Utah (WRCC 2010). Runoff from melting mountain snow usually reaches a peak in April, May, or early June, and sometimes causes flooding along the lower streams. However, damaging floods of this kind are infrequent. Flash floods from summer thunderstorms are more frequent, but they affect only small, local areas (WRCC 2010).

Wind speeds are usually light to moderate, ranging below 20 miles per hour. There are only a few tornadoes in Utah as a rule, and those reported usually result in only slight property or resource damage (WRCC 2010).

Global Climate Change

Climate variability and change exert profound influences on agriculture, natural ecosystems, wildfires, tourism, and water resources. Climate is determined by fixed or slowly varying factors that modulate weather. The primary factors include the intensity of sunlight, Earth's orbital geometry, and latitude. In addition to the sun's radiation, Earth's surface receives infrared radiation from the atmosphere above. The intensity of infrared radiation is determined by cloud cover, humidity, and the atmospheric concentrations of infrared-absorbing trace gases (GHG, such as carbon dioxide [CO_2]) (Gutzler 2005).

Other climatic conditions vary depending on longitude. Such longitudinally varying conditions include the distribution of oceans and continents, continental topography, and land surface cover. "Average weather" can vary systematically from year to year. Such variability in climate is associated with changes in ocean temperatures that modulate storm tracks and moisture transport for entire seasons or years. Slow variations in ocean temperature and currents, especially in the Pacific Ocean, are a major cause of wintertime climate variability across North America (Gutzler 2005).

The El Niño cycle, a tongue of anomalously warm Pacific Ocean surface water extending along the equator westward from the South American coast, is the best known and best understood example. El Niño pulls the North Pacific atmospheric jet stream, and the storm track associated with it, southward and

eastward, with increased precipitation over the southwestern United States. The mirror-image cold phase, La Niña, has the opposite effect, pushing the jet stream northward and leaving the southwestern states drier than normal. Extreme warm and cold phases each tend to occur several years per decade, reaching maximum amplitude in the Northern Hemisphere's winter season (Gutzler 2005).

Recent research suggests that longer, multi-decadal fluctuations in the northern Pacific Ocean also affect precipitation across southwestern North America. Northern Pacific Ocean temperatures seem to vary more slowly than tropical El Niño-related anomalies. This Pacific Decadal Oscillation tends to modulate the effects of El Niño. A negative Pacific Decadal Oscillation seems to bring greater drought to the southwestern United States, while a positive phase brings wet decades (Gutzler 2005).

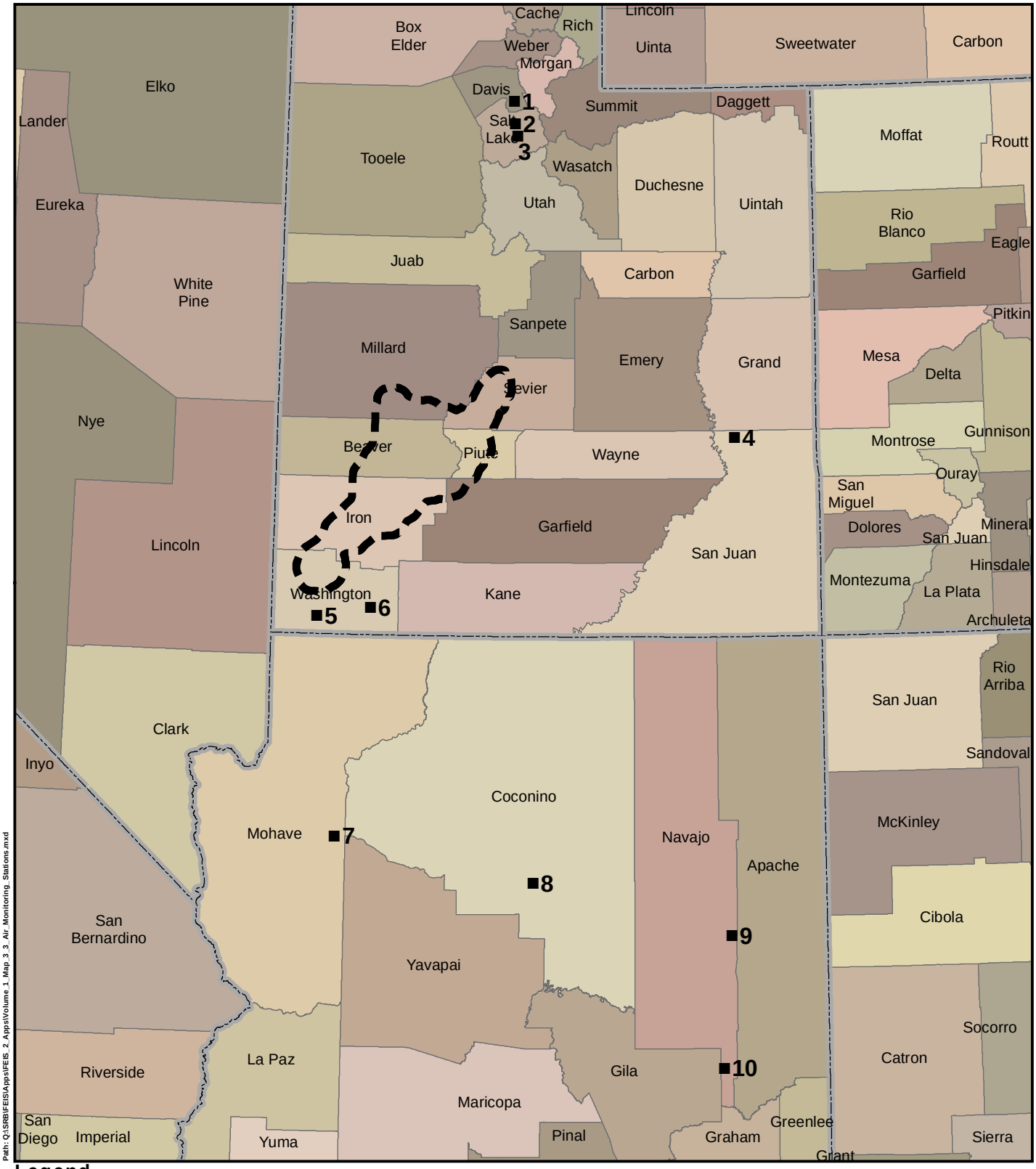
Evidence of decade-scale climate variability during the past 1,000 years recently has come to light through examination of annual growth rings in ancient trees. One of the major results of recent tree ring analysis is the discovery of southwestern "drought cycles," with intermittent severe droughts recurring every 50 to 100 years (Gutzler 2005).

Forming a backdrop to climate variability are constant climatic shifts that occur over longer time scales. The current warming trend is observed across much of the world, consistent with the prevailing hypothesis that such warming can be attributed at least partly to worldwide increases in GHGs in the atmosphere (Gutzler 2005). The current knowledge, professional opinions, and concerns of many federal and state land managers, scientists, stakeholders, and partners (captured at the August 2010 workshop on natural resource mitigation related to climate change in the Great Basin and Mojave Desert) indicate a general consensus that climate change models for the southwestern deserts predict general warming and drying with increasing precipitation variability year to year. Because of these changing conditions, the past may no longer be a guide to the future in which managers envision increasing conflicts between human water uses and sustaining ecosystems. Workshop attendees also agreed that increasing environmental stress also is expected as a consequence of shifting ecosystem boundaries and species distributions, expansion of non-native species, and other potential effects leading to increasingly unstable biologic communities (Hughson et al. 2011).

While the significance of the current warming trend in climate should not be understated, projected 21st century climate changes are nonetheless modest compared to some changes that have occurred in the distant past. During the last ice age, abundant geological evidence indicates that huge ice sheets covered much of North America. That event was merely the latest in a long series of ice-age cycles that have characterized climate over the last 2 million years. Ice age cycles are thought to be caused by decreases in the tilt of Earth's rotational axis (Gutzler 2005).

Air Quality

Relevant monitoring data for concentrations of criteria pollutants available from EPA's AirData website and from the Utah Department of Environmental Quality for monitors near the Project area are shown in Table 3-5 for the most recent year, or years, available. The locations of these monitoring stations are shown in Map 3-3. There are no nearby or representative locations that monitor ambient concentrations of lead.



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Legend

Project Study Area

■ Air Quality Monitoring Locations

No.	Pollutant	Averaging Period
1	NO2	1-hour and annual mean
	Ozone	1-hour, 8-hour
	PM10	24-hour
	SO2	annual mean, 24-hour, 3-hour, 1-hour
2	NO2	1-hour and annual mean
	Ozone	1-hour, 8-hour
3	CO	1-hour, 8-hour
4	Ozone	1-hour, 8-hour

No.	Pollutant	Averaging Period
5	NO2	1-hour and annual mean
	Ozone	1-hour, 8-hour
6	PM2.5	24-hour, annual
7	PM10	24-hour
	PM2.5	24-hour, annual
8	Ozone	1-hour, 8-hour
	PM10	24-hour
	PM2.5	24-hour, annual
9	Ozone	1-hour, 8-hour
10	PM10	24-hour

MAP 3-3
REPRESENTATIVE AIR
MONITORING STATION LOCATIONS

SIGURD TO RED BUTTE NO. 2
345kV TRANSMISSION PROJECT

SOURCES:
Monitoring Stations: EPA, 2011
UDEQ Division of Air Quality, 2011
County and State Boundary: ESRI, 2008

0 35 70 Miles

October 2012
Final EIS

TABLE 3-5
REPRESENTATIVE AIR QUALITY IN THE PROJECT AREA

Pollutant	Averaging Period	State/County						
		Utah/ Davis	Utah/ Salt Lake	Utah/ San Juan	Utah/ Washington	Arizona/ Coconino	Arizona/ Mohave	Arizona/ Navajo
Ozone (ppm)	1 hour 2nd max	0.098	0.086	0.080	0.072	0.079	–	0.079
	8 hour 4th max (3-year average)	0.074	0.071	0.069	0.065	0.069	–	0.067
PM_{10} ($\mu g/m^3$)	24 hour 2nd max (2-year average)	59	–	–	–	34	46.8	59
$PM_{2.5}$ ($\mu g/m^3$)	24 hour 98th percentile (3-year average)	–	–	–	10.2 (2-year average)	12.7	12.5 (2-year average)	–
	Annual mean	–	–	–	4.0	5.1	5.4	–
CO ($\mu g/m^3$)	1 hour 1st max	–	3,333	–	–	–	–	–
	8 hour 2nd max	–	2,299	–	–	–	–	–
SO_2 ($\mu g/m^3$)	1 hour 4th max (3-year average)	34.2	–	–	–	–	–	–
	3 hour 2nd max	21.8	–	–	–	–	–	–
	24 hour 2nd max	11.8	–	–	–	–	–	–
	Annual mean	6.7	–	–	–	–	–	–
NO_2 ($\mu g/m^3$)	1 hour 98th percentile (3-year average)	109.4	111.3	–	38.4	–	–	–
	Annual mean	55.4	64.4	–	8.4	–	–	–

SOURCES: Environmental Protection Agency 2011b; Utah Department of Environmental Quality, Division of Air Quality 2011
NOTES:
Monitoring data is not shown for pollutants for which indicated counties are nonattainment areas. The Project area is considered unclassifiable and assumed to attain the NAAQS due to the generally low number and size of emission sources.
$\mu g/m_3$ = Micrograms per cubic meter
CO = Carbon monoxide
NO_2 = Nitrogen dioxide
PM_{10} = Particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers in diameter
ppm = Parts per million
SO_2 = Sulfur dioxide

3.2.1.2 Study Methodology

Inventory

Air Quality

Sources of GHG emissions (e.g., CO_2, methane, and nitrous oxide) and criteria pollutant emissions (e.g., nitrogen oxides [NO_x]; CO; SO_2; hydrocarbons, including volatile organic compounds [VOC]; and PM_{10} and $PM_{2.5}$) associated with implementation of the Project are summarized in Table 3-6.

TABLE 3-6
SOURCES OF AIR POLLUTANT EMISSIONS ASSOCIATED WITH PROJECT CONSTRUCTION AND OPERATION

Pollutant	Emissions Source					
	Earth-moving/ Ground Disturbance	Nonroad Equipment Tailpipes	On-road Vehicle Tailpipes	Helicopter Operation	Paved and Unpaved Road Dust	Construction/ Operation of Concrete Batch Plant
Construction Phase						
$PM_{10}/PM_{2.5}$	✓	✓	✓	✓	✓	✓
SO_2	–	✓	✓	✓	–	✓
NO_x	–	✓	✓	✓	–	✓
CO	–	✓	✓	✓	–	✓
VOC	–	✓	✓	✓	–	✓
GHG	–	✓	✓	✓	–	✓
Operation Phase						
$PM_{10}/PM_{2.5}$	✓	✓	✓	–	✓	–
SO_2	–	✓	✓	–	–	–
NO_x	–	✓	✓	–	–	–
CO	–	✓	✓	–	–	–
VOC	–	✓	✓	–	–	–
GHG	–	✓	✓	–	–	✓

NOTES:
CO = Carbon monoxide
GHG = Greenhouse gas (emissions)
NO_x = Nitrogen oxides
PM_{10} = Particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers in diameter
SO_2 = Sulfur dioxide
VOC = Volatile organic compound

Emissions from construction activities would be confined to the daytime hours and would occur only during active construction periods. Also, emissions would be transient as construction progresses, so emissions would not occur in one area for a long duration. Design features of the Proposed Action would be applied during construction to reduce particulate matter emissions. Design features of the Proposed Action also would be applied to limit particulate matter emissions from ground disturbance, road dust, and vehicle emissions during periodic maintenance or emergency repair activities. Based on professional judgment, emissions related to operation and maintenance activities were assumed to be negligible and were, therefore, not quantified with the exception of GHG emissions from circuit breakers at the substations.

Emissions of PM_{10}, $PM_{2.5}$, CO, NO_x, SO_2, VOCs, and GHGs from construction equipment, vehicles, and facilities and fugitive dust were estimated from the following source activities:

- Fugitive dust from earth-moving activities such as grading and dozing roads, work pads, and substation areas
- Dust from traffic on paved and unpaved roads associated with construction
- Tailpipe and evaporative emissions from construction-phase traffic
- Tailpipe emissions from construction equipment such as dozers, graders, generators, helicopters, etc.
- Construction and operation of one or more concrete batch plants

The methods for estimating emissions associated with each activity to be used to model air-quality impacts are discussed in the following.

Fugitive Dust from Transmission Line and Batch Plant Construction

For this analysis, uncontrolled fugitive dust emission factors of 0.42 tons PM_{10} per acre per month and 0.042 tons $PM_{2.5}$ per acre per month were used (Countess Environmental 2006; EPA 2001; Midwest Research Institute 2005) to estimate quantities of fugitive dust generated from access road construction. Uncontrolled fugitive dust emission factors of 0.11 tons PM_{10} per acre per month and 0.011 tons $PM_{2.5}$ per acre per month were used (Countess Environmental 2006; EPA 2001; Midwest Research Institute 2005) for other construction activities. Emissions from construction of the proposed concrete batch plants have been included in the total fugitive dust emissions for transmission line construction. Substation expansion will not include significant fugitive dust-generating activities, such as grading. A control efficiency of 61 percent was assumed for watering as needed; application of dust suppressant, if warranted, was applied to uncontrolled emissions based on research sponsored by the Western Regional Air Partnership (Countess Environmental 2006).

Quantities of dust generated from use of paved and unpaved roads during construction were calculated by Project engineers (i.e., Proponent's engineers and contracted engineering staff) based on estimates of the number of miles traveled and vehicle counts planned for construction for each alternative route and the proposed substation expansions. Emissions were calculated using spreadsheets developed by Western Regional Air Partnership (2010). In calculating emissions, a speed limit of 25 miles per hour was assumed for unpaved roads. Half of unpaved roads were assumed to have a silt content characteristic of a graveled surface, while the rest were assumed to have a silt content characteristic of a scraper road at a construction site. An average speed of 55 miles per hour was assumed on paved roads. Compliance with these speed limits would be a requirement of the POD and compliance with the POD would be monitored by an agency-appointed compliance inspection contractor. In addition to speed control, mitigation measures would include dust suppressant application on unpaved roads (if warranted), frequent watering of unpaved roads (twice daily assumed), and prompt removal of dirt tracked onto paved roads. Such measures generally would be required under Utah dust-control regulations.

Traffic Emissions

A number of support vehicles would be used during construction, including a fleet of pickup trucks, flatbed trucks, and other supporting vehicles (e.g., concrete and boom trucks). Each of these vehicles would emit criteria and GHG pollutants. Estimated emissions were calculated using the EPA-approved MOBILE6 emission model (EPA 2003) for all pollutants except methane and nitrous oxide. Emission factors for methane and nitrous oxide were taken from EPA's *Climate Leaders Greenhouse Gas*

Inventory Protocol Core Module Guidance – Direct Emissions from Mobile Combustion Sources (EPA 2008).

The MOBILE6 model inputs included use of high-altitude mode and conventional Western gasoline composition. Emissions of mobile source CO_2, NO_x, CO, VOC, and particulate-related combustion pollutants (SO_2, PM_{10}, $PM_{2.5}$) were calculated. Total pound-per-day emissions were based on the MOBILE6 or Climate Leaders emission factors (expressed in grams per mile) and the number of vehicle miles traveled. These emission factors were applied to the various vehicle classes based on size and fuel used. For diesel fueled equipment, 15 parts per million (ppm) sulfur content was assumed (based on federal low-sulfur diesel requirements for nonroad engines effective June 2010).

EPA has recently required the use of the updated MOVES2010 Mobile Source Emissions Model for certain analyses, including transportation conformity and State Implementation Plan inventories, neither of which is a subject of this EIS. MOVES2010 was promulgated in early 2010, during the development of emission estimates for this project, and was subject to a 2-year phase-in period. Because traffic emissions are a relatively insignificant portion of the overall Project emissions, the analysis has not been updated to use MOVES2010.

Construction Equipment Emissions

Nonroad engine exhaust emissions associated with construction of the Project were estimated for each month of construction based on the number and type of equipment and construction schedule provided by Project engineers. Emission factors for diesel engines were obtained from the federal Tier 1-4 emission standards for CO, NO_x, PM, and VOC. The SO_2 emission factor for diesel engines was estimated using methods established in EPA NR-009A (EPA 1998a) and the June 2010 diesel fuel sulfur content standard of 15 ppm. Emission factors for gasoline engines were obtained from EPA 420R-05-019, *Exhaust Emission Factors for Nonroad Engine Modeling: Spark Ignition* (EPA 2005a). The SO_2 emission factor for gasoline engines was estimated using methods established in EPA NR-010b (EPA 1999).

CO_2 emission factors for gasoline engines were estimated based on an equation given in the EPA document *Exhaust Emission Factors for Nonroad Engine Modeling —Spark-Ignition* (EPA 2005a). For diesel engines, the CO_2 emission factors were calculated based on an equation in EPA document NR-009d (*Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling – Compression-Ignition*) (EPA 2010a). Methane and nitrous oxide emission factors for gasoline and diesel engines and CO_2, methane, and nitrous oxide emission factors for helicopters were obtained from *Climate Leaders Greenhouse Gas Inventory Protocol Core Module Guidance – Direct Emissions from Mobile Combustion Sources* (EPA 2008). Global warming potentials for calculating CO_2 equivalent (CO_2e) emissions from 40 CFR 98, Table A-1 were used. Additional assumptions include:

- Total particulate matter emission factors were used to estimate emissions for PM_{10} and $PM_{2.5}$.
- Where available, nonmethane hydrocarbon emission factors were used to estimate VOC emissions. If nonmethane hydrocarbon emission factors were not available, hydrocarbon emission factors were conservatively used to estimate VOC emissions.
- Gasoline-fired air compressors were assumed to have Phase 2, four-stroke engines.
- Generators and compactors were assumed to have Phase 2, side-valved engines.

Criteria pollutant emissions from helicopters to be used in construction were estimated based on hours of operation and the shaft horsepower of the engines of a Bell UH-1H helicopter. The methods for emission estimation from helicopters were developed by the Swiss Federal Office of Civil Aviation, and documented in *Guidance on the Determination of Helicopter Emissions* (Swiss Federal Office of Civil Aviation 2009).

Batch Plant Emissions

Up to four temporary concrete batch plants would be constructed and operated to supply concrete for use in construction. Fugitive dust, construction equipment, and traffic emissions for batch plant construction are included in the emission totals for transmission line construction.

Emissions generated from operation of the concrete batch plant during Project construction were estimated using emission factors established in EPA's *Compilation of Air Pollutant Emission Standards* (EPA 2005b) for concrete batching operation. Emissions were based on the planned total output from the batching operation of up to 4,000 cubic yards of concrete. The concrete was assumed to be truck-mixed. Traffic emissions for delivery of raw materials to the plant were based on MOBILE6 emission factors and the amount of raw materials required to produce 4,000 cubic yards of concrete.

In some cases, power may be provided to the batch plants by a generator. Emissions from operation of a representative generator were included in the batch plant operation emissions. It was assumed no more than two batch plants would operate simultaneously. Generator emissions were therefore based on operation of two generators during the construction period.

Impact Assessment and Mitigation Planning

Construction activities associated with the Project would release regulated pollutants into the atmosphere for subsequent transport. Some of these pollutants may be transported from the immediate area into the surrounding air. A dispersion modeling analysis was conducted to assess probable Project impacts on ambient air quality. It should be noted that screening-level models calculate conservative impacts that are likely to overestimate actual impacts.

The EPA recently has promulgated a new screening-level dispersion model, AERSCREEN. AERSCREEN is a screening version of EPA's recommended model for near-field dispersion analyses, AERMOD. AERSCREEN was used to simulate emissions and transport from transmission line and substation construction for those pollutants for which state or federal ambient standards have been defined. Construction of concrete batch plants is included in transmission line construction emissions and operation emissions from the batch plants were not modeled because they will be negligible (less than 1 ton of particulate matter emissions for all concrete batch plants associated with each potential transmission line).

For the transmission line segments, maximum fugitive dust and construction equipment emissions would occur during access road construction. For the other pollutants, maximum emissions from construction equipment would occur during foundation work. Emissions from helicopter operations, traffic, and paved and unpaved road traffic were not modeled because they would occur over a large area, resulting in negligible impacts at any given location.

Because AERSCREEN only can simulate emissions from a single source for a 1-hour time period, both fugitive dust and construction equipment emissions were modeled as being emitted from an area

representing a work site, rather than from individual pieces of equipment, with the size of the site based on expected activities. The release height was set to 10 meters, in accordance with procedures recommended by the Colorado Department of Public Health and Environment, Air Pollution Control Division for fugitive sources with substantial turbulence (e.g., equipment activity) (Colorado Department of Public Health and Environment 2005). Although Colorado Department of Public Health and Environment guidance was developed for a previous screening model, SCREEN3, the recommendation can be reasonably applied to the newer AERSCREEN model as well.

Maximum 1-hour impacts were conservatively assumed to apply to other short-term averaging periods (i.e., 3-hour, 8-hour, and 24-hour). Annual impacts were not estimated because the equipment and other emitting activities would not stay in one location, but would move along the right-of-way as the transmission lines are constructed. The calculated impacts would apply to the construction of the transmission line for any of the route group alternatives.

AERSCREEN requires information about the surface characteristics that may influence dispersion, including representative albedo, Bowen ratio, and surface roughness length. The various transmission line route groups would traverse a wide variety of terrain and vegetation types. Albedo (0.3), Bowen ratio (1.8), and surface roughness (0.5 meter) values were used for the modeling for all alternative routes. The albedo and Bowen ratio represent annual average dry grassland values, while the surface roughness was slightly higher than would be characteristic of grasslands due to the presence of scattered pinyon, juniper, and other larger elements over many of the alternative routes (EPA 2004). Default maximum and minimum expected temperatures were used. Because the daily or hourly emissions from a single work site were modeled, impacts would apply equally to any route alternative or segment.

VOCs were not modeled because they are regulated as precursors to other pollutants (ozone, PM_{10}), and are generally modeled only as part of regional applications.

For substation construction, pollutant emissions characteristic of the month with the highest overall estimated emissions were modeled. As with the transmission lines, these activities were simulated as area sources representing a daily work site. Emissions estimated for the Red Butte Substation were used for modeling because they are slightly higher than those for the Sigurd Substation expansion.

The concrete batch plants would require an air permit or Approval Order in compliance with Utah Administrative Code (UAC) R307-401, *Permit: Notice of Intent and Approval Order*. The Approval Order would provide enforceable air pollution mitigation measures to reduce air emission impacts from operation of the batch plant.

Dust-generating activities are required to meet general dust-control requirements as specified in UAC R307-205. Mitigation measures, including watering, application of dust suppressant as needed, road sweeping, and speed control would be used to limit particulate emissions. Following construction, disturbed areas would be reclaimed with native vegetation or seed mix prescribed by the land-management agency.

Most emissions of gaseous pollutant would be generated by diesel equipment used in Project construction. The use of equipment that meets current EPA emission standards and proper maintenance of that equipment would reduce emissions generated from diesel construction equipment.

Standard dust control requirements specified in UAC R307-205 that would apply to Project construction include the following:

- Fugitive emissions should not exceed 20 percent opacity.

- Fugitive dust must be minimized from any aggregate storage or handling activities.
- Watering, chemical stabilization, wind breaks, and other similar measures must be employed to minimize fugitive dust from cleared areas and unpaved roads.
- For any new roads with an average of 150 vehicle trips per day or greater, a NOI must be submitted prior to construction.

3.2.1.3 Results

Estimated emissions of criteria pollutants associated with construction of all transmission line action alternatives are shown in Table 3-7. Estimated emissions of GHGs associated with construction of all transmission line action alternatives, which are common to all alternatives, are shown in Table 3-8. Air dispersion modeling results for criteria pollutants are shown in Table 3-9.

TABLE 3-7
ESTIMATED TONS OF EMISSIONS OF CRITERIA POLLUTANTS FROM TRANSMISSION LINE CONSTRUCTION

Emissions	Alternative Routes														
	N1	N2	N2-A[1]	N3	N4	N5	N6[2]	S1	S2	S3	S4	S5[2]	S6	S7	S7-A[1]
Fugitive Dust from Earth-moving Activities (activity duration of 14 months)[3]															
PM_{10}	94.9	93.7	93.6	86.3	91.1	83.8	92.9	51.2	43.2	56.0	50.1	52.5	58.2	46.8	44.4
$PM_{2.5}$	9.5	9.4	9.4	8.6	9.1	8.4	9.3	5.1	4.3	5.6	5.0	5.2	5.8	4.7	4.4
Travel on Paved Roads (activity duration of 23 months)[3]															
PM_{10}	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5
$PM_{2.5}$	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Travel on Unpaved Roads (activity duration activity of 23 months)[3]															
PM_{10}	418.0	418.0	418.0	418.0	418.0	418.0	418.0	418.0	418.0	418.0	418.0	418.0	418.0	418.0	418.0
$PM_{2.5}$	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8	41.8
Construction Equipment (activity duration of 23 months)[3]															
NO_x	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0
SO_2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
CO	137.9	137.9	137.9	137.9	137.9	137.9	137.9	137.9	137.9	137.9	137.9	137.9	137.9	137.9	137.9
VOC	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8
PM_{10}	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
$PM_{2.5}$	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Traffic (activity duration of 23 months)[3]															
NO_x	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
SO_2	<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
CO	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8
VOC	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
PM_{10}	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
$PM_{2.5}$	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Helicopters (activity duration of 4 months)[3]															
NO_x	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
SO_2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
CO	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
VOC	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
PM_{10}	<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
$PM_{2.5}$	<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

TABLE 3-7
ESTIMATED TONS OF EMISSIONS OF CRITERIA POLLUTANTS FROM TRANSMISSION LINE CONSTRUCTION

Emissions	Alternative Routes														
	N1	N2	N2-A[1]	N3	N4	N5	N6[2]	S1	S2	S3	S4	S5[2]	S6	S7	S7-A[1]
Total Emissions															
NO_x	157.6	157.6	157.6	157.6	157.6	157.6	157.6	157.6	157.6	157.6	157.6	157.6	157.6	157.6	157.6
SO_2	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53
CO	156.3	156.3	156.3	156.3	156.3	156.3	156.3	156.3	156.3	156.3	156.3	156.3	156.3	156.3	156.3
VOC	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8
PM_{10}	492.2	491.0	490.9	483.6	488.4	481.1	490.2	448.5	440.5	453.3	447.4	449.8	455.5	444.1	441.7
$PM_{2.5}$	57.8	57.7	57.7	56.9	57.4	56.7	57.6	53.4	52.6	53.9	53.3	53.5	54.1	53.0	52.7

NOTES:
[1]Agency Preferred Alternative
[2]Proponent's Preferred Alternative
[3]All activities would begin in December 2012, except helicopter activity, which would begin in July 2013.
CO = Carbon monoxide
NO_x = Nitrogen oxides
PM_{10} = Particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers in diameter
SO_2 = Sulfur dioxide
VOC = Volatile organic compound

TABLE 3-8
ESTIMATED TONS OF EMISSIONS OF GHGs FROM TRANSMISSION LINE CONSTRUCTION

Emissions	Alternative Routes														
	N1	N2	N2-A[1]	N3	N4	N5	N6[2]	S1	S2[1]	S3	S4	S5[2]	S6	S7	S7-A[1]
Construction Equipment (activity duration of 23 months)[3]															
CO_2	25,427	25,427	25,427	25,427	25,427	25,427	25,427	25,427	25,427	25,427	25,427	25,427	25,427	25,427	25,427
CH_4	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45
NO_x	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Traffic (activity duration of 23 months)[3]															
CO_2e	6,684	6,684	6,684	6,684	6,684	6,684	6,684	6,684	6,684	6,684	6,684	6,684	6,684	6,684	6,684
CH_4	<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
NO_x	<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
Helicopters (activity duration of 4 months)[3]															
CO_2	715.4	715.4	715.4	715.4	715.4	715.4	715.4	715.4	715.4	715.4	715.4	715.4	715.4	715.4	715.4
CH_4	<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
NO_x	<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
Total Emissions															
CO_2	32,826	32,826	32,826	32,826	32,826	32,826	32,826	32,826	32,826	32,826	32,826	32,826	32,826	32,826	32,826
CH_4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
NO_x	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
CO_2e [4]	33,075	33,075	33,075	33,075	33,075	33,075	33,075	33,075	33,075	33,075	33,075	33,075	33,075	33,075	33,075

NOTES:
[1]Agency Preferred Alternative
[2]Proponent's Preferred Alternative
[3]All activities would begin in December 2012, except helicopter activity, which would begin in July 2013.
[4]Carbon dioxide equivalent is the sum of emissions of carbon dioxide, methane, and nitrous oxide, multiplied by their Global Warming Potentials. Carbon dioxide equivalent (tons) = (Carbon dioxide [tons] x 1) + (Methane [tons] x 21) + (Nitrous oxide [tons] x 310)
CH_4 = Methane
CO_2 = Carbon dioxide
CO_2e = Carbon dioxide equivalent
NO_x = Nitrogen oxides

TABLE 3-9
AIR DISPERSION MODELING RESULTS – TRANSMISSION LINE CONSTRUCTION

Pollutant and Averaging Period	Modeled Concentration ($\mu g/m^3$)[1]	Background Concentrations ($\mu g/m^3$)	Project Plus Background ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
PM_{10}: 24 hour	87.8	34.0	121.8	150
$PM_{2.5}$: 24 hour	20.2	10.2	30.4	35
CO: 1 hour	94.9	3,333	3,428	40,000
CO: 8 hour	94.9	2,299	2,394	10,000
SO_2: 1 hour	0.16	34.2	34.4	196.4
SO_2: 3 hour	0.16	21.8	22.0	1,300
SO_2: 24 hour	0.16	11.8	12.0	365
NO_2: 1 hour	74.8	38.4	113.2	188.7

NOTES:
[1] Modeled concentrations of criteria pollutants represent impacts on air quality and would be common to all alternatives.
μg/m3 = Micrograms per cubic meter
CO = Carbon monoxide
NAAQS = National Ambient Air Quality Standards
NO_2 = Nitrogen dioxide
PM_{10} = Particulate matter less than 10 microns in diameter
$PM_{2.5}$ = Particulate matter less than 2.5 microns in diameter
SO_2 = Sulfur dioxide

Batch Plants

Table 3-10 summarizes emissions for construction and operation of the concrete batch plants. Impacts on air quality (i.e., pollutant concentrations) resulting from construction and operation of the batch plants would be less than estimated for construction of the transmission line or expansion of the substations because overall emissions are lower and the batch plants would be temporary facilities only that would serve portions of the transmission line.

TABLE 3-10
AIR POLLUTANT EMISSIONS – BATCH PLANTS

Activity	NO_x (tons)	SO_2 (tons)	CO (tons)	VOC (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)	CO_2 (tons)	Methane (tons)	Nitrous Oxide (tons)	CO_2e (tons)
Operation emissions	–	–	–	–	<0.1	<0.1	–	–	–	–
Operation traffic	0.4	<0.1	0.2	0.1	1.2	0.2	106	<0.1	<0.1	106
Generators	190	0.2	110	12.7	6.4	6.4	22,426	1.3	0.6	22,631
Totals	191	0.20	110	12.7	7.6	6.6	22,532	1.3	0.6	22,737

NOTES:
CO = Carbon monoxide
CO_2 = Carbon dioxide
CO_2e = Carbon dioxide equivalent
NO_x = Nitrogen oxides
PM_{10} = Particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers in diameter
SO_2 = Sulfur dioxide
VOC = Volatile organic compound

No Action Alternative

Under this alternative, the environment would remain as it presently exists.

Impacts Common to Alternatives

Regardless of the alternative route selected, construction of the transmission line and associated facilities would result in the dispersion of emissions of criteria pollutants generated from construction equipment, vehicles, and facilities and fugitive dust. The estimated concentrations of emissions generated by implementing the Project would vary by alternative route; however, the dispersion of criteria pollutants and overall impact on air quality would be common to all alternatives. Impacts on air quality resulting from emissions of criteria pollutants would be short-term (i.e., during Project construction) and the dispersion of criteria pollutants would be limited to the vicinity of construction activity (i.e., maximum impacts would occur within 100 meters of the emission source). Impacts on air quality would not be anticipated to result in violations of the NAAQS. Air dispersion modeling results for criteria pollutants are shown in Table 3-11.

Expansion of Existing Sigurd Substation

Estimated emissions for criteria pollutants associated with construction activities for the additional equipment expansion of the existing Sigurd Substation are shown in Table 3-11, while GHG emissions from both construction activities and operation of the expanded substation are shown in Table 3-12. Dispersion modeling results are shown in Table 3-13 and are assumed to be representative of maximum impacts at either substation.

TABLE 3-11
ESTIMATED EMISSIONS OF CRITERIA POLLUTANTS FOR SIGURD SUBSTATION

Emission Source	Duration of Activity (months)[1]	NO_x (tons)	SO_2 (tons)	CO (tons)	VOC (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)
Travel on paved roads	20	–	–	–	–	1.3	0.2
Travel on unpaved roads	20	–	–	–	–	0.8	0.1
Construction equipment	20	17.9	0.08	52.6	1.9	1.1	1.1
Traffic	20	0.7	0.003	1.8	0.22	0.03	0.02
Totals	–	18.6	0.1	54.4	2.1	3.2	1.4

NOTES:
[1]All activities would begin in October 2012.
CO = Carbon monoxide
NO_x = Nitrogen oxides
PM_{10} = Particulate matter less than 10 microns in diameter
$PM_{2.5}$ = Particulate matter less than 2.5 microns in diameter
VOC = Volatile organic compound

TABLE 3-12
ESTIMATED EMISSIONS OF GHGs FOR SIGURD SUBSTATION

Emission Source	Duration of Activity (months)[1]	CO_2 (tons)	Methane (tons)	Nitrous Oxide (tons)	CO_2e (tons)	Sulfur Hexafluoride (tons/year)	CO_2e (tons)
Construction Activity Emissions							
Construction equipment	20	3,448	0.20	0.09	3,480	–	–
Traffic	20	288	0.003	0.002	289	–	–
Totals	–	3,736	0.2	0.1	3,768	–	–
Substation Operation Emissions							
Circuit Breakers	–	–	–	–	–	5.4e-04	12.9

NOTES:
CO_2 = Carbon dioxide
CO_2e = Carbon dioxide equivalent

TABLE 3-13
AIR DISPERSION MODELING RESULTS – SUBSTATION EXPANSIONS

Pollutant and Averaging Period	Modeled Concentration ($\mu g/m^3$)[1]	Background Concentrations ($\mu g/m^3$)	Project Plus Background ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
PM_{10}: 24 hour	31.6	34.0	65.6	150.0
$PM_{2.5}$: 24 hour	31.6	10.2	41.82	35.0
CO: 1 hour	1,568.0	3,333.0	4,901	40,000.0
CO: 8 hour	1,568.0	2,299.0	3,867	10,000.0
SO_2: 1 hour	2.3	34.2	36.5	196.4
SO_2: 3 hour	2.3	21.8	24.1	1,300.0
SO_2: 24 hour	2.3	11.8	14.1	365.0
NO_2: 1 hour	403.8	38.4	442.2[2]	188.7

NOTES:
[1]Modeled concentrations of criteria pollutants represent impacts on air quality and would be common to both substations.
[2]Results are highly conservative. While the numerical value of the standard may be exceeded during construction activities, an actual violation is unlikely because the standard is based on a 3-year average of sub-maximum concentrations, while the model only predicts maximum concentrations over construction duration of less than 2 years.
$\mu g/m^3$ = Micrograms per cubic meter
CO = Carbon monoxide
NAAQS = National Ambient Air Quality Standards
NO_2 = Nitrogen dioxide
PM_{10} = Particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers in diameter
SO2 = Sulfur dioxide

Expansion of Existing Red Butte Substation

Estimated emissions for criteria pollutants associated with construction activities for the additional equipment expansion of the existing Red Butte Substation are shown in Table 3-14, while GHG emissions from both construction activities and operation of the expanded substation are shown in Table 3-15. Dispersion modeling results (Table 3-13) are common to the expansion of both substations (Sigurd and Red Butte).

TABLE 3-14
ESTIMATED EMISSIONS OF CRITERIA POLLUTANTS FOR RED BUTTE SUBSTATION

Emission Source	Duration of Activity (months)[1]	NO_x (tons)	SO_2 (tons)	CO (tons)	VOC (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)
Travel on paved roads	20	–	–	–	–	1.4	0.2
Travel on unpaved roads	20	–	–	–	–	0.8	0.1
Construction equipment	20	18.1	0.08	52.9	1.9	1.1	1.1
Traffic	20	0.7	0.003	1.9	0.22	0.03	0.02
	Totals:	18.8	0.1	54.8	2.2	3.4	1.4

NOTES:
[1]All activities would begin in October 2012.
CO = Carbon monoxide
NO_x = Nitrogen oxides
PM_{10} = Particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers in diameter
SO_2 = Sulfur dioxide
VOC = Volatile organic compound

TABLE 3-15
ESTIMATED EMISSIONS OF GHGs FOR RED BUTTE SUBSTATION

Emission Source	Duration of Activity (months)[1]	CO_2 (tons)	Methane (tons)	Nitrous Oxide (tons)	CO_2e (tons)	Sulfur Hexafluoride (tons/year)	CO_2e (tons)
Construction Activity Emissions							
Construction equipment	20	3,487	0.20	0.09	3,518	–	–
Traffic	20	304	0.003	0.002	304	–	–
Totals		3,823	0.2	0.1	3,823	–	–
Substation Operation Emissions							
Circuit Breakers	–	–	–	–	–	1.6e-03	38.7

NOTES:
CO_2 = Carbon dioxide
CO_2e = Carbon dioxide equivalent

General Conformity

In 1993, the EPA promulgated a rule requiring federal actions to conform to State Implementation Plans. Conformity means that a federal action would not interfere with strategies to attain the NAAQS. The State of Utah has incorporated the federal conformity requirements in 40 CFR 93 by reference.

Federal actions responsible for air pollutant emissions within a nonattainment or maintenance area must undergo a conformity applicability analysis to determine whether a conformity determination is necessary. The total of Project-related direct and indirect emissions (such as emissions from associated traffic) is tested against *de minimis* emission levels. Conformity determinations are required for any federal action where the total of direct and indirect emissions exceeds the annual *de minimis* thresholds.

There are no portions of the transmission line alternative routes that would traverse any nonattainment or maintenance areas. Therefore, the conformity requirements are satisfied since no nonattainment or maintenance areas would be affected.

Global Climate Change

Because GHG emissions from proposed projects contribute to climate change on a global scale, project-specific impacts of GHG emissions on the local environment cannot be quantified. The lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts. Currently, BLM does not have an established mechanism to accurately predict the effect of resource management-level decisions from this project-specific effort on global climate change. Although the Project would emit GHGs during construction, the emissions would be temporary, only occurring over a period of less than 2 years. GHG emissions from operation of the additional equipment that expanded substations would be negligible.

GHG emissions from Project construction would total approximately 96,500 tons of CO_2e, with up to 62,700 tons CO_2e emitted in the year with maximum construction activity. In contrast, U.S. energy-related CO_2 emissions totaled 6,215 million tons in 2010 (U.S. Energy Information Administration [EIA] 2011a); energy-related CO_2 constitutes approximately 80 percent of total U.S. anthropogenic GHG emissions (EIA 2011b). The maximum annual GHG emissions from Project construction would represent approximately 0.001 percent of annual U.S. energy-related emissions, an insignificant additional contribution.

The assessment of climate-changing pollutant emissions and climate change is in its formative phase; therefore, it is not yet possible to know with confidence the net impact to climate in coming years. However, the United Nations Intergovernmental Panel on Climate Change (2007) recently concluded that "warming of the climate system is unequivocal" and "most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic [man-made] GHG concentrations."

As discussed previously, the climate of the southwestern United States has undergone profound changes over time. Climate change is a normal part of the aging and evolution of the Earth and of changes in the factors that control climate, such as solar intensity and ocean currents occurring over multi-year to multi-decadal cycles. In recent years, however, concern has risen that human activities may be influencing climate in ways that have not occurred in the past.

According to the U.S. National Oceanic and Atmospheric Administration's National Climatic Data Center, the "greenhouse effect" is a natural process that helps to regulate the temperature of the planet. It results from heat absorption by certain gases in the atmosphere (GHGs) and re-radiation downward of some of that heat. Water vapor is the most abundant GHG, followed by CO_2 and other trace gases. Without a natural greenhouse effect, the average temperature of the Earth would be approximately 0 degrees Fahrenheit (-18 degrees Celsius), instead of its present 57 degrees Fahrenheit (14 degrees Celsius). So, the concern is not with the greenhouse effect itself, but whether human activities are enhancing the effect through GHG emissions from fossil fuel combustion and deforestation (Easterling and Karl 2011).

Human activity has clearly been increasing the concentration of GHGs in the atmosphere in recent years (primarily CO_2 from the combustion of coal, oil, and gas). Pre-industrial levels of CO_2 were approximately 280 ppm by volume and current levels are greater than 380 ppm by volume, increasing at a rate of 1.9 ppm per year since 2000. The global concentration of CO_2 in the atmosphere today far exceeds the natural range over the last 650,000 years of 180 to 300 ppm by volume. According to the United Nation's Intergovernmental Panel on Climate Change, by the end of the 21st century, CO_2 concentrations could be 75 to 350 percent above the pre-industrial concentration (Easterling and Karl 2011).

Global surface temperatures have increased approximately 0.74 degrees Celsius (plus or minus 0.18 degrees) since the late 19th century, and the linear trend for the past 50 years of 0.13 degrees Celsius (plus or minus 0.03 degrees) per decade is nearly twice that for the past 100 years. However, the change in surface temperatures is not uniform. Recent warming trends have been greatest over North America and Eurasia between 40°N and 70°N. Indirect indicators of warming, such as borehole temperatures, snow cover, and glacier recession data, are in substantial agreement with the more direct indicators of recent warmth (Easterling and Karl 2011).

Precipitation changes have been spatially variable over the last century. On a regional basis, increases in annual precipitation have occurred in the higher latitudes of the Northern Hemisphere and southern South America and northern Australia. Decreases have occurred in the tropical region of Africa and southern Asia. Northern Hemisphere snow-cover extent consistently has remained below average since 1987 and has decreased by approximately 10 percent since 1966 (Easterling and Karl 2011).

Because changes in ambient temperature and precipitation are important for agriculture, natural ecosystems, wildfires, tourism, and water resources, there has been a response to recent changes in climate on the part of various national and state governments, nongovernmental organizations, and citizen's groups, advocating decreases in GHG emissions.

With respect to the consequences for the climate of the Project area, federal and state land managers, scientists, stakeholders, and partners (at an August 2010 workshop on natural resource mitigation related to climate change in the Great Basin and Mojave Desert) noted that climate change models for the southwestern deserts predict general warming and drying with increasing precipitation variability year to year, leading to increasing conflicts between competing water uses. Workshop attendees also agreed that increasing environmental stress is expected as a consequence of shifting ecosystem boundaries and species distributions, expansion of non-native species, and other potential effects leading to increasingly unstable biologic communities (Hughson et al. 2011).

Rising temperatures also will adversely affect winter activities such as downhill and cross-country skiing. Record-setting wildfires are likely due to rising temperatures and related reductions in spring snowpack and soil moisture. Increased frequency and altered timing of flooding will increase risks to people, ecosystems, and infrastructure. Ozone pollution, which in many areas of the southwest increases as summer temperatures rise and clouds decrease, may also increase as a result of climate change. (U.S. Global Change Research Program 2012)

More intense, longer-lasting heat waves will result in increasing demands for air-conditioning, depleting electrical generation and distribution capacity, resulting in increased risks of brownouts and blackouts. In addition, since increased year-to-year variability of precipitation is expected, electricity supply will be affected by changes in the timing of river flows and where hydroelectric systems have limited storage capacity and reservoirs. (U.S. Global Change Research Program 2012)

3.2.1.4 Summary

Implementation of the Project on any of the alternative routes would have similar emissions and impacts on air quality. The same construction equipment would be used on any of the alternative routes, and construction would occur over the same time frame. Therefore, the only differences would be the amount of fugitive dust generated from earth-moving operations because each alternative would have slightly different surface disturbance based on different terrain. However, as discussed in the following, the differences among the alternatives would be negligible.

Particulate-matter emissions associated with construction of the transmission line would result predominantly from fugitive dust generated by construction vehicles traveling on unpaved roads. Frequent watering, speed control, and possible application of dust suppressant would minimize these emissions.

Gaseous pollutant emissions associated with construction of the transmission line would result predominantly from diesel- and gasoline-powered construction equipment. Proper equipment maintenance and use of equipment that meets current EPA emission standards would reduce these emissions and associated impacts on air quality.

Overall, impacts on air quality from Project construction would be temporary, localized to the vicinity of the activity, and would disperse or settle quickly. The screening-level air-quality model performed to analyze potential impacts on air quality could not rule out a potential exceedance of the numerical value of the 1-hour standard for NO_2 or the 24-hour standard for $PM_{2.5}$ because of emissions from construction equipment to be used during Project construction. However, based on the conservative assumptions used in estimating the concentrations and dispersion of criteria pollutants generated from construction activities, violations of the NAAQS for $PM_{2.5}$, NO_2, or any other criteria pollutant resulting from Project construction would not be anticipated. In addition, both the $PM_{2.5}$ and NO_2 NAAQS are based on a 3-year average of sub-maximum concentrations, while the model only predicts maximum concentrations over a construction duration of less than 2 years.

Although the Project would emit GHGs during construction, the emissions would be temporary, occurring over a period of less than 2 years. GHG emissions from operation of the additional equipment that expanded the substations would be negligible. The maximum annual GHG emissions from Project construction would represent approximately 0.001 percent of annual U.S. energy-related emissions, an insignificant additional contribution.

3.2.2 Earth Resources

Issues raised by the public and agencies during Project scoping and preparation of the EIS related to potentially significant effects on earth resources include geologic hazards that could result in potential risks to Project construction or operation, soil disturbance and increased erosion resulting from construction activities, and conflicts with authorized mineral operations.

Geologic Hazards

Geologic hazards generally consist of Quaternary faults, seismicity (earthquakes), liquefaction, steep terrain, and landslide susceptibility. Earthquakes are the surface expression of large energy releases that result from motion along faults. Quaternary faults are considered active and, therefore, are likely to have earthquakes occur along their length in the future. The U.S. Geological Survey (USGS) measures seismicity as the probability an area would be affected by a damaging earthquake. It is measured as the probability of a certain degree of ground-shaking in terms of the percentage of acceleration due to gravity (9.8 square meters per second) (Peterson et al. 2008). Liquefaction occurs in areas where soils are fully saturated with water and experience ground-shaking as a result of an earthquake, which is capable of causing great damage to structures in the area. Landslides are the downward and outward movement of earth materials on a slope through the falling, sliding, or flowing of rock or soil that is a result of slope failure (Radbruch-Hall et al. 1982). The slope-failure is a result of ground saturation and/or ground shaking. In the Basin and Range Province, air-fall tuff and shale are the rocks most commonly involved in

landsliding (Radbruch-Hall et al. 1982). Landsliding is especially common where tuff and shale are capped by more resistant rocks, which creates steep slopes.

In accordance with the NESC, the Proponent is required to consider the potential for seismic activity in the design of transmission structures and facilities and must construct the transmission structures and substation facilities to withstand seismic forces. Further, avoidance of geologic hazards and engineering constraints were criteria in the Proponent's feasibility study to identify general corridors where transmission lines could be sited and constructed (GeoEngineers 2007).

Mineral Resources

Mineral resources typically are divided into three broad categories: (1) locatable, (2) leasable, and (3) salable mineral resources. Locatable minerals include a broad category of economically important minerals that include precious and base metals, such as gold, silver, and lead; fissionable products, such as uranium; and industrial minerals. Locatable resources also include rocks that bear precious stones, such as diamonds or sapphires. Leasable resources typically are extracted for use in energy production and include oil, natural gas, coal, and geothermal deposits. Leasable mineral resources on federal lands require a lease of set duration with the government. Salable mineral resources typically are used for construction and industrial purposes and include sand, gravel, stone, pumice, and cinders. Salable mineral resources may be acquired from federally owned or controlled lands via a permit or contract, or through small-scale collection, such as recreational rock collecting.

NEPA and FLPMA serve as the primary federal legislation requiring assessment and mitigation of potential impacts on mineral resources when considering proposals for major federal actions on federally administered lands.

Soil Resources

Soil is defined as a "relatively thin, unconsolidated layer of mineral type horizons located upon the earth's crust." The soil profile usually acquires its unique properties as a direct result of physical and chemical weathering along with the biological alteration of its geologic source materials; in addition, the actual process of soil formation includes a contribution by factors such as climate and topography, along with the simple recognition – that, all soils continue to form over time" (Smith 2005). In addition to the requirements of NEPA and FLPMA, the Farmland Protection Policy Act of 1981 requires the assessment of impacts on farmlands from proposed conversion of farmlands to nonagricultural uses.

3.2.2.1 Regional Setting

Geologic Hazards

The Project is located along the eastern margin of the Basin and Range Physiographic Province, a physiographic region characterized by mostly parallel, north-south trending mountain ranges separated by desert basins and valleys (Fenneman 1931). The Basin and Range Physiographic Province is bordered on its eastern margin by the Wasatch Mountains and the Colorado Plateau Physiographic Province. Geological units in the Project area range in age from Proterozoic to Cenozoic (refer to Table 3-51 in Section 3.2.7).

Geologic hazards are common in the Basin and Range Physiographic Province. The eastern portion of the Project area is located in a moderately seismically active region of Utah, which is associated with the transition zone between the Basin and Range and Colorado Plateau physiographic provinces. This area is located within an area designated by USGS as seismic zone 3, which means the area has a 1 in 10 chance an earthquake with an active peak acceleration level of 0.03 g (3/100 the acceleration of gravity) will occur within the next 50 years, which translates to 5.5 to 5.9 on the Richter scale. This level of seismicity is due to the many Quaternary faults present along the eastern border of the Basin and Range Physiographic Province. These Quaternary faults are scattered throughout the Project area, with some faults being crossed multiple times by alternative routes. A total of 1,799 earthquakes have been recorded within the Project area between 1962 and 2001, ranging in magnitude between 0.1 and 5.2 on the Richter scale. A 5.2-magnitude earthquake occurred in 1967. The epicenter is located in the Marysvale area (University of Utah Seismograph Stations 1967), about 7 miles from the study corridor.

There are numerous areas of landslide susceptibility in the Project area. The areas with the highest concentration of high landslide susceptibility occur in the Richfield and Sulphurdale areas. Historically, most mapped landslides within the Project area are located in an area extending from Richfield to west of the community of Sevier (Hardy 1991). Very few landslides have been mapped in the southern portion of the Project area. The Sevier River Valley was identified as an area that has a potential for liquefaction (Anderson et al. 1990), with the highest potential being located within a narrow band bordering either side of the Sevier River, which is associated with a region of shallow groundwater. The Sulphurdale-Cove Fort area was classified as having low potential for liquefaction due to its deeper groundwater and more dense deposits (Anderson et al. 1990).

Mineral Resources

Mineral resources occur throughout the Project area. A large number of oil and gas leases occur in the transition zone area between the Basin and Range and the Colorado Plateau physiographic provinces. Twenty mining districts are present throughout the Project area as shown in Table 3-16.

TABLE 3-16
MINING DISTRICTS IN THE PROJECT AREA

Mining District	Location	Mining Operations[1]
Iron Springs	West of Cedar City along the Iron and Granite mountains	Iron ore from replacement deposits in the Homestake Limestone of the Carmel Formation
Pinto	Southwest of the Iron Springs district	Iron; precious and base metals
Antelope Range	West of the Iron Springs district near Newcastle	Precious and base metals
Bull Valley	South of Enterprise	Iron
Beaver Lake Mountains	West of Milford	Precious and base metals
Rocky Range	West of Milford	Precious and base metals
Star	West of Milford	Precious and base metals
Bradshaw	North Minersville	Precious and base metals
Lincoln	North Minersville	Precious and base metals
Granite	East of Minersville	Combination of precious and base metals; miscellaneous metals
Roosevelt	North of Minersville	Precious and base metals
Fortuna	North of Minersville	Precious and base metals
Antelope Springs	Southeast of Black Rock	Precious and base metals
Gordon	Near Cove Fort	Precious and base metals

TABLE 3-16
MINING DISTRICTS IN THE PROJECT AREA

Mining District	Location	Mining Operations[1]
Newton	Between Manderfield and Marysvale	Precious and base metals; radioactive elements
Gold Mountain	Between Manderfield and Marysvale	Precious and base metals; radioactive elements
Henry	Between Manderfield and Marysvale	Precious and base metals; radioactive elements
Marysvale	Between Manderfield and Marysvale	Precious and base metals; radioactive elements
Ohio	Between Manderfield and Marysvale	Precious and base metals; radioactive elements
Mount Baldy	Between Manderfield and Marysvale	Precious and base metals; radioactive elements

SOURCES: Doelling and Tooker 1983; Ege 2005
NOTE: [1]Precious and base metals (gold, silver, lead, copper, and zinc); miscellaneous metals (antimony, beryllium, bismuth, manganese, mercury, molybdenum, tungsten, vanadium, etc.); and radioactive elements (uranium, thorium).

The Project area, located along the eastern margin of the Basin and Range Physiographic Province, west of the Colorado Plateau, does not have large oil and gas fields similar to those located in the Colorado Plateau or the Uinta Basin to the north. There are, however, several smaller oil fields present within the Project area. One such oil field is the newly discovered Covenant Oil Field, which is located east of Richfield and is expected to produce large amounts of oil. The Covenant Oil Field is in a fold structure of the Navajo Sandstone that is capped by the Arapien Shale (Sorkhabi 2007).

There are four areas with known geothermal resources occurring within the Project area: (1) Cove Fort-Sulphurdale geothermal area; (2) Roosevelt Hot Springs geothermal area; (3) Newcastle geothermal area; and (4) Monroe-Joseph geothermal area. In Beaver County, Utah, the geothermal resources have been linked to faults that are a result of both the Mesozoic Sevier Orogeny and the tectonic forces that created the Basin and Range Physiographic Province (Barker et al. 2002). The Cove Fort-Sulphurdale geothermal area has been investigated since the 1980s, in which the first power plant to use the local geothermal resources entered service in 1985 (Barker et al. 2002). It is believed a combination of complex geologic structures has localized the geothermal source in the Cove Fort-Sulphurdale area (Blackett and Wakefield 2002). The Roosevelt Hot Springs geothermal area is located west-southwest of the Cove Fort-Sulphurdale area. Production from the Roosevelt Hot Springs area is primarily from highly fractured Tertiary granitic and metamorphic rocks (Blackett and Wakefield 2002). Currently, a geothermal well field and electrical generation plant are operational in this area and within the Project area (Chiasson 2004). The Newcastle geothermal system is a result of thermal fluids rising from fracture zones along the Antelope Range that have created a geothermal aquifer (Blackett 2007).

Soils

The Project area includes the following physiographic subregions: salt deserts, shadscale-dominated saline basins, sagebrush basins and slopes, and woodland- and shrub-covered low mountains (Woods et al. 2001). The salt deserts and shadscale-dominated saline basins sub-regions typically exhibit clayey, poorly drained soils that may exhibit high concentrations of salt or alkaline deposits. The sagebrush basins and slopes sub-region is an intermediate zone that links the arid and largely flat salt deserts and shadscale-dominated saline basins with the wetter and more rugged woodland- and shrub-covered low mountains. The woodland- and shrub-covered low mountains sub-region exhibits shallow, well-drained, loamy, and neutral to slightly alkaline soils covered by woodlands or mountain brush at higher elevations.

3.2.2.2 Study Methodology

Inventory

Geologic Hazards

Information regarding geologic hazards was obtained from the scientific literature and discussions with resource specialists at the BLM, USFS, Utah Geological Survey, and University of Utah seismograph stations. Geological units within the Project area were identified from geological maps (Hintze 2003; Hintze et al. 2000; Rowley et al. 2005; Rowley et al. 2006). Fault data were compiled from USGS Atlas-Digital Library (USGS 2009a). Earthquake data between 1973 and the present were acquired from the National Earthquake Information Center (NEIC) (USGS-NEIC 2009). Seismicity data were obtained from the Geological Hazards Team at the USGS Earthquake Hazard Program (Peterson et al. 2008; USGS-NEIC 2009).

Mineral Resources

Areas with active mining claims, mining material sites, oil and gas leases, coal leases, and geothermal leases in the study corridors were identified using the BLM and USFS Geocommunicator service and LR2000 database (Geocommunicator-National Integrated Land System 2009). Additional information pertaining to mineral resources was obtained from other federal and state sources that include USGS, Utah Geological Survey, and Utah Department of Natural Resources (UDNR) Oil and Gas Mining Division.

Soil Resources

Information for the soil inventory was obtained primarily from the Natural Resources Conservation Service (NRCS) (Web Soil Survey and online Soil Data Mart) and the USFS, both of the USDA. Soils within the Project area were mapped by the NRCS at two different scales of resolution: (1) the smaller-scale State Soil Geographic Database (STATSGO) and (2) the larger-scale Soil Survey Geographic Database (SSURGO). Additional soil data were obtained from soil science staff at both the Fishlake and Dixie National Forests, including the Tushar-Pahvant Canyon Soil Survey Area #649. USFS soils data are similar in scale to the SSURGO-level surveys of the NRCS. Four SSURGO soil surveys are relevant to the study corridor and were referenced for information: (1) Beaver-Cove Fort Area Soil Survey, (2) Beaver County (Western Part) Soil Survey, (3) Iron-Washington Area Soil Survey, and (4) Washington County Area Soil Survey. If SSURGO or USFS data were unavailable for portions of the study corridor, smaller-scale data from the STATSGO database were used. These areas only include data for zones susceptible to wind erosion.

Impact Assessment and Mitigation Planning

Geologic Hazards

After compiling resource inventory for geologic hazards, the methodology for assessing the potential impacts on the Project from geologic hazards associated with implementation of the Project included (in order): (1) identifying the types of potential effects on the Project from geologic hazards; (2) developing criteria for assessing the intensity of potential effects on the Project from geologic hazards; (3) classifying the relative intensity of a potential effect (high, moderate, or low) on areas with the likelihood of a

geologic hazard occurring in the future; (4) assessing initial impacts on the Project; (5) identifying the appropriate selective mitigation measures (Table 3-3) for minimizing potential adverse effects; (6) determining specific areas where selective mitigation measures should be applied; and (7) disclosing potential residual impacts on the Project.

Types of Potential Effects by and to Geologic Hazards

The Project would not be anticipated to affect faults, earthquakes, or liquefaction. However, the Project could potentially contribute to destabilization of slopes or the re-activation of landslide deposits. Specific locations where geologic hazards could be affected are identified in the results section. Geologic hazards could directly or indirectly affect the construction, operation, and maintenance of the Project. Potential direct effects include direct loss of equipment or injury to personnel as a result of seismic activity or landslides, especially in steep terrain. Potential indirect effects on the operation of the Project could include indirect loss of transmission service as a result of seismic activity or landslides.

The construction of the Project could directly or indirectly affect areas with high and moderate landslide susceptibility. A potential direct effect includes the removal of soils and sediments in areas with moderate-high landslide susceptibility. A potential indirect effect is the removal of vegetation, which could affect slope stability.

Criteria for Assessing Intensity of Impacts

Criteria were developed to assess the intensity of a potential effect from a geologic hazard on the Project (Table 3-17). Quaternary faults were assigned a high level of intensity because they are considered active and capable of generating strong earthquakes in the near future. Inactive (pre-Quaternary) faults were assigned a moderate level of intensity because these faults could be reactivated in the distant future. Intensity for landsliding was based on areas with landslide susceptibility, previously mapped landslides, and steep slopes.

TABLE 3-17
CRITERIA FOR ASSESSING INTENSITY OF IMPACTS FROM GEOLOGIC HAZARDS

Intensity of Impacts	Description
High	▪ Areas with steep terrain (30 percent slope or greater) or high landslide susceptibility ▪ Areas where Quaternary faults (most recent and considered active) are present
Moderate	▪ Areas with moderately steep terrain (15 to 30 percent slope) or moderate landslide susceptibility ▪ Areas with pre-Quaternary faults (inactive) present
Low	▪ Areas without steep terrain (0 to 15 percent slope) having low landslide susceptibility

Effects Analysis

Assessment of Initial Impacts

The intensity of potential effects on geologic hazards that could result from implementation of the Project is used for assessing initial impacts of geologic hazards. Based on the intensity of potential effects on geologic hazards, initial impacts were assigned using the criteria presented in Table 3-17 and are presented in Table 3-18.

Mitigation Planning and Effectiveness

In addition to the design features of the Proposed Action included as part of the Project description in Chapter 2 (Table 2-6), cut and fill of slopes would be minimized to the extent possible (Mitigation Measure 3) during construction of access roads on slopes greater than 8 percent (i.e., Access Levels 4 and 5 [Table 2-7]) to reduce the risk of landslides and associated impacts on the Project facilities.

Residual Impacts

Table 3-18 summarizes the initial impacts based on the intensity of potential effects on geologic hazards, the selective mitigation measure applied to mitigate potentially adverse effects by geologic hazards, and residual impacts.

TABLE 3-18
SUMMARY OF INITIAL AND RESIDUAL IMPACTS BY AND FROM GEOLOGIC HAZARDS

Geologic Hazard	Initial Impact	Selective Mitigation Measures Applied	Residual Impact
Quaternary faults	High	None	Moderate
High landslide susceptibility	High	3	Moderate
Pre-Quaternary faults	Moderate	None	Low
Moderate landslide susceptibility	Moderate	3	Low

Mineral Resources

After compiling a resource inventory for mineral resources, the methodology for assessing the potential impacts on mineral resources associated with implementation of the Project included (in order): (1) identifying the types of potential effects on the mineral resources that could result from construction, operation, and maintenance of the proposed transmission line and associated facilities; (2) developing criteria for assessing the intensity of a potential effect on a mineral resource; (3) identifying the level of intensity of potential effects of the mineral resources; (4) assessing the initial impacts on mineral resources; and (5) identifying the appropriate selective mitigation measures (Table 3-3) for minimizing potential adverse effects; (6) determining specific areas where selective mitigation measures should be applied; and (7) disclosing potential residual impacts on the Project.

Types of Potential Environmental Effects

Locatable and salable mineral resources can be exposed at the surface, lie just below the surface, or be located several hundred feet below the surface. Oil and gas leases exist in a number of counties that could be crossed by the Project. Significant petroleum exploration, recovery, and transportation infrastructure exists, or could exist in the future. By avoiding existing oil and gas production facilities, the Project would not interfere with current oil and gas production in the Project area. Furthermore, the Project should not affect future oil or gas production because oil and gas deposits generally are located at depths of more than 1,000 feet.

Active mines and mining operations exist in a number of counties in the Project area. Avoidance of land use conflicts, such as mining operations and oil and gas production areas, where possible, was a criterion in the Proponent's engineering study to identify locations where transmission lines could be sited and

constructed. Where mining operations or mineral resources could not be avoided, the construction and maintenance of the Project could have direct effects on mineral resources that include the following:

- Loss of mineral resources caused by construction activities
- Limiting development and extraction of mineral resources resulting from the presence of permanent facilities (permanent)

There would be no indirect effects on mineral resources as a result of implementation of the Project.

Criteria for Assessing Intensity of Impacts

Criteria were developed to assess the intensity of a potential effect on a mineral resource associated with implementation of the Project (Table 3-19). Criteria developed to assess the intensity of impacts on mineral resources were based on the type of mineral resource and any activities associated with the mineral resource.

TABLE 3-19
CRITERIA FOR ASSESSING INTENSITY OF IMPACTS ON MINERAL RESOURCES

Intensity of Impacts	Description
High	▪ Areas with active mines or mining claims ▪ Areas with oil or gas wells ▪ Areas with mineral resources
Moderate	▪ Areas with geothermal resources or producing geothermal leases ▪ Oil and gas leases and coal leases ▪ Mineral leases
Low	▪ No known mineral resources

Effects Analysis

Assessment of Initial Impacts

The intensity of potential effects on mineral resources that could result from implementation of the Project are the basis for assessing initial impacts on mineral resources. The initial impacts were assigned using the criteria presented in Table 3-19.

Mitigation Planning and Effectiveness

In addition to the design features of the Proposed Action in Chapter 2 (Table 2-6), selective mitigation measures were developed to minimize or avoid potential high and moderate impacts on mineral resources (Table 3-3). These measures include avoidance of active or potential mines, oil and gas leases and producing wells, and areas with geothermal agreements, leases or producing wells (Mitigation Measure 2), where feasible. If avoidance of active mines were not feasible, the active mines would be spanned (Mitigation Measure 7).

Residual Impacts

Table 3-20 summarizes the initial impacts based on the intensity of a potential effect on mineral resources, the selective mitigation measures applied to mitigate potentially high and moderate adverse effects on those mineral resources, and residual impacts.

TABLE 3-20
SUMMARY OF INITIAL IMPACTS AND RESIDUAL IMPACTS ON MINERAL RESOURCES

Mineral Resource	Initial Impact	Selective Mitigation Measures Applied	Residual Impact
Active mine	High	2, 7	Low
Geothermal agreements, leases, and producing wells	Moderate	2	Low
Oil and gas leases	Moderate	2	Low
Potential mines	Moderate	2	Low

Soil Resources

After compiling the resource inventory for soil resources, the methodology for assessing the potential impacts of the Project on soil resources included (in order): (1) identifying the types of potential effects on soil resources from the Project; (2) developing criteria for assessing the intensity of potential effects on soil resources; (3) classifying the relative intensity of potential effects (high, moderate, or low) of areas to accelerated erosion by water or wind and the conversion of designated Prime and Unique Farmlands soils to nonagricultural uses; (4) assessing initial impacts on soil resources; (5) identifying the appropriate selective mitigation measures (Table 3-3) for minimizing potential adverse effects; (6) determining specific areas where selective mitigation measures should be applied; and (7) disclosing potential residual impacts on soil resources.

Types of Potential Environmental Effects

The construction, operation, and maintenance of the Project would result in both direct and indirect adverse effects on soil resources. Direct effects associated with construction activities could include the following:

- Accelerated soil erosion in areas where construction-related activities have disturbed or altered the land surface by exposing soils (temporary)
- Accelerated soil erosion in areas where construction-related activities have altered the contours of the land surface (temporary)
- Loss of designated Prime and Unique Farmland soils (i.e., conversion to nonagricultural uses) (permanent)
- Compaction of soil resources in tower sites and along new access roads (permanent and temporary)

Direct effects associated with the operation and maintenance of the transmission line and ancillary facilities, as well as the presence of the transmission line, would include continued soil compaction along permanent Project-related access roads to be used for annual maintenance and inspection.

Indirect effects associated with the construction, operation, and maintenance of the Project could include the following:

- Construction of permanent access roads, which could be used by the general public to access currently inaccessible areas, potentially resulting in accelerated rates of erosion by water or wind (permanent)
- Degradation of the land surface and loss of soils resulting from accelerated soil erosion (temporary to permanent)
- Loss of soil productivity and negative impacts on water quality if sediment is washed into nearby streams and lakes (temporary)

Potential impacts on erodible soils on steep slopes were analyzed relative to gradual slopes and flat land. New or expanded access roads on steep slopes would have greater potential impacts on erodible soils than existing access roads on gradual or flat slopes. The potential for greater impacts would result in more extensive implementation of mitigation measures in these areas.

Compaction and puddling are soil disturbances that result in the loss of soil structure, possibly leading to a decrease in water infiltration rates, soil loss, or environmental degradation (e.g., the establishment of noxious weeds in disturbed areas). Overland movement of construction equipment during moist conditions is the primary cause of soil compaction or puddling. However, compaction also could occur where new access roads are constructed and at tower sites. Compaction of soils would be mitigated where access roads are temporary but could remain on permanent access roads and at tower sites. Furthermore, reducing vegetation cover (i.e., vegetation clearing) in the right-of-way could increase soil temperatures resulting in reduced soil productivity. However, retaining vegetation less than 25 feet in height within parts of the right-of-way would reduce the intensity of this impact. Overall, soil compaction and puddling would be mitigated by design features of the Project for environmental project and mitigation measures to be included as requirements in the POD, including soil tillage, limiting movement of construction equipment over moist soils, limited vegetation clearing, and use of agency-approved herbicides under direction of agency-issued Pesticide Use Permits.

Criteria for Assessing Intensity of Impacts

Criteria were developed to assess the intensity of a potential effect on soil resources associated with implementation of the Project (Table 3-21). Criteria developed to assess the intensity of impacts on soil resources were based on susceptibility of soils to water and wind erosion and potential impact on designated Prime and Unique Farmland.

Soil susceptibilities to water and wind erosion were assessed based on standards from the NRCS. Soils assigned a K_w (numerical factor for a the whole soil's susceptibility to water erosion) value of 0.40 or higher have a high susceptibility to water erosion; whereas, soils assigned a K_w value between 0.20 and 0.40 have a moderate susceptibility to water erosion, and soils assigned a K_w value below 0.20 have a low susceptibility to water erosion. The susceptibility of a soil to wind erosion is based on its assignment to a Wind Erodibility Group. Soils assigned to Wind Erodibility Group 1 or 2 are highly susceptible to wind erosion; soils assigned to Wind Erodibility Groups 3, 4, or 4L have a moderate susceptibility to wind erosion; soils assigned to Wind Erodibility Groups 5, 6, and 7 have a low susceptibility to wind erosion; and soils assigned to Wind Erodibility Group 8 are not susceptible to wind erosion.

TABLE 3-21 CRITERIA FOR ASSESSING INTENSITY OF IMPACTS ON SOIL RESOURCES	
Intensity of Impacts	**Description**
High	▪ Disturbance of land surface where soils exhibit high susceptibility to erosion by water or wind ▪ Improvement of existing roads in areas where soils exhibit high susceptibility to erosion by water or wind ▪ Construction of new access roads across designated Prime and Unique Farmland
Moderate	▪ Disturbance of land surface where soils exhibit moderate susceptibility to erosion by water or wind ▪ Improvement of existing roads in areas where soils exhibit moderate susceptibility to erosion by water or wind
Low	▪ Disturbance of land surface where soils exhibit low to no susceptibility to erosion by water or wind ▪ Use of existing roads

Effects Analysis

Assessment of Initial Impacts

The intensity of a potential effect on soil resources that could result from implementation of the Project is used for assessing initial impacts. The initial impacts were assigned using the criteria presented in Table 3-21.

Mitigation Planning and Effectiveness

In addition to the design features of the Proposed Action in Chapter 2 (Table 2-6), mitigation measures (Table 3-3) would be applied to all areas of potential high and moderate (initial) impacts on soils and designated Prime and Unique Farmland, where feasible, to reduce impacts. Mitigation measures applied to reduce impacts on soil resources are summarized in Table 3-22 and described in this section.

Existing access roads or trails would not be widened or otherwise improved for construction or maintenance (Mitigation Measure 1) in areas where soils are moderately to highly susceptible to accelerated erosion (e.g., Link 165 northwest of Cedar City) or where designated Prime and Unique Farmland are crossed by the Project. This measure would limit new disturbance associated with construction and maintenance of the Project in previously undisturbed areas, which would minimize exposure of soils highly or moderately susceptible to wind or water erosion.

There would be no blading of new access roads (Mitigation Measure 2) in areas where Project-related activities could affect designated Prime and Unique Farmland soils (e.g., Link 350 west of Cove Fort).

New access roads and overland access routes in areas where soils could be moderately or highly susceptible to soil erosion (i.e., in moderately rolling or steep terrain; applied to slopes greater than 3 percent) would be aligned to follow the landform contours where practicable (Mitigation Measure 3) to reduce associated soil erosion by maintaining the natural land contours and thereby limiting the rate of water runoff.

Tower structures would be located to span designated Prime and Unique Farmland (Mitigation Measure 7) to minimize irreversible conversion of agricultural lands to nonagricultural uses by limiting the number of tower sites located on designated Prime and Unique Farmland.

Where no grading would be needed to access work areas, overland access (Mitigation Measure 13) would be used to the extent possible in areas where soils would be moderately to highly susceptible to accelerated erosion and in designated Prime and Unique Farmland, which would avoid or minimize the removal of surface soil and vegetation and limit the exposure of soils susceptible to wind and water erosion.

Residual Impacts

Table 3-22 summarizes the initial impacts based on the intensity of potential effects on soil resources, the selective mitigation measures applied to mitigate potentially adverse impacts on soil resources, and residual impacts. A description of residual impacts by alternative route is provided in Section 3.2.2.3.

TABLE 3-22
SUMMARY OF INITIAL IMPACTS AND RESIDUAL IMPACTS ON SOIL RESOURCES

Soil Resource	Initial Impact	Selective Mitigation Measures Applied	Residual Impact
Soils with a high susceptibility to water erosion	High	1, 3, 13	Moderate
Soils with a high susceptibility to wind erosion	High	1, 3, 13	Moderate
Soils designated Prime and Unique Farmland	High	1, 2, 7, 13	Moderate
Soils with a moderate susceptibility to water erosion	Moderate	1, 3, 13	Low
Soils with a moderate susceptibility to wind erosion	Moderate	1, 3, 13	Low
Soils with a low susceptibility to water or wind erosion	Low	None	Low
Soils not designated Prime and Unique Farmland	Low	None	Low

3.2.2.3 Results

A summary of baseline resource inventory and results of the effects analysis for geologic hazards, mineral resources, and soils are presented in Tables 3-23 to 3-28 and described in this section. The description of residual impacts should be reviewed in conjunction with the resource inventory maps in Volume II. Table 2-11 presents a comparison of results of the effects analysis for the alternative routes, and Table 2-12 presents a summary of the information presented in Table 2-11.

No Action Alternative

Under this alternative, the environment would remain as it presently exists.

Northern Area - Sigurd Substation to South of the Black Mountains

The geologic hazards crossed, mineral resources crossed, baseline resource inventory, and residual impacts for alternative routes considered in the northern area are presented in Tables 3-23, 3-24, and 3-25.

TABLE 3-23
GEOLOGIC HAZARDS CROSSED BY NORTHERN ALTERNATIVE ROUTES

Alternative Routes	Quaternary Faults	Landslide Susceptibility	Seismicity (peak ground acceleration)
Alternative N1	15	Low to high	50 to 90
Alternative N2	15	Low to high	50 to 90
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	15	Low to High	50 to 90
Alternative N3	17	Low to high	50 to 90
Alternative N4	19	Low to high	50 to 90
Alternative N5	12	Low to high	50 to 90
Alternative N6 (Proponent's Preferred Alternative)	11	Low to high	50 to 90

TABLE 3-24
MINERAL RESOURCES CROSSED BY NORTHERN ALTERNATIVE ROUTES

Alternative Routes	Existing Mining Operations	Number of Potential Mines[1]	Geothermal Resources[2]	Oil and Gas Leases
Alternative N1	48	4	2	46
Alternative N2	54	4	2	46
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	54	4	2	46
Alternative N3	48	4	4	40
Alternative N4	51	6	5	46
Alternative N5	45	6	6	40
Alternative N6 (Proponent's Preferred Alternative)	45	6	10	40

NOTES:
[1]Potential mines are areas that have identified mineral resources but have not yet been mined.
[2]Leases and producing wells

Alternative N1 – Black Rock Road to IPP North of Milford Wind Farm

Affected Environment

Geologic Hazards

Alternative N1 crosses 15 Quaternary faults over a total distance of 3.7 miles (Table 3-23 and MV-2). Seismicity along the alternative route ranges from 50 to 90 peak ground acceleration (PGA) (percent of gravity). Alternative N1 also crosses about 3.3 miles of area with high landslide susceptibility. Also, about 7.0 miles of the route would be located on slopes greater than 30 percent and 11.6 miles on slopes between 15 and 30 percent.

Mineral Resources

Alternative N1 crosses 48 mines and mining claims, no authorized geothermal agreements, 2 producing geothermal leases, 46 oil and gas leases, and 4 potential mining areas (Table 3-24 and MV-3). No existing oil and gas production areas would be affected by this alternative route.

TABLE 3-25
ALTERNATIVE ROUTE COMPARISON
FOR EARTH RESOURCES INVENTORY DATA AND RESIDUAL IMPACTS BY NORTHERN ALTERNATIVE ROUTES

Alternative Route	Total Miles	Geologic Hazards (miles)									Mineral Resources (miles)			Soil (miles)									Residual Impacts (miles [percent])											
			Percent of Slope				Landslide Susceptibility							Unique Farmland			Water Erosion			Wind Erosion			Geologic Hazards				Mineral Resources				Soil Resources			
		Faults	0 to 8	8 to 15	15 to 30	Greater than 30	None	Low	Moderate	High	High	Moderate	Low	High	Moderate	Low	High	Moderate	Low	High	Moderate	Low	No Identifiable	Low	Moderate	High	No Identifiable	Low	Moderate	High	No Identifiable	Low	Moderate	High
Alternative N1	120.6	3.7	90.8	11.2	11.6	7.0	101.0	3.0	13.3	3.3	6.6	18.0	96.0	5.3	–	115.3	14.1	43.3	63.2	–	68.3	52.3	97.7 [81.0]	19.3 [16.0]	3.6 [3.0]	–	96.0 [79.6]	19.5 [16.2]	5.1 [4.2]	–	–	102.2 [84.8]	18.4 [15.2]	–
Alternative N2	120.4	4.1	86.8	14.8	11.8	7.0	100.0	3.0	14.1	3.3	7.0	21.1	92.3	4.7	–	115.7	16.5	46.2	57.7	6.4	69.5	44.5	96.3 [80.0]	20.5 [17.0]	3.6 [3.0]	–	92.3 [76.7]	22.6 [18.8]	5.5 [4.5]	–	–	93.8 [77.9]	26.6 [22.1]	–
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	120.0	4.4	85.5	15.3	12.1	7.1	99.6	3.0	14.1	3.3	8.0	20.2	91.8	4.7	–	115.3	16.5	46.8	56.7	6.5	69.7	43.8	95.5 [79.6]	20.9 [17.4]	3.6 [3.0]	–	91.8 [76.5]	21.8 [18.2]	6.4 [5.3]	–	–	93.3 [77.8]	26.7 [22.1]	–
Alternative N3	117.2	5.0	79.5	17.6	13.0	7.1	95.5	3.9	14.5	3.3	5.9	24.7	86.6	5.5	–	111.7	7.9	48.1	61.2	15.8	43.7	57.7	90.9 [77.5]	22.7 [19.4]	3.6 [3.1]	–	86.6 [73.9]	26.2 [22.4]	4.4 [3.7]	–	–	89.0 [76.0]	28.2 [24.0]	–
Alternative N4	109.4	3.2	72.4	14.3	14.7	8.0	87.8	4.2	14.1	3.3	6.4	21.7	81.3	0.7	–	108.7	13.9	45.5	50.0	4.9	55.9	48.6	85.0 [77.7]	20.8 [19.0]	3.6 [3.3]	–	81.3 [74.3]	22.8 [20.8]	5.3 [4.9]	–	–	90.0 [82.3]	19.4 [17.7]	–
Alternative N5	106.2	4.1	65.1	17.1	15.9	8.1	83.3	5.1	14.5	3.3	5.3	25.3	75.6	1.5	–	104.7	5.3	47.4	53.5	14.3	30.1	61.8	79.6 [75.0]	23.0 [21.6]	3.6 [3.4]	–	75.6 [71.2]	26.4 [24.9]	4.2 [3.9]	–	–	85.2 [80.2]	21.0 [19.8]	–
Alternative N6 (Proponent's Preferred Alternative)	105.4	4.2	60.7	18.2	17.8	8.7	81.6	5.2	15.3	3.3	5.6	26.0	73.8	0.8	–	104.6	5.4	44.8	55.2	15.5	28.7	61.2	77.9 [73.9]	23.9 [22.7]	3.6 [3.4]	–	73.8 [70.0]	27.1 [25.7]	4.5 [4.3]	–	–	83.8 [79.5]	21.6 [20.5]	–

Soil Resources

Alternative N1 crosses 5.3 miles of lands designated as Prime and Unique Farmland (MV-4). This alternative also crosses 14.1 miles of soils highly susceptible to water erosion and 43.3 miles of soils moderately susceptible to water erosion. There are no soils highly susceptible to wind erosion along Alternative N1. This alternative crosses 68.3 miles of soils moderately susceptible to wind erosion.

Environmental Effects

Geologic Hazards

Following the implementation of design features of the Proposed Action (Table 2-6) and Mitigation Measure 3 (Table 3-3) along Alternative N1, the alternative route crosses 3.6 miles of areas that could pose moderate impacts on the Project and 19.3 miles of areas that could pose low impacts on the Project due to geologic hazards (Table 3-25 and MV-2). Moderate impacts could include loss of equipment, interruption of power, or personal injury. Low-to-moderate impacts include Quaternary faults along Links 30, 33, 45, 63, 66, 305, 320, 350, 360, 155, and 160, and low-to-moderate landslide susceptibility along Links 30, 33, 45, 63, 64, and 66.

Mineral Resources

Following the implementation of design features of the Proposed Action and Mitigation Measures 2 and 7 (Table 3-3) along Alternative N1, there would be 5.1 miles of moderate impacts and 19.5 miles of low impacts on mineral resources (Table 3-25 and MV-3). High impacts could include potential impacts on a mine along Link 381 and moderate impacts could include potential impacts on mines and geothermal resources along Links 45, 66, 381.

Soil Resources

Under this alternative, the primary impact would be on soils susceptible to wind erosion, primarily those associated with the Escalante Desert. Following the implementation of Mitigation Measures 1, 2, 3, 7, and 13 (Table 3-3), there would be 18.4 miles of moderate impacts and 102.2 miles of low impacts (Table 3-23 and MV-4). Moderate impacts on designated Prime and Unique Farmland could include irreversible conversion of these soils to nonagricultural uses along Links 305, 330, 350, and 360. Moderate impacts on soils would include potential acceleration of water erosion along Links 305, 320, 330, 350, 360, 155, and 160. Accelerated erosion could result in temporary to permanent loss of soil material.

Alternative N2 – Black Rock Road to IPP South of Milford Wind Farm

Affected Environment

Geologic Hazards

Alternative N2 crosses 15 Quaternary faults, totaling about 4.1 miles (Table 3-23 and MV-2). Along the alternative route, seismicity ranges between 50 and 90 PGA (percent of gravity). Alternative N2 also crosses about 3.3 miles of areas with high landslide susceptibility. There are also 7.0 miles with slopes greater than 30 percent and 11.8 miles with slopes between 15 and 30 percent.

Mineral Resources

Alternative N2 crosses 54 mines and mining claims, no authorized geothermal agreements, 2 producing geothermal leases, 46 oil and gas leases, and 4 potential mining areas (Table 3-24 and MV-3).

Soil Resources

Alternative N2 crosses 4.7 miles of lands designated as Prime and Unique Farmland (MV-4). This alternative also crosses 16.5 miles of soils highly susceptible to water erosion and 46.2 miles of soils moderately susceptible to water erosion. This alternative also crosses 6.4 miles of soils highly susceptible to wind erosion and 69.5 miles of soils moderately susceptible to wind erosion.

Environmental Effects

Geologic Hazards

Following the implementation of design features of the Proposed Action (Table 2-6) and Mitigation Measure 3, (Table 3-3) along Alternative N2, the alternative crosses 3.6 miles of areas that could pose moderate impacts on the Project and 20.5 miles of areas that could pose low impacts on the Project due to geologic hazards (Table 3-25 and MV-2). Moderate impacts could include loss of equipment, interruption of power, or personal injury. Low-to-moderate impacts include Quaternary faults along Links 30, 33, 45, 63, 66, 305, 320, 350, 155, and 160, and low-to-moderate landslide susceptibility along Links 30, 33, 45, 63, 64, 66, 345, and 450.

Mineral Resources

Following the implementation of design features of the Proposed Action and Mitigation Measures 2 and 7 (Table 3-3) along Alternative N2, there would be 5.5 miles of moderate impacts and 22.6 miles of low impacts on mineral resources (Table 3-25 and MV-3). High impacts could include potential impacts on a mine along Link 381, and moderate impacts could include potential impacts on mines and geothermal resources along Links 45, 66, and 381.

Soil Resources

Under this alternative, the primary impact would be on soils susceptible to wind erosion primarily those associated with the Escalante Desert. Following the implementation of Mitigation Measures 1, 2, 3, 7, and 13 (Table 3-3), there would be 26.6 miles of moderate impacts and 93.8 miles of low impacts (Table 3-25 and MV-4). Moderate impacts on designated Prime and Unique Farmland could include irreversible conversion of these soils to nonagricultural uses along Links 305, 330, and 350. Moderate impacts on soils would include potential acceleration rates of wind erosion along Links 345, 450, 385, 386, and 381, and acceleration of water erosion along Links 305, 320, 330, 350, 345, 385, 155, and 160. Accelerated erosion could result in temporary to permanent loss of soil material.

Alternative N2-A (Route Variation of Alternative N2) – Black Rock Road to IPP South of Milford Wind Farm 1,500 Feet East of Kern River Pipeline (Agency Preferred Alternative)

Affected Environment

Geologic Hazards

Alternative N2-A crosses 15 Quaternary faults, totaling about 4.4 miles (Table 3-23 and MV-2). Along the alternative route, seismicity ranges between 50 and 90 PGA (percent of gravity) along the route. Alternative N2-A also crosses about 3.3 miles of areas with high landslide susceptibility. There are also 7.1 miles with slopes greater than 30 percent and 12.1 miles with slopes between 15 and 30 percent.

Mineral Resources

Alternative N2-A crosses 54 mines and mining claims, no authorized geothermal agreements, 2 producing geothermal leases, 46 oil and gas leases, and 4 potential mining areas (Table 3-24 and MV-3).

Soil Resources

Alternative N2-A crosses 4.7 miles of lands designated as Prime and Unique Farmland (MV-4). This alternative also crosses 16.5 miles of soils highly susceptible to water erosion and 46.8 miles of soils moderately susceptible to water erosion. This alternative also crosses 6.5 miles of soils highly susceptible to wind erosion and 69.7 miles of soils moderately susceptible to wind erosion.

Environmental Effects

Geologic Hazards

Following the implementation of design features of the Proposed Action (Table 2-6) and Mitigation Measures 3, (Table 3-3) along Alternative N2-A, the alternative route crosses 3.6 miles of areas that could pose moderate impacts on the Project and 20.9 miles of areas that could pose low impacts on the Project due to geologic hazards (Table 3-23 and MV-2). Moderate impacts could include loss of equipment, interruption of power, or personal injury. Low-to-moderate impacts include Quaternary faults along Links 30, 33, 45, 63, 66, 305, 320, 350, 155, and 160, and low-to-moderate landslide susceptibility along Links 30, 33, 45, 63, 64, 66, 345, and 450.

Mineral Resources

Following the implementation of design features of the Proposed Action and Mitigation Measures 2 and 7 (Table 3-3) along Alternative N2-A, there would be 6.4 miles of moderate impacts and 21.8 miles of low impacts on mineral resources (Table 3-24 and MV-3). Moderate impacts could include potential impacts on a mine along Link 381, and on mines and geothermal resources along Links 45, 66, 348, 381.

Soil Resources

Under this alternative, the primary impact of concern would be on soils susceptible to wind erosion, primarily those associated with the Escalante Desert. Following the implementation of Mitigation Measures 1, 2, 3, 7, and 13 (Table 3-3), there would be 26.7 miles of moderate impacts and 93.3 miles of low impacts (Table 3-25 and MV-4). Moderate impacts on designated Prime and Unique Farmland could include irreversible conversion of these soils to nonagricultural uses along Links 305, 330, and 350. Moderate residual impacts on soils would include potential acceleration of wind erosion along Links 345, 455, 385, 386, and 381, and acceleration of water erosion along Links 305, 320, 330, 350, 345, 385, 155, and 160. Accelerated erosion could result in temporary to permanent loss of soil material.

Alternative N3 – Black Rock Road Parallel to Kern River Pipeline

Affected Environment

Geologic Hazards

Alternative N3 crosses 17 Quaternary faults, totaling about 5.0 miles (Table 3-23 and MV-2). Seismicity ranges between 50 and 90 PGA (percent of gravity) along the route. Alternative N3 also crosses about 3.3 miles of areas with high landslide susceptibility. There are also 7.1 miles with slopes greater than 30 percent and 13.0 miles with slopes between 15 and 30 percent.

Mineral Resources

Alternative N3 crosses 48 mines and mining claims, 2 authorized geothermal agreements, 2 producing geothermal leases, 40 oil and gas leases, and 4 potential mining areas (Table 3-24 and MV-3).

Soil Resources

Alternative N3 crosses 5.5 miles of lands designated as Prime and Unique Farmland (MV-4). This alternative also crosses 7.9 miles of soils highly susceptible to water erosion and 48.1 miles of soils moderately susceptible to water erosion. This alternative also crosses 15.8 miles of soils highly susceptible to wind erosion and 43.7 miles of soils moderately susceptible to wind erosion.

Environmental Effects

Geologic Hazards

Following the implementation of design features of the Proposed Action and Mitigation Measure 3 (Table 3-3) along Alternative N3, the alternative route crosses 3.6 miles of areas that could pose moderate impacts on the Project and 22.7 miles of areas that could pose low impacts on the Project due to geologic hazards (Table 3-25 and MV-2). Moderate impacts could include loss of equipment, interruption of power, or personal injury. Low-to-moderate impacts include Quaternary faults along Links 30, 33, 45, 63, 66, 305, 320, 350, 470, 490 and high landslide susceptibility along Links 30, 33, 45, 63, 64, 66, 345, and 450.

Mineral Resources

Active mines and oil and gas wells are considered to have high initial impacts. Geothermal agreements, producing geothermal leases, oil and gas leases, and potential mining areas are considered to have moderate initial impacts. Following the implementation of design features of the Proposed Action and Mitigation Measures 2 and 7 (Table 3-3) along Alternative N3, there would be 4.4 miles of moderate impacts and 26.2 miles of low impacts on mineral resources (Table 3-25 and MV-3). Moderate and low impacts could include potential impacts on mines and geothermal resources along Links 45 and 66.

Soil Resources

Under this alternative, the primary impact of concern would be on soils susceptible to water erosion in mountainous areas and those susceptible to wind erosion, primarily those associated with the Escalante Desert. Following the implementation of Mitigation Measures 1, 2, 3, 7, and 13 (Table 3-3), there would be 28.2 miles of moderate impacts and 89.0 miles of low impacts (Table 3-25 and MV-4). Moderate impacts on designated Prime and Unique Farmland could include irreversible conversion of these soils to nonagricultural uses along Links 305, 330, and 350. Moderate impacts on soils would include potential acceleration of wind erosion along Links 345, 450, 460, 470, and 475 and acceleration of water erosion along Links 305, 320, 330, 350, 345, 475, and 397. Accelerated erosion could result in temporary to permanent loss of soil material.

Alternative N4 – Mineral Mountains to IPP South of Milford Wind Farm

Affected Environment

Geologic Hazards

Alternative N4 crosses 19 Quaternary faults, totaling about 3.2 miles (Table 3-23 and MV-2). Seismicity ranges between 50 and 90 PGA (percent of gravity) along the route. Alternative N4 also crosses about 3.3 miles of areas with high landslide susceptibility. There are also 8.0 miles with slopes greater than 30 percent and 14.7 miles with slopes between 15 and 30 percent.

Mineral Resources

Alternative N4 crosses 51 mines and mining claims, 2 authorized geothermal agreements, 3 producing geothermal leases, 46 oil and gas leases, and 6 potential mining areas (Table 3-24 and MV-3).

Soil Resources

Alternative N4 crosses 0.7 mile of land designated as Prime and Unique Farmland (MV-4). This alternative also crosses 13.9 miles of soils highly susceptible to water erosion and 45.5 miles of soils moderately susceptible to water erosion. This alternative also crosses 4.9 miles of soils highly susceptible to wind erosion and 55.9 miles of soils moderately susceptible to wind erosion.

Environmental Effects

Geologic Hazards

Following the implementation of design features of the Proposed Action and Mitigation Measure 3 (Table 3-3) along Alternative N4, the alternative route crosses 3.6 miles of areas that could pose moderate impacts on the Project and 20.8 miles of areas that could pose low impacts from geologic hazards (Table 3-25 and MV-2). Moderate impacts could include loss of equipment, interruption of power, or personal injury. Low-to-moderate impacts include Quaternary faults along Links 30, 33, 45, 63, 66, 68, 75, 155, 160 and low-to-moderate landslide susceptibility along Links 30, 33, 45, 63, 64, 66, and 75.

Mineral Resources

Active mines and oil and gas wells are considered to have high initial impacts. Geothermal agreements, producing geothermal leases, oil and gas leases, and potential mining areas are considered to have moderate initial impacts. Following the implementation of design features of the Proposed Action and Mitigation Measures 2 and 7 (Table 3-3) along Alternative N4, there would be 5.3 miles of moderate impacts and 22.8 miles of low impacts on mineral resources (Table 3-25 and MV-3). High impacts could include potential impacts on a mine along Link 381, and moderate impacts could include potential impacts on mines and geothermal resources along Links 45, 66, and 381.

Soil Resources

Under this alternative, the primary impact of concern would be on soils susceptible to wind erosion, primarily those associated with the Escalante Desert. Following the implementation of Mitigation Measures 1, 2, 3, 7, and 13 (Table 3-3), there would be 19.4 miles of moderate impacts and 90.0 miles of low impacts (Table 3-25 and MV-4). Moderate impacts on designated Prime and Unique Farmland could include irreversible conversion of these soils to nonagricultural uses along Link 75. Moderate impacts on soils would include potential acceleration of wind erosion along Links 385 and 386 and acceleration of water erosion along Links75, 385, 155, and 160. Accelerated erosion could result in temporary to permanent loss of soil material.

Alternative N5 – Mineral Mountains Parallel to Kern River Pipeline

Affected Environment

Geologic Hazards

Alternative N5 crosses 12 Quaternary faults, totaling about 4.1 miles (Table 3-23 and MV-2). Seismicity ranges between 50 and 90 PGA (percent of gravity) along the route. Alternative N5 also crosses about 3.3 miles of areas with high landslide susceptibility. There are also 8.1 miles with slopes greater than 30 percent and 15.9 miles with slopes between 15 and 30 percent.

Mineral Resources

Alternative N5 crosses 45 mines and mining claims, 4 authorized geothermal agreements, 2 producing geothermal leases, 40 oil and gas leases, and 6 potential mining areas (Table 3-24 and MV-3).

Soil Resources

Alternative N5 crosses 1.5 miles of lands designated as Prime and Unique Farmland (MV-4). This alternative also crosses 5.3 miles of soils highly susceptible to water erosion and 47.4 miles of soils moderately susceptible to water erosion. This alternative also crosses 14.3 miles of soils highly susceptible to wind erosion and 30.1 miles of soils moderately susceptible to wind erosion.

Environmental Effects

Geologic Hazards

Following the implementation of design features of the Proposed Action and Mitigation Measure 3 (Table 3-3) along Alternative N5, the alternative route crosses 3.6 miles of areas that could pose moderate impacts on the Project and 23.0 miles of areas that could pose low impacts on the Project due to geologic hazards (Table 3-25 and MV-2). Moderate impacts could include loss of equipment, interruption of power, or personal injury. Moderate impacts include Quaternary faults along Links 30, 33, 45, 63, 66, 75, 470, 475, and 490 and low-to-moderate landslide susceptibility along Links 30, 33, 45, 63, 64, 66, and 75.

Mineral Resources

Active mines and oil and gas wells are considered to have high initial impacts. Geothermal agreements, producing geothermal leases, oil and gas leases, and potential mining areas are considered to have moderate initial impacts. Following the implementation of design features of the Proposed Action and Mitigation Measures 2 and 7 (Table 3-3) along Alternative N5, there would be 4.2 miles of moderate impacts and 26.4 miles of low impacts on mineral resources (Table 3-25 and MV-3). Moderate impacts could include potential impacts on mines and geothermal resources along Links 45 and 66.

Soil Resources

Under this alternative, the primary impact of concern would be soils susceptible to water erosion primarily associated with mountainous areas. Following the implementation of Mitigation Measures 1, 2, 3, 7, and 13 (Table 3-3), there would be 21.0 miles of moderate impacts and 85.2 miles of low impacts (Table 3-25 and MV-4). Moderate impacts on designated Prime and Unique Farmland soils could include irreversible conversion of these soils to nonagricultural uses along Link 75. Moderate residual impacts on soils would include potential acceleration of wind erosion along Links 460, 470, and 475 and acceleration of water erosion along Links 75, 475, and 397. Accelerated erosion could result in temporary to permanent loss of soil material.

Alternative N6 – Mineral Mountains 1,500 Feet East of Kern River Pipeline (Proponent's Preferred Alternative)

Affected Environment

Geologic Hazards

Alternative N6 crosses 11 Quaternary faults, totaling about 4.2 miles (Table 3-23 and MV-2). Seismicity ranges between 50 and 90 PGA (percent of gravity) along the route. Alternative N6 also crosses about 3.3

miles of areas with high landslide susceptibility. There are also 8.7 miles with slopes greater than 30 percent and 17.8 miles with slopes between 15 and 30 percent.

Mineral Resources

Alternative N6 crosses 45 mines and mining claims, 6 authorized geothermal agreements, 4 producing geothermal leases, 40 oil and gas leases, and 6 potential mining areas (Table 3-24 and MV-3).

Soil Resources

Alternative N6 crosses 0.8 mile of lands designated as Prime and Unique Farmland (MV-4). This alternative also crosses 5.4 miles of soils highly susceptible to water erosion and 44.8 miles of soils moderately susceptible to water erosion. This alternative also crosses 15.5 miles of soils highly susceptible to wind erosion and 28.7 miles of soils moderately susceptible to wind erosion.

Environmental Effects

Geologic Hazards

Following the implementation of design features of the Proposed Action and Mitigation Measure 3 (Table 3-3) along Alternative N6, the alternative route crosses 3.6 miles of areas that could pose moderate impacts on the Project and 23.9 miles of areas that could pose low impacts on the Project due to geologic hazards (Table 3-25 and MV-2). Low-to-moderate impacts include Quaternary faults along Links 30, 33, 45, 63, 66, 75, 390, 475, and low-to-moderate landslide susceptibility along Links 30, 33, 45, 63, 64, 66, and 75.

Mineral Resources

Active mines and oil and gas wells are considered to have high initial impacts. Geothermal agreements, producing geothermal leases, oil and gas leases, and potential mining areas are considered to have moderate initial impacts. Following the implementation of design features of the Proposed Action and Mitigation Measures 2 and 7 (Table 3-3) along Alternative N6, there would be 4.5 miles of moderate impacts and 27.1 miles of low impacts on mineral resources (Table 3-25 and MV-3). Moderate and low impacts could include potential impacts on mines and geothermal resources along Links 45 and 66.

Soil Resources

Under this alternative, the primary impact would be on soils susceptible to water or wind erosion. Following the implementation of Mitigation Measures 1, 2, 3, 7, and 13 (Table 3-3 and MV-4), there would be 21.6 miles of moderate impacts and 83.8 miles of low impacts (Table 3-25 and MV-4). Moderate impacts on designated Prime and Unique Farmland soils could include irreversible conversion of these soils to nonagricultural uses along Links 75 and 396. Moderate residual impacts on soils would include potential acceleration of wind erosion along Links 349, 390, and 475 and acceleration of water erosion along Links 75, 475, 395, and 397. Accelerated erosion could result in temporary to permanent loss of soil material.

Southern Area – South of the Black Mountains to Red Butte Substation

The geologic hazards crossed, soils and mineral resources crossed, baseline resource inventory, and residual impacts for alternative routes considered in the northern area are presented in Tables 3-26, 3-27, and 3-28.

TABLE 3-26
GEOLOGIC HAZARDS CROSSED BY SOUTHERN ALTERNATIVE ROUTES

Alternative Route	Quaternary Faults	Landslide Susceptibility	Seismicity (peak ground acceleration)
Alternative S1	4	Low to moderate	30 to 80
Alternative S2	0	Low to moderate	30 to 80
Alternative S3	1	Low to moderate	30 to 80
Alternative S4	4	Low to moderate	30 to 80
Alternative S5 (Proponent's Preferred Alternative)	1	Low to moderate	30 to 80
Alternative S6	1	Low to moderate	30 to 80
Alternative S7	3	Low to moderate	30 to 80
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative)	3	Low to moderate	30 to 80

TABLE 3-27
MINERAL RESOURCES CROSSED BY SOUTHERN ALTERNATIVE ROUTES

Alternative Route	Existing Mining Operations	Number of Potential Mines[1]	Geothermal Resources[2]	Oil and Gas Leases
Alternative S1	0	2	0	18
Alternative S2	3	2	0	18
Alternative S3	3	0	0	18
Alternative S4	3	0	0	18
Alternative S5 (Proponent's Preferred Alternative)	6	2	0	42
Alternative S6	6	0	0	30
Alternative S7	6	0	0	18
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative)	6	0	0	18

NOTES:
[1]Potential mines are areas that have identified mineral resources but have not yet been mined.
[2]Leases and producing wells

Alternative S1 – Pinto Creek

Affected Environment

Geologic Hazards

Alternative S1 crosses 4 Quaternary faults, totaling about 0.8 mile (Table 3-26 and MV-2). Seismicity ranges between 30 and 80 PGA (percent of gravity) along the route. Alternative S1 does not cross any areas with high landslide susceptibility. There are also 4.0 miles with slopes greater than 30 percent and 8.0 miles with slopes between 15 and 30 percent.

TABLE 3-28
ALTERNATIVE ROUTE COMPARISON
FOR EARTH RESOURCES INVENTORY DATA AND RESIDUAL IMPACTS BY SOUTHERN ALTERNATIVE ROUTES

Alternative Route	Total Miles	Geologic Hazards (miles)									Mineral Resources (miles)			Soils (miles)									Residual Impacts (Miles [Percent])											
			Percent of Slope				Landslide Susceptibility							Unique Farmland			Water Erosion			Wind Erosion			Geologic Hazards				Mineral Resources				Soil Resources			
		Faults	0 to 8	8 to 15	15 to 30	Greater than 30	None	Low	Moderate	High	High	Moderate	Low	High	Moderate	Low	High	Moderate	Low	High	Moderate	Low	No Identifiable	Low	Moderate	High	No Identifiable	Low	Moderate	High	No Identifiable	Low	Moderate	High
Alternative S1	55.9	0.8	33.0	10.9	8.0	4.0	43.3	5.7	6.9	–	–	7.9	48.0	11.5	–	44.4	7.0	19.0	29.9	–	30.6	25.3	42.6 [76.2]	13.3 [23.8]	–	–	48.0 [85.9]	7.9 [14.1]	–	–	–	40.0 [71.6]	15.9 [28.4]	–
Alternative S2	49.6	1.0	33.8	8.0	5.7	2.1	42.5	2.7	4.4	–	0.3	8.5	40.8	12.8	–	36.8	7.0	22.2	20.4	–	35.6	14.0	41.8 [84.3]	7.8 [15.7]	–	–	40.8 [82.3]	8.5 [17.1]	0.3 [0.6]	–	–	32.4 [65.3]	17.2 [34.7]	–
Alternative S3	57.4	1.0	33.0	8.8	8.7	6.9	42.0	3.5	11.9	–	0.2	8.5	48.7	12.8	–	44.6	7.0	22.7	27.7	–	41.8	15.6	41.3 [72.0]	16.1 [28.0]	–	–	48.7 [84.8]	8.5 [14.8]	0.2 [0.4]	–	–	40.2 [70.0]	17.2 [30.0]	–
Alternative S4	48.9	1.0	27.4	7.6	8.1	5.8	34.7	5.7	8.5	–	0.9	8.5	39.5	11.3	–	37.6	7.0	20.5	21.4	–	30.4	18.5	32.7 [66.8]	16.1 [33.0]	0.1 [0.2]	–	39.5 [80.8]	8.6 [17.6]	0.8 [1.6]	–	–	33.2 [67.9]	15.7 [32.1]	–
Alternative S5 (Proponent's Preferred Alternative)	59.0	0.3	36.6	11.4	7.6	3.4	46.6	6.7	5.7	–	0.5	11.0	47.5	6.9	–	52.1	4.3	22.0	32.7	–	22.3	36.7	46.3 [78.5]	12.7 [21.5]	–	–	47.5 [80.5]	11.0 [18.6]	0.5 [0.9]	–	–	48.8 [82.7]	10.2 [17.3]	–
Alternative S6	61.8	0.3	36.8	10.0	9.2	5.8	45.7	5.2	10.9	–	0.7	10.8	50.3	8.1	–	53.7	4.3	26.2	31.3	–	34.4	27.4	45.4 [73.5]	16.4 [26.5]	–		50.3 [81.4]	10.8 [17.5]	0.7 [1.1]	–	–	50.4 [81.6]	11.4 [18.4]	–
Alternative S7	49.8	1.0	31.7	8.2	6.8	3.1	40.1	4.9	4.8	–	0.4	8.5	40.9	12.8	–	37.0	7.0	22.2	20.6	–	35.6	14.2	38.1 [76.5]	11.6 [23.3]	0.1 [0.2]	–	40.9 [82.1]	8.6 [17.3]	0.3 [0.6]	–	–	32.6 [65.5]	17.2 [34.5]	–
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative)	49.8	1.0	32.1	8.6	6.2	2.9	40.4	4.7	4.7	-	0.3	8.5	41.0	12.8	–	37.0	7.0	22.2	20.6	–	35.6	14.2	39.7 [79.7]	9.6 [19.3]	0.5 [1.0]	–	41.0 [82.3]	8.5 [17.1]	0.3 [0.6]	–	–	32.6 [65.5]	17.2 [34.5]	–

Mineral Resources

Alternative S1 crosses no mines and mining claims, no authorized geothermal agreements, no producing geothermal leases, 18 oil and gas leases, and 2 potential mining areas (Table 3-27 and MV-3).

Soil Resources

Alternative S1 crosses 11.5 miles of lands designated as Prime and Unique Farmland (MV-4). This alternative also crosses 7.0 miles of soils highly susceptible to water erosion and 19.0 miles of soils moderately susceptible to water erosion. This alternative does not cross any soils highly susceptible to wind erosion, but it crosses 30.6 miles of soils moderately susceptible to wind erosion.

Environmental Effects

Geologic Hazards

Following the implementation of design features of the Proposed Action and Mitigation Measure 3 (Table 3-3) along Alternative S1, the alternative route crosses 13.3 miles of areas that could pose low impacts on the Project due to geologic hazards (Table 3-28 and MV-2). Low impacts could include low landslide susceptibility along Links 220 and 260 and Quaternary faults along Link 220.

Mineral Resources

Active mines and oil and gas wells are considered to have high initial impacts. Geothermal agreements, producing geothermal leases, oil and gas leases, and potential mining areas are considered to have moderate initial impacts. Following the implementation of design features of the Proposed Action and Mitigation Measures 2 and 7 (Table 3-3) along Alternative S1, there would be 7.9 miles of low impacts on mineral resources (Table 3-26 and MV-3), including oil and gas leases along Links 163 and 165 and a potential mineral resource along Link 260.

Soil Resources

Under this alternative, the primary impact would be on soils susceptible to water erosion primarily associated with mountainous areas. Following the implementation of Mitigation Measures 1, 2, 3, 7, and 13 (Table 3-3), there would be 15.9 miles of moderate impacts and 40.0 miles of low impacts (Table 3-28 and MV-4). Moderate impacts on designated Prime and Unique Farmland soils could include irreversible conversion of these soils to nonagricultural uses along Links 163, 165, and 220. Moderate impacts on soils would include potential acceleration of water erosion occurring along Links 163, 165, and 220. Accelerated erosion could result in temporary to permanent loss of soil material.

Alternative S2 – IPP West

Affected Environment

Geologic Hazards

Alternative S2 crosses 3 Quaternary faults totaling 1.0 mile (Table 3-26 and MV-2). Seismicity ranges between 30 and 80 PGA (percent of gravity) along the route. Alternative S2 does not cross any areas with high landslide susceptibility. There are also 2.1 miles with slopes greater than 30 percent and 5.7 miles with slopes between 15 and 30 percent.

Mineral Resources

Alternative S2 crosses 3 mines and mining claims, no authorized geothermal agreements, no producing geothermal leases, 18 oil and gas leases, and 2 potential mining areas (Table 3-27 and MV-3).

Soil Resources

Alternative S2 crosses 12.8 miles of lands designated as Prime and Unique Farmland (MV-4). This alternative also crosses 7.0 miles of soils highly susceptible to water erosion and 22.2 miles of soils moderately susceptible to water erosion. This alternative does not cross any soils highly susceptible to wind erosion, but it crosses 35.6 miles of soils moderately susceptible to wind erosion.

Environmental Effects

Geologic Hazards

Following the implementation of design features of the Proposed Action and Mitigation Measure 3 (Table 3-3) along Alternative S2, the alternative route would have no identifiable miles of high or moderate impacts, but it crosses 7.8 miles of areas that could pose low impacts on the Project due to geologic hazards (Table 3-28 and MV-2). Low impacts include low landslide susceptibility along Links 220, 221, and 275 and Quaternary faults along Links 220 and 221.

Mineral Resources

Active mines and oil and gas wells are considered to have high initial impacts. Geothermal agreements, producing geothermal leases, oil and gas leases, and potential mining areas are considered to have moderate initial impacts. Following the implementation of design features of the Proposed Action and Mitigation Measures 2 and 7 (Table 3-3) along Alternative S2, there would be 0.3 mile of moderate impacts and 8.5 miles of low impacts on mineral resources (Table 3-28 and MV-3). Moderate impacts could include potential impacts on mines along Link 221 and low impacts on oil and gas leases and geothermal resources along Links 163, 165, and 221.

Soil Resources

Under this alternative, the primary impact would be on soils susceptible to water erosion primarily associated with mountainous areas. Following the implementation of Mitigation Measures 1, 2, 3, 7, and

13 (Table 3-3), there would be 17.2 miles of moderate impacts and 32.4 miles of low impacts (Table 3-28 and MV-4). Moderate impacts on designated Prime and Unique Farmland soils could include irreversible conversion of these soils to nonagricultural uses along Links 163, 165, 220, and 221. Moderate residual impacts on soils would include potential acceleration of water erosion along Links 163 and 165. Accelerated erosion could result in temporary to permanent loss of soil material.

Alternative S3 – Ox Valley

Affected Environment

Geologic Hazards

Alternative S3 crosses 3 Quaternary faults, totaling about 1.0 mile (Table 3-26 and MV-2). Seismicity ranges between 30 and 80 PGA (percent of gravity) along the route. Alternative S3 does not cross any areas with high landslide susceptibility. There are also 6.9 miles with slopes greater than 30 percent and 8.7 miles with slopes between 15 and 30 percent.

Mineral Resources

Alternative S3 crosses 3 mines and mining claims, no authorized geothermal agreements, no producing geothermal leases, 18 oil and gas leases, and no potential mining areas (Table 3-27 and MV-3).

Soil Resources

Alternative S3 crosses 12.8 miles of lands designated as Prime and Unique Farmland (MV-4). This alternative also crosses 7.0 miles of soils highly susceptible to water erosion and 22.7 miles of soils moderately susceptible to water erosion. This alternative does not cross any soils highly susceptible to wind erosion, but it crosses 41.8 miles of soils moderately susceptible to wind erosion.

Environmental Effects

Geologic Hazards

Following the implementation of design features of the Proposed Action and Mitigation Measure 3 (Table 3-3) along Alternative S3, the alternative route could have no identifiable miles of high or moderate impacts, but it crosses 16.1 miles of areas that could pose low impacts on the Project due to geologic hazards (Table 3-28 and MV-2). Low impacts include low landslide susceptibility along Links 220, 221, and 285 and Quaternary faults along Links 220 and 221.

Mineral Resources

Active mines and oil and gas wells are considered to have high initial impacts. Geothermal agreements, producing geothermal leases, oil and gas leases, and potential mining areas are considered to have moderate initial impacts. Following the implementation of design features of the Proposed Action and Mitigation Measures 2 and 7 (Table 3-3) along Alternative S3, there would be 0.2 mile of moderate impacts and 8.5 miles of low impacts on mineral resources (Table 3-26 and MV-3). Moderate impacts

could include potential impacts on mines along Link 221 and low impacts could include potential impacts on oil and gas leases and geothermal resources along Links 163, 165, and 221.

Soil Resources

Under this alternative, the primary impact would be on soils susceptible to water erosion primarily associated with mountainous areas. Following the implementation of Mitigation Measures 1, 2, 3, 7, and 13 (Table 3-3), there would be 17.2 miles of moderate impacts and 40.2 miles of low impacts (Table 3-27 and MV-4). Moderate residual impacts on designated Prime and Unique Farmland soils could include irreversible conversion of these soils to nonagricultural uses along Links 163, 165, 220, and 221. Moderate residual impacts on soils would include potential acceleration of water erosion along Links 163 and 165. Accelerated erosion could result in temporary to permanent loss of soil material.

Alternative S4 – IPP East

Affected Environment

Geologic Hazards

Alternative S4 crosses 4 Quaternary faults, totaling about 1.0 mile (Table 3-26 and MV-2). Seismicity ranges between 30 and 80 PGA (percent of gravity) along the route. Alternative S4 does not cross any areas with high landslide susceptibility. There are also 5.8 miles with slopes greater than 30 percent and 8.1 miles with slopes between 15 and 30 percent.

Mineral Resources

Alternative S4 crosses 3 mines and mining claims, no authorized geothermal agreements, no producing geothermal leases, 18 oil and gas leases, and no potential mining areas (Table 3-27 and MV-3).

Soil Resources

Alternative S4 crosses 11.3 miles of lands designated as Prime and Unique Farmland (MV-4). This alternative also crosses 7.0 miles of soils highly susceptible to water erosion and 20.5 miles of soils moderately susceptible to water erosion. This alternative does not cross any soils highly susceptible to wind erosion, but it crosses 30.4 miles of soils moderately susceptible to wind erosion.

Environmental Effects

Geologic Hazards

Following the implementation of design features of the Proposed Action and Mitigation Measure 3 (Table 3-3) along Alternative S4, there would be 0.1 mile of moderate impacts and 16.1 miles of areas that could pose low impacts on the Project due to geologic hazards (Table 3-28 and MV-2). Low impacts include low landslide susceptibility along Links 220, 221, 222, 270, and 275, and Quaternary faults along Links 220 and 221.

Mineral Resources

Active mines and oil and gas wells are considered to have high initial impacts. Geothermal agreements, producing geothermal leases, oil and gas leases, and potential mining areas are considered to have moderate initial impacts. Following the implementation of design features of the Proposed Action and Mitigation Measures 2 and 7 (Table 3-3) along Alternative S4, there would be 0.8 mile of moderate impacts and 8.6 miles of low impacts on mineral resources (Table 3-28 and MV-3). Moderate impacts could include potential impacts on mines along Links 221, 225, 270, and 275, and low impacts could include potential impacts on oil and gas leases and geothermal resources along Links 163, 165, and 221.

Soil Resources

Under this alternative, the primary impact would be on soils susceptible to water or wind erosion. Following the implementation of Mitigation Measures 1, 2, 3, 7, and 13 (Table 3-3), there would be 15.7 miles of moderate impacts and 33.2 miles of low impacts. Moderate residual impacts on designated Prime and Unique Farmland soils could include irreversible conversion of these soils to nonagricultural uses along Links 163, 165, 220, and 221. Moderate residual impacts on soils would include potential acceleration of water erosion along Links 163 and 165. Accelerated erosion could result in temporary to permanent loss of soil material.

Impacts on soil resources specific to the IRA of the Dixie National Forest will be associated primarily with the creation of new access roads in previously undisturbed areas. As with other parts of the Project, creation of access roads would disturb the land surface and may result in increased rates of soil erosion as a result of water or wind. Furthermore, the creation of new, temporary, roads in areas without roads may result in increased public access from motorized vehicles (especially off-highway vehicles [OHV]). Increased OHV traffic may result in increased rates of soil erosion through increased traffic and the associated increase in ground disturbance. Implementation of design features of the Proposed Action would mitigate impacts on the IRA to the same degree as on the Dixie National Forest (Table 3-28 and MV-4).

Alternative S5 – Iron Springs and Pinto Creek (Proponent's Preferred Alternative)

Affected Environment

Geologic Hazards

Alternative S5 crosses 1 Quaternary fault, totaling about 0.3 mile (Table 3-26 and MV-2). Seismicity ranges between 30 and 80 PGA (percent of gravity) along the route. Alternative S5 does not cross any areas with high landslide susceptibility. There are also 3.4 miles with slopes greater than 30 percent and 7.6 miles with slopes between 15 and 30 percent.

Mineral Resources

Alternative S5 crosses 6 mines and mining claims, no authorized geothermal agreements, no producing geothermal leases, 42 oil and gas leases, and 2 potential mining areas (Table 3-26 and MV-3).

Soil Resources

Alternative S5 crosses 6.9 miles of lands designated as Prime and Unique Farmland (MV-4). This alternative also crosses 4.3 miles of soils highly susceptible to water erosion and 22.0 miles of soils moderately susceptible to water erosion. This alternative does not cross any soils highly susceptible to wind erosion, but it crosses 22.3 miles of soils moderately susceptible to wind erosion.

Environmental Effects

Geologic Hazards

Following the implementation of design features of the Proposed Action and Mitigation Measure 3 (Table 3-3) along Alternative S5, high or moderate impacts would be anticipated, but the alternative route crosses 12.7 miles of areas that could pose low impacts on the Project due to geologic hazards (Table 3-28 and MV-2). Low impacts include low landslide susceptibility along Link 260.

Mineral Resources

Active mines and oil and gas wells are considered to have high initial impacts. Geothermal agreements, producing geothermal leases, oil and gas leases, and potential mining areas are considered to have moderate initial impacts. Following the implementation of design features of the Proposed Action and Mitigation Measures 2 and 7 (Table 3-3) along Alternative S5, there would be 0.5 mile of moderate impacts and 11.0 miles of low impacts on mineral resources (Table 3-28 and MV-3). Moderate impacts could include potential impacts on mines along Link 438, and low impacts could include potential impacts on oil and gas leases along Links 163, 165, 430, 435, and 438 and a potential mineral resource along Link 260.

Soil Resources

Under this alternative, the primary impact would be soils susceptible to water erosion primarily associated with mountainous areas. Following the implementation of Mitigation Measures 1, 2, 3, 7, and 13 (Table 3-3), there would be 10.2 miles of moderate impacts and 48.8 miles of low impacts (Table 3-28 and MV-4). Moderate residual impacts on designated Prime and Unique Farmland soils would include irreversible conversion of these soils to nonagricultural uses along Links 163, 430, and 435. Moderate residual impacts on soils would include potential acceleration of water erosion occurring along Links 163, 430, and 435. Accelerated erosion could result in temporary to permanent loss of soil material.

Alternative S6 – Iron Springs and Ox Valley

Affected Environment

Geologic Hazards

Alternative S6 crosses 1 Quaternary fault, totaling about 0.3 mile (Table 3-26 and MV-2). Seismicity ranges between 30 and 80 PGA (percent of gravity) along the route. Alternative S6 does not cross any areas with high landslide susceptibility. There are also 5.8 miles with slopes greater than 30 percent and 9.2 miles with slopes between 15 and 30 percent.

Mineral Resources

Alternative S6 crosses 6 mines and mining claims, no authorized geothermal agreements, no producing geothermal leases, 30 oil and gas leases, and no potential mining areas (Table 3-27 and MV-3).

Soil Resources

Alternative S6 crosses 8.1 miles of lands designated as Prime and Unique Farmland (MV-4). This alternative also crosses 4.3 miles of soils highly susceptible to water erosion and 26.2 miles of soils moderately susceptible to water erosion. This alternative does not cross any soils highly susceptible to wind erosion, but it crosses 34.4 miles of soils moderately susceptible to wind erosion.

Environmental Effects

Geologic Hazards

Following the implementation of design features of the Proposed Action and Mitigation Measure 3 (Table 3-3) along Alternative S6, the alternative route could have no identifiable miles of high or moderate impacts, but it crosses 16.4 miles of areas that could pose low impacts on the Project due to geologic hazards (Table 3-28 and MV-2). Low impacts include moderate landslide susceptibility along Links 250 and 285 and Quaternary faults along Link 430.

Mineral Resources

Active mines and oil and gas wells are considered to have high initial impacts. Geothermal agreements, producing geothermal leases, oil and gas leases, and potential mining areas are considered to have moderate initial impacts. Following the implementation of design features of the Proposed Action and Mitigation Measures 2 and 7 (Table 3-3) along Alternative S6, there would be 0.7 mile of moderate impacts and 10.8 miles of low impacts on mineral resources (Table 3-28 and MV-3). Moderate impacts could include potential impacts on mines along Links 250 and 438, and low impacts could include potential impacts on oil and gas leases and geothermal resources along Links 163, 430, 435, and 438.

Soil Resources

Under this alternative, the primary impact would be on soils susceptible to water or wind erosion. Following the implementation of Mitigation Measures 1, 2, 3, 17, and 13 (Table 3-3), there would be 11.4 miles of moderate impacts and 50.4 miles of low impacts (Table 3-28 and MV-4). Moderate residual impacts on designated Prime and Unique Farmland soils could include irreversible conversion of these soils to nonagricultural uses along Links 163, 430, and 435. Moderate residual impacts on soils would include potential acceleration of water erosion along Links 163, 430, and 435. Accelerated erosion could result in temporary to permanent loss of soil material.

Alternative S7 – Middle Hybrid Route

Affected Environment

Geologic Hazards

Alternative S7 crosses 3 Quaternary faults, totaling 1.0 mile (Table 3-26 and MV-2). Seismicity ranges between 30 and 80 PGA (percent of gravity) along the route. Alternative S7 does not cross any areas with high landslide susceptibility. There are also 3.1 miles with slopes greater than 30 percent and 6.8 miles with slopes between 15 and 30 percent.

Mineral Resources

Alternative S7 crosses 6 mines and mining claims, no authorized geothermal agreements, no producing geothermal leases, 18 oil and gas leases, and no potential mining areas (Table 3-27 and MV-3).

Soil Resources

Alternative S7 crosses 12.8 miles of lands designated as Prime and Unique Farmland (MV-4). This alternative also crosses 7.0 miles of soils highly susceptible to water erosion and 22.2 miles of soils moderately susceptible to water erosion. This alternative does not cross any soils highly susceptible to wind erosion, but it crosses 35.6 miles of soils moderately susceptible to wind erosion.

Environmental Effects

Geologic Hazards

Following the implementation of design features of the Proposed Action and Mitigation Measure 3 (Table 3-3) along Alternative S7, there would be 0.1 mile of moderate impacts and 11.6 miles of areas that could pose low impacts on the Project due to geologic hazards (Table 3-28 and MV-2). Low impacts include low landslide susceptibility along Links 220, 221, 270, 271, 275, 445, and 500 and Quaternary faults along Links 220 and 221.

Mineral Resources

Active mines and oil and gas wells are considered to have high initial impacts. Geothermal agreements, producing geothermal leases, oil and gas leases, and potential mining areas are considered to have moderate initial impacts. Following the implementation of design features of the Proposed Action and Mitigation Measures 2 and 7 (Table 3-3) along Alternative S7, there would be 0.3 mile of moderate impacts and 8.6 miles of low impacts on mineral resources (Table 3-28 and MV-3). Moderate impacts could include potential impacts on mines along Links 221, 270, and 275, and low impacts could include potential impacts on oil and gas leases and geothermal resources along Links 163, 165, and 221.

Soil Resources

Under this alternative, the primary impact would be on soils susceptible to water or wind erosion. Following the implementation of Mitigation Measures 1, 2, 3, 7, and 13 (Table 3-3), there would be 17.2

miles of moderate residual impacts and 32.6 miles of low residual impacts (Table 3-28 and MV-4). Moderate residual impacts on designated Prime and Unique Farmland soils could include irreversible conversion of these soils to nonagricultural uses along Links 163, 165, 220, and 221. Moderate residual impacts on soils would include potential acceleration of water erosion along Links 163, 165, and 220. Accelerated erosion could result in temporary to permanent loss of soil material.

Alternative S7-A (Route Variation of Alternative S7) – Middle Hybrid Route 300 Feet East of Sigurd to Red Butte No. 1 Transmission Line Adjacent to Atchinson IRA (Agency Preferred Alternative)

Affected Environment

Geologic Hazards

Alternative S7-A crosses 3 Quaternary faults, totaling 1.0 mile (Table 3-26 and MV-2). Seismicity ranges between 30 and 80 PGA (percent of gravity) along the route. Alternative S7-A does not cross any areas with high landslide susceptibility. There are also 2.9 miles with slopes greater than 30 percent and 6.2 miles with slopes between 15 and 30 percent.

Mineral Resources

Alternative S7-A crosses 6 mines and mining claims, no authorized geothermal agreements and no producing geothermal leases (although geothermal resources do occur), 18 oil and gas leases, and no potential mining areas (Table 3-27 and MV-3).

Soil Resources

Alternative S7-A crosses 12.8 miles of lands designated as Prime and Unique Farmland (MV-4). This alternative also crosses 7.0 miles of soils highly susceptible to water erosion and 22.2 miles of soils moderately susceptible to water erosion. This alternative does not cross any soils highly susceptible to wind erosion, but it crosses 35.6 miles of soils moderately susceptible to wind erosion.

Environmental Effects

Geologic Hazards

Following the implementation of design features of the Proposed Action and Mitigation Measure 3 (Table 3-3) along Alternative S7-A, there would be 0.5 mile of moderate impacts and 9.6 miles of areas that could pose low impacts on the Project due to geologic hazards (Table 3-28 and MV-2). Low impacts include low landslide susceptibility along Links 220, 221, 270, 272, 275, 445, and 500. Potential moderate impacts could result from presence of Quaternary faults along Links 220 and 221.

Mineral Resources

Active mines and oil and gas wells are considered to have high initial impacts. Geothermal agreements, producing geothermal leases, oil and gas leases, and potential mining areas are considered to have moderate initial impacts. Following the implementation of design features of the Proposed Action and

Mitigation Measures 2 and 7 (Table 3-3) along Alternative S7-A, there would be 0.3 mile of moderate impacts and 8.5 miles of low impacts on mineral resources (Table 3-28 and MV-3). Moderate impacts could include potential impacts on mines along Links 221, 270, 272, and 275, and low impacts could include potential impacts on oil and gas leases and geothermal resources along Links 163, 165, and 221.

Soil Resources

Under this alternative, primary impacts would be on soils susceptible to water or wind erosion. Following the implementation of Mitigation Measures 1, 2, 3, 7, and 13 (Table 3-3), 17.2 miles of moderate residual impacts and 32.6 miles of low residual impacts would be anticipated (Table 3-28 and MV-4). Moderate residual impacts on designated Prime and Unique Farmland soils could include irreversible conversion of these soils to nonagricultural uses along Links 163, 165, 220, and 221. Moderate residual impacts on soils would include potential acceleration of water erosion along Links 163, 165, and 220. Accelerated erosion could result in temporary to permanent loss of soil material.

3.2.2.4 Summary

Geologic Hazards

A potential for direct impacts on transmission reliability, the integrity of Project structures, and constructability and indirect impacts on public health and safety associated with geologic hazards, including earthquakes and landslides, would exist regardless of the alternative routes selected. The alternative routes with the highest potential for impacts associated with geologic hazards are those located in the Sevier River Valley and Sulphurdale areas, which includes all northern alternatives. In general, alternative routes considered for the southern segment of the Project cross more areas with moderate susceptibility to landslides and some faults. Alternative routes considered for the northern segment of the Project are characterized by less landslide susceptibility, but with more faults and seismicity.

Because all alternative routes considered for the northern segment of the Project have Links 24, 26, 30, 33, 45, 63, 64, 66, and 68 in common, the potential impacts on earth resources associated with these links would be common for these links. Along these links, the potential for impacts on the Project would be associated with the concentrated areas with high susceptibility for landslides and several faults that occur between the communities of Sigurd and Elsinore (Links 24, 25, 26, 27, 30, and 33), as well as near the community of Sevier (Links 45 and 64). Other areas with higher concentrations of faults occur near Links 75 (Alternatives N4, N5, and N6); 305 and 320 (Alternatives N1, N2, and N3); and 460 (Alternatives N3, N5, and N6). Alternative N3 has the highest number of Quaternary faults and the second highest amount of area with steep slopes. Alternative N6 has the largest areas with moderate landslide susceptibility. Alternative N1 has the least number of Quaternary faults and the lowest amount of areas with steep slopes. Areas with higher concentrations of faults occur near Links 75, 305, 320, and 460. Overall, Alternative N1 would have the least total potential for impacts on the Project associated with geologic hazards.

The southern alternative routes have fewer areas with geologic hazards; Alternative S5 and Alternative S6 have the smallest number of Quaternary faults. Alternative S5 also has the second lowest amount of area with high impacts from steep slopes. However, Alternative S2 would have the least overall total potential for impacts on the Project associated with geologic hazards.

Mineral Resources

The alternatives considered for the northern segment of the Project have in common Links 24, 30, 33, 45, 63, 64, 66, and 68. These links are characterized by concentrated areas of mineral resources, particularly along Links 30 and 33 that occur between Sigurd and Richfield and between Elsinore and Sevier. Alternatives N3 and N5 would be anticipated to result in the lowest impacts on mineral resources (i.e., the least conflict with authorized mineral operations). Overall, the southern alternative routes would have less impact on mineral resources than alternative routes in the northern segment. Alternative S1 would be anticipated to have the least potential for impacts on mineral resources, as only low-to-moderate impacts on mineral resources located in the study corridor were identified.

Soil Resources

Impacts on soil resources would be restricted to areas where ground-disturbing activities, access-road cutting and grading; clearing and leveling of tower sites, staging areas, and pulling areas; and tower construction would occur.

Overall, the impacts on soil resources for the northern alternative routes differ by 9.8 miles of moderate impacts from the shortest alternative (Alternative N1 – Black Rock Road to IPP north of Milford Wind Farm) to the longest alternative (Alternative N3 – Black Rock Road parallel to Kern River Pipeline). Alternative N1 would have 18.4 miles of moderate impacts whereas Alternative N3 would have 28.2 miles of moderate impacts. Impacts would be associated with the conversion of farmland to nonagricultural uses and the temporary to permanent loss of soil material by accelerated erosion.

The impacts on soil resources for the southern routes differ by 7.0 miles of moderate residual impacts from the shortest alternative (Alternative S5 – Iron Springs and Pinto Creek) to the longest alternatives (Alternative S2 – IPP West, Alternative S3 – Ox Valley, and Alternative S7 – Hybrid). Alternative S5 would have 10.2 miles of moderate residual impacts and Alternatives S2, S3, S7, and S7-A would have 17.2 miles of moderate residual impacts. Impacts would be associated with the conversion of farmland to nonagricultural uses and the temporary to permanent loss of soil material by accelerated erosion.

3.2.3 Water Resources

Issues raised by the public and agencies during Project scoping and preparation of the EIS related to potentially significant effects from construction activities on surface-water quality, groundwater quantity and quality, and community water supplies are the main focus of this section.

3.2.3.1 Regulatory Framework

Federal

- The Federal Water Pollution Control Act of 1948 was the first major U.S. law to address water pollution. Growing public awareness and concern for controlling water pollution led to sweeping amendments in 1972. As amended in 1977, the law became commonly known as the CWA, codified generally as 33 U.S.C. 1251-1387. The CWA's objective is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Individual sections of the Act maintain and protect the nation's water resources. The following sections of the Act may influence construction and maintenance of the Project:

- **Section 301: Effluent Limitations from Point Sources.** The volume of pollutants generated by a known source or point source is limited by specific water resources as described in Section 303d. These limitations may affect the Project if a construction-related activity discharges a controlled pollutant such as sediment into regulated waters, which would require a permit.

- **Section 302: Water Quality Related Effluent Limitations.** Under Section 302, water-quality standards designated by the State-set levels of allowable pollutants called Total Maximum Daily Loads (TMDL). This pollutant allotment criterion is designated for a specific water body relative to its particular usage (e.g., recreation, water supply, aquatic life, and agriculture). A water-quality criterion (numeric pollutant concentrations and narrative requirements) is also designated to protect particular resource uses. If the Project has the potential to add pollutants to a particular resource that is protected by a TMDL, it may be necessary to mitigate impacts and potentially require the Project to be included into the TMDL permit.

- **Section 303**: **Water Quality Standards and Implementation Plans, Designation of Impaired Waters.** Water bodies not meeting State-mandated water-quality standards are presented to the EPA for designation as Impaired Waters and issuance of federal protection under a TMDL. Impaired waters that may potentially be affected by the Project are subject to limitations set forth by the TMDL issued for the particular impaired water. If there is a high probability the Project would affect the impaired water, modification to the Utah Pollutant Discharge Elimination System (UPDES) construction general permit could be required.

- **Section 319**: **Effluent Limitations from Nonpoint Sources.** Nonpoint source pollution management under Section 319 of the CWA was created following the 1987 amendments to the CWA. Section 319 regulates the discharge of pollutants from various sources, which culminate to reduce water-quality standards set by the state. If the Project has the potential to add nonpoint source pollutants to a particular resource protected by a TMDL, it may be necessary to mitigate impacts and may potentially require the Project to be included into the TMDL permit.

- **Section 401**: **Water Quality Certification.** An application for a federally permitted activity that may result in a discharge into a water of the United States must obtain a Section 401 Water Quality Certification from the state with jurisdiction, certifying the action will not violate state or federal water-quality standards. In Utah, the 401 Certificate is issued by the UPDES.

- **Section 402**: **National Pollutant Discharge Elimination System.** The State of Utah has been delegated permit authority over the federal NPDES and maintains the UPDES, which regulates water-quality standards specifically by issuing and monitoring construction-related permits. This is described in more detail under the State Regulatory Framework section.

- **Section 404**: **Dredge or Fill in Waters of the United States.** The CWA regulates the dredging or filling of any material in a water of the United States under the regulatory jurisdiction of the USACE. If the Project requires the dredge or fill in a water of the United States as defined in the CWA, it may be necessary to obtain a federal permit to conduct the work.

- **Safe Drinking Water Act.** Originally passed by Congress in 1974, the Safe Drinking Water Act protects public health by regulating the quality of Americans' drinking water. The law was

amended in 1986 and 1996 and requires many actions to protect drinking water and its sources that include rivers, lakes, reservoirs, springs, and groundwater wells. Under Safe Drinking Water Act, the EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards, but does not regulate private wells that serve fewer than 25 individuals (EPA 2010d). The Safe Drinking Water Act also mandates a Groundwater Wellhead Protection Program be developed by each state to protect groundwater resources that serve as sources for public drinking water.

- **EPA Executive Order 11990: Protection of Wetlands.** Ordered by Jimmy Carter in 1977, EO 11990 provides additional support to NEPA, as amended (42 U.S.C. 4321 et seq.), in order to avoid to the extent possible the long and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.

- **National Flood Insurance Program**: The National Flood Insurance Program is administered by the Federal Emergency Management Agency (FEMA), a component of the U.S. Department of Homeland Security. In support of the National Flood Insurance Program, FEMA identifies flood hazard areas throughout the United States, including Special Flood Hazard Areas, which are defined as areas of land that would be inundated by a flood having a 1 percent chance of occurring in any given year (previously referred to as the base flood or 100-year flood). Development may take place within Special Flood Hazard Areas, provided development complies with local floodplain management ordinances, which must meet the minimum federal requirements.

State

- **Utah BLM Riparian Policy (Instruction Memorandum 2005-091).** The objective of the policy is to establish an aggressive riparian area management program that will identify, maintain, restore, and/or improve riparian values to achieve a healthy and productive ecological condition for maximum long-term benefits; provide watershed protection while still preserving quality riparian-dependent aquatic and terrestrial species habitats; and, as appropriate, allow for reasonable resource uses.

- **Utah Pollutant Discharge Elimination System.** UAC R317-8 mandates both direct and indirect discharges to waters of the State be regulated and permitted by the Utah Division of Water Quality, including surface-water discharges; wastewater discharges; indirect discharges; stormwater discharges from commercial, industrial, and municipal activities; groundwater discharges; and discharges resulting from underground injection. Construction General Permits for Stormwater Discharge and Hydrostatic Testing and Dewatering likely will be required during the construction of the Project.

- **Utah State Executive Order 11988**: **Floodplain Management.** If structures are to be placed in a FEMA-designated, flood-hazard area, a floodplain modification permit may be required.

- **Utah State Stream Alteration Permit.** Work done to the bed and banks of a named intermittent or perennial stream will require the issuance of a State Stream Alteration Permit and likely will require a USACE Section 404 and 401 permit.

3.2.3.2 Regional Setting

The Project area is located within the eastern portion of the semi-arid Basin and Range Physiographic Province (Fenneman 1931). The Basin and Range Physiographic Province is characterized by north-south trending mountain ranges separated by basins and valleys. Surface water within the area shows a strong relationship to seasonal trends in temperature and precipitation. Following a typical winter, snowpack melts in the spring and fills streams, rivers, and reservoirs, which aids groundwater recharge. Seasonal snowmelt also leads to flooding and ponding in the lower valleys, creating vast tracts of inundated land. Even though these springtime flows can result in rivers, streams, and reservoirs filling to capacity, surface water is limited temporally by seasonal fluctuations of high summer temperatures and strong winds, which can result in rapid evaporation of water that is not supported by groundwater sources or upstream storage facilities. Throughout the summer months, sporadic thunderstorms can produce heavy rainfall, but most of this precipitation is confined to the soil surface where summer heat rapidly can evaporate the water.

Basins, Watersheds, and Drainages

The Project area is located within the Escalante River-Sevier Lake Basin (Hydrologic Unit Code [HUC] 160300) and the Lower Colorado-Lake Mead Basin (HUC 150200). Three watersheds exist within the Escalante River-Sevier Lake Basin: Beaver Bottoms-Upper Beaver (HUC 16030007 at 1,100,800 acres), Escalante Desert (HUC 16030006 at 2,092,800 acres), and Middle Sevier (HUC 16030003 at 1,184,000 acres). The Lower Colorado-Lake Mead Basin contains the Upper Virgin Watershed (HUC 15010008 at 1,363,200 acres). The combined surface acreage of the four watersheds is approximately 5,740,800 acres (Montana State University 1999).

The Beaver Bottoms-Upper Beaver Watershed encompasses approximately 169,440 acres, where 15.4 percent of the watershed is within the Project area. The Escalante Desert Watershed encompasses approximately 161,408 acres, with 7.7 percent within the Project area. These two physiographic areas, located in southwestern Utah, are both part of the Sevier Lake Basin. Included in these watersheds are the Beaver River drainage, Parowan Valley, Cedar Valley, and the Beryl-Enterprise area. Precipitation ranges from more than 40 inches in the Tushar Mountains and Markagunt Plateau to about 8 inches in the desert areas of the northwestern part of the basin (UDNR Division of Water Resources [UDNR-DWR] 1995).

The Middle Sevier Watershed is located in south-central Utah, where the Wasatch Mountain Range divides Utah into the Colorado Plateau on the east and the Basin and Range Province on the west. This watershed encompasses approximately 51,351 acres, where 43.4 percent of the watershed is within the Project area. The climate of the Middle Sevier Watershed reflects its location in the transition zone from the Basin and Range Province to the Rocky Mountain-Colorado Plateau Province. Precipitation ranges from more than 35 inches in the highest mountain areas to less than 8 inches in the Sevier Desert (UDNR-DWR 1999).

The Upper Virgin Watershed, located in southwestern Utah, encompasses approximately 33,362 acres, where 2.4 percent of the watershed is within the Project area. It includes the Kanab Creek and Virgin River drainages. Mean annual precipitation varies from 17 inches at New Harmony to 8 inches at St. George (UDNR-DWR 1993).

Rivers and Streams

Several river systems located in the Project area collect and drain water from large areas of local watersheds (Table 3-29). Within the Escalante River-Sevier Lake Basin, the Beaver River forms at the confluences of South Creek, North Creek, and numerous other tributaries originating from the west and south slopes of the Tushar Mountains. The Beaver River flows west until it reaches Minersville Reservoir, where water is impounded for agricultural and recreational purposes. Below the dam, the tail-water is confined to a shallow channelized section of river until it flows through the town of Minersville where it is diverted into multiple irrigation canals and eventually dissipates into the Escalante Desert or is lost to evaporation. The Sevier River originates at the Markagunt Plateau, where it flows northward and terminates in Sevier Lake. Sevier Lake is a hydrologically isolated water body with no outflow. The Santa Clara River originates on the north slopes of the Pine Valley Mountains flowing west, where it ultimately joins the Virgin River. The Virgin River terminates at the confluence with Lake Mead in Nevada (USGS 2009b).

TABLE 3-29
NAMED PERENNIAL AND INTERMITTENT STREAMS IN THE PROJECT AREA

Watershed (Hydrologic Unit Code)	Perennial Streams	Intermittent Streams[1]
Beaver Bottoms-Upper Beaver (1603007)	Beaver River Cove Creek Indian Creek Jim Reed Creek Little North Creek North Wildcat Creek Pine Creek South Creek Wildcat Creek	Coral Canyon Cove Creek Tributary First Spring Creek Little North Creek Tributary Negro Mag Wash Parowan Canyon Wash Pine Creek Tributary Ranch Canyon South Creek Tributary Sulphur Creek Wildcat Creek Tributary
Escalante Desert (1603006)	Little Pinto Creek Pinto Creek Shinbone Creek South Fork Pinto Creek Spring Creek	Cottonwood Wash Bullion Canyon Bulrush Creek Calf Springs Creek Chloride Canyon Dick Palmer Wash Grassy Flat Canyon Hickory Wash Holt Canyon Iron Springs Creek Little Pinto Creek Moscow Wash Mud Spring Wash Joel Spring Canyon Shinbone Creek Tributary Silver Canyon Spring Creek Tributary Third Canyon Twin Spring Creek Urie Hollow Wheat Grass Canyon

TABLE 3-29
NAMED PERENNIAL AND INTERMITTENT STREAMS IN THE PROJECT AREA

Watershed (Hydrologic Unit Code)	Perennial Streams	Intermittent Streams[1]
Middle Sevier (1603003)	Clear Creek Dry Creek Fish Creek Joe Lott Creek Mill Creek Sevier River Shingle Creek	Carter Hollow Cedar Canyon Cottonwood Creek Currant Creek Dry Creek Tributary Dell Lott Hollow Dry Wash Flat Canyon Gooseberry Creek Indian Creek Mortensen Creek North South Creek Raphaelsen Canyon Sevier River Tributary Whiskey Spring Creek Willow Creek
Upper Virgin (15010008)	Mogotsu Creek Santa Clara River	California Hollow Dan Sill Creek Hardscrabble Hollow Kane Spring Draw Lark Canyon Mogotsu Creek Tributary Mahogany Creek Ox Valley Wash

SOURCE: U.S. Geological Survey 2009b (National Hydrography Dataset)
NOTE: [1]Numerous unnamed intermittent and ephemeral streams also exist within the Project area.

The Beaver, Sevier, and Santa Clara rivers and their associated lakes, reservoirs, and tributaries are valuable ecological and economic components of local environments. Many plants and vegetative communities dependent on continual availability of water are found in the study corridor associated with these waterways. These riparian communities and aquatic plants support important habitat for wildlife, including species listed as sensitive and endangered. The southwestern willow flycatcher, bald eagle, osprey, and several species of migratory birds (Section 3.2.4; Appendix D) known to use areas of the study corridors are dependent on water resources. Mammals, amphibians, and reptiles found in the Project area depend on habitats created by surface water and use these areas as travel corridors and nesting, brooding, and foraging habitat. Ranchers use highly productive vegetative communities associated with water resources in the study corridor for grazing livestock. Riparian and wetland systems associated with streams and rivers provide flood attenuation, erosion control, and a vector for groundwater recharge. The aquatic habitat associated with the perennial streams, rivers, lakes, and reservoirs support fish, aquatic plants and invertebrates, and amphibians (Levick et al. 2008). These plants and animals depend on the unique and diverse habitat features supported by water resources in this semi-arid ecological setting.

Several perennial streams exist within the Project area, including Pinto Creek, Jim Reed Creek, Spring Creek, and Joe Lott Creek (Table 3-29). These water features provide landscape hydrologic connections. Streams throughout the Project area typically provide a degree of biological, chemical, and physical functionality at a varying degree of scale. Ecosystem functions provided by streams and riparian habitats include (1) stream-energy dissipation during high-water flows that reduces erosion and improves water quality; (2) surface and subsurface-water storage and exchange; (3) groundwater recharge and discharge; (4) sediment transport, storage, and deposition to aid in floodplain maintenance and development; (5)

nutrient storage and cycling; (6) wildlife habitat and migration corridors; (7) support for vegetation communities that stabilize stream banks and provide wildlife services; and (8) water supply and water-quality filtering. (Levick et al. 2008).

The majority of streams in the Project area are intermittent and exhibit only seasonal flow. In the spring, runoff flows through these streambeds until they join perennial waterways or are absorbed into groundwater reservoirs. These streams typically dry out in the spring after the depletion of mountain snowpack. Some streams exhibit ephemeral flow where water may be present only once every few years or on a more consistent pattern, showing a direct response to local precipitation. Ephemeral and intermittent streams provide the same ecological and hydrological functions as perennial streams by moving water, nutrients, and sediment throughout the watershed, but are limited in their overall biological addition to the surrounding areas by the temporary presence of water (Levick et al. 2008). Dry washes typically do not support any discernible riparian vegetation, yet they commonly promote the establishment of a greater density of upland species that use the temporary resource. Examples of named intermittent streams in the study corridors include First Spring Creek, Cove Creek, Bulrush Creek, and Willow Creek (Table 3-29).

The Project area also contains many man-made canals that convey water from source areas toward municipalities, irrigated cropland, and pastures. These canals were initially created to supply water to areas suitable for agriculture that lack a sufficient water supply. Water from many perennial rivers and streams in the Project area has been diverted into canals and is used for agricultural purposes (USGS 1975).

Reservoirs, Lakes, and Ponds

Several reservoirs, lakes, and ponds exist within the Project area. These natural and man-made surface-water features are used to collect and store water from spring runoff for subsequent municipal and agricultural use. Large reservoirs in the Project area include Rocky Ford Reservoir, Piute Reservoir, Three Creek Reservoir, Minersville Reservoir, Grass Valley Reservoir, and Newcastle Reservoir. Typically, natural lakes are found at higher elevation, where the cooler climate reduces the amount of water lost to evaporation and snowmelt is retained in semi-impermeable basins. Examples of natural lakes in the Project area include Duck Lake, Deep Lake, Hunts Lake, Barney Lake, Puffer Lake, Birch Lake, and Kent’s Lake. Several man-made lakes, ponds, and small reservoirs also are found within the Project area. These surface-water features are typically used for agricultural purposes and include Taylor Pond, Moscow Reservoir, Sand Pond, Mound Pond, and Danish Reservoir (USGS 2009b).

State-Listed Impaired Waters

Several water bodies within the Project area have been identified by the State of Utah and designated as impaired waters by the EPA. These water resources may exceed federal water-quality standards for total phosphorus, selenium, dissolved solids, chlorides, and salinity and may harbor noxious aquatic plants, show signs of significant riparian habitat alteration, low-dissolved oxygen, increased water temperature, or a suite of these problematic elements. Impairment originates from many sources, including agricultural activities, urban runoff, summer home development, and recreational activities (Utah Department of Environmental Quality, Division of Water Quality 2010). These impaired waters have received growing attention from state and federal agencies as the understanding of the consequences from under-protected and over-used water resources becomes increasingly apparent.

Understanding from where pollutants originate is a developing science in the field of water-quality management. Known sources were initially identified as point source pollutants as these types of pollutants can be traced to a known source. State and federal water-quality control agencies, including the Utah Division of Water Quality and the EPA, have identified sources of pollutants and established limits to effluence using TMDLs to identify agency approved maximum allowable discharge. NPDES and UPDES have been integral in the establishment of TMDLs and identification of point source pollutants in the Project area. These actions have significantly improved water quality in Utah and the United States (U.S. General Accounting Office 1999).

Until recently, nonpoint source pollution has been subject to relatively little regulatory attention by the states and EPA. Current management of nonpoint source pollution relies on the use of design features of the Proposed Action and a number of voluntary incentive programs (U.S. General Accounting Office 1999). Determining the source of a particular type of nonpoint pollution (e.g., sedimentation, discharge of nutrients, or pathogen-harboring effluent) is highly problematic. The State of Utah is responsible for collecting and disclosing data from statistical modeling and physical investigation of potential sources of nonpoint source pollutants used in developing the state list of impaired waters.

When the state recognizes potentially impaired water, modeling and analysis data are sent to the EPA for review and validation. The EPA will often issue a recommended TMDL for the impaired water. The Utah State 303(d) list of impaired waters identifies problematic surface-water resources and their TMDL (if an EPA-issued recommended TMDL has been issued) as well as the type and source of impairment. Listed impaired waters occurring within the Project area are represented in Table 3-30.

TABLE 3-30
UTAH STATE-LISTED IMPAIRED WATERS IN THE PROJECT AREA

Impaired Water	Watershed	Identification Number	Source	State Impairment
Beaver River	Upper Beaver-Beaver Bottoms	UT-R_SEVIER_Beaver_River	Point/nonpoint source	Noxious aquatic plants Riparian habitat alteration Phosphorus Dissolved oxygen Temperature
Minersville Reservoir	Upper Beaver-Beaver Bottoms	UT-L-73	Point/nonpoint source	Noxious aquatic plants Riparian habitat alteration Phosphorus Dissolved oxygen Temperature
Puffer Lake	Upper Beaver-Beaver Bottoms	Not applicable	Point/nonpoint source	Noxious aquatic plants Riparian habitat alteration Phosphorus Dissolved oxygen Temperature
LaBaron Reservoir	Upper Beaver-Beaver Bottoms	Not applicable	Point/nonpoint source	Noxious aquatic plants Riparian habitat alteration Phosphorus Dissolved oxygen Temperature

TABLE 3-30
UTAH STATE-LISTED IMPAIRED WATERS IN THE PROJECT AREA

Impaired Water	Watershed	Identification Number	Source	State Impairment
Kent's Lake	Upper Beaver-Beaver Bottoms	Not applicable	Point/nonpoint source	Noxious aquatic plants Riparian habitat alteration Phosphorus Dissolved oxygen Temperature
Sevier River	Lower Sevier	UT-L-16030003-012	Nonpoint source	Total dissolved solids Total phosphorus
Santa Clara River	Middle and Lower Sevier	UT15010008-001	Nonpoint source	Salinity Total dissolved solids Chlorides Selenium
East Fork Sevier River	Middle Sevier	UT 16030002-005	Nonpoint source	Temperature Phosphorus
New Castle Reservoir	Escalante Desert	UT-L-16030006-008	Nonpoint source	Phosphorus Dissolved oxygen
Baker Reservoir	Upper Virgin	UT-L-15010008-008	Nonpoint source	Phosphorus

SOURCE: Environmental Protection Agency 2010d

Groundwater and Aquifers

Groundwater in the Project area is contained within two large basins. The Sevier River Basin contains 6,768,070 acres and includes parts of Beaver, Garfield, Iron, Juab, Kane, Millard, Piute, Sanpete, Sevier, and Tooele counties (UDNR-DWR 1999). The Project area from Sigurd south to Circleville at the Piute-Garfield county line is within the Sevier River Basin. The rest of the Project area, including the Black Rock, Milford, Beaver, Cedar City, and Enterprise areas, is located within the Cedar/Beaver Basin. The Cedar/Beaver Basin contains 3.6 million acres and is bordered by, and drains into, the Sevier River Basin to the east and northwest (UDNR-DWR 1995). The Cedar/Beaver Basin is separated from the Sevier River Basin by the Tushar Mountains and the Pahvant Range. Both of these basins and much of western Utah is part of a wider Great Salt Lake Desert subregion of the closed Great Basin (Prudic et al. 1995). For both the Sevier River and Cedar/Beaver basins, the primary use for groundwater is irrigation, followed by municipal and industrial needs and smaller private uses. Groundwater flow in these basins is typically from recharge areas in and adjacent to mountain ranges toward discharge areas in the valley lowlands (Prudic et al. 1995). In the Sevier River Basin, groundwater flow varies from area to area, having inflow and outflow throughout most of the area with a general trend to the west as it approaches Sevier Lake. In the Cedar/Beaver Basin, groundwater flow is generally from the eastern margin to the west and to the north.

Groundwater in the Project area is mostly in basin-fill deposits between zero and 600 feet below the ground surface. In addition, fractures in carbonate rocks located beneath the basin-fill deposits also can contain groundwater (Harrill et al. 1983; Prudic et al. 1995). The basin-fill deposits formed mostly during the Cenozoic Era and consist of alluvial sand, gravel, and silt with some finer-grained lake deposits. The basin-fill deposits usually vary between 1,000 to 5,000 feet in thickness, but could be greater than 10,000 feet in some areas (Harrill and Prudic 1998; Prudic et al. 1995). Well data show the depth to groundwater in the study corridor averages between 5 and 664 feet below the surface (USGS 2011), becoming shallower the closer the wells are to the center of topographically low parts of a valley or basin (Harrill

and Prudic 1998). The underlying carbonate rocks were deposited during the Paleozoic Era and underlie large areas in the eastern portion of the Great Basin. These carbonate rocks (Harrill et al. 1983; Harrill and Prudic 1998; Prudic et al. 1995) are highly permeable, providing conduits for the movement of groundwater (Prudic et al. 1995).

The principal aquifers in the Project area are located in basin-fill deposits, such as those found in the Cedar Valley and Milford areas. Permeable carbonate rocks also act as significant regional aquifers (Harrill et al. 1983). The Cedar/Beaver Basin contains five major aquifers, all of which are within the Project area. The Beaver Valley aquifer stores approximately 4 million acre-feet of water, mostly in the upper 200 feet of the basin-fill deposits (UDNR-DWR 1995). The Milford Valley aquifer stores approximately 10 million acre-feet of water within the upper 200 feet of the basin-fill deposits. The Parowan Valley aquifer stores approximately 20 million acre-feet of water. The Cedar Valley aquifer stores approximately 20 million acre-feet of water. The Beryl-Enterprise aquifer stores approximately 72 million acre-feet of water (UDNR-DWR 1995). The water quality of aquifers in the Cedar/Beaver Basin is generally good, with total dissolved solids typically less than 500 milligrams per liter (UDNR-DWR 1995).

The Sevier River Basin contains 19 aquifers, two of which are within the Project area. The Junction-Marysvale aquifer stores approximately 30,000 acre-feet of water (UDNR-DWR 1999). The Sevier-Sigurd aquifer stores approximately 3 million acre-feet of water. The water quality of the aquifers in the Sevier River Basin is generally good, with total dissolved solids typically less than 600 milligrams per liter, but some wells near Richfield have had total dissolved solids greater than 2,000 milligrams per liter (UDNR-DWR 1999).

Springs and Wells

Springs and wells are located throughout the Project area, with concentrations in the Blundell, Milford, and Newcastle areas. Springs are defined as places where groundwater flows naturally from a rock or the soil onto the land surface or into a body of surface water (Bates and Jackson 1987). A seep is a special kind of spring where water percolates slowly to the land surface. These water resources are primarily used for production of agricultural and municipal water. There are 6 springs and 12 wells (Table 3-31) located within 600 feet of the reference centerline for the alternative routes considered in the EIS (USGS 2009b, Utah Automated Geographic Reference Center 2010).

TABLE 3-31
SPRINGS AND WELLS IN THE PROJECT AREA

Location	Milepost	Spring	Well
Link 66	10		Utah State 31-33
Link 75	15		CalEnergy 28-3
Link 155	2		Dry Well
Link 160	2		Corral Well
Link 260	20	Irvine Spring	
Link 260	22	Mud Spring	
Link 348	1	Salt Spring	
Link 349	0		Phillips 9-1
Link 365	2		Unnamed
Link 386	2		Unnamed
Link 430	5		Unnamed
Link 438	12	Joel Spring	
Link 444	2	Unnamed spring	

TABLE 3-31
SPRINGS AND WELLS IN THE PROJECT AREA

Location	Milepost	Spring	Well
Link 444	3	Abe Spring	
Links 450, 455	1		Geothermal
Link 490	4		Horse Valley Well 1
Link 490	4		Horse Valley Well 2
Link 490	6		Marshall Well

SOURCES: U.S. Geological Survey 2009b (National Hydrography Dataset); Utah Automated Geographic Reference Center 2010

3.2.3.3 Study Methodology

Inventory

Information for the water resources inventory was obtained from scientific literature, governmental agencies, and institutions including the BLM, USFS, NRCS, EPA, FWS, FEMA, UDNR-DWR, Utah Geological Survey, and USGS. Water resources identified during inventory analysis include watersheds, perennial and intermittent streams, lakes, reservoirs, floodplains, shallow groundwater, springs, and wells. Water resources were identified within 600 feet of the reference centerline for the alternative routes considered in the EIS. This buffer was based on Utah BLM's riparian policy (Instructional Memorandum [IM] 2005-91), which states that no new surface-disturbing activities will be allowed within 328 feet (100 meters) of riparian areas. To be conservative, all water resources, including surface water, shallow groundwater, springs/seeps, and wells, were identified within 600 feet of the reference centerline for each alternative route and are included in the analysis of potential impacts on water resources in the EIS.

Impact Assessment and Mitigation Planning

For the purpose of the EIS, potential effects were evaluated for all water resources identified during the inventory process. Water resources were divided into surface water, groundwater and aquifers, and wells. Potential Project-related impacts on each category of water resources were evaluated separately.

The methodology for assessing the potential impacts on water resources associated with implementing the Project generally included (in order) (1) identifying the types of potential effects on water resources that could result from construction, operation, and maintenance of the proposed transmission line and associated facilities; (2) use of USACE- and EPA-approved parameters to identify the functions and values of water resources to classify potential environmental effects; (3) developing criteria for assessing the intensity of a potential effect on a water resource; (4) assessing the initial impacts on water resources; (5) identifying the appropriate mitigation measures (Table 3-3) for minimizing potential adverse effects; (6) determining areas where mitigation should be applied; and (7) disclosing potential residual impacts on water resources.

Types of Potential Environmental Effects

Surface Water

Impacts on surface water associated with implementation of the Project could result from placement of tower structures, access roads, or temporary work areas in identified water resources, which could require placement of temporary or permanent fill and removal of riparian vegetation. Other impacts could include

accidental spills of environmentally harmful materials, sedimentation, and contamination of surface-water resources from construction-related disturbance, fugitive dust deposition, increased soil erosion from removal of vegetation, or the introduction of herbaceous and aquatic invasive species.

Construction of permanent and temporary access roads likely would require crossing several surface-water resources. These crossings could require the placement of fill into a stream channel along with structures (e.g., bridge pilings, culverts, wing walls, etc.) that support the crossing and protect water resources. All crossings would be constructed with the minimum footprint required to transfer building materials and construction equipment. Work performed within the bed and banks and below the plane of ordinary high water mark in streams determined to be waters of the United States will require a Section 404 CWA permit issued by the USACE. The CWA requires that impacts resulting from these crossings are avoided or minimized to the extent possible. Any unavoidable impacts must be mitigated. Impacts resulting from permanent crossings would be limited to the structures placed into the streambed and potential loss of riparian vegetation on either side of the crossing.

Temporary crossings typically would be used to cross water resources with little to no stream flow or on temporary access roads. Types of temporary stream crossings would include (1) dry crossings with no bank or channel improvement; (2) mechanically grading banks to a slope sufficient to drive equipment and building materials across the channel (bank recontouring and revegetation would follow the work at the temporary crossing); (3) placement of temporary fill that would be removed following the completion of work at the site; or (4) temporary span structures. While temporary, these crossings would have the potential to affect stream morphology and ecological function. Modification of stream banks could result in removal of vegetation that could take many years to recover. The sedimentation potential would increase with the extent of disturbance and recontouring required. Depending on which type of crossing method is used, it may be necessary to obtain a stream alteration permit from the State of Utah and/or a Section 404 permit from the USACE.

Groundwater

Groundwater and aquifers located within the Project area are used for both municipal and agricultural water supply. Subsurface-water resources are typically less susceptible than surface water to impacts associated with the Proposed Action, although, if negatively affected, remedial actions are often problematic and complicated. The Project has the potential to affect subsurface-water resources in areas of shallow groundwater where placement of tower structures could come into contact with the water table. As proposed, the Project would not involve placement of hazardous material belowground and would not impede the flow or depth of underground water.

Wells

Wells providing groundwater for municipal and agricultural uses are located within the Project area. Wells also provide connectivity between surface waters and aquifers through which contamination could travel. This potential impact was considered in the impact assessment by examining the distance between each well and project elements. Wells located within 600 feet of project elements could be affected.

Criteria for Assessing Intensity of Impacts

Criteria were developed to assess the intensity of a potential effect on a water resource associated with implementation of the Project (Table 3-32). Criteria were developed to assess the intensity of potential

effects from the construction, operation, and maintenance of the Project. Assessment criteria focused on the abundance of a particular water resource component; the time in which, if affected, those resources would regenerate; the potential for permanent loss of water resources and/or associated vegetation components; federal and state statutes applicable to particular water resources; and the varying degree of importance a particular water resource has to the greater ecosystem.

TABLE 3-32
CRITERIA FOR ASSESSING INTENSITY OF IMPACTS ON WATER RESOURCES

Intensity of Impacts	Description
High	▪ Permanent loss of Palustrine Forest Overstory wetlands ▪ Permanent loss of wetlands that support federally endangered, threatened, or candidate species ▪ Construction, operation, and maintenance activities that lead to deposition of materials into state-listed impaired waters ▪ Construction, operation, and maintenance activities that impact springs or wells ▪ Placement of tower foundations in areas of shallow groundwater or aquifers
Moderate	▪ Permanent loss of Palustrine Scrub/Shrub wetlands ▪ Permanent loss of wetland habitat crucial to nesting, brooding, and overwintering wildlife species ▪ Permanent fill in waters of the United States ▪ Construction, operation, and maintenance activities that result in a permanent increase of sedimentation to nearby surface-water resources
Low	▪ Permanent loss of Palustrine Emergent wetlands ▪ Temporary loss of Palustrine Scrub/Shrub wetlands ▪ Temporary fill in waters of the United States ▪ Construction, operation, and maintenance activities that result in temporary increases in sedimentation to nearby surface-water resources

Effects Analysis

Assessment of Initial Impacts

The intensity of a potential effect on a water resource that could result from implementation of the Project is based on the susceptibility of particular water resources to impacts generated through ground-disturbing activities. Water resources identified by this analysis were differentiated into sub-categories to better represent potential impacts. Surface water was broken into three different categories: (1) major rivers (e.g., the Beaver, Sevier, and Santa Clara rivers); (2) river streams, which incorporate both perennial and intermittent streams with a vegetative component; and (3) water bodies. Surface-water resources were identified using the National Hydrography Dataset, groundwater and aquifers were identified using the shallow groundwater dataset, and wells and springs were analyzed as separate resources that were later combined for ease of discussion.

Based on the intensity of a potential effect on a water resource, initial impacts were assigned as high due to the environmental benefits and socioeconomic interests surrounding water resources (i.e., limited water quantity throughout the semi-arid landscape, critical ecological functions, and public and recreational value).

Mitigation Planning and Effectiveness

Removal of unique riparian habitat, increased sedimentation, and reduced water quality are among the primary adverse environmental effects on water resources associated with the construction, operation, and

maintenance of the proposed transmission line. In addition to the design features of the Proposed Action described as part of the Project description in Chapter 2 (Table 2-6), mitigation measures were developed to minimize adverse impacts on water resources (Mitigation Measures 2, 4, and 7 as defined in Table 3-3). Mitigation measures would be applied to all areas of high initial impact to reduce impact levels where necessary and feasible based on the Project description.

Tree clearing would be minimized (Mitigation Measure 4) within 328 feet of surface-water features, including major rivers; perennial, temporary, and ephemeral streams; and water bodies. Trees associated with water resources in the Project area typically are confined to a specific niche with a hydrologic regime and a particular soil type adequate for the establishment and long-term growth of forested wetlands. Further, because of the unique features associated to these Palustrine Forest Overstory (PFO) wetlands, the EPA and USACE regard these wetlands as highly valuable commodities due to (1) their functionality for protecting and improving water quality through dissipation of flood velocity, (2) deposition of organic material into the stream and underlying soil, and (3) the provision of habitat types utilized by a multitude of species inhabiting these wetlands or using them during crucial life stages (e.g., nesting, brooding, and overwintering). Due to the infrequency and high value of this wetland type throughout the Project area, minimizing tree clearing (Mitigation Measure 4) would reduce impacts on unique wetlands during the construction, operation, and maintenance of the Project.

Potential impacts on surface water and groundwater resources also would be minimized by locating tower structures so as to avoid sensitive features, such as wetlands, riparian areas, perennial rivers, and perennial and temporary streams, and water bodies (Mitigation Measure 7). The application of Mitigation Measure 7 would reduce soil destabilization near sensitive surface-water resources, which would result in less construction-related erosion and downstream sedimentation.

Degradation of groundwater quality and the depletion of groundwater quantity caused by construction and maintenance activities and the presence of permanent facilities would be the primary adverse environmental effects on groundwater resources associated with the implementation of the Project. Impacts on groundwater resources would be mitigated through spanning and avoidance, ensuring that no construction-related materials (e.g., concrete foundations or accidentally spilled hazardous liquids) would enter those areas. Well structures also would be avoided or spanned so no municipal or agricultural wells would be affected. The use of Mitigation Measure 7 (span or avoid sensitive features) would be applied to those areas where shallow groundwater, springs, or wells are present.

Access roads would be designed to avoid placement of permanent fill in rivers and perennial and intermittent streams, springs, and wetlands. Avoiding these sensitive water resources also would reduce the need for removing riparian or wetland vegetation (Mitigation Measure 2). Avoidance of the features would decrease soil erosion and sedimentation and preserve the functional condition of wetlands and riparian systems that provide habitat for wildlife and other aquatic species. Where construction vehicles and equipment would need to access areas within the 328 foot BLM riparian buffer, potential impacts would be avoided in the design stage and anticipated impacts would be adequately mitigated as required by the Utah BLM's riparian policy (IM 2005-091). Additionally, an erosion control plan would be implemented to minimize the potential for sedimentation. Spill prevention and containment measures would be implemented, and vehicle refueling and maintenance activities would be limited to designated work areas at least 328 feet away from all water resources, regardless of their order (i.e., perennial, temporary, or ephemeral streams; wetlands; springs; shallow groundwater; and wells). The Project would comply with the requirements of Executive Order 11988 (Floodplain Management), Executive Order 11990 (Wetland Protection), and Sections 401 and 404 of the CWA.

Residual Impacts

Residual impacts were assessed for potentially affected riparian wetlands and habitats associated with each water resource. This approach is consistent with that used by the EPA and USACE for evaluating wetland functions and values to determine adequate mitigation for actions that affect wetlands and waters of the United States.

Table 3-33 summarizes the initial impacts based on the intensity of a potential effect on water resources, the selective mitigation measures (from Table 3-3) applied to minimize potentially adverse effects on those resources, and residual impacts.

TABLE 3-33
SUMMARY OF INITIAL IMPACTS AND RESIDUAL IMPACTS

Water Resource	Initial Impact	Selective Mitigation Measures Applied	Residual Impact
Major Rivers	High	2, 4, 7	Low
River Streams	High	2, 4, 7	High/Low[1]
Shallow Groundwater	High	2, 7	Low
Springs	High	2, 7	Low
Wells	High	2, 7	Low
Water Bodies	High	2, 4, 7	Low

NOTE: [1]High impacts on those areas where components of a Palustrine Forest Overstory wetland are permanently removed. Low impacts on those areas where vegetation removal is temporary.

3.2.3.4 Results

A summary of baseline resource inventory and results of the effects analysis are presented in Tables 3-34 and 3-35 and described in this section. Table 2-11 presents a comparison of results of the effects analysis for the alternative routes, and Table 2-12 presents a summary of the information presented in Table 2-11.

No Action Alternative

Under this alternative, there would be no construction, operation, or maintenance activities associated with the Project. Current management and use of the area would continue into the reasonably foreseeable future. Impacts on water resources associated with the implementation of the Project would not occur.

Northern Area - Sigurd Substation to South of the Black Mountains

The baseline resource inventory and residual impacts for alternative routes considered in the northern area are presented in Table 3-34.

TABLE 3-34
ALTERNATIVE ROUTE COMPARISON
FOR WATER RESOURCES INVENTORY DATA AND RESIDUAL IMPACTS
BY NORTHERN ALTERNATIVE ROUTES

Alternative Route	Total Miles	Initial Impacts by Water Resources (miles crossed)						Residual Impacts (miles [percent])			
		Major River	River Stream	Shallow Groundwater	Springs[1]	Wells[1]	Water Bodies	No Identifiable	Low	Moderate	High
Alternative N1	120.6	0.7	7.8	12.8	0.7	0.1	–	–	120.6 [100.0]	–	–
Alternative N2	120.4	0.6	9.3	9.1	0.9	0.1	–	–	120.4 [100.0]	–	–
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	120.0	0.6	9.2	6.7	1.1	0.2	–	–	120.0 [100.0]	–	–
Alternative N3	117.2	1.7	9.9	–	0.6	0.2	–	–	117.2 [100.0]	–	–
Alternative N4	109.4	0.3	9.0	6.7	0.9	0.4	–	–	109.4 [100.0]	–	–
Alternative N5	106.2	1.4	9.6	–	0.6	0.5	–	–	106.2 [100.0]	–	–
Alternative N6 (Proponent's Preferred Alternative)	105.4	1.1	10.8	–	–	0.4	–	–	105.4 [100.0]	–	–

NOTE: [1]A 600-foot buffer was applied to each well and spring.

Alternative N1 – Black Rock Road to IPP North of Milford Wind Farm

Affected Environment

From the Sigurd Substation to Black Rock Road, Alternative N1 crosses 6 perennial streams, including Joe Lott Creek (Link 63); Clear and Dry creeks (Link 64); and Mill, Fish, and Shingle creeks (Link 66). Alternative N1 also crosses 17 named intermittent streams, including Willow, Cottonwood, Mortensen, South, Gooseberry, Currant, Indian, Cedar Canyon, Flat Canyon, Raphaelsen Canyon, Dry Hollow, and Dell Lott Hollow (Link 30); Sulphur (Link 305); Cove three times (Links 66, 305, and 320); and Sig Carter Hollow Dry Wash, and Spring Hollow (Link 64) creeks. Alternative N1 also crosses 22 unnamed intermittent and ephemeral drainages, the Piute Canal and an unnamed canal (Link 26), as well as the Sevier Valley Canal (Link 30). In addition, Dry Well (Link 155), Corral Well (Link 160), Utah State Well 31-33 (Link 66), and one unnamed well (Link 365) are located within 600 feet of the reference centerline.

From Black Rock Road to south of the Black Mountains, Alternative N1 crosses no perennial streams. The alternative crosses one named intermittent stream, the Beaver River (Link 365), as well as five washes: Hickory (Link 381), Moscow (Link 155), Third Canyon (Link 160), Mud Spring (Link 160), and The Big Wash (Link 381). In addition, 17 unnamed intermittent drainages are crossed by this segment of Alternative N1.

The alternative route crosses 12.8 miles of shallow groundwater (30 meters or less below the ground surface) along Links 360, 365, and 380. Three springs (Links 155, 160, and 365) are located within 600 feet of the reference centerline.

Environmental Effects

Impacts resulting from the construction, operation, and maintenance of Alternative N1 would be attributed to a potential increase of temporary sedimentation to the water resources identified under affected environment, as well as the potential placement of temporary fill in waters of the United States and the State of Utah (refer to Types of Potential Environmental Effects in Section 3.2.3.3).

Alternative N1 potentially would affect perennial and intermittent streams, rivers, canals, springs, wells, and shallow groundwater. Impacts on perennial surface-water features and canals could include sedimentation from Project-related disturbance, temporary and permanent fill associated with development of access routes, removal of riparian vegetation, bank alteration, and accidental contamination associated with spills of environmentally harmful material. Impacts on intermittent surface-water features are similar to perennial water features, although intermittent features typically have less associated riparian vegetation and subsequently are more prone to erosion and subsequent downstream sedimentation.

Impacts on springs are similar to those described for perennial surface-water features. Impacts on wells could include accidental physical damage to well structures during construction or accidental contamination of groundwater resources. These potential impacts are highly unlikely. Potential impacts on groundwater resources include accidental contamination during tower structure placement or accidental spills of environmentally harmful liquids that have the potential of percolating into shallow groundwater. Implementation of the Project would not require placement of hazardous material belowground, and shallow groundwater would be identified prior to work occurring in those areas. Impacts on groundwater would be highly unlikely due to appropriate avoidance and mitigation measures identified in the POD. Stormwater discharge of sedimentation to surface-water resources are often correlated to Project-related surface disturbance.

Alternative N1 would result in 1,099.5 acres of anticipated temporary surface disturbance, 352.6 acres of permanent disturbance, and 364.6 acres of vegetation cleared from the proposed right-of-way (Table 3-2).

Prior to the implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), high initial impacts resulting from construction, operation, and maintenance of Alternative N1 could be attributed to actions that potentially would affect shallow groundwater, springs, and wells. Avoiding springs and wells (Mitigation Measure 7) would remove the risk of impacting those resources and thus only low residual impacts are expected.

Following the proper implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), impacts on water resources associated with Alternative N1 would include 120.6 miles of low residual impacts (MV-5). High and moderate residual impacts are not anticipated for Alternative N1.

The reduction of initial impacts can be attributed to avoiding the removal of riparian vegetation that aids in bank stabilization and spanning or avoiding areas with steep slopes adjacent to streams that, when disturbed, are easily erodible by wind and precipitation. Spanning water resources with temporary crossing structures also would reduce impacts on perennial and intermittent streams due to the low level of ground disturbance necessary to install temporary crossing structures. Avoidance of springs, wells, and areas of shallow groundwater also would reduce impacts on those resources.

Alternative N2 – Black Rock Road to IPP South of Milford Wind Farm

Affected Environment

From the Sigurd Substation to Black Rock Road, Alternative N2 shares the same alignment with Alternative N1. All water resources in this portion of the alternative are the same as described for Alternative N1.

From Black Rock Road to the to the junction of Links 380 and 381, Alternative N2 runs along the west side of the Mineral Mountains (Links 345 and 450), then turns west, crossing the Beaver Bottoms (Links 385 and 386) until it meets back up with Alternative N1, approximately 6 miles north of Milford at the junction of Link 380 and 381. This portion of Alternative N2, crosses no perennial streams; 2 named intermittent streams (Negro Mag Wash, Link 450, and Beaver River, Link 386); and 39 unnamed intermittent streams.

The alternative route crosses 6.6 miles of area containing shallow groundwater along Links 160, 385, and 386. Utah State Well 31-33 (Link 66), Dry Well (Link 155), Corral Well (Link 160), an unnamed geothermal well (Link 450), and one unnamed well (Link 386) are located within 600 feet of the reference centerline.

Environmental Effects

Alternative N2 potentially would affect the same categories of water resources as Alternative N1. Residual impacts resulting from the construction, operation, and maintenance of Alternative N2 would result in low impacts similar to those described for Alternative N1. Potential impacts on water resources related to ground disturbance and vegetation clearing are discussed in Section 3.2.3.3 (refer to Types of Potential Environmental Effects).

Alternative N2 would result in 1,103.0 acres of anticipated temporary surface disturbance, 344.0 acres of permanent disturbance, and 364.6 acres of vegetation would be cleared from the proposed right-of-way (Table 3-2).

Prior to the implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), high initial impacts resulting from construction, operation, and maintenance of Alternative N2 could be attributed to actions that potentially would affect shallow groundwater and wells. Avoiding springs and wells (Mitigation Measure 7) would remove the risk of impacting those resources and thus only low residual impacts are expected.

Following proper implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), impacts on water resources associated with Alternative N2 would include 120.4 miles of low impacts (MV-5). No high or moderate residual impacts are anticipated for Alternative N2.

The reduction of initial impacts can be attributed to avoiding ground-disturbing activities that would remove soil-stabilizing vegetation in riparian areas as well as on steep slopes where the potential for erosion following ground disturbance exists. Spanning sensitive water resources such as perennial and intermittent streams with a riparian component also would reduce residual impacts on water resources. Avoidance of wells, springs, and areas of shallow groundwater would further reduce impacts on those resources. Avoidance of wells, springs, and areas of shallow groundwater would further reduce impacts on those resources.

Alternative N2-A (Route Variation of Alternative N2) – Black Rock Road to IPP South of Milford Wind Farm 1,500 Feet East of Kern River Pipeline (Agency Preferred Alternative)

Affected Environment

From the Sigurd Substation to Black Rock Road, Alternative N2-A shares the same alignment with Alternative N2. All water resources in this portion of the alternative are the same as those previously described for Alternative N1.

From Black Rock Road to south of the Black Mountains, Alternative N2-A crosses the same water resources as described for Alternative N2. Along this portion of Alternative N2-A, the transmission line route deviates from Alternative N2 to allow 1,500 feet of separation from the Kern River pipeline near the Blundell Geothermal Plant. The slight variation uses Links 348 and 455 instead of Link 450.

Utah State Well 31-33 (Link 66), Dry Well (Link 155), Corral Well (Link 160), Phillips Well 9-1 (Link 455), Geothermal Well (Link 450), one unnamed well (Link 386), and Salt Spring (Link 348) are located within 600 feet of the reference centerline of the transmission line.

Environmental Effects

Alternative N2-A would affect the same categories of water resources as Alternative N1. Residual impacts resulting from the construction, operation, and maintenance of Alternative N2-A would result in low impacts similar to those described in Alternative N1. Potential impacts on water resources related to ground disturbance and vegetation clearing are discussed in Section 3.2.3.3 (refer to Types of Potential Environmental Effects).

Alternative N2-A would result in 1,099.8 acres of anticipated temporary surface disturbance, 344.4 acres of permanent disturbance, and 362.7 acres of vegetation cleared from the proposed right-of-way (Table 3-2).

Prior to the implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), high initial impacts resulting from construction, operation, and maintenance of Alternative N2-A could be attributed to actions that potentially would affect springs and wells. Avoiding springs and wells (Mitigation Measure 7) would remove the risk of impacting those resources and thus only low impacts are expected.

Following proper implementation of Mitigation Measures, impacts on water resources associated with Alternative N2-A would include 120.0 miles of low impacts (MV-5). No high or moderate residual impacts are anticipated for Alternative N2-A.

The reduction of initial impacts can be attributed to spanning riparian areas or avoiding ground-disturbing activities that would remove soil-stabilizing vegetation in riparian areas such as at Dry Creek. Avoiding surface-disturbing activities on steep slopes like those occurring in the Dry Hollow area, where the potential for increased erosion following ground disturbance or removal of vegetation exists, also would reduce impacts.

Alternative N3 – Black Rock Road Parallel to Kern River Pipeline

Affected Environment

From the Sigurd Substation to Black Rock Road, Alternative N3 shares the same alignment with Alternative routes N1, N2, and N2-A. All water resources in this segment of the alternative route are the same as described for Alternative N1. At Black Rock Road, Alternative N3 diverts from Alternative N1 to follow the western flank of the Mineral Mountains along with Alternatives N2 and N2-A until Link 480 where Alternative N3 continues to travel south rather than crossing the Beaver Bottoms, using Links 460, 470, 475, 480, and 490 to bisect to the Black Mountains.

From Black Rock Road to the south side of the Black Mountains, Alternative N3 crosses no perennial streams or shallow groundwater. The alternative route crosses 6 named intermittent streams, including the Beaver River (Link 475); Cove Creek at two locations (Links 320 and 350); Kirk Canyon, Ranch Canyon, and Corral Canyon (Link 470); and Mud Spring Wash (Link 397). The Low Line Canal and a connector canal also are crossed. In addition, 35 unnamed intermittent drainages are crossed by this segment of Alternative N3. Utah State Well 31-33 (Link 66), Geothermal Well (Link 455), Marshall Well (Link 490), and 2 unnamed wells in Horse Valley (Link 490) are located within 600 feet of the reference centerline.

Environmental Effects

Alternative N3 potentially would affect the same categories of water resources as Alternative N1, with the exception of shallow groundwater, which would not be affected. Alternative N3 would result in 1,077.3 acres of anticipated temporary surface disturbance, 303.8 acres of permanent disturbance, and 418.1 acres of vegetation will be cleared from the proposed right-of-way (Table 3-2).

Prior to the implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), high initial impacts resulting from construction, operation, and maintenance of Alternative N3 could be attributed to actions that potentially would affect springs and wells. Avoiding springs and wells (Mitigation Measure 7) would remove the risk of impacting those resources and thus only low residual impacts are expected. Additional low residual impacts resulting from construction, operation, and maintenance of Alternative N3 would be attributed to a potential increase of temporary sedimentation in nearby surface-water resources resulting from the removal of riparian vegetation at Dry Creek and the grading of a temporary crossing at Cove Creek. Furthermore, the use of an existing crossing in Shingle Creek, which is a potential jurisdictional water of the United States, would lead to a temporary increase of sedimentation to the stream.

Following proper implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), initial impacts on water resources associated with Alternative N3 would include 117.2 miles of low impacts (MV-5). High and moderate residual impacts are not anticipated for this route.

The reduction of initial impacts can be attributed to spanning riparian areas or avoiding ground-disturbing activities that would remove soil-stabilizing vegetation in riparian areas such as at Dry Creek. Avoiding surface-disturbing activities on steep slopes like those occurring in the Dry Hollow area, where the potential for increased erosion following ground disturbance or removal of vegetation exists, also would reduce impacts.

Alternative N4 – Mineral Mountains to IPP South of Milford Wind Farm

Affected Environment

From the Sigurd Substation to Cove Fort, Alternative N4 shares the same alignment with Alternatives N1, N2, N2-A, and N3. All water resources along this segment of the alternative route are the same as described for Alternative N1.

From Cove Fort to south of the Black Mountains, Alternative N4 crosses no perennial streams. The alternative route crosses 7 named intermittent streams, including Sulphur Creek and Negro Mag Wash (Link 75); the Beaver River (Link 386); Hickory Wash (Link 381); Moscow Wash (Link 155); and Third Canyon and Mud Spring Wash (Link 160). Additionally, 23 unnamed intermittent drainages are crossed by this segment of Alternative N4. This segment of the alternative route crosses 6.7 miles of area containing shallow groundwater along Links 160, 385, and 386. Utah State Well 31-33 (Link 66), CalEnergy Well 28-3 (Link 75), Dry Well (155), Corral Well (Link 160), Phillips Well 9-1 and a geothermal well (Link 455), and one unnamed well (Link 386) are located within 600 feet of the reference centerline.

Environmental Effects

Alternative N4 potentially would affect the same categories of water resources as Alternative N1, resulting in 1,010.6 acres of anticipated temporary surface disturbance, 351.2 acres of permanent disturbance, and 370.4 acres of vegetation will be cleared from the proposed right-of-way (Table 3-2).

Prior to the implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), high initial impacts resulting from construction, operation, and maintenance of Alternative N4 could be attributed to actions that potentially would affect areas of shallow groundwater and wells. Avoiding shallow groundwater and wells (Mitigation Measure 7) would remove the risk of impacting those resources and thus only low residual impacts are expected. Additional low residual impacts resulting from construction, operation, and maintenance of Alternative N4 would be attributed to a potential increase of temporary sedimentation in nearby surface-water resources resulting from the removal of riparian vegetation at Dry Creek and from grading temporary crossings at multiple intermittent or ephemeral streams. Furthermore, the using an existing crossing through Shingle Creek, a perennial stream and a potential jurisdictional water of the United States, would lead to a temporary increase of sedimentation to the stream.

Following proper implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), impacts on water resources associated with Alternative N4 would include 109.4 miles of low residual impacts (MV-5). High and moderate residual impacts are not expected for Alternative N4.

The reduction of initial impacts can be attributed to spanning riparian areas or avoiding ground-disturbing activities that would remove soil-stabilizing vegetation in riparian areas such as at Dry Creek. Avoiding surface-disturbing activities on steep slopes like those occurring in the Dry Hollow area, where the potential for increased erosion following ground disturbance or removal of vegetation exists, also would reduce impacts. Spanning or avoiding the wells and springs also would reduce impacts on those resources.

Alternative N5 – Mineral Mountains Parallel to Kern River Pipeline

Affected Environment

From the Sigurd Substation to Cove Fort, Alternative N5 shares the same alignment with Alternative routes N1, N2, N3, and N4. All water resources in this portion of the alternative route are the same as described for Alternative N1.

From Cove Fort to south of the Black Mountains, Alternative N5 crosses no perennial streams. The alternative route crosses 6 named intermittent streams, including Sulphur Creek and Negro Mag Wash (Link 75); Ranch Canyon and Corral Canyon (Link 470); Beaver River (Link 475); and Mud Spring Wash (Link 397). Additionally 30 unnamed intermittent drainages are crossed by this segment of Alternative N5. This segment of the alternative route crosses no shallow groundwater. Utah State Well 31-33 (Link 66), CalEnergy Well 28-3 (Link 75), Phillips Well 9-1 (Link 455), Geothermal Well (Link 455), Marshall Well, and two wells in Horse Valley (Link 490) are located within 600 feet of the reference centerline. All springs are avoided by Alternative N5.

Environmental Effects

Alternative N5 potentially would affect the same categories of water resources as Alternative N1, with the exception of shallow groundwater, which would not be affected. Alternative N5 would result in 985.4 acres of anticipated temporary surface disturbance and 311.0 acres of permanent disturbance, and 423.8 acres of vegetation cleared from the proposed right-of-way (Table 3-2).

Prior to the implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), high initial impacts resulting from construction, operation, and maintenance of Alternative N5 could be attributed to actions that potentially would affect wells. Avoiding wells (Mitigation Measure 7) would remove the risk of impacting those resources and thus only low residual impacts are expected. Additional low residual impacts resulting from construction, operation, and maintenance of Alternative N5 would be attributed to a potential increase of temporary sedimentation in nearby surface-water resources resulting from the removal of riparian vegetation at Dry Creek and from grading temporary crossings at multiple intermittent or ephemeral streams. Avoiding surface-disturbing activities on steep slopes like those occurring in the Dry Hollow area, where the potential for increased erosion following ground disturbance or removal of vegetation exists, also would reduce impacts. Furthermore, the using an existing crossing through Shingle Creek, a perennial stream and a potential jurisdictional water of the United States, would lead to a temporary increase of sedimentation to the stream. Spanning or avoiding wells and springs also would reduce impacts on those resources.

Following proper implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), impacts on water resources associated with Alternative N5 would include 106.2 miles of low residual impacts (MV-5). High and moderate residual impacts are not anticipated for Alternative N5.

Alternative N6 – Mineral Mountains 1,500 Feet East of Kern River Pipeline (Proponent's Preferred Alternative)

Affected Environment

From the Sigurd Substation to Cove Fort, Alternative N6 shares the same alignment with Alternative routes N1, N2, N3, N4, and N5, with the exception that Alternative N6 follows Links 25 and 27 instead of

Link 26 (MV-5). Water resources are the same as described for Alternative N1, with the exception that the Piute Canal crossed by Link 26 is now crossed by Link 25, and there is one less unnamed intermittent stream crossed by the alternative route.

From Cove Fort to south of the Black Mountains, Alternative N6 affects the same water resources as Alternative N1, with the exception that Alternative N6 crosses four additional unnamed intermittent streams and avoids a geothermal well, the Marshall Well, and the two Horse Valley wells.

Environmental Effects

Alternative N6 potentially would affect the same categories of water resources as Alternative N1, with the exception of shallow groundwater, which would not be affected. Impacts on these resources would be similar to those described in Alternative N5. Alternative N6 would result in 977.3 acres of anticipated temporary surface disturbance, 371.2 acres of permanent disturbance, and 481.1 acres of vegetation cleared from the proposed right-of-way (Table 3-2).

Following proper implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), impacts on water resources associated with Alternative N6 would include 105.4 miles of low residual impacts (MV-5). High and moderate residual impacts are not anticipated for Alternative N6.

Low residual impacts resulting from construction, operation, and maintenance of Alternative N6 would be attributed to a potential increase of temporary sedimentation in nearby surface-water resources resulting from the removal of riparian vegetation at Dry Creek and from grading temporary crossings at multiple intermittent or ephemeral streams. Avoiding surface-disturbing activities on steep slopes like those occurring in the Dry Hollow area, where the potential for increased erosion following ground disturbance or removal of vegetation, exists also would reduce impacts. Furthermore, the using an existing crossing through Shingle Creek, a perennial stream and a potential jurisdictional water of the United States, would lead to a temporary increase of sedimentation to the stream. Avoidance of springs, wells, and areas of shallow groundwater also would reduce impacts on those resources.

Southern Area – South of the Black Mountains to Red Butte Substation

The baseline resource inventory and residual impacts for alternative routes considered in the southern area are presented in Table 3-35.

Alternative S1 – Pinto Creek

Affected Environment

Alternative S1 crosses 3 perennial streams, including Little Pinto Creek (Link 245), 2 crossings of Pinto Creek (Links 245, 260), and 2 crossings of the Santa Clara River (Link 260). The alternative route also crosses 10 named intermittent streams, including Iron Springs Creek and Dick Palmer Wash (Link 165); Urie Hollow, Chloride Canyon, and Bullion Canyon (Link 220); Wheat Grass Canyon, Grassy Flat Canyon, Lark Canyon, Mahogany Creek, and Kane Spring Canyon (Link 260), as well as 20 unnamed intermittent streams. In addition, the alternative route crosses no areas of shallow groundwater. Irvine and Mud springs (Link 260) are located within 600 feet of the reference centerline.

TABLE 3-35
ALTERNATIVE ROUTE COMPARISON
FOR WATER RESOURCES INVENTORY DATA AND RESIDUAL IMPACTS
BY SOUTHERN ALTERNATIVE ROUTES

Alternative Route	Total Miles	Initial Impacts by Water Resource (miles crossed)						Residual Impacts (miles [percent])			
		Major River	River Stream	Shallow Groundwater	Springs[1]	Wells[1]	Water Bodies	No Identifiable	Low	Moderate	High
Alternative S1	55.9	1.0	3.6		0.1	0.2	–	–	55.7 [99.6]	–	0.2 [0.4]
Alternative S2	49.6	–	3.4	–	0.4	–	–	–	49.6 [100.0]	–	–
Alternative S3	57.4	–	3.8	–		–	–	–	57.4 [100.0]	–	–
Alternative S4	48.9	–	2.5	–	–	–	–	–	48.9 [100.0]	–	–
Alternative S5 (Proponent's Preferred Alternative)	59.0	1.0	4.3	–	0.5	0.2	–	–	58.8 [99.6]	–	0.2 [0.4]
Alternative S6	61.8	0.2	4.5	–	0.4	–	–	–	61.6 [99.7]	–	0.2 [0.3]
Alternative S7	49.8	–	2.3	–	–	–	–	–	49.8 [100.0]	–	–
Alternative S7-A (route variation of S7) (Agency Preferred Alternative)	49.8	–	2.4	–	–	–	–	–	49.8 [100.0]	–	–

NOTE: [1]A 600-foot buffer was placed around each spring and well.

Environmental Effects

Alternative S1 potentially would affect the same categories of water resources as Alternative N1, with the exception of shallow groundwater and wells, which would not be affected. Alternative S1 would result in 526.0 acres of anticipated temporary surface disturbance, 195.6 acres of permanent disturbance, and 330.3 acres of vegetation cleared from the proposed right-of-way (Table 3-2).

Following proper implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), impacts on water resources associated with Alternative S1 would include 0.2 mile of high impacts and 55.7 miles of low residual impacts (MV-5). Moderate impacts are not anticipated for Alternative S1.

High residual impacts resulting from construction, operation, and maintenance of Alternative S1 would be attributed to actions that potentially would result in the loss of PFO wetlands, the loss of wetlands that support a federally listed endangered species (southwestern willow flycatcher (*Empidonax traillii extimus*), activities that may result in the deposition of materials into state-listed impaired waters (Pinto Creek and Santa Clara River), and impacts on springs along the alignment. Low residual impacts resulting from construction, operation, and maintenance of Alternative S1 would be attributed to permanent loss of Palustrine Emergent (PEM) wetlands and temporary loss of Palustrine Scrub/Shrub (PSS) wetlands along the Pinto Creek Valley. Low residual impacts also would be attributed to the placement of temporary fill

in potential jurisdictional waters of the United States that temporarily increases sedimentation to those waters.

Alternative S2 – IPP West

Affected Environment

Alternative S2 crosses the same water resources as Alternative S1 north of State Highway 56. South of Highway 56, Alternative S2 crosses 1 perennial stream, Spring Creek (Link 443); 3 named intermittent streams, including Pinto Creek (Link 221), Iron Springs (Link 165), and California Hollow (Link 275); and 17 unnamed streams. The alternative route crosses one unnamed intermittent water body (Link 443). The alternative route crosses no areas containing shallow groundwater. Abe Spring and 1 unnamed spring along Link 444 are located within 600 feet of the reference centerline.

Environmental Effects

Alternative S2 potentially would affect the same categories of water resources as Alternative N1, with the exception of wells, which would not be affected. Alternative S2 would result in 499.3 acres of anticipated temporary surface disturbance, 157.9 acres of permanent disturbance, and 184.2 acres of vegetation cleared from the proposed right-of-way (Table 3-2).

Following proper implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), impacts on water resources associated with Alternative S2 would include 49.6 miles of low residual impacts (MV-5). High and moderate residual impacts are not anticipated for Alternative S2.

Low residual impacts resulting from construction, operation, and maintenance of Alternative S2 would be attributed to a potential increase of temporary sedimentation in nearby surface-water resources, as well as the placement of temporary fill in waters of the United States and the State of Utah. Both high and low impacts can be minimized or even avoided through the proper implementation of Mitigation Measures 2, 4, and 7 by spanning sensitive features or avoiding ground-disturbing activities in proximity to the sensitive water resources.

Alternative S3 – Ox Valley

Affected Environment

Alternative S3 crosses the same water resources as Alternative S1 north of State Highway 56. South of Highway 56, Alternative S3 crosses 1 perennial stream, Twin Spring Creek (Link 285). The alternative route also crosses 8 named intermittent streams, including Pinto, Holt Canyon, and Cottonwood Wash (Link 280); Twin Springs Creek. Bulrush Creek, Ox Valley Canyon, Hardscrabble Hollow (Link 285); and Mogotsu Creek (Link 290). In addition, 15 unnamed intermittent drainages also are crossed by Alternative S3 south of Highway 56. No springs or wells are located within 600 feet of the reference centerline.

Environmental Effects

Alternative S3 potentially would affect the same categories of water resources as Alternative N1, with the exception of springs, wells, and canals, which would not be affected. Alternative S3 would result in 536.9

acres of anticipated temporary surface disturbance, 223.4 acres of permanent disturbance, and 339.8 acres of vegetation cleared from the proposed right-of-way (Table 3-2).

Following proper implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), impacts on water resources associated with Alternative S3 would include 57.4 miles of low residual impacts (MV-5). High and moderate residual impacts are not anticipated for Alternative S3.

Low residual impacts resulting from construction, operation, and maintenance of Alternative S3 would be attributed to the potential placement of temporary fill in potential jurisdictional waters of the United States, which in turn could result in temporarily increased sedimentation to nearby surface-water resources (e.g., Twin Spring Creek, Bulrush Creek, etc.). Low impacts can be minimized or even avoided through the proper implementation of Mitigation Measures 2, 4, and 7 by spanning sensitive features or avoiding ground-disturbing activities in proximity to the sensitive water resources.

Alternative S4 – IPP East

Affected Environment

Alternative S4 crosses the same water resources as Alternative S1 north of State Highway 56. South of Highway 56, Alternative S4 crosses 1 perennial stream, Spring Creek (Link 270), and 3 named intermittent streams: Pinto Creek (Link 221), Dan Sill Creek (Link 270), and California Hollow (Link 275). Additionally, 14 unnamed intermittent streams are crossed. No shallow groundwater, springs, or wells are located within 600 feet of the reference centerline.

Following the public comment period, a concerned citizen of Central, Utah, raised a question of why the Kane Spring was not addressed in this analysis. In regards to this concern, correspondence with the Dixie Deer Special Service District has been conducted and the locations of Central's two municipal wells have been identified. These wells are not within 600 feet of the Project centerline and thus are not considered in the impact analysis. The water district manager had no prior knowledge of the Kane Spring but did indicate a few people got water from an active spring approximately 7.5 miles south of Central, which also falls outside the study corridor.

Environmental Effects

Alternative S4 potentially would affect the same categories of water resources as Alternative N1, with the exception of wells, springs, shallow groundwater, and canals, which would not be affected. Alternative S4 would result in 547.9 acres of anticipated temporary surface disturbance, 147.0 acres of permanent disturbance, and 320.3 acres of vegetation cleared from the proposed right-of-way (Table 3-2).

Following proper implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), impacts on water resources associated with Alternative S4 would include 48.9 miles of low impacts (MV-5).

Alternative S4 potentially would affect the same categories of water resources as Alternative N1, with the exception of wells, springs, shallow groundwater, and canals, which would not be affected. Low residual impacts resulting from construction, operation, and maintenance of Alternative S4 would be attributed to the potential placement of temporary fill in potential jurisdictional waters of the United States which in turn could result in temporarily increased sedimentation to nearby surface-water resources (e.g., Pinto Creek, Spring Creek, Dan Sill Creek, etc.). Low impacts could be minimized or even avoided through the

proper implementation of Mitigation Measures 2, 4, and 7 by spanning sensitive features or avoiding ground-disturbing activities in proximity to the sensitive water resources.

Impacts on State-listed Impaired Waters

Temporary and permanent impacts on water resources along Alternative S4 are possible. Both watersheds crossed by the alternative contain state-listed impaired waters. This could prove problematic in that TMDL limits set by the EPA to protect and improve water quality could limit the amount of ground-disturbing work that can be done in the upper tributaries of these protected waters, if it is assumed this action would have detrimental effects on the downstream impaired waters.

If Alternative S4 is constructed, ground disturbance related to the construction of the transmission line potentially would increase erosion, which could lead to an increased level of total dissolved solids being discharged into the impaired water. Clearing the pinyon-juniper forest along the right-of-way would decrease canopy cover. This clearing activity could result in a decrease in shade over tributaries, effectively heating the water, which could be a source of impairment to the state-listed waters.

If appropriate measures are taken during the construction of the transmission line, most effects on state-listed impaired waters, as well as the municipal and agricultural needs of citizens living downstream, can be avoided and/or mitigated to acceptable levels.

Alternative S5 – Iron Springs and Pinto Creek (Proponent's Preferred Alternative)

Affected Environment

Alternative S5 crosses 4 named intermittent streams north of Highway 56, including Iron Springs Creek (Link 435); the Big Wash twice, Joel Spring Canyon, and Silver Canyon (Link 438); and 7 unnamed intermittent streams. Joel Spring (Link 438) and 1 unnamed well at Link 430 are located within 600 feet of the reference centerline north of Highway 56. South of Highway 56, Alternative S5 shares the same alignment as Alternative S1 and impacts on water resources would be the same up to the termination of both alternatives at the Red Butte Substation.

Environmental Effects

Alternative S5 potentially would affect the same categories of water resources as Alternative N1, with the exception of wells, shallow groundwater, and canals, which would not be affected. Alternative S5 would result in 553.2 acres of anticipated temporary surface disturbance and 197.1 acres of permanent disturbance, and 423.8 acres of vegetation cleared from the proposed right-of-way (Table 3-2)

Following proper implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), impacts on water resources associated with Alternative S5 would include 0.2 mile of high residual impacts and 58.8 miles of low residual impacts (MV-5). Moderate impacts are not anticipated for Alternative S5.

High residual impacts resulting from construction, operation, and maintenance of Alternative S5 would be attributed to actions that potentially would result in the loss of PFO wetlands and the loss of wetlands that support a federally listed endangered species along the Pinto River Valley. High residual impacts also could be attributed to activities that result in the deposition of materials into state-listed impaired waters (i.e., Pinto River and Santa Clara River), and impacts on springs and wells along the alignment. Low

residual impacts resulting from construction, operation, and maintenance of Alternative S5 would be attributed to the permanent loss of PEM wetlands and temporary loss of PSS wetlands in the Pinto Creek Valley. Additionally, temporary fill in potential jurisdictional waters of the United States resulting in temporary increases in sedimentation to nearby surface-water resources also could create low-level impacts along Alternative S5. Impacts can be minimized or even avoided through the proper implementation of Mitigation Measures 2, 4, and 7 by spanning sensitive features or avoiding ground-disturbing activities in proximity to the sensitive water resources.

Alternative S5 has the second largest anticipated surface disturbance and could result in more sedimentation and stormwater discharge to surface-water resources than other alternative routes.

Alternative S6 – Iron Springs and Ox Valley

Affected Environment

Alternative S6 shares the same alignment as Alternative S5 north of State Highway 56 and would affect the same water resources as Alternative S5. South of Highway 56, Alternative S6 crosses 3 perennial streams, including Little Pinto and Pinto creeks (Link 245) and Spring Creek (285). The alternative route also crosses 7 named intermittent streams, including Holt Canyon and Cottonwood Wash (Link 280); Twin Springs Creek, twice on Bulrush Creek, Ox Valley Canyon, and Hardscrabble Hollow (Link 285); and Mogotsu Creek (Link 290). Additionally, 16 unnamed intermittent drainages are crossed by Alternative S6 south of Highway 56.

Environmental Effects

Alternative S6 potentially would affect the same categories of water resources as Alternative N1, with the exception of wells, shallow groundwater, and canals, which would not be affected. Alternative S6 would result in 573.5 acres of anticipated temporary surface disturbance, 228.3 acres of permanent disturbance, and 460.1 acres of vegetation cleared from the proposed right-of-way (Table 3-2).

Following proper implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), impacts on water resources associated with Alternative S6 would include 0.2 mile of high impacts and 61.6 miles of low residual impacts (MV-5). Moderate impacts are not anticipated for Alternative S6.

High residual impacts resulting from construction, operation, and maintenance of Alternative S6 would be attributed to actions potentially resulting in the loss of PFO wetlands along the Pinto River Valley and the loss of wetlands supporting a federally listed endangered species near Newcastle Reservoir, activities that may result in the deposition of materials into state-listed impaired waters (i.e., Pinto Creek and Santa Clara River), and impacts on springs. Low residual impacts resulting from construction, operation, and maintenance of Alternative S6 would be attributed to permanent loss of PEM wetlands and a temporary loss of PSS wetlands in the Pinto Creek Valley. Additionally, temporary fill in potential jurisdictional waters of the United States resulting in temporary increases in sedimentation to nearby surface-water resources also could create low-level impacts along Alternative S5. High and low residual impacts can be minimized or even avoided through the proper implementation of Mitigation Measures 2, 4, and 7 by spanning sensitive features or avoiding ground-disturbing activities in proximity to the sensitive water resources.

Alternative S6 has the largest anticipated surface disturbance and could result in more sedimentation and stormwater discharge to surface-water resources than other southern alternative routes.

Alternative S7 – Middle Hybrid Route

Affected Environment

Alternative S7 shares the same alignment as Alternative S1 north of State Highway 56 and would affect the same water resources as Alternative S1. South of Highway 57, Alternative S7 crosses 1 perennial stream, Spring Creek (Link 270), and 3 named intermittent streams, including Pinto Creek (Link 221), Dan Sill Creek (Link 270), and California Hollow (Link 275). Additionally, 15 unnamed intermittent streams are crossed and no springs or wells are located within 600 feet of the reference centerline. Alternative S7 crosses the Upper Virgin Watershed (HUC 15010008). This watershed includes tributaries that support agricultural and municipal water needs of multiple communities, including the towns of Central, Pine Valley, Gunlock, and St. George (USGS 2009b).

Environmental Effects

Alternative S7 would result in 518.7 acres of anticipated temporary surface disturbance, 162.6 acres of permanent disturbance, and 234.4 acres of vegetation cleared from the proposed right-of-way (Table 3-2).

Following proper implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), impacts on water resources associated with Alternative S7 would include 49.8 miles of low impacts (MV-5). High and moderate impacts are not anticipated for Alternative S7.

Impacts on State-listed Impaired Waters

Temporary and permanent impacts on state-listed waters (tributaries of the Santa Clara River) within the Upper Virgin Watershed are expected if Alternative S7 is constructed. Ground disturbance related to construction and maintenance of the transmission line potentially would increase erosion in disturbed areas and would reduce permeability of soils where compacted, potentially contributing to an increased level of total dissolved solids, salinity, chlorides, and selenium being discharged into the Santa Clara River. This potentially could exceed effluent limits set by the EPA.

If Mitigation Measures 2, 4, and 7 (Table 3-3) are implemented appropriately during the construction of the transmission line, most effects on state-listed impaired waters, as well as the municipal and agricultural needs of citizens living downstream, can be avoided and/or mitigated to acceptable levels.

Alternative S7-A (Route Variation of Alternative S7) – Middle Hybrid Route 300 Feet East of Sigurd to Red Butte No. 1 Transmission Line Adjacent to Atchinson IRA (Agency Preferred Alternative)

Affected Environment

Alternative S7-A shares the same alignment as Alternative S1 north of State Highway 56 and would affect the same water resources as Alternative S1. South of Highway 57, Alternative S7 crosses 1 perennial stream, Spring Creek (Link 270), and 3 named intermittent streams, including Pinto Creek (Link 221), Dan Sill Creek (Link 270), and California Hollow (Link 275). Additionally, 16 unnamed intermittent streams are crossed and no springs or wells are located within 600 feet of the reference centerline.

Environmental Effects

Alternative S7-A would result in 506.2 acres of anticipated temporary surface disturbance, 161.7 acres of permanent disturbance, and 226.8 acres of vegetation cleared from the proposed right-of-way (Table 3-2).

Following proper implementation of Mitigation Measures 2, 4, and 7 (Table 3-3), impacts on water resources associated with Alternative S7-A would include 49.8 miles of low impacts (MV-5). High and moderate impacts are not anticipated for Alternative S7.

Impacts on State-listed Impaired Waters

Temporary and permanent impacts on state-listed impaired waters are possible if Alternative S7-A is constructed. Alternative S7-A is within the Upper Virgin Watershed, which contains a state-listed impaired water (Santa Clara River) that has the potential for being affected by construction and maintenance activities. If constructed, ground disturbance related to the construction and maintenance of the transmission line potentially would increase erosion in disturbed areas and would reduce permeability of soils where compacted, potentially contributing to an increased level of total dissolved solids, salinity, chlorides, and selenium being discharged into the Santa Clara River. This potentially could exceed effluent limits set by the EPA.

If Mitigation Measures 2, 4, and 7 (Table 3-3) are implemented appropriately during the construction of the transmission line, most effects on state-listed impaired waters, as well as the municipal and agricultural needs of citizens living downstream, can be avoided and/or mitigated to acceptable levels.

3.2.3.5 Summary

By implementing design features of the proposed Project, permanent and temporary impacts on surface-water quality and groundwater quality and quantity could be reduced or minimized. Implementation of the Project would result in both high and low residual impacts. High residual impacts would be limited, resulting from construction, operation, and maintenance of the proposed Project. These impacts would be attributed to actions that potentially would result in the permanent loss of PFO wetlands and the loss of wetlands that support a federally listed endangered species; activities that could result in the deposition of materials into state-listed impaired waters; and impacts on springs, wells, and shallow groundwater or aquifers along the alignment. Moderate residual impacts are not anticipated for the Project. Low residual impacts resulting from construction, operation, and maintenance of the proposed Project would be attributed to permanent loss of PEM wetlands, temporary loss of PSS wetlands, and temporarily filling waters of the United States that subsequently would result in temporary increases in sedimentation to nearby surface-water resources.

All alternative routes considered for the northern area share very similar attributes, and impacts on water resources would not differ much across these alternatives. All residual impacts in the northern area would be anticipated to be low. The least surface disturbance and the least overall impacts on all water-resource types would be anticipated from selection of Alternatives N5 or N6. Alternative N3 would be anticipated to have higher impacts on rivers and streams but no identifiable impacts on shallow groundwater and the least permanent surface disturbance. Alternative N3 would have the least overall impacts on all water resource types.

In the southern area, impacts on water resources would vary more among the alternative routes considered. Construction of Alternatives S1, S5, and S6 would require the placement of permanent fill in

emergent wetlands and waters of the United States, the permanent removal of PSS wetlands, and the clearing of old-grown PFS wetlands considered by the USACE and EPA to be a unique and valuable resource. Additionally, these alternative routes could require access roads or overland access routes to be located in proximity to state-listed impaired waters, potentially increasing sediment load and further deteriorating the quality of those protected waters. However, high residual impacts associated with construction of these alternatives would be 0.2 mile for Alternatives S1, S5, and S6. In the southern Project area, Alternative S4 would be anticipated to have the lowest overall impact on water resources.

3.2.4 Biological Resources

3.2.4.1 Introduction

Issues raised by the public and agencies during Project scoping and preparation of the EIS include the effects of the Project on Utah prairie dog colonies, greater sage-grouse, high-priority habitats, viability of species in the Project area, habitat integrity, burrowing owl, mule deer, riparian areas, wetlands, and sensitive plant populations. Fragmentation of raptor habitats, alteration of prey availability, disturbance to raptors during sensitive periods, and raptor electrocution on transmission lines were raised as raptor-related issues. Other issues raised during the scoping process include the effects of the Project on the spread of noxious weeds and invasive species and the degree to which potential impacts could be mitigated through the use of design features of the Proposed Action and mitigation measures.

3.2.4.2 Regulatory Framework

Implementation of the Proposed Action would be consistent with statutes, regulations, plans, programs, and policies of affiliated tribes, federal agencies, and state and local governments.

Federal

- The ESA (16 U.S.C. 1531 - 1544), as amended, provides broad protection for species of fish, wildlife, and plants listed as threatened or endangered by the FWS. Provisions are made for listing species, as well as for recovery plans and the designation of critical habitat for listed species. All federal agencies in consultation with and with the assistance of the FWS, also must use their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of listed species. All federal agencies, in consultation with, and with the assistance of, the FWS must ensure any action authorized, funded, or carried out by federal agency is not likely to jeopardize the continued existence of an endangered, threatened, or proposed listed species, or result in destruction or adverse modification of a critical habitat of a species. Agencies are required to use the best scientific and commercial data available to fulfill this charge.

- The Migratory Bird Treaty Act of 1918 (16 U.S.C. 703 - 712) provides it is unlawful to pursue, hunt, take, capture, or kill; attempt to take, capture, or kill; possess any migratory bird, part, nest, egg or product, manufactured or not.

- The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d) prohibits the “taking” or possession or any commerce of bald or golden eagles. The definition of “take” includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.

- The FLPMA, as amended, consolidates and articulates BLM and USFS management responsibilities and governs most uses of the federal lands, including authorization to grant or renew rights-of-way. In accordance with FLPMA, BLM, and USFS must make land use decisions based on principles of multiple use and sustained yield. As such, a grant of right-of-way must be limited to its necessary use and must contain terms and conditions that reflect the agencies' management responsibilities under FLPMA, including minimizing impacts on fish and wildlife habitat.

- The Wild Free-Roaming Horses and Burros Act of 1971 (Public Law 92-195) declares wild free-roaming horses and burros are living symbols of the historic and pioneer spirit of the West; they contribute to the diversity of life forms within the nation and enrich the lives of the American people; and these horses and burros are fast disappearing from the American scene. It is the policy of the Congress that wild free-roaming horses and burros shall be protected from capture, branding, harassment, or death; and to accomplish this they are to be considered in the area where presently found, as an integral part of the natural system of the public lands.

- The National Forest Management Act of 1976, as amended, and its implementing regulations under 36 CFR 219, consolidate and articulate USFS management responsibilities for lands and resources of the National Forest System. The National Forest Management Act requires each national forest develops a management program based on multiple-use, sustained-yield principles, and implement a land management plan for each unit of the National Forest System. The implementing regulations at the time the current forest plans were approved required the identification of Management Indicator Species (MIS) (36 CFR 219.19, published as 36 CFR Parts 200 to 299, July 1, 2000, edition). MIS were selected because their population changes were believed to indicate the effects of management activities on habitats of other species of selected major biological communities or water quality. The land management plan established objectives for the maintenance and improvement of habitat for the MIS.

- The BLM Washington Office Instructional Bulletin (WO-IB) 2012-097 states current BLM policy for any cutting or removal of timber, trees or vegetative resources, including such resources located within the clearing limits of rights-of-way.

- The BLM UT-IM-2005-091 provides the Utah BLM Riparian Management Policy aimed at identifying, maintaining, restoring, and/or improving riparian values to achieve a healthy and productive ecological condition for maximum long-term benefits and overall watershed protection while allowing for reasonable resource uses.

- The BLM UT-IM-2010-071 identifies management actions necessary at some sites to ensure environmentally responsible exploration, authorization, leasing, and development of renewable and nonrenewable energy resources within the ranges of the Gunnison sage-grouse and greater sage-grouse.

- BLM Manual 6840 provides BLM's special status species management policy and guidance for the conservation of special status species and their habitats. Under this policy, special status species include animal and plant species listed as threatened or endangered, proposed for listing, or candidates for listing under the provisions of the ESA; those listed as sensitive species by a state; and those listed by a BLM State Director as sensitive. The objective of this policy is to ensure actions requiring authorization or approval by the BLM are consistent with the conservation needs of special status species and do not contribute to the need to list any special status species, under provisions of the ESA.

- USFS Manual 2670 directs each Regional Forester to designate sensitive species on public lands administered by USFS. Per the manual, sensitive species are defined "as plant or animal species identified by a Regional Forester for which population viability is a concern, as evidenced by a significant current or predicted downward trend in population numbers or density, or significant current or predicted downward trends in habitat capability that would reduce an existing distribution of the species."

- The *Roadless Area Conservation Rule of 2001* (RACR) (36 CFR Part 294) was adopted by the USDA to "establish prohibitions on road construction, road reconstruction, and timber harvesting in IRAs on National Forest System lands" (USDA 2001). The rule established criteria for identifying IRAs and prescribed management for road construction and timber harvesting. Pursuant to the *Roadless Area Review and Evaluation (RARE) II of 1979*, the USFS identified IRAs in national forests across the nation, which were incorporated into the *Roadless Area Conservation Rule of 2001*, to prevent the fragmentation of pristine, sensitive, and roadless areas due to road construction or timber harvesting (USDA 2001).Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, directs federal agencies to take certain actions to further implement the Migratory Bird Treaty Act (16 U.S.C. 703-711). The federal agencies are directed to develop and implement a Memorandum of Understanding with the FWS to promote conservation of migratory bird populations. Forest Service Agreement #08-MU-1113-2400-264 *Memorandum of Understanding Between the U.S. Department of Agriculture Forest Service and the U.S. Fish and Wildlife Service to Promote the Conservation of Migratory Birds* identifies specific activities where cooperation between these parties will contribute to the conservation of migratory birds and their habitats. The BLM *Memorandum of Understanding Between the Bureau of Land Management and the U.S. Fish and Wildlife Service to Promote the Conservation of Migratory Birds* outlines a collaborative approach to promote the conservation of migratory bird populations and is intended to strengthen migratory bird conservation efforts by identifying and implementing strategies to promote conservation and reduce or eliminate adverse impacts on migratory birds through enhanced collaboration between the BLM and the FWS, in coordination with state, tribal, and local governments.

- Executive Order 13112 (*Invasive Species*) requires federal agencies prevent the introduction and spread of invasive species and prohibits their authorization of actions that would be likely to cause or promote the introduction or spread of invasive species.

- Executive Order 11990 (Wetlands) requires federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out an agency's responsibilities.

- LRMPs, as amended, for the Dixie (1986) and Fishlake (1986) National Forests identify goals for forest health and constraints on resource uses to meet these goals. LRMPs also identify project restrictions to protect fish and wildlife and MIS for each forest.

- BLM RMPs and Management Framework Plans, including the Richfield Field Office ROD and Approved Resource Management Plan (2008), the Warm Springs Resource Area Resource Management Plan, ROD Rangeland Program Summary (1987), the Pinyon Management Framework Plan (1983), and the Cedar/Beaver/Garfield/Antimony Resource Area Resource Management Plan (as amended) (1986), specify regulations and goals for management of BLM-administered lands and set restrictions to protect fish and wildlife and the habitats on which they depend.

- The BLM WO IM 2012-043 provides interim conservation policies and procedures to the BLM field officials to be applied to ongoing and proposed authorizations and activities that affect the greater sage-grouse (*Centrocerus urophasianus*) and its habitat while the BLM develops and decides how to best incorporate long-term conservation measures into applicable land use plans.

State

- Section 23-14-1 of the Utah State Code directs the Utah Division of Wildlife Resources (UDWR) to protect, propagate, manage, conserve, and distribute protected wildlife throughout the state. This statute also authorizes UDWR to identify and delineate crucial seasonal wildlife habitats.

- UAC R657-48 directs the UDWR to maintain a Utah Sensitive Species List that identifies plant and animal species (1) listed, or candidates for listing, pursuant to the ESA; (2) for which a conservation agreement is in place; or (3) whose population viability is threatened in Utah (i.e., wildlife species of concern). Timely and appropriate conservation actions implemented on behalf of species listed on the Utah Sensitive Species List will preclude the need to list these species under the provisions of the federal ESA.

- Utah Noxious Weed Act (Rule R68-9) officially designates the list of weeds as noxious for the State of Utah, equipment capable of disseminating those weeds, and treatments considered to prevent dissemination of weed seeds or parts of noxious weed plants that could cause new growth by contaminated equipment, as per the authority vested in the Commissioner of Agriculture and Food under Section 4-17-3.

- Utah Partners in Flight Avian Conservation Strategy, Version 2.0 prioritizes avian species and their habitats and sets objectives designed to determine which species are most in need of immediate and continuing conservation effort. The other purpose of the strategy is to recommend appropriate conservation actions required to accomplish stated objectives.

- Utah Comprehensive Wildlife Conservation Strategy directs the integration and implementation of ongoing and planned management actions that will conserve native species and thereby prevent the need for additional listings under the ESA.

- Southwest Desert Greater Sage-grouse (*Centrocercus urophasianus*) Local Conservation Plan provides guidance and recommendations to meet the overall goal of maintaining and, where possible, increasing sage-grouse populations and improving habitat conditions in the Southwest Desert.

3.2.4.3 Regional Setting

The Project area is within the Central Basin and Range Level III Ecoregion, which is characterized by broad desert valleys bordered by narrow, north-south trending mountain ranges (Woods et al. 2001). The Project area encompasses several small mountain ranges, including the Mineral Mountains, Pahvant Range, Tushar Mountains, Pine Valley Mountains, the Wah Wahs, and Indian Peak Mountain. The western portion of the Project area lies in the Escalante Desert. Elevations in the study corridors range from approximately 5,000 feet above mean sea level in the northern valleys to more than 7,000 feet mean sea level in the southern mountains.

The primary vegetation communities in the study corridors include desert scrub, grassland, and sagebrush communities in lower elevation valleys; pinyon-juniper and mountain shrub communities on mid-elevation slopes; and mixed conifer and aspen at higher elevations. A portion of the study corridor vegetation was burned during wildfires (e.g., the Milford Flat, Dog Valley, and Twitchell wildfires).

Perennial surface waters in the Project area include two reservoirs (Minersville Reservoir and Newcastle Reservoir), three rivers (Sevier, Beaver, and Santa Clara rivers), and numerous small creeks (i.e., Clear Creek, Indian Creek, North Creek, and Pinto Creek). Small wetlands and riparian habitats are present throughout the study corridor adjacent to reservoirs and other perennial waters.

3.2.4.3.1 Vegetation Communities

A total of 57 land cover categories identified by the Southwest Regional Gap Analysis Project (GAP) occur within the study corridors. For the purposes of this EIS, these categories were consolidated into 15 primary habitat types. In addition, data on recent wildfires (USGS 2009c), and associated data from BLM restoration and reseeding projects and noxious weed survey data (Fletcher 2010) were incorporated into the vegetation data and used to identify burn, post-burn (reseeded), and noxious weed vegetation communities. Primary habitat types are described briefly in the following and illustrated on MV-6 (Volume II).

Agriculture

Agriculture habitat consists of both irrigated and nonirrigated agricultural lands. This vegetation community occurs in the Sevier River Valley and the Milford-Minersville area.

Aspen

Aspen habitat consists of the GAP Rocky Mountain aspen forest and woodland land cover categories. This community occurs in montane areas and is dominated by quaking aspen (*Populus tremuloides*) with less than 25 percent conifer species component. The distribution of this land cover type is limited by soil moisture and the growing season. The understory vegetation generally includes a complex shrub-herb community or a simple herbaceous layer. Primary shrub species include snowberry (*Symphoricarpos* spp.), thimbleberry (*Rubus parviflorus*), Saskatoon serviceberry (*Amerlanchier alnifolia*), and kinnikinnick (*Arctostaphylos uva-ursi*). This vegetation community originates and is maintained by stand-replacing disturbances, such as avalanches, crown fire, insect outbreak, windthrow, and vegetation management practices. Aspen habitats have been identified by the State of Utah as a key habitat type and a priority for conservation actions (Sutter et al. 2005). Key habitats were identified by UDWR using their abundance, level of development threat, trends in abundance and condition, and number of species that depend on the habitat type. In Sutter (2005), UDWR has noted conservation and restoration activities within key habitats are the most efficient way to benefit Utah's species of greatest conservation need.

Barren/Sparsely Vegetated

Barren/sparsely vegetated habitat includes the GAP intermountain basins playa land cover type and occurs at lower elevations in the Escalante Desert. This community includes barren or sparsely vegetated playas (less than 10 percent plant cover) that are intermittently flooded. Characteristic plant species include inland saltgrass (*Distichlis spicata*), iodinebush (*Allenrolfea occidentalis*), greasewood

(*Sarcobatus vermiculatus*), sickle saltbush (*Atriplex falcata*), pickleweed (*Salicornia europeae*), spiny hopsage (*Grayia spinosa*), and basin wildrye (*Leymus cinereus*).

Big Sagebrush

Big sagebrush habitat consists of the GAP intermountain basins big sagebrush shrubland land cover type. This community occurs on well-drained, nonalkaline soils at middle elevations and is dominated by basin big sagebrush (*Artemisia tridentata ssp. tridentata*) and Wyoming big sagebrush (*Artemisia tridentata ssp. wyomingensis*). Typical codominant species include antelope bitterbrush (*Purshia tridentata*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), and rubber rabbitbrush (*Ericameria nauseosa*). Big sagebrush occurs in valleys and foothills throughout the study corridors.

Desert Shrub

Desert shrub consists of the GAP intermountain basins greasewood flat and intermountain basins mixed salt desert shrub land cover types. These represent open-canopied shrub communities that occur on alkaline soils in desert basins. Greasewood flat is dominated typically by greasewood with saltbush (*Atriplex* spp.), sagebrush (*Artemisia* spp.), and winterfat (*Krascheninnikovia lanata*). Salt desert shrub is dominated typically by one or more species of saltbush, including shadscale saltbush (*Atriplex confertifolia*), fourwing saltbush (*Atriplex canescens*), cattle saltbush (*Atriplex polycarpa*), and spinescale saltbush (*Atriplex spinifera*). Common codominant species include Wyoming big sagebrush, yellow rabbitbrush, rubber rabbitbrush, winterfat, Mormon tea (*Ephedra nevadensis*), and spiny hopsage. Desert shrub occurs in valley bottoms throughout the study corridors, particularly in the Sevier River Valley and the Escalante Desert.

Disturbed

Disturbed lands consist of the GAP developed, medium-high intensity and developed, open-space low intensity land cover types. This vegetation community includes areas in which native vegetation communities have been altered or eliminated as a result of urban land development and construction of roadway infrastructure. Disturbed lands occur throughout the study corridors.

Grassland

Grassland habitat consists of the GAP southern Rocky Mountain montane-subalpine grassland land cover type. This vegetation community typically occurs on flat to gently rolling topography at higher elevations. This habitat often consists of a mosaic of several plant associations with a dominant bunch grass, such as an oatgrass (e.g., *Danthonia intermedia* and *Danthonia parryi*), fescue (e.g., *Festuca idahoensis*, *F. arizonica*, and *F. thurberi*), or slimstem muhly (*Muhlenbergia filiculmis*). Grassland habitats have been identified by the State of Utah as a key habitat type and a priority for conservation actions (Sutter et al. 2005).

Invasive

The invasive vegetation community consists of the GAP invasive annual and biennial forbland, invasive annual grassland, and invasive perennial grassland land cover types. This habitat is dominated by invasive

non-native species, including cheatgrass (*Bromus tectorum*), halogeton (*Halogeton glomeratus*), and Russian thistle (*Salsola* spp.). Invasive habitats occur throughout the study corridors.

Noxious Weed

The Utah Noxious Weed Act defines noxious weeds as "any plant the commissioner determines to be especially injurious to public health, crops, livestock, land, or other property" (Utah State Code Annotated §4-17-2). The State of Utah currently classifies 27 plant species as noxious weeds (Belliston et al. 2009). Numerous invasive non-native species have been documented in one or more of the counties in the Project area (Table 3-36). Although not prevalent, several noxious weeds (e.g., Scotch thistle) occur in the study corridor.

Noxious weed mapping has been completed in the BLM Cedar City Field Office portion of the Project area. The vegetation community is based on this recent mapping (Fletcher 2010). Noxious weed mapping has not been provided by the BLM Fillmore Field Office. Noxious weed species mapped include black henbane (*Hyoscyamus niger*), perennial pepperweed (*Lepidium latifolium*), bull thistle (*Cirsium vulgare*), diffuse knapweed (*Acosta diffusa*), musk thistle (*Carduus nutans*), scotch thistle (*Onopordum acanthium*), and spotted knapweed (*Centaurea maculosa*).

TABLE 3-36
NOXIOUS WEED SPECIES IN THE PROJECT AREA

Common Name	Scientific Name	Common Name	Scientific Name
Black henbane	*Hyoscyamus niger*	Hoary cress	*Cardaria draba*
Diffuse knapweed	*Centaurea diffusa*	Musk thistle	*Carduus nutans*
Johnsongrass	*Sorghum halepense*	Perennial pepperweed	*Lepidium latifolium*
Leafy spurge	*Euphorbia esula*	Poison hemlock	*Conium maculatum*
Purple loosestrife	*Lythrum salicaria*	Russian knapweed	*Centaurea repens*
Spotted knapweed	*Centaurea maculosa*	Scotch thistle	*Onopordum acanthium*
Sulphur cinquefoil	*Potentilla recta*	Squarrose knapweed	*Centaurea virgata*
Yellow starthistle	*Centaurea solstitalis*	Canada thistle	*Circium arvense*
Yellow toadflax	*Linaria vulgaris*	Field bindweed	*Convolvulus arvensis*
Bermudagrass[1]	*Cynodon dactylon*	Houndstongue	*Cynoglossum officinale*
Dalmatian toadflax	*Linaria genistifolia*	Quackgrass	*Elytrigia repens*
Bull thistle[2]	*Cirsium vulgare*	Western whorled milkweed[3]	*Asclepias subverticillata*
Dyer's woad	*Isatis tinctoria*	Saltcedar	*Tamarix ramosissima*

SOURCE: U.S. Forest Service 2009
NOTES:
[1]Not subject to provision of the Utah Noxious Weed Act in Washington County
[2]Listed as noxious in Iron and Beaver counties
[3]Listed as noxious in Iron County

Mountain Shrub

Mountain shrub consists of the GAP mogollon chaparral and Rocky Mountain Gambel oak-mixed montane shrubland land cover types. Mogollon chaparral is associated with xeric, coarse-textured substrates on foothills and mountain slopes. Dominant species include shrub live oak (*Quercus turbinella*), Toumey oak (*Quercus toumeyi*), mountain mahogany (*Cercocarpus montanus*), desert *ceanothus (Ceanothus greggii),* and Stansbury cliffrose (*Purshia stansburiana*). This community occurs in the Bull Valley Mountains northwest of the Red Butte Substation. Gambel oak-mixed montane shrubland occurs on more mesic habitats. Vegetation is dominated by Gambel oak (*Quercus gambelii*)

alone or codominant with antelope bitterbrush, serviceberry (*Amelanchier* spp.), and chokecherry (*Prunus virginiana*). This community occurs on mid-elevation slopes in the Tushar, Mineral, and Bull Valley mountains. Mountain shrub habitats have been identified by the State of Utah as a key habitat type and a priority for conservation actions (Sutter et al. 2005).

Pinyon-Juniper

Pinyon-Juniper vegetation community consists of the GAP Colorado plateau pinyon-juniper woodland, Great Basin pinyon-juniper woodland, and recently chained pinyon-juniper land cover types. These communities occur on dry, mid-elevation foothills and mountain slopes. Utah juniper (*Juniperus osteosperma*) and pinyon pine *(Pinus monophylla* and *P. edulis*) represent the dominant tree species. Common understory species include greenleaf manzanita (*Arctostaphylos patula*), bitterbrush, sagebrush (*Artemisia* spp.), mountain mahogany (*Cercocarpus intricatus* and *C. montanus*), oaks (*Quercus* spp.), Stansbury cliffrose, and various grasses. Pinyon-juniper vegetation communities occur throughout the study corridors.

Ponderosa pine

This vegetation community occurs on a wide variety of slopes and aspects commonly with moderate-to-steep slopes, rocky areas with good soil aeration and drainage, and periods of drought during the growing season. Ponderosa pine (*Pinus ponderosa*) is the predominant conifer with juniper (*Juniperus* spp.) often present in the tree canopy. The understory is usually shrubby, dominated by sagebrush and Gambel oak. Muhlygrasses (*Muhlenbergia* spp.), and blue grama (*Bouteloua gracilis*) are common grasses. Ponderosa pine occurs within the Project area, but does not occur within the study corridors.

Shrub Steppe

Shrub steppe habitat consists of the GAP Colorado plateau mixed low sagebrush shrubland, Great Basin xeric mixed sagebrush shrubland, intermountain basins montane sagebrush steppe, and intermountain basins semi-desert shrub steppe land cover types. These communities occur on relatively xeric sites with shallow, rocky, nonsaline soils. While specific species composition varies, common dominant shrub species include sagebrush (*Artemisia nova*, *A. arbuscula*, and *A. bigelovii*), rabbitbrush, Mormon tea, broom snakeweed (*Gutierrezia sarothrae*) and semi-arid grasses such as bluebunch wheatgrass (*Pseudoroegneria spicata*), Indian ricegrass (*Achnatherum hymenoides*), desert needlegrass (*Achnatherum speciosum*), bluegrasses (*Poa fendleriana* and *Poa secunda*), blue grama, and needle and thread (*Hesperostipa comata*). This vegetation community occurs at middle elevations throughout the study corridors. Shrub steppe habitats have been identified by the State of Utah as a key habitat type and a priority for conservation actions (Sutter et al. 2005).

Riparian

Riparian areas consist of stream channel and vegetated banks with woody overstory vegetation. Riparian habitats typically are associated with the perennial and intermittent drainages listed in Table 3-29, Section 3.2.3.2. Within the Project area, the majority of this habitat includes Pinto and Little Pinto creeks, the Beaver, Sevier, and Santa Clara rivers and their associated reservoirs and tributaries. These riparian corridors support PEM, PSS, or PFO vegetation. Riparian habitats have been identified by the State of Utah as a key habitat type and a priority for conservation actions (Sutter et al. 2005).

Wildfire-affected Areas/Reseeded through Emergency Stabilization and Rehabilitation Efforts

This vegetation community is based on recent wildfire mapping obtained from the Geospatial Multi-Agency Coordination Group (USGS 2009c). The majority of wildfires are revegetated to some degree following the Emergency Stabilization and Rehabilitation Efforts. A diverse seed mix of native and non-native species were planted. These species support herbaceous vegetation, including tall wheatgrass (*Agropyron elongatum*), crested wheatgrass (*Agropyron cristatum*), Indian ricegrass (*Achnatherum hymenoides*), intermediate wheatgrass (*Thinopyrum intermedium*), bluebunch wheatgrass (*Pseudoroegneria spicata*), western wheatgrass (*Pascopyrum smithii*), thickspike wheatgrass (*Elymus lanceolatus ssp lanceolatus*), sandberg bluegrass (*Poa secunda*), mountain brome (*Bromus marginatus*), globe mallow (*Sphaeralcea coccinea*), forage Kochia (*Kochia prostrata*), small burnett (*Sanguisorba minor*), alfalfa (*Medicago sativa*), palmer penstemon (*Penstemon palmeri*), sainfoin (*Onobrychis sativa*), Lewis flax (*Linum lewisii*), Wyoming sagebrush (*Artemisia tridentata spp. wyomingensis*), Mountain sagebrush (*Artemisia tridentata*), and Fourwing saltbush (*Atriplex canescens*).

3.2.4.3.2 Wildlife

The existing wildlife habitats within the Project area exhibit some fragmentation from roadway development, utility rights-of-way, agricultural use, livestock grazing practices, and wildland fire. However, large blocks of contiguous habitat occur throughout the Project area. Wildlife populations in the vicinity of the existing utility rights-of-way and roadway facilities are likely to have already experienced many of the population changes typically associated with habitat fragmentation (e.g., reduced carrying capacity, lower reproductive success, higher susceptibility to predation, and reduced mobility within home ranges). Although limited in extent, open-water and riparian habitat in the Project area provides habitat for fish, amphibian, avian, and mammal species. Although they are limited in size and abundance and widely dispersed in the Project area, these habitats provide links within a long network of similar habitats along the Beaver, Sevier, and Santa Clara River watersheds.

Fish and Aquatic Invertebrates

At least 12 species of fish and a variety of aquatic species are known to occur in the Project area (Table D-5, Appendix D). Bonneville cutthroat trout (*Oncorhynchus clarki Utah*), brown trout (*Salmo trutta*), rainbow trout (*Oncorhynchus mykiss*), southern leatherside chub (*Gila copei*), mountain sucker (*Catostomus platyrhynchus*), and speckled dace (*Rhinichthys osculus*) are known to occur in the Fishlake National Forest. Bonneville cutthroat trout, a USFS sensitive species and Conservation Agreement Species, occurs in Birch Creek. Bonneville cutthroat trout also occurs in Pine Creek and Sam Stowe Creek, but these creeks are located outside of the study corridors. The southern leatherside chub, also a USFS sensitive species, also may occur within the Project area. Newcastle Reservoir contains golden shiner (*Notemigonus crysoleucas*), smallmouth bass (*Micropterus dolomieu*), rainbow trout, wipers (*Morone* spp.), and green sunfish (*Lepomis cyanellus*). Little Pinto Creek and Pinto Creek, tributaries to Newcastle Reservoir, also contain golden shiners, speckled dace, and rainbow trout. Additionally, the Santa Clara River contains brown trout and potentially the desert sucker (*Catostomus clarkii*). Caddis fly, mayflies, odonates, chironomids, and other aquatic invertebrates are known to occur in the open-water habitats within the Project area.

Amphibians and Reptiles

A total of 8 amphibian and 25 reptile species (Table D-4, Appendix D) are known or likely to occur in the Project area based on observations during recent surveys, review of available literature, and Utah Natural Heritage Program (UNHP) data (UNHP 2009). Reptile species inhabit a variety of terrestrial vegetation communities, while amphibian species require aquatic and semi-aquatic habitats for breeding and often utilize adjacent terrestrial habitats during nonbreeding periods. Amphibians likely to occur in the Project area include the northern leopard frog (*Rana pipiens*) on the Fishlake National Forest and Arizona toad (*Bufo microscaphus*), spotted toad (*Bufo punctatus*), Woodhouse's toad (*Bufo woodhousii*), canyon tree frog (*Hyla arenicolor*), and Great Basin spadefoot toad (*Spea intermontana*) on the Dixie National Forest. The most frequently observed reptiles during surveys conducted for other wildlife species for the Project and previous biology surveys included the common sagebrush lizard (*Sceloporus graciosus*), long-nosed leopard lizard (*Gambelia wislizenii*), common side blotch lizard (*Uta stansburiana*), greater short-horned lizard (*Phrynosoma hernandesi*), western fence lizard (*Sceloporus occidentalis*), gophersnake (*Pituophis catenifer*), desert striped whipsnake (*Masticophis taeniatus taeniatus*), and great basin rattlesnake (*Crotalus oreganus lutosus*).

Birds

At least 90 bird species are known or likely to occur in the Project area based on observations during recent surveys, review of available literature, and UNHP data (UNHP 2009) (Tables D-2 and D-3, Appendix D). The vegetation communities in the Project area support a diversity of avian species, including passerines, upland game birds, and raptors. Passerine species expected to occur in the Project area include members of guilds that occupy big sagebrush, riparian, desert shrub, pinyon-juniper, shrub steppe, and mountain shrub communities. Limited aquatic and wetland habitats within the Project area limit the presence of waterfowl and shorebird species, although transient individuals may occasionally occur. Species listed or candidates for listing under the ESA or designated as sensitive by the BLM, USFS, or UDWR are discussed in the Special Status Species section.

Passerines and Aquatic Birds

The most commonly observed passerines during surveys conducted for other wildlife species for the Project and previous biology surveys within the study corridor included the horned lark (*Eremophila alpestris*), sage sparrow (*Amphispiza belli*), black-chinned sparrow (*Spizella atrogularis*), and western meadowlark (*Sturnella neglecta*). Other avian species potentially occurring in the study corridor include vesper sparrow (*Pooecetes gramineus*), lark sparrow (*Chondestes grammacus*), chipping sparrow (*Spizella atrogularis*), sage thrasher (*Oreoscoptes montanus*), loggerhead shrike (*Lanius ludovicianus*), and common raven (*Corvus corax*). As pinyon-juniper habitats are widespread throughout the Project area, avian species associated with this vegetation community, such as ash-throated flycatcher (*Myiarchus cinerascens*), black-throated gray warbler (*Dendroica nigrescens*), gray flycatcher (*Empidonax wrightii*), and juniper titmouse (*Baeolophus ridgwayi*), are also likely to occur. Bird species associated with aquatic habitats occurring in the Project area include great blue heron (*Andea herodias*), spotted sandpiper (*Actitis macularius*), American coot (*Fulica americana*), and several species of waterfowl. Riparian species occurring within the study corridor include yellow warbler (*Dendroica petechia*), black-crowned night-heron (*Nycticorax nycticorax*), and yellow-breasted chat (*Icteria virens*). The southwestern willow flycatcher (*Empidonax traillii extimus*) is an endangered species found in association with riparian habitats and is known to occur within the study corridors.

Upland Game Birds

Several native upland game bird species are likely to occur in the study corridors, including wild turkey (*Meleagris gallopavo*), blue grouse (*Dendragapus obscures*), band-tailed pigeon (*Patagioenas fasciata*), Gambel's quail (*Callipepla gambelii*), and greater sage-grouse.

Sagebrush habitats near Milford, Minersville, Horse Valley, and the Mud Springs Bench have been classified as crucial brood habitat for the greater sage-grouse (UDWR 2011a). Crucial winter habitat for sage-grouse has been designated in the vicinity of the Black Mountains the Mud Springs Bench. This species has been designated as a federal candidate species, and is a BLM, State of Utah, and USFS sensitive species. A detailed discussion of the greater sage-grouse is presented under the Special Status Species subheading in this section. Introduced game birds in the study corridors include chukar (*Alectoris chukar*) and ring-necked pheasant (*Phasianus colchicus*).

Raptors

A variety of raptor species are known or likely to occur in the study corridors based on observations during recent surveys, review of available literature, and UNHP data (UNHP 2009) (Table D-3, Appendix D). Common raptors include American kestrel (*Falco sparverius*), burrowing owl (*Athene cunicularia*), ferruginous hawk (*Buteo regalis*), northern harrier (*Circus cyaneus*), prairie falcon (*Falco mexicanus*), red-tailed hawk (*Buteo jamaicensis*), golden eagles, and Swainson's hawk (*Buteo swainsoni*). Bald eagles are also commonly observed throughout the study corridor during winter months (UNHP 2009). The study corridors bisect areas identified by UDWR as high quality raptor habitat. Active nest surveys were not completed to support preparation of the EIS, but would be conducted on the selected route of any action alternative prior to construction to identify locations where spatial and seasonal restrictions would be implemented during construction.

The burrowing owl and ferruginous hawk are designated as a Utah BLM sensitive species, and the bald eagle is designated as a Utah BLM sensitive species and USFS sensitive species. These species are discussed under the Special Status Species subheading in this section.

Mammals

Mammal species that inhabit grassland, riparian, desert shrub, sagebrush, and pinyon-juniper vegetation communities of the Great Basin are likely or known to occur in the study corridors. Small mammal species likely to occur in the study corridors include black-tailed jackrabbit (*Lepus californicus*), cottontail (*Sylvilagus* sp.), kangaroo rat (*Dipodomys* sp.), and white-tailed antelope squirrel (*Ammospermophilus leucurus*). The study corridors contain potential foraging habitat for several bat species. Ten bat species were identified in the general Project vicinity in previous wildlife surveys (BLM 2008a), including Brazilian free-tailed bat (*Tadarida brasiliensis*), western small-footed myotis (*Myotis ciliolabrum*), little brown myotis (*Myotis lucifugus*), and hoary bat (*Lasiurus cinereus*). There are no known roosts or hibernacula located within the study corridors; however, a known hibernaculum for the Townsend's big-eared bat is located near the community of Enterprise (UNHP 2009), but is outside of the study corridors. Individuals from this hibernaculum may forage in the study corridors. The Utah prairie dog (*Cynomys parvidens*) is a threatened species (49 *Federal Register* 22330) and the pygmy rabbit is a sensitive species (Pontarolo 2011; UDWR 2011b; USFS 2011a) known to occur in the study corridors. These species are discussed under the Special Status Species subheading in this section.

Carnivorous mammal species likely to occur in the study corridors include badger (*Taxidea taxus*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and mountain lion (*Puma concolor*). The kit fox is a special status species (Pontarolo 2011; UDWR 2011a) known to occur in the study corridors and is discussed under the Special Status Species subheading in this section. A complete list of mammal species known or likely to occur in the study corridors is presented in Table D-1 of Appendix D.

Big Game

Big game species known to occur in the study corridors include pronghorn, mule deer, and elk. Designated crucial seasonal habitats occur in the study corridors for all three species (UDWR 2008a).

Pronghorn are common year-round residents in the valleys in the Project area. Most of the lower elevation habitats between Cove Fort and Cedar City are designated as crucial year-long pronghorn habitat (UDWR 2008a).

Mule deer occupy foothill and montane habitats. The study corridors contain several important seasonal habitats, including crucial winter range, crucial summer range, and crucial year-long range (UDWR 2008a). Crucial winter range for mule deer is distributed widely throughout the Project area with the exception of the Escalante Desert and lower elevations between the Black Mountains and Antelope Range. Crucial summer range occurs in higher elevations along the I-70 corridor through the Tushar and Bull Valley mountains between the communities of Central and Enterprise. Crucial winter and summer ranges also have been designated as fawning habitat for mule deer. Crucial mule deer year-long range occurs in the vicinity of the Red Butte Substation.

The study corridors also contain crucial elk habitats, including crucial winter range, crucial summer range, and crucial year-long ranges (UDWR 2008a). Crucial elk summer range and fawning habitat occurs along the I-70 corridor through the Tushar Mountains. Substantial elk winter range is located along the western foothills of the Tushar Mountains generally between Cove Fort and the Beaver area. Substantial elk year-long range is located west of the I-15 corridor generally between Cove Fort and the Milford area. Impacts to elk and mule deer substantial habitats are disclosed in Appendix E as these habitats occur mainly on Forest Service lands and are limited on BLM lands within the project area.

3.2.4.3.3 Special Status Species

A preliminary list of special status species potentially occurring within the study corridors was developed based on (1) county-level lists for federally threatened, endangered, proposed, and candidate species (FWS 2011a); (2) county-level lists (Beaver, Iron, Millard, Sevier, and Washington counties) of state sensitive species (UDWR 2011b); (3) the BLM statewide list of sensitive plant and animal species (Pontarolo 2011; BLM 2010b; BLM 2010c); and (4) the USFS Region 4 list of sensitive species (USFS 2011a). Based on these lists, 186 special status species could potentially occur in the study corridors (Table D-6, Appendix D). Several species are assigned a status by multiple agencies. In addition to special status species, MIS lists from the Dixie and Fishlake National Forests LRMPs, as amended (USFS 1986a; USFS 1986b), were obtained. Species accounts, including habitat requirements, known distribution, recent and historical observations, and the likelihood of occurrence in the study corridors, were prepared for special status and MIS and are presented in Appendix D for those species that may occur, are likely to occur, or are known to occur in the study corridors.

Based on an assessment of known species distributions and habitats in the Project area, it was determined 60 special status and MIS are likely to occur in the study corridors. These species are listed in Table 3-37 and are briefly summarized in the following. Full species accounts are presented in Appendix D.

TABLE 3-37
SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN THE STUDY CORRIDORS

Common Name	Scientific Name	Status[1]	Likelihood of Occurrence[2]
Plants			
Elsinore buckwheat	*Eriogonum ostlundii*	USFS	Known to occur
Franklin's penstemon	*Penstemon franklinii*	BLM	May occur
Greenwood's goldenbush	*Haplopappus lignumviridis*	BLM	May occur
Pinyon penstemon	*Penstemon pinorum*	BLM, USFS	Known to occur
Sevier townsendia	*Townsendia jonesii var. lutea*	BLM, USFS	Likely to occur
Utah phacelia	*Phacelia utahensis*	BLM	Known to occur
Ward's beardtongue	*Penstemon wardii*	BLM, USFS	Known to occur
Fish			
Bonneville cutthroat trout	*Oncorhynchus clarki utah*	BLM, UT, USFS, CAS	Known to occur
Brown trout	*Salmo trutta*	MIS	Known to occur
Cutthroat trout	*Oncorhynchus clarki*	MIS	Known to occur
Desert sucker	*Catstomus clarkia*	BLM, UT	Known to occur
Rainbow trout	*Oncorhynchus mykiss*	MIS	Known to occur
Southern leatherside chub	*Lepidomeda aliciae*	BLM, USFS, CAS, UT, MIS	Likely to occur
Amphibians			
Arizona toad	*Bufo microscaphus*	BLM, UT	Likely to occur
Western toad	*Bufo boreas*	BLM, UT	May occur
Birds			
American white pelican	*Pelecanus erythrorhynchos*	BLM, UT	Not known to breed in study corridor, but suitable habitat is present; foraging habitat and incidental migrants known to occur
Bald eagle	*Haliaeetus leucocephalus*	BLM, USFS, UT	No breeding habitat; known to forage and winter roost
Black swift	*Cypseloides niger*	BLM, UT	No breeding habitat; incidental migrants may occur
Bobolink	*Dolichonyx oryzivorus*	BLM, UT	No breeding habitat; incidental migrants may occur
Brewer's sparrow	*Spizella breweri*	MIS	Likely to breed and forage
Burrowing owl	*Athene cunicularia*	BLM, UT	Known to breed and forage
California condor	*Gymnogyps californianus*	FWS E, FWS X	No breeding habitat; foraging may occur
Ferruginous hawk	*Buteo regalis*	BLM, UT	Known to breed and forage
Flammulated owl	*Otus flammeoulus*	USFS	No breeding habitat; foraging may occur
Grasshopper sparrow	*Ammodramus savannarum*	BLM, UT	No breeding habitat; incidental migrants may occur

TABLE 3-37
SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN THE STUDY CORRIDORS

Common Name	Scientific Name	Status[1]	Likelihood of Occurrence[2]
Greater sage-grouse	*Centrocercus urophasianus*	FWS C, BLM, USFS, UT	Known to breed and forage
Hairy woodpecker	*Picoides villosus*	MIS	Likely to breed and forage
Lewis's woodpecker	*Melanerpes lewis*	BLM, UT	No breeding habitat; foraging may occur
Lincoln's sparrow	*Melospiza lincolnii*	MIS	No breeding habitat; foraging likely to occur
Long-billed curlew	*Numenius americanus*	BLM, UT	Known to breed and forage
MacGillivray's warbler	*Oporornis tolmiei*	MIS	No breeding habitat; foraging may occur
Mexican spotted owl	*Strix occidentalis lucida*	FWS T	No breeding or foraging habitat; transients may occur
Mountain bluebird	*Sialia currucoides*	MIS	Likely to breed and forage
Northern flicker	*Colaptes auratus*	MIS	Known to breed and forage
Northern goshawk	*Accipiter gentilis*	BLM, USFS, UT, MIS, CAS	Likely to breed and forage
Peregrine falcon	*Falco peregrinus anatum*	USFS	Likely to breed and forage
Sage thrasher	*Oreoscoptes montanus*	MIS	Likely to breed and forage
Short-eared owl	*Asio flammeius*	BLM, UT	Likely to breed and forage
Snowy plover	*Charadrius alexandrines*	BLM	No breeding habitat or foraging habitat; incidental migrants may occur
Song sparrow	*Melospiza melodia*	MIS	Likely to breed and forage
Southwestern willow flycatcher	*Empidonax traillii extimus*	FWS E	Known to breed and forage
Three-toed woodpecker	*Picoides tridactylus*	BLM, USFS, UT	No breeding habitat; foraging may occur
Vesper sparrow	*Pooecetes gramineus*	MIS	Likely to breed and forage
Western bluebird	*Sialia Mexicana*	MIS	Likely to breed and forage
Wild turkey	*Meleagris gallopavo*	MIS	Likely to breed and forage
Yellow warbler	*Dendroica petechia*	MIS	Known to breed and forage
Western yellow-billed cuckoo	*Coccyzus americanus*	FWS C, USFS, BLM, UT	No breeding or foraging habitat; incidental migrants may occur
Mammals			
Allen's big-eared bat	*Idionycteris phyllotis*	BLM, UT	No breeding or roosting habitat; foraging may occur
Big free-tailed bat	*Nyctinomops macrotis*	BLM, UT	No breeding or roosting habitat; foraging may occur
Dark kangaroo mouse	*Microdipodops megacephalus*	BLM, UT	Likely to breed and forage
Fringed myotis	*Myotis thysanodes*	BLM, UT	No breeding or roosting habitat; foraging may occur
Kit fox	*Vulpes macrotis*	BLM, UT	Known to breed and forage
Mule deer	*Odocoileus hemionus*	MIS	Known to breed and forage
Pygmy rabbit	*Brachylagus idahoensis*	BLM, USFS,	May breed and forage

TABLE 3-37
SPECIAL STATUS SPECIES POTENTIALLY OCCURRING IN THE STUDY CORRIDORS

Common Name	Scientific Name	Status[1]	Likelihood of Occurrence[2]
		UT	
Rocky Mountain elk	*Cervus canadensis*	MIS	Known to breed and forage
Spotted bat	*Euderma maculatum*	BLM, USFS, UT	No breeding or roosting habitat; foraging may occur
Townsend's big-eared bat	*Corynorhinus townsendii*	BLM, USFS, UT	No breeding or roosting habitat; foraging may occur
Utah prairie dog	*Cynomys parvidens*	FWS T, UT	Known to breed and forage
Western red bat	*Lasiurus blossevillii*	BLM	No breeding or roosting habitat; foraging may occur

NOTES:
[1]Status abbreviations are as follows:
BLM = Plant and animal species designated as sensitive by Utah Bureau of Land Management
CAS = Conservation Agreement Species
FWS C = Federal candidate by U.S. Fish and Wildlife Service (FWS)
FWS E = Federal endangered
FWS T = Federal threatened
FWS X = Federal nonessential/experimental
MIS = Management Indicator Species for the Dixie and Fishlake National Forests (Analysis of impacts on MIS [necessary to determine LRMP compliance] and effects summaries for these species is included in Appendix E of this EIS.)
USFS = Species designated as sensitive by U.S. Forest Service Intermountain Region
UT = Animal species designated as sensitive by the State of Utah
[2] Likelihood of species occurrence within the study corridors based on habitat requirements, distribution, and documented occurrences.

Federally Listed and Candidate Species

Two federally listed endangered species (California condor and southwestern willow flycatcher), two federally listed threatened (Mexican spotted owl and Utah prairie dog), and two federal-candidate species (greater sage-grouse and yellow-billed cuckoo) have the potential to occur within the study corridors (Table 3-37). There are no designated critical habitats for these species within, or adjacent to, the study corridors. In accordance with the LRMPs, as amended, for the Dixie and Fishlake National Forests, federally listed species occurring within the study corridors on USFS-administered lands should be managed as MIS. One active Utah prairie dog colony, two known sage-grouse leks, and suitable breeding habitat for the southwestern willow flycatcher are located within the study corridor on land administered by the BLM, State of Utah, and privately owned parcels. California condor, yellow-billed cuckoo, or Mexican spotted owl may occur occasionally in the study corridor during seasonal migrations or movements, but no designated critical habitat or suitable breeding habitat for these species occurs in the study corridor.

BLM, USFS, and State Sensitive Species

There are 52 species listed as sensitive by Utah BLM, State of Utah, or USFS that potentially could occur within the study corridors (Table 3-37). The USFS sensitive species list includes plant and animal species for which population viability is a concern on USFS-administered lands. USFS manages sensitive species under policy contained in USFS Manual 2670. The objective of the USFS policy is to maintain viable

populations for native and desired non-native wildlife, fish, and plant species in habitats distributed throughout their geographic range on USFS lands. BLM sensitive species are managed under the special status species policy contained in BLM Manual 6840. The objectives of the BLM special status species policy are to (1) conserve and/or recover ESA-listed species and the ecosystems on which they depend so ESA protections are no longer needed for these species and (2) to initiate proactive conservation measures that reduce or eliminate threats to BLM sensitive species and minimize the likelihood of and the need for listing these species under the ESA.

Suitable breeding or nesting habitat does not occur in the study corridors for 10 of the sensitive bird species presented in Table 3-37; however, they are included in the analysis because they may occur in the study corridors during seasonal migrations or movements. The sensitive bat species included in the list may forage within the Project area, and there is one known hibernacula for Townsend's big-eared bat near Enterprise (UNHP 2009). The kit fox and pygmy rabbit are known to occur in suitable habitats within the Project area. The Bonneville cutthroat trout occurs in Birch Creek, Pine Creek, and Sam Stowe Creek and is approved for reintroduction into Shingle Creek and Fish Creek. Fish Creek also is designated a National Wild and Scenic River.

USFS Management Indicator Species

Species selected by a national forest as MIS are used to monitor a particular habitat type. This is accomplished by assessing the habitat conditions and population changes of the species MIS that occupy each habitat as required in the NFMA implementing regulations at the time the LRMPs were developed, found at 36 CFR 219.19 (published at 36 CFR parts 200 to 299, July 1, 2000 edition. MIS are selected based on five criteria: (1) a strong affinity for a vegetative type, but not exclusive; (2) a life cycle keyed to a vegetative type; (3) sensitivity to habitat change; (4) relative ease of monitoring; and (5) somewhat representative of other species that use the same vegetation types.

There is a combined total of 25 species designated as MIS by the Dixie and Fishlake National Forests. Within the study corridors, 18 MIS are likely or known to occur, 3 MIS may occur, and 5 MIS do not occur (Table 3-37). MIS effects analyses and summaries are located in Appendix E of this EIS.

3.2.4.3.4 Wild Horses and Burros

No records exist of wild burros occurring in the Project area (Fletcher 2010). A wild horse management area exists on the Dixie National Forest; however, this management area is outside of the Project area. Wild horses are known to occur within the Project area and are managed by BLM within the Chloride Canyon Herd Management Area (HMA). The HMA includes 44,285 acres in the southern part of the Project area. The HMA is centered on the Antelope Range north of Highway 56. BLM data from 2007 indicated an Appropriate Management Level for the Chloride Canyon herd of 30 horses. Currently, there is an estimated population of 59 horses within the HMA.

3.2.4.4 Study Methodology

The general methodology used to evaluate potential impacts on biological resources is described in Section 3.1. Information presented in this section includes (1) descriptions of resource-specific information collected for the analysis, (2) discussion of potential effects on resources present in the study corridors, and (3) evaluation of the intensity of these effects, the degree to which these effects can be

mitigated, and where residual effects (i.e., post-mitigation) could occur. Results of the analysis are presented in Section 3.2.4.5.

3.2.4.4.1 Inventory

Preliminary biological resource information, including lists of threatened, endangered, and sensitive species; wildlife management plans; and vegetative communities, were collected for the entire Project area. For the purposes of evaluating Project-related impacts on biological resources, more detailed information was collected within a 2-mile-wide study corridor (i.e., 1 mile on either side of the reference centerline), including known localities of special status species and sensitive habitats for each alternative route. General data categories for organizing the information represent issues raised during the scoping process, including vegetation, wildlife, and special status species.

Vegetation Communities

For the analysis, vegetation communities and land cover types in the study corridors were derived from GIS data obtained from GAP (Lowry et al. 2005). GAP data were supplemented with data collected from the BLM on inventoried noxious weed locations for the BLM Cedar City Field Office portion of the Project area (Fletcher 2010) and fire history information (e.g., locations and perimeters) for wildland fires occurring between 2001 and 2008 (USGS 2009c).

Wildlife

Wildlife information, including wildlife management plans and spatial data, were obtained from a variety of sources, including UDWR (Sutter et al. 2005; UDWR 2011b; UDWR 2010b; UDWR 2008a), FWS (FWS 2011a; FWS 2010a; Sogge et al. 1997), federal land management plans (Section 1.6.3), peer-reviewed scientific studies, and previous surveys (e.g., conducted to support the Milford Wind Farm Environmental Assessment). Data collected included information on species identified as particularly sensitive to the Proposed Action (e.g., big game and raptors) and related to particular wildlife issues raised as concerns by the public or federal agency staff during the scoping process.

Raptors

Maps identifying high-, medium-, and low-quality raptor habitats were obtained from the UDWR (2010a). Low-quality habitats are characterized by low and sparse vegetation rarely used for nesting, sparse prey, and areas with existing disturbances. Medium-quality habitats are characterized by more abundant prey, many documented observations of raptors using previously disturbed areas, evidence of nesting, and areas known to be used by cliff-nesting species. High-quality habitats include forested or riparian areas mostly undisturbed with evidence of tree nesting and roosts, evidence of cliff nesting, availability of high prey, and areas known to be used by many species of raptors. Raptor nest locations were not available for all alternative routes; thus, potential impacts on specific nests were not included in this analysis. Potential for impacts on nesting raptors are evaluated in this analysis by assuming raptor nests may be present in all raptor habitats throughout the Project area. Surveys for nesting raptors would be performed prior to construction on the selected route.

Big Game

Crucial habitat data (i.e., summer, winter, and year-long ranges) were obtained from UDWR (2008a; 2010b) for elk, mule deer, and pronghorn for use in assessing potential impacts on big game species. UDWR-designated crucial habitats are considered as ranges the local population depends on for survival because no alternative range or habitat is available due to climatic conditions or other limiting factors. Availability of crucial habitats is important for the maintenance of big game herds.

Special Status Species

Federally listed, BLM, USFS, and State Sensitive Species

Lists of special status species and information on occurrence of special status species were obtained from UDWR (UDWR 2011b; UDWR 2008a), UNHP (UNHP 2009), FWS (FWS 2011a; FWS 2010a; Sogge et al. 1997), BLM (BLM 2010b; Pontarolo 2011; BLM 2011a), USFS (USFS 2011a; Rodriguez 2006 and 2012) federal land management plans (Section 1.6.3), and peer-reviewed scientific studies. Where gaps in data for sensitive species were identified, an assessment of potential habitat was performed to determine the species' potential range within the Project area. For species that insufficient data is available for meaningfully identifying habitat within the study corridors, a qualitative evaluation of the potential occurrence of sensitive species in the Project area was performed. This analysis is included in supporting materials presented in Appendix D. Additional analysis of the potential presence of and impacts on USFS sensitive species, as required by USFS to ensure compliance with USFS policy and to facilitate a decision to issue a special-use authorization, is included in Appendix E. Surveys for BLM and USFS sensitive species would be performed along the selected route prior to Project implementation to identify specific locations where mitigation measures would be applied during construction to reduce impacts on these species.

Biological surveys were conducted in the spring and summer of 2010 and 2012 for federally threatened, endangered, and candidate species to support consultation with the FWS under Section 7(a)(2) of the ESA. Surveys were conducted for all ESA-listed species with the potential to occur in the study corridors for all alternative routes, including the Utah prairie dog, greater sage-grouse, and southwestern willow flycatcher.

USFS Management Indicator Species

Information on MIS was obtained primarily from the *Life History and Analysis of Endangered, Threatened, Candidate, Sensitive, and Management Indicator Species of the Fishlake and Dixie National Forests* (Rodriguez 2012; Rodriguez 2006). Additional locality data for wildlife species were obtained from the UNHP (2009) and UDWR (2008a).

Wild Horses and Burros

Maps of wild horse and burro HMAs were obtained from the wild horse and burro program in the BLM Utah State Office (BLM 2004). Data collected were organized by wild horse management units that occur within wild horse herd areas throughout the State of Utah.

3.2.4.4.2 Impact Assessment and Mitigation Planning

The methodology for assessing the potential impacts on biological resources associated with implementing the Project generally included (in order) (1) identifying the types of potential effects on the biological resources that could result from construction, operation, and maintenance of the proposed transmission line and associated facilities, (2) developing criteria for assessing the intensity of potential effects on biological resources and classifying the sensitivity of vegetation communities to potential effects, (3) assessing initial impacts on biological resources present in the study corridors, (4) identifying appropriate mitigation measures (Table 3-3) for minimizing some potential adverse effects and determining specific areas where mitigation measures should be applied, and (5) disclosing potential residual impacts on biological resources (i.e., impacts anticipated after application of mitigation measures).

Types of Potential Environmental Effects

The construction, operation, and maintenance of the Project would result in both direct and indirect effects on biological resources. The type of effects experienced by specific biological resources would depend on each resource's sensitivity to activities related to the construction, operation, and maintenance of the Project. Types of potential environmental effects are organized by biological resource categories representative of issues raised by agencies or the public during the scoping process and include vegetation, wildlife, and special status species.

The BLM performed an expanded analysis of impacts on greater sage-grouse compared to other threatened, endangered, and candidate species in response to comments received on the Draft EIS, to maintain consistency with analysis of impacts on the species performed for other proposed transmission line projects (refer to the Special Status Species subheading under Section 3.2.4.4.4), and to demonstrate compliance with BLM WO IM 2012-043. The analysis in Chapters 3 and 4 addresses direct and indirect impacts on greater sage-grouse and potential loss of birds that may occur as a result of the Project, including impacts on the species resulting from transmission lines identified in the FWS's *12-Month Findings for Petitions to List the Greater Sage-grouse as Threatened or Endangered* (FWS 2010b). Analysis of impacts on sage-grouse and documentation of interagency coordination required to demonstrate compliance with BLM WO IM 2012-043 is included in Appendix F.

Analysis of impacts on MIS associated with implementation of the Proposed Action on the Dixie and Fishlake National Forests is required by USFS to ensure compliance with LRMPs and to facilitate their decision to issue a special-use authorization is included in Appendix E.

MIS and sensitive species lists were obtained from USFS Region 4 sensitive species lists (USFS 2011a) and the applicable LRMPs, as amended (USFS 1986a; USFS 1986b). Natural history, status, and trend information can be obtained from *Life History and Analysis of Endangered, Threatened, Candidate, Sensitive, and Management Indicator Species of the Fishlake National Forest* (Rodriguez 2006) and *Life History and Analysis of Endangered, Threatened, Candidate, Sensitive, and Management Indicator Species of the Dixie National Forest* (Rodriguez 2012), unless another citation is otherwise specified. Potential effects and determinations are based in part on the data presented in these life history documents. Other migratory birds are listed in a memorandum of understanding between the USFS and FWS (*Memorandum of Understanding between the U.S. Department of Agriculture Forest Service and the U.S. Fish and Wildlife Service to Promote the Conservation of Migratory Birds* [Forest Service Agreement No. 08-MU-1113-2400-264]).

Direct Effects

Vegetation

Vegetation would be cleared prior to construction of access roads, tower sites, and work areas; tall growing vegetation would be removed from within the right-of-way throughout the life of the Project to allow for safe operation of the transmission line. Other impacts could include crushing of vegetation during construction, operation, and maintenance as a result of movement of public and construction vehicles off areas cleared and maintained for vehicle access and construction activities.

Wildlife

Behavioral disturbance and displacement of wildlife from areas within and adjacent to the right-of-way due to construction noise and the presence of humans and construction equipment could occur during construction. Mortality of wildlife could occur during construction and maintenance if wildlife are crushed by or collide with moving construction equipment. Birds and bats may be killed by collisions with the transmission line and other Project features during operation of the transmission line. Additionally, construction of access roads and the transmission line could alter existing habitats, affecting their capability to satisfy the forage and shelter needs of wildlife.

Aquatic species could experience loss of aquatic habitat and removal of vegetation that is important for habitat function as a result of construction of access roads or transmission structures in aquatic habitats.

Raptors and Other Migratory Birds

Raptors and migratory birds could experience modification of foraging and nesting habitat due to construction of access roads and tower structures. Vegetation clearing and maintenance also could modify or remove foraging and nesting habitat. Mortality of birds could occur due to collisions with the transmission line or towers. Birds may abandon nests during breeding seasons as a result of increased stress from human presence and construction activities. Construction of tall structures that could be used by raptors for perching or nesting in habitats where perches are otherwise limited could increase raptor hunting success.

Big Game

Effects on big game (i.e., mule deer, elk, and pronghorn) could include temporary displacement of big game animals from crucial seasonal habitats into less suitable habitats, behavioral disruption, and additional stress due to construction noise and activity. Impacts associated with operation and maintenance could include temporary behavioral disturbance and displacement from crucial seasonal habitats to less suitable habitats during routine inspections and maintenance activities. Big game animals also could experience modification of forage resources as a result of right-of-way vegetation maintenance and Project construction.

Special Status Species

Federally Listed and Candidate Species

Greater Sage-grouse. The FWS's *12-Month Findings for Petitions to List the Greater Sage-Grouse as Threatened or Endangered* (FWS 2010b) identifies several potential direct impacts on greater sage-grouse related to transmission lines including (1) mortality due to electrocution and collision with structures and conductors, (2) habitat fragmentation due to presence of tall structures, clearing of vegetation, and presence of electric and magnetic fields (EMF), and (3) direct loss of habitat due to clearing of vegetation. Other direct effects on sage-grouse related to the construction of the transmission line that could occur include potential disturbance of birds during sensitive breeding and wintering periods.

Direct effects on other federally listed wildlife species would be similar to those described under the Wildlife and Raptors and Other Migratory Birds headings.

BLM, USFS, and State Sensitive Species

Direct effects on BLM and USFS sensitive and USFS MIS wildlife and plants would be similar to those described under the Vegetation and Wildlife headings.

Direct effects on BLM, USFS, and state sensitive aquatic species without mitigation, would include loss of aquatic habitat and removal of vegetation, critical to habitat function, as a result of construction of access roads or transmission structures in aquatic habitats. (Note: Analysis of effects on USFS sensitive aquatic species and MIS, including species-specific findings, required for compliance with the USFS LRMPs, are included in Appendix E.)

Wild Horses and Burros

Direct effects on wild horses and burros would be similar to those described for big game species.

Indirect Effects

Vegetation

Project-related construction and maintenance activities, in addition to construction of access roads that could be used by the public for motorized access to previously inaccessible areas, could affect vegetation communities in the Project area by introducing or spreading weeds and non-native plant species. These activities also could potentially alter the frequency of wildland fire in the Project area due to increased risk of fire ignition due to vehicle use, human presence, and spread of non-native plant species.

Wildlife

Construction of the transmission line, access roads, and other Project facilities could fragment wildlife habitat, increase the potential for spread of noxious weeds, and could increase the frequency of human-caused wildfires. Habitats affected by wildfires often take several years to recover and provide for the forage and shelter needs of wildlife. Construction of new access roads and associated increases in human visitation could cause disturbance of wildlife due to increased human presence in areas rarely visited by humans in their existing condition. Prey species for raptors could experience increased predation due to

use of transmission structures by raptors as perches in habitats with otherwise limited perching opportunities. These impacts may cause degradation and abandonment of wildlife habitat and alteration of predator-prey relationships, which potentially could affect carrying capacity of habitats in the Project area.

Indirect effects on aquatic habitats and fisheries could include temporary increases in turbidity and sedimentation associated with ground disturbance near aquatic habitats.

Raptors and Other Migratory Birds

Construction, operation, and maintenance of the transmission line could cause similar indirect impacts on raptors and migratory birds as those described under the Wildlife subheading. Additionally, raptors and other migratory birds could be affected by increases in hunting and poaching pressure due to increased motorized access in habitats that in their existing condition are visited rarely by humans.

Big Game

Construction, operation, and maintenance of the transmission line could cause similar indirect impacts on big game as those described under the Wildlife subheading. Other impacts on big game species that could occur include increased legal hunting and poaching pressure resulting from increased public access into big game habitats.

Special Status Species

Federally Listed and Candidate Species

Greater Sage-grouse. The FWS's *12-Month Findings for Petitions to List the Greater Sage-Grouse as Threatened or Endangered* (FWS 2010b) identifies potential indirect impacts on greater sage-grouse related to transmission lines including (1) increased predation from raptors and ravens along transmission lines and (2) degradation of habitat due to spread of non-native plants and noxious weeds. In addition to these effects, alteration of wildland fire frequency in sage-grouse habitats in the Project area could affect sage-grouse as a result of the construction, operation, and maintenance of a new transmission line.

Indirect effects on other federally listed wildlife species would be similar to those described under the Wildlife and Raptors and Other Migratory Birds headings.

BLM, USFS, and State Sensitive Species

The magnitude and extent of indirect effects on BLM and USFS sensitive wildlife and plants would be similar to those described under the Vegetation and Wildlife headings.

Indirect effects on aquatic habitats and fisheries, including for USFS sensitive aquatic species (Bonneville cutthroat trout and southern leatherside chub), associated with the Project, would be limited in extent and magnitude. Indirect effects could include potential temporary increases in turbidity and sedimentation associated with ground disturbance near aquatic habitats during construction.

Wild Horses and Burros

Indirect effects on wild horses and burros would be similar to those described for wildlife species, although wild horses and burros would not be affected by alteration of predator-prey relationships.

3.2.4.4.3 Criteria for Assessing Intensity of Impacts

Criteria were developed in collaboration with the Agency ID Team to assess the intensity of a potential effect on biological resources associated with implementation of the Project (Table 3-38). Criteria developed to assess the intensity of impacts on vegetation communities were based on considerations of relative abundance of each vegetative community; regeneration time; magnitude of anticipated impacts; additional protections for vegetation, including laws and statutes; and existing conditions. Criteria developed to assess the intensity of impacts on wildlife and sensitive wildlife habitats were based on considerations of a species legal status, regulatory protection, and susceptibility to temporary or permanent disturbances.

TABLE 3-38
CRITERIA FOR ASSESSING INTENSITY OF IMPACTS

Intensity of Impacts	Description
High	▪ Mortality of a federally endangered, threatened, or candidate plant or wildlife species ▪ Mortality of sensitive and other nonlisted plants or wildlife or permanent displacement from habitat that results in population or species-level effects ▪ Permanent displacement of federally endangered, threatened, or candidate plants or wildlife from habitats on which they depend ▪ Permanent loss of habitat that would result in species- or population-wide effects ▪ Permanent loss of habitat for federally endangered, threatened, or candidate plants or wildlife ▪ Loss or modification of vegetation communities that are rare, support a wide range of species, regenerate slowly, and would require significant modification of vegetation during construction
Moderate	▪ Permanent loss of important habitat for sensitive plant or wildlife species ▪ Mortality of sensitive plants or wildlife that does not reduce population viability ▪ Permanent loss of biologically important habitats ▪ Disturbance to nonlisted wildlife during a critical or sensitive period ▪ Permanent displacement of nonlisted wildlife from important habitats that does not have population-level effects ▪ Loss or modification of vegetation communities that provide value to wildlife, regenerate from anticipated disturbance rapidly, and common vegetation that would require permanent alteration to accommodate the Project
Low	▪ Temporary disturbance of sensitive or federally endangered, threatened, or candidate species ▪ Loss of habitat for nonlisted species that does not result in population- or species-level effects ▪ Limited or incidental mortality of nonlisted species that does not result in population- or species-level effects ▪ Temporary displacement of nonlisted wildlife from seasonal habitats ▪ Loss or modification of vegetation communities that provide little value to wildlife, regenerate rapidly, and vegetation that is not a component of the natural landscape

3.2.4.4.4 Effects Analysis

Assessment of Initial Impacts

The intensity of a potential effect on a biological resource (i.e., a particular habitat type, vegetation community, or species) that could result from implementation of the Project is used as the basis for assessing initial impacts. Design features of the Proposed Action (Table 2-6) would reduce impacts on biological resources and were considered when assessing potential impacts on specific resources. Based on the intensity of a potential effect on a biological resource, initial impacts were assigned (Table 3-39) using the criteria presented in Table 3-38. Initial impacts are described in this section.

Vegetation Communities

Design features of the Proposed Action (refer to Table 2-6) include revegetating and reclaiming areas not required for ongoing operation and maintenance of the transmission line in accordance with the Reclamation, Revegetation, and Monitoring Framework Plan and preventing the spread of noxious weeds through the development of a Noxious Weed Management Plan. These design features would reduce impacts on all vegetation communities and are considered when assessing initial impacts on vegetation communities.

A low initial impact was assigned to the disturbed, barren, invasive grassland, and noxious weed habitats because only minimal impacts on the existing condition of these vegetation communities would be expected from short- or long-term Project-related activities. Vegetation would be removed and damaged in previously disturbed vegetation communities that provide little value to wildlife. Vegetation in these communities regenerates rapidly and has been introduced through previous human activities.

A moderate initial impact was assigned to wildfire-affected areas/reseeded through emergency stabilization and rehabilitation efforts, desert shrub, big sagebrush, shrub steppe, native grassland, pinyon-juniper, mountain shrub, ponderosa pine, aspen, agriculture, and surface water. Anticipated impacts on these vegetation communities from short- or long-term Project-related activities could result in permanent removal of vegetation communities that provide value to wildlife (desert shrub, mountain shrub, big sagebrush, shrub steppe, and native grassland). Pinyon-juniper, ponderosa pine, and aspen vegetation communities were assigned moderate initial impacts due to the need to remove high-growing vegetation required to meet the Project's safety standards, the quantity of each community present in the Project area, and the amount of wildlife dependent on each community. Agriculture communities were assigned a moderate initial impact due to the number of wildlife species using this vegetation type in the Project area (including the mule deer and Utah prairie dog) and the potential for loss of these habitats due to construction of the Project.

A high initial impact was assigned to riparian vegetation communities. Riparian communities are among the most rare vegetation communities in southwestern Utah, supporting a large diversity of plant and wildlife species. Without mitigation, riparian communities could be permanently altered to meet the Project's operational safety standards (i.e., vegetation greater than 12 feet tall would be removed from the right-of-way or regularly maintained).

Wildlife

Several design features of the Proposed Action (refer to Table 2-6) would help reduce impacts on wildlife. These design features are considered when assessing initial impacts on wildlife. Wildlife species

that could be affected by the Project are identified in Appendix D (Tables D-1, D-2, D-3, and D-4). These impacts are described under the subheading Types of Potential Environmental Effects and would not be anticipated to cause a loss in population viability or widespread mortality of any species listed in Tables D-1, D-2, D-3, or D-4. Effects on wildlife species and their habitats were assigned a low intensity (Table 3-39).

Design features of the Proposed Action (refer to Table 2-6) also would minimize impacts associated with the Project on aquatic habitats and organisms. In areas where construction vehicles and equipment would be required to access areas within 600 feet of riparian habitats, potential impacts would be mitigated to be in compliance with Utah BLM Riparian Policy (IM 2005-091). Additionally, an erosion control plan would be developed and approved by the agencies to minimize the potential for sedimentation. Spill prevention, control, and countermeasures would be implemented, and vehicle refueling and maintenance activities would be limited to designated work areas at least 328 feet (100 meters) away from all creeks. The Project would be designed to comply with the requirements of Executive Order 11988 (Floodplain Management), Executive Order 11990 (Wetland Protection), and Sections 401 and 404 of the CWA. Despite these design features of the Proposed Action, aquatic species may experience temporary decreases in habitat suitability, reduced availability of food, and reduced reproductive success due to temporary increases in turbidity and sedimentation associated with ground disturbance near aquatic habitats. These impacts are not anticipated to cause a loss in population viability or widespread mortality of any species listed in Table D-5. Effects on nonlisted aquatic species were assigned a low intensity (Table 3-39).

Raptors and Other Migratory Birds

General public and agency concern regarding avian electrocutions on transmission lines resulted in the development of avian-safe (or raptor-safe) design guidelines (APLIC 2006). Studies have indicated most avian electrocutions occur on smaller voltage lines (less than 69kV) because the narrow spacing between conductors can be bridged by birds with long wingspans (APLIC 2006). The standard raptor-safe design includes a minimum vertical separation of 60 inches between conductors. For this Project, spacing between conductors would exceed the wingspan of the largest bird species in the Project area to be consistent with APLIC recommendations (refer to Section 2.3.1.3). These design features, included in PacifiCorp's *Utah Avian Protection Plan* (PacifiCorp 2011), would minimize the potential for avian electrocutions on the transmission line.

Other design features of the Proposed Action would also minimize impacts on raptors and migratory birds. FWS seasonal and spatial buffers for raptor nests (Romin and Muck 2002) would be followed. To minimize impacts on all other migratory birds, nest surveys would be conducted prior to commencement of any construction activities occurring during the breeding bird season (February 15 through July 31). Where nests are identified, no construction activities would be allowed within 100 feet of any active nest until juveniles either fledge or the nest fails.

All potential effects on raptors were considered to have a moderate initial impact due to the potential for Project-related activities to disturb raptors during sensitive breeding and nesting periods (if seasonal and spatial restrictions were not applied to construction, operation, and maintenance activities). Installation of permanent roads, substations, work areas, towers, and overhead transmission lines could lead to the loss of some raptor habitats (e.g., the removal of trees from the right-of-way). After construction, raptors are likely to use transmission structures for perching and nesting. The Project primarily would use tubular H-frame transmission line structures, which are selected as nest sites by raptors less often than lattice-type structures. However, lattice structures may be required occasionally where more robust structures are needed. Raptors are known to frequently nest and forage in transmission line rights-of-way and are

expected to continue to use habitats altered by the Project. If the Project is located adjacent to an existing transmission line that uses lattice-type structures, raptors preferentially would select nest sites on the existing lattice-type structures over potential nest sites on H-frame structures constructed for the Project. Removal of nesting substrate, clearing of vegetation, and construction of the transmission line could reduce the quality of existing habitats. High-, medium-, and low-quality raptor habitats were all assigned a moderate initial impact because the types of potential effects on raptors within these habitats are anticipated to be similar.

Big Game

Sensitive big game habitats, including crucial year-long pronghorn habitat and crucial winter and summer habitat for mule deer were assigned moderate initial impacts. Without mitigation (i.e., construction time restrictions), impacts associated with construction and maintenance activities could disturb mule deer and pronghorn in these crucial habitats during sensitive periods (e.g., winter and fawning). Disturbance during these sensitive periods could result in added stress on individual animals, reduced recruitment rates and reproductive success, and smaller herd sizes. Long-term impacts associated with the presence of the transmission line could include habitat fragmentation and modification of existing patterns of seasonal range use in response to increased human presence as the transmission line is maintained or access roads are used by the public. Conversely, alteration of some vegetation communities within the proposed right-of-way could increase forage available for some big game species (e.g., removal of trees and resulting increase in shrubs and forbs in pinyon-juniper habitat).

Special Status Species

Federally Listed and Candidate Species

All effects on federally listed or candidate species and their potential habitats were assigned a high initial impact. Effects associated with the construction, operation, and maintenance of the Project could lead to mortality of federally endangered, threatened, or candidate species or permanent alteration of habitats on which these species depend. Mortality of federally listed and candidate species or adverse modification of the habitats on which they depend would require formal consultation with the FWS under the ESA. The FWS may require additional mitigation to avoid or reduce these impacts, through the type or extent of this mitigation could not be determined until a route is selected.

An expanded discussion of the potential effects of the construction, operation, and maintenance of the proposed transmission line on greater sage-grouse and their habitat is included in this section to meet BLM requirements under WO IM 2012-043 and to maintain consistency with analysis performed for other transmission projects that could affect sage-grouse. Additional analysis of impacts on sage-grouse and documentation of interagency coordination required to demonstrate compliance with WO IM 2012-043 is included in Appendix F.

Greater Sage-grouse – Direct Impacts. Greater sage-grouse could be disturbed by construction noise and human and equipment presence during sensitive breeding, brood-rearing, and wintering periods. Disturbances during the breeding and brood-rearing period could cause a decrease in reproductive success and recruitment to sage-grouse populations. Disturbances to sage-grouse in winter habitats may cause additional expenditure of individual birds' energy and displace grouse into less suitable habitats, resulting in decreased reproductive fitness, increased mortality, and decreases in population size. Studies have shown that sage-grouse that attend leks up to 11 miles from disturbance may be affected by the loss of seasonal habitat functionality (Connelly et al. 2000). To minimize disturbance to sage-grouse during the

nesting and brood rearing periods, biological monitors would be present during all construction activities in occupied sage-grouse habitat between February 15 and July 31. Biological monitors would search for sage-grouse nests and brooding sage-grouse. If active nests or brooding sage-grouse are located, BLM and UDWR would be notified and appropriate spatial buffers would be implemented to avoid disturbing nesting activities.

Effects on sage-grouse due to construction activities within UDWR-designated sage-grouse crucial brood-rearing and crucial wintering habitat could include removal of vegetation used by sage-grouse for nesting, foraging, and escape cover. Removal of vegetation and placement of transmission line structures could fragment and reduce the connectivity of sage-grouse habitat in the Project area. However, long-term impacts on sage-grouse habitats would be reduced by reclaiming and revegetating areas not required for ongoing operation and maintenance of the transmission line in accordance with the Reclamation, Revegetation, and Monitoring Framework Plan to be included as a part of the POD (refer to Section 2.3.5). Sage-grouse experts and agency personnel have raised concerns that sage-grouse may avoid areas that contain tall structures (Braun 1998, Braun et al. 2002, Pruett et al. 2009) and areas adjacent to transmission lines due to the presence of EMFs near the line (FWS 2010b). Peer-reviewed studies of the effects of tall structures and EMFs on habitat use by greater sage-grouse are limited. Published studies on species with similar life history to the greater sage-grouse, including the lesser (*Tympanuchus pallidicinctus*) and greater (*Tympanuchus cupidolesser*) prairie chickens, indicated avoidance of areas where tall structures exist within prairie chicken habitat. These studies concluded that new transmission lines could lead to avoidance of previously suitable habitat and serve as barriers to movement in prairie chickens (Pruett et al. 2009). If the conclusions presented in these studies are indicative of impacts on greater sage-grouse, construction of a new overhead transmission line could result in fragmentation and decreased carrying capacity of habitats that become isolated as a result of construction of the transmission line. However, prairie chickens and sage-grouse differ in morphology, behavior, seasonal habitat use, and distribution. These differences require that caution be exercised when comparing their individual and population responses to tall structures (UDNR 2010).

Increased EMFs have been shown to alter the behavior of avian species, though species vary in their sensitivity to this disturbance (Fernie and Reynolds 2005). Peer-reviewed studies regarding greater sage-grouse reactions to EMFs are not available. The potential effect of the proposed Project on EMFs is described in Section 3.2.13. If sage-grouse avoid EMFs created by transmission lines, the effects are likely to be similar to those described as potentially occurring as a result of introduction of tall structures.

Under any of the action alternatives, introduction of the transmission line into sage-grouse habitat could increase the potential for individual grouse mortality as a result of collisions with construction vehicles, in-flight collisions with transmission lines or towers, and electrocution due to contact with energized electrical infrastructure. A Project speed limit of 20 miles per hour would be posted and implemented on all roads within sage-grouse habitat to minimize the probability of sage-grouse mortality due to collisions with construction equipment. Additionally, the potential for electrocution of sage-grouse due to interactions with the proposed transmission line is nonexistent. The spacing between conductors of the transmission line would be much larger than the species wingspan, and all proposed substation expansions (where spacing between energized components is often reduced) associated with the Project would be located outside of sage-grouse habitat. Potential for sage-grouse mortality due to collisions with the proposed transmission line and towers are also low. Factors influencing avian transmission line collisions include the location and configuration of transmission lines, species-specific tendencies for collision, and environmental conditions, including weather, topography, and habitat (APLIC 2006). Greater sage-grouse are unlikely to collide with the proposed transmission line due to their tendency for short, low flights and the elevation of the proposed conductors. If guyed structures are required in sage-grouse habitat, collisions with guy wires could occur.

Greater Sage-grouse – Indirect Impacts. Increased predation of sage-grouse by raptors and ravens could result due to construction of the transmission line. Tall structures provide attractive hunting perches for raptors and ravens in areas where vegetation is low and terrain is relatively flat (Connelly et al. 2000). Studies in Wyoming found leks in proximity to transmission lines have lower annual recruitment of individual birds when compared to leks farther from these lines. The difference was presumed to be a result of raptor predation (Braun et al. 2002). Raptors and ravens are known to prey on nesting and foraging sage-grouse in addition to grouse on leks. Researchers have estimated the area of sage-grouse habitats potentially affected by perches provided by transmission lines based on the average foraging distance of these predators (3.1 to 4.3 miles) (Connelly et al. 2004). Increases in predation on greater sage-grouse due to introduction of tall structures could result in losses of individual birds and impact local population sizes. Peer-reviewed studies on methods of quantifying predation on sage-grouse and its effect on sage-grouse populations are not available.

Construction activities could increase the potential for introduction and spread of non-native plants and noxious weeds in sage-grouse habitats. The potential spread of noxious weeds as a result of ground disturbance during construction under all action alternatives would be minimized through the development of a Noxious Weed Management Plan to be included in the POD (refer to Section 2.3.5). Invasive plant and noxious weeds can reduce or eliminate vegetation used by sage-grouse for food and cover and do not provide quality sage-grouse habitat (FWS 2011a). Invasion of non-native plants and noxious weeds also can increase fire frequency in sagebrush habitats. Degradation of sage-grouse habitat due to invasion of non-native plants and noxious weeds could lead to decreased survival of individual birds within affected populations and reduction in habitat-carrying capacity.

Introduction of new access roads that could be used by the public and potential spread of non-native and invasive plants in sage-grouse habitats could increase fire frequency in the Project area. Sagebrush species important for sage-grouse survival are killed by fire and habitats require decades to recover. Prior to re-establishment of sagebrush cover, these sites are of limited or no use to sage-grouse (Connelly et al. 2000). More frequent fires in sage-grouse habitats as a result of construction of the transmission line, access roads, and alteration of vegetation communities could result in reduced local sage-grouse population size and reduction of suitable habitat available for the species.

BLM, USFS, and State Sensitive Species

Effects on habitat for pygmy rabbit were assigned a moderate initial impact. Impacts associated with the construction, operation, and maintenance of the transmission line could result in mortality or displacement of pygmy rabbits but would not likely cause a loss of population viability. Design features of the Proposed Action would reduce these potential impacts.

Effects on habitat for Ward’s beardtongue, Elsinore buckwheat, and Utah phacelia were assigned a high initial impact. Preliminary assessments of suitable habitat indicate that large populations of Ward’s beardtongue and Elsinore buckwheat occur in suitable habitat in the Project area. Habitat for pinyon penstemon was assigned a high initial impact because the species is known to occur over a small geographic range. Implementation of some Project alternative routes could cause mortality of plants and alteration of habitat. Without mitigation, impacts associated with the construction, operation, and maintenance of the transmission line could result in mortality of these sensitive species and cause a loss of population viability or trend toward federal listing. The effects analyses, and determinations for each USFS sensitive plant species are described in Appendix E of this document (Sections 2.2.1 and 4.1 of Appendix E).

Indirect effects on BLM, USFS, and state sensitive aquatic species would be limited to temporary increases in turbidity and sedimentation associated with ground disturbance during construction and natural rain events near aquatic habitats. (Note: Analysis of effects on USFS sensitive aquatic species and MIS, including species-specific findings, required for compliance with the USFS LRMPs, is included in Appendix E.)

Effects on other BLM and USFS sensitive species could occur due to implementation of the Project, although sufficient information is not available to determine the location or intensity of these species or potential impacts. Pre-construction surveys would be performed to determine the location of sensitive species and appropriate action would be taken to reduce or avoid these impacts. Without preconstruction surveys and application of mitigation measures, impacts associated with the construction, operation, and maintenance of the transmission line could result in mortality of these sensitive species. Effects on sensitive species would be mitigated as required by BLM and USFS policy so that viable populations are maintained.

Mitigation Planning and Effectiveness

In addition to the design features of the Proposed Action (Table 2-6), selective mitigation measures would be applied where feasible to reduce potential high and moderate adverse impacts on biological resources. Mitigation measures effective at reducing impacts on biological resources include measures 1, 2, 4, 7, 12, 14, and 15 and are described in this section (presented in more detail in Table 3-3). Table 3-39 also presents the mitigation measures that would be applied to specific vegetation communities or sensitive habitats to minimize impacts on these resources.

- Mitigation Measure 1 (avoiding unnecessary road upgrades) reduces the amount of vegetation and wildlife habitat disturbed during construction. This mitigation measure also reduces indirect effects associated with road improvements (increased spread of noxious weeds and harassment of wildlife due to increased traffic).

- Mitigation Measure 2 (avoiding disturbance to sensitive resources) reduces loss and degradation of vegetation and sensitive plant and wildlife habitat. Sensitive biological resources (i.e., sensitive plant populations or habitats occupied by sensitive wildlife species) would be identified prior to construction and avoided to the extent feasible with access road and tower placement.

- Mitigation Measure 4 (selective tree clearing) reduces the amount of vegetation removed from the right-of-way. Vegetation not removed is available to provide for the habitat requirements of wildlife and other special status species.

- Mitigation Measure 7 (spanning or avoiding sensitive resources) reduces impacts on habitats occupied by special status species and other sensitive biological resources. These sensitive resource areas would be identified prior to construction and tower locations and access roads would be positioned to avoid impacts on these sensitive resources where feasible.

- Mitigation Measure 12 (seasonal wildlife restrictions) reduces impacts on wildlife during sensitive breeding, nesting, and wintering periods by avoiding disturbance and displacement of animals due to construction noise and human presence during these sensitive periods.

- Mitigation Measure 14 (flight diverters) reduces impacts on wildlife by increasing visibility of shield wires, guy wires, and overhead optical ground wires to avian species. Increased visibility

of shield wires, guy wires, and OPGW reduces the probability of in-flight collisions that could result in avian mortality.

- Mitigation Measure 15 (limiting accessibility in sensitive habitats) reduces impacts on wildlife dependent on these habitats by preventing displacement and disturbance of animals associated with increased human presence and public access along new access roads in these sensitive habitats.

Other mitigation measures applied to reduce impacts on a specific biological or non-biological resource also could reduce impacts on other biological resources. For example, spanning riparian, wetland, and aquatic habitats (Mitigation Measure 7) would reduce impacts on sensitive species that rely on these communities for survival. Impacts on sensitive fish, birds, amphibians, and mammals would be reduced by avoiding riparian vegetation communities. Mitigation measures not applied to reduce impacts on a specific biological resource are not considered in the evaluation of impacts on these biological resources.

Vegetation Communities

Sensitive vegetation, including riparian communities and associated stream crossings and agriculture fields, would be avoided or spanned (Mitigation Measure 7) and vegetation clearing would be limited (Mitigation Measure 4) in riparian habitats to minimize adverse impacts. Application of these mitigation measures would allow sensitive vegetation to remain undisturbed by the Project activities and available for use by wildlife. Avoiding or spanning these resources also would lower the risk of introduction of weeds and invasive species and reduces overall habitat fragmentation associated with the Project within the Project area.

Wildlife

Tower structures would be located to allow conductors to span creeks, wetlands, and riparian areas where feasible (Mitigation Measure 7), and construction access roads and work areas would be designed to avoid riparian habitat and perennial streams where practicable (Mitigation Measure 2). Thus, application of these mitigation measures would minimize disturbance that could increase turbidity and sedimentation in aquatic habitats. Impacts on fish and other aquatic organisms due to disturbance of aquatic habitats would be anticipated to be low under all action alternatives.

<u>Raptors and Other Migratory Birds</u>

Raptor nest surveys would be conducted on the selected route prior to construction to identify locations where mitigation measures would be applied. Migratory bird nest surveys would be performed prior to construction if construction would take place during the migratory bird nesting season. Where nests are present, seasonal wildlife restrictions (Mitigation Measure 12) would be applied during construction and maintenance activities. Seasonal wildlife restrictions would be effective in reducing impacts on raptors by preventing Project-related human disturbances during sensitive breeding, nesting, and brood-rearing activities.

Big Game

Application of seasonal wildlife restrictions (Mitigation Measure 12) to construction activities in areas designated as crucial big game ranges and known fawning areas would reduce impacts on big game by minimizing stress on big game individuals and herds and avoid potential displacement from habitats important for their survival. Where feasible, new access roads that traverse crucial big game habitats would be gated or blocked to limit public access to these sensitive areas via these access routes (Mitigation Measure 15). Limiting access into sensitive habitats reduces public access and human disturbance during crucial periods and limits potential hunting and poaching of big game.

Special Status Species

Federally Listed and Candidate Species

Seasonal restrictions on construction activities would be implemented in areas within 4.0 miles of known leks and in crucial wintering habitat (Mitigation Measure 12) to reduce construction impacts. However, sage-grouse hens have been documented to nest greater than 4.0 miles away from leks in Wyoming, Colorado, and Idaho (Lyon and Anderson 2003; Schroder et al. 1999). Application of seasonal restrictions may not prevent disturbance to sage-grouse nesting outside the 4.0-mile seasonal restriction around leks.

If structures within sage-grouse habitat require guy wires for support, guy wires would be marked as approved devices by the BLM or USFS (Mitigation Measure 14) to minimize the risk of sage-grouse collisions with guy wires. Marking guy-wires in sage-grouse habitat would reduce, but may not eliminate, the possibility of sage-grouse mortality due to collisions with guy wires.

Habitat for federally listed and candidate species would be avoided (Mitigation Measure 2) where possible and occupied habitat would be spanned (Mitigation Measure 7) to the extent feasible. Avoiding sensitive habitats and populations through spanning and micro-siting would reduce physical disturbance of habitat for these species associated with construction of the Project, and these habitats would remain available for use. Mitigation Measures 2 and 7 would be effective at reducing impacts on riparian habitats used by southwestern willow flycatcher and burrows used by Utah prairie dogs.

Seasonal wildlife restrictions (Mitigation Measure 12) also would be applied for federally listed and candidate species and their habitats. Potential impacts on greater sage-grouse and southwestern willow flycatcher would be reduced by avoiding construction-related disturbance to the species during sensitive breeding, nesting, wintering, and brood-rearing periods. Seasonal restrictions would be effective at reducing impacts on Utah prairie colonies dog because construction would be avoided during the inactive season for the species. During the active season, individual prairie dogs are more likely to disperse within colonies away from construction activities and reducing the likelihood of mortality due to burrow collapses associated with use of heavy machinery. Mitigation Measure 4 (selectively removing trees), when applied to riparian habitats, also would reduce the potential for impacts on the southwestern willow flycatcher. Trees in riparian communities left undisturbed by Project construction and maintenance activities would be available for use as breeding habitat for the species.

Project-related impacts on federally listed and candidate wildlife species could occur despite application of mitigation measures. For example, recent research has shown that introduction of tall structures can have indirect effects on sage-grouse, including increasing predation (Connelly et al. 2004) and decreasing recruitment of birds at leks (Braun et al. 2002). Sage-grouse also could avoid areas occupied by utility infrastructure (Schroeder 2010) and construction of a new transmission line functionally could reduce availability and connectivity of crucial sage-grouse habitats. Also, similar predation effects could occur

when tall structures are introduced into occupied Utah prairie dog habitat. Due to these indirect effects, Project-related residual impacts on greater sage-grouse brood-rearing habitat and occupied Utah prairie dog habitat could be high despite application of the selective mitigation measures described in this section.

Prior to any grant of a right-of-way for construction of the Project, the FWS would make a determination of effect on federally listed species and occupied habitat for the selected route. Mitigation measures for federally listed species would be further refined in consultation with the FWS before the Project could affect habitat occupied by any federally listed species.

BLM, USFS, and State Sensitive Species

Potential development of site-specific mitigation measures to ensure sensitive species and associated habitats are avoided would occur when the agency preferred route is selected.

Surveys for special status species would be conducted within suitable habitat along the selected route prior to construction. Habitats occupied by sensitive species would be spanned (Mitigation Measure 7) or avoided (Mitigation Measure 2) to the extent feasible. Avoiding habitats for sensitive wildlife through spanning and micro-siting would reduce physical disturbance of habitat for these species associated with construction of the Project, as well as the habitats remaining available for use. Spanning and avoiding sensitive plant populations would reduce impacts on sensitive plant populations because specialized soil, geology, hydrology, and vegetative communities that provide habitat for these species would not be disturbed by construction activities. However, all occurrences of special status species and their habitats could not be avoided. Limited or incidental mortality of special status species and some loss of habitat could occur. Furthermore, the limited clearing of trees (Mitigation Measure 4) in occupied habitat for pinyon penstemon would be implemented. Limiting clearing of pinyon pine would reduce impacts on pinyon penstemon because habitat needs for this species are associated with the presence of pinyon pine.

Residual Impacts

Residual impacts represent anticipated impacts on biological resources after the application of mitigation measures described in the *Mitigation Planning and Effectiveness* section. The intensity of potential residual impacts on biological resources associated with implementation of the Project was assessed using the criteria presented in Table 3-38.

Application of mitigation measures would reduce the intensity and quantity of anticipated impacts on biological resources. For some biological resources, such as raptor nests and big game seasonal ranges, application of mitigation measures would reduce the intensity of impacts. For other biological resources (e.g., greater sage-grouse habitats and Utah prairie dog colonies), application of mitigation measures would reduce the quantity (i.e., number of individuals lost) of anticipated impacts, though the intensity of impact could remain unchanged (i.e., residual impacts could be high). Application of mitigation measures where sensitive species are identified during preconstruction surveys would be anticipated to reduce impacts on these species under all alternatives. A summary of anticipated initial and residual impacts are presented in Table 3-39.

Analysis of effects on USFS sensitive species and MIS, including species-specific findings required for compliance with USFS LRMPS are included in Appendix E. Also, the Project Biological Evaluation, which will be prepared after an agency preferred route has been selected for construction, site-specific

surveys have been performed, and mitigation measures to reduce impacts have been applied, if necessary. The Biological Evaluation will be available on request from USFS.

Analysis of effects on threatened and endangered species required for compliance with the ESA will be presented in the Project Biological Assessment if FWS determines that formal consultation is required for the Project.

Table 3-39 summarizes the initial impacts based on the intensity of a potential effect on biological resources, the selective mitigation measures (from Table 3-3) applied to mitigate potentially adverse effects on those resources, and the anticipated residual impacts.

TABLE 3-39
SUMMARY OF INITIAL AND RESIDUAL IMPACTS BY BIOLOGICAL RESOURCE

Biological Resource	Initial Impacts	Selective Mitigation Measure(s) Applied	Residual Impact
Disturbed	Low	–	Low
Invasive grassland	Low	–	Low
Invasive non-native species	Low	–	Low
Barren	Low	–	Low
Burn/Reclamation	Moderate	–	Moderate
Desert shrub	Moderate	–	Moderate
Big sagebrush	Moderate	–	Moderate
Shrub steppe	Moderate	–	Moderate
Native grassland	Moderate	–	Moderate
Pinyon-juniper	Moderate	–	Moderate
Mountain shrub	Moderate	–	Moderate
Ponderosa pine	Moderate	–	Moderate
Aspen	Moderate	–	Moderate
Agriculture	Moderate	7	Low
Riparian	High	4, 7	Moderate
Surface water (aquatic habitat)	Moderate	7	Low
Sensitive Habitats			
Crucial year-long range – pronghorn	Moderate	12, 15	Low
Crucial winter, summer, year-long range – mule deer	Moderate	12, 15	Low
Crucial winter, summer, year-long range – elk	Moderate	12, 15	Low
Raptor low-, medium-, and high-quality areas[1]	Moderate	4, 12	Low
Ward's beardtongue/Elsinore buckwheat[1]	High	2, 7	Moderate
Suitable habitat – pygmy rabbit	Moderate	2, 7	Moderate
Pinyon penstemon[2]	High	4, 7	Moderate
Sage-grouse crucial winter and brooding habitat	High	12, 14	High
Sage-grouse lek	High	12	High
Utah prairie dog colony	High	2, 7, 12	High
Southwestern willow flycatcher breeding area	High	4, 7, 12	High

NOTE: [1]Mitigation measures would be refined for specific areas when resource surveys are completed.

3.2.4.5 Results

Similar types of impacts on biological resources associated with the construction, operation, and maintenance of the transmission line would be anticipated for all alternative routes. Differences in impacts anticipated among individual alternative routes are driven by the type and quantity of biological resources present along specific alternative routes and the degree to which anticipated impacts can be mitigated or avoided. Table 2-11 presents a comparison of results of the quantitative effects analysis for the alternative routes and Table 2-12 presents a summary of the information presented in Table 2-11. Likelihood of occurrence of impacts by alternative for all sensitive species can be seen in Table 3-40.

A summary of baseline resource inventory and potential impacts on these resources is presented in Tables 3-41 through 3-44) and is described in this section. Site-specific data for all biological resources, including location of habitat for sensitive wildlife and plant species along all alternative routes were not available. A qualitative analysis of potential impacts on these resources is presented in this section. Supporting materials are included in Appendix D. Additional information regarding potential impacts on USFS sensitive species and MIS demonstrating compliance with National Forest Management Act and Dixie and Fishlake LRMPs, as amended, are included in Appendix E.

No Action Alternative

Under this alternative, there would be no construction, operation, or maintenance activities associated with the Project. Current management and use of the area would continue into the reasonably foreseeable future. Impacts on biological resources associated with the implementation of the Project would not occur.

Northern Area - Sigurd Substation to South of the Black Mountains

The baseline resource inventory and residual impacts for alternative routes considered in the northern area are presented in Tables 3-41 and 3-42, respectively.

TABLE 3-40
OCCURRENCE OF SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE STUDY CORRIDORS BY ALTERNATIVE

Common Name (*Scientific Name*)	Group (Status[1])	Alternative Route														
		N1	N2	N2-A[2]	N3	N4	N5	N6[3]	S1	S2	S3	S4	S5[3]	S6	S7	S7-A[2]
Federally Listed Species																
California condor (*Gymnogyps californianus*)	Bird (FWS X; west of Interstate 15 and north of Interstate 70, FWS E)	NOT LIKELY - No designated critical habitat; transients may occur														
Greater sage-grouse (*Centrocercus urophasianus*)	Bird (FWS C) (BLM, USFS, UT)	YES – Brood-rearing and winter habitat present			YES - Active lek, brood-rearing, and winter habitat present	YES – Brood-rearing and winter habitat present	YES - Active lek, brood-rearing and winter habitat present		YES – Brood-rearing and winter habitat present							
Mexican spotted owl (*Strix occidentalis lucida*)	Bird (FWS T)	NOT LIKELY – No designated critical habitat; transients may occur														
Southwestern willow flycatcher (*Empidonax traillii extimus*)	Bird (FWS E) (State)	NOT LIKELY – No designated critical habitat or suitable riparian habitats; transient may occur							YES – Known to breed and forage	NOT LIKELY – No designated critical habitat or suitable riparian habitats; transient may occur			YES – Known to breed and forage		NOT LIKELY – No designated critical habitat or suitable riparian habitats; transient may occur	
Utah prairie dog (*Cynomys parvidens*)	Mammal (FWS T)	NOT LIKELY – Suitable habitat present but extensive surveys did not identify any colonies			YES – Colonies identified and habitat present	NOT LIKELY – Suitable habitat present but extensive surveys did not identify any colonies	YES – Colonies identified and habitat present		NOT LIKELY – Suitable habitat present but extensive surveys did not identify any colonies							
Western yellow-billed cuckoo (*Coccyzus americanus*)	Bird (FWS C)	MAY OCCUR – No suitable dense riparian nesting habitat; transients and foraging may occur														
BLM, USFS, Utah State Sensitive Species																
Allen's big-eared bat (*Idionycteris phyllotis*)	Mammal (BLM, UT)	NOT LIKELY – No breeding or roosting habitat; foraging may occur														

TABLE 3-40
OCCURRENCE OF SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE STUDY CORRIDORS BY ALTERNATIVE

Common Name (*Scientific Name*)	Group (Status[1])	Alternative Route														
		N1	N2	N2-A[2]	N3	N4	N5	N6[3]	S1	S2	S3	S4	S5[3]	S6	S7	S7-A[2]
American white pelican (*Pelecanus erythrorhynchos*)	Bird (BLM, UT)	NOT LIKELY – No suitable habitat; transients may occur							YES – Not known to breed in any corridor but suitable habitat is present and transients known to occur							
Arizona toad (*Bufo microscaphus*)	Amphibian (BLM, UT)	NO – Outside of accepted distribution of species							LIKELY– Suitable habitat and observations within study corridors							
Bald eagle (*Haliaeetus leucocephalu*)	Bird (BLM, USFS, UT)	LIKELY – No known breeding sites; known to forage and winter roost														
Big free-tailed bat (*Nyctinomops macrotis*)	Mammal (BLM, UT)	NOT LIKELY – No breeding or roosting habitat; foraging may occur														
Black swift (*Cypseloides niger*)	Bird (BLM, UT)	NOT LIKELY – No breeding habitat; transients may occur during migration														
Bobolink (*Dolichonyx oryzivorus*)	Bird (BLM, UT)	NOT LIKELY – No breeding habitat; transients may occur during migration														
Bonneville cutthroat trout (*Oncorhynchus clarki utah*)	Fish (BLM, USFS, UT, MIS)	YES – Known to occur														
Burrowing owl (*Athene cunicularia*)	Bird (BLM, UT)	YES – Known to breed and forage throughout														
Dark kangaroo mouse (*Microdipodops megacephalus*)	Mammal (BLM, UT)	LIKELY – Suitable habitat present and observations in vicinity of study corridors														
Desert Sucker (*Catstomus clarkia*)	Fish (BLM, UT)	NO – Outside of distribution of species							LIKELY – Suitable habitat is present							
Elsinore buckwheat (*Eriogonum ostlundii*)	Plant (USFS)	YES – Suitable habitat present; species known to occur							NO – No suitable habitat present and out of range of species							

TABLE 3-40
OCCURRENCE OF SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE STUDY CORRIDORS BY ALTERNATIVE

Common Name (*Scientific Name*)	Group (Status[1])	Alternative Route														
		N1	N2	N2-A[2]	N3	N4	N5	N6[3]	S1	S2	S3	S4	S5[3]	S6	S7	S7-A[2]
Ferruginous hawk (*Buteo regalis*)	Bird (BLM, UT)	YES – Known to breed and forage throughout														
Flammulated owl (*Otus flammeolus*)	Bird (USFS)	NOT LIKELY – No breeding habitat or observation of species; transients may occur														
Franklin's penstemon (*Penstemon franklinii*)	Plant (BLM)	MAY OCCUR – Within known range of the species with suitable habitat present														
Fringed myotis (*Myotis thysanodes*)	Mammal (BLM, UT)	NOT LIKELY – No breeding or roosting habitat; foraging may occur														
Grasshopper sparrow (*Ammodramus savannarum*)	Bird (BLM, UT)	NOT LIKELY – No breeding habitat; transients may occur during migrations														
Greenwood's goldenbush (*Haplopappus lignumviridis*)	Plant (BLM)	NOT LIKELY – Located within the known range of the species; but no suitable habitat present							NO – outside of known range of the species							
Kit fox (*Vulpes macrotis*)	Mammal (BLM, UT)	YES – Known to breed and forage throughout							LIKELY – Suitable habitat is present but no known occurrences				YES – Known to breed and forage throughout		LIKELY – Suitable habitat is present but no known occurrences	
Lewis's woodpecker (*Melanerpes lewis*)	Bird (BLM, UT)	NOT LIKELY – No breeding habitat; foraging may occur														
Long-billed curlew (*Numenius americanus*)	Bird (BLM, State)	LIKELY – Known to breed and forage throughout Project area														
Northern goshawk (*Accipiter gentilis*)	Bird (BLM, USFS, UT, MIS)	LIKELY – Suitable mature forest habitats, no species occurrences known														

TABLE 3-40
OCCURRENCE OF SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE STUDY CORRIDORS BY ALTERNATIVE

Common Name (*Scientific Name*)	Group (Status[1])	Alternative Route														
		N1	N2	N2-A[2]	N3	N4	N5	N6[3]	S1	S2	S3	S4	S5[3]	S6	S7	S7-A[2]
Peregrine falcon (*Falco peregrinus anatum*)	Bird (USFS)	LIKELY – Suitable habitat throughout Mineral Mountains; likely to breed and forage							NOT LIKELY – No suitable cliff-like breeding habitat; species may forage							
Pinyon penstemon (*Penstemon pinorum*)	Plant (BLM, USFS)	NO – No suitable habitat and outside of known range of species							NOT LIKELY – Not known to occur			YES – Known to occur			NOT LIKELY – Not known to occur	
Pygmy rabbit (*Brachylagus idahoensis*)	Mammal (BLM, USFS, UT)	MAY OCCUR – Suitable habitat present throughout corridors; no known populations														
Sevier townsendia (*Townsendia jonesii var. lutea*)	Plant (BLM, USFS)	LIKELY – Suitable habitat present and within range of species							NO – Outside of known range for the species							
Short-eared owl (*Asio flammeius*)	Bird (BLM, UT)	LIKELY – Likely to breed and forage throughout Project area														
Snowy plover (*Charadrius alexandrinus*)	Bird (BLM)	NOT LIKELY – No breeding or foraging habitat, incidental migrants may occur														
Southern leatherside chub (*Lepidomeda aliciae*)	Fish (BLM, USFS, UT, MIS)	KNOWN – Suitable habitat occurs and observation of species in corridors							POSSIBLE – Suitable habitat occurs but no observations of the species in corridors							
Spotted bat (*Euderma maculatum*)	Mammal (BLM, USFS, UT)	NOT LIKELY – No breeding or roosting habitat; foraging may occur														
Three-toed woodpecker (*Picoides tridactylus*)	Bird (BLM, USFS, UT)	NOT LIKELY – No suitable breeding habitat; foraging may occur														
Townsend's big-eared bat (*Corynorhinus townsendii*)	Mammal (BLM, USFS, UT)	NOT LIKELY – No breeding or roosting habitat; foraging may occur														
Utah phacelia (*Phacelia utahensis*)	Plant (BLM)	YES – Known to occur							NO – No suitable habitat and no known occurrences							

TABLE 3-40
OCCURRENCE OF SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE STUDY CORRIDORS BY ALTERNATIVE

Common Name (*Scientific Name*)	Group (Status[1])	Alternative Route														
		N1	N2	N2-A[2]	N3	N4	N5	N6[3]	S1	S2	S3	S4	S5[3]	S6	S7	S7-A[2]
Ward's beardtongue (*Penstemon wardii*)	Plant (BLM, USFS)	YES – Known to occur							NO – No suitable habitat and no known occurrences							
Western red bat (*Lasiurus blossevillii*)	Mammal (BLM, UT)	NOT LIKELY – No breeding or roosting habitat; foraging may occur														
Western toad (*Bufo boreas*)	Amphibian (BLM, USFS, UT)	MAY OCCUR – No known occurrences, but suitable riparian habitats are present														
Management Indicator Species																
Brown trout (*Salmo trutta*)	Fish	LIKELY – Suitable habitat present														
Brewer's sparrow (*Spizella breweri*)	Bird	LIKELY – Suitable habitat present														
Cutthroat trout (*Oncorhynchus clarki*)	Fish	YES – Suitable habitat present														
Hairy woodpecker (*Picoides villosus*)	Bird	LIKELY – Suitable breeding and foraging habitat present														
Lincoln's sparrow (*Melospiza lincolnii*)	Bird	NOT LIKELY – No breeding habitat; foraging may occur														
MacGillivray's warbler (*Oporornis tolmiei*)	Bird	NOT LIKELY – No breeding habitat; foraging may occur														
Mountain bluebird (*Sialia currucoides*)	Bird	LIKELY – Suitable breeding and foraging habitat present														
Mule deer (*Odocoileus hemionus*)	Mammal	YES – Known to occur throughout Project area														

TABLE 3-40
OCCURRENCE OF SPECIAL STATUS SPECIES THAT MAY OCCUR IN THE STUDY CORRIDORS BY ALTERNATIVE

Common Name (*Scientific Name*)	Group (Status[1])	Alternative Route														
		N1	N2	N2-A[2]	N3	N4	N5	N6[3]	S1	S2	S3	S4	S5[3]	S6	S7	S7-A[2]
Northern flicker (*Colaptes auratus*)	Bird	YES – Known to occur throughout Project area														
Rainbow trout (*Oncorhynchus mykiss*)	Fish	LIKELY – Suitable habitat present														
Rocky Mountain elk (*Cervus canadensis*)	Mammal	YES – Known to occur throughout Project area														
Sage thrasher (*Oreoscoptes montanus*)	Bird	LIKELY – Likely to breed and forage throughout Project area														
Song sparrow (*Melospiza melodia*)	Bird	LIKELY – Likely to breed and forage throughout Project area														
Vesper sparrow (*Pooecetes gramineus*)	Bird	LIKELY – Likely to breed and forage throughout Project area														
Western bluebird (*Sialia mexic*)	Bird	LIKELY – Likely to breed and forage throughout Project area														
Wild turkey (*Meleagris gallopa*)	Bird	LIKELY – Suitable habitat present; likely to breed and forage														
Yellow warbler (*Dendroica petechia*)	Bird	LIKELY – Likely to breed and forage throughout Project area								YES – Known to breed and forage			LIKELY – Likely to breed and forage throughout Project area		YES – Known to breed and forage	

NOTES:
[1] Status abbreviations are as follows:
BLM = Plant and animal species designated as sensitive by Utah Bureau of Land Management
FWS C = U.S. Fish and Wildlife Service federal candidate
FWS E = U.S. Fish and Wildlife Service federal endangered
FWS T = U.S. Fish and Wildlife Service federal threatened
FWS X = U.S. Fish and Wildlife Service federal nonessential/experimental
USFS = Species designated as sensitive by U.S. Forest Service Intermountain Region
UT = Animal species designated as sensitive by the State of Utah
[2]Agency Preferred Alternative
[3]Proponent's Preferred Alternative

TABLE 3-41
ALTERNATIVE ROUTE COMPARISON
FOR BIOLOGICAL RESOURCES INVENTORY DATA BY NORTHERN ALTERNATIVE ROUTES

Alternative Route	Total Miles	Initial Impacts																											
		Big Game (miles crossed)			Threatened and Endangered Species (miles crossed)					Sensitive Species – Wildlife and Plants (miles crossed)						Vegetation Community or Habitat Type (miles crossed)													
		Mule Deer		Pronghorn	Utah Prairie Dog	Sage-grouse			Southwestern Willow Flycatcher	Raptor			Pygmy Rabbit	Ward's Beardtongue/ Elsinore Buckwheat	Pinyon Penstemon														
		Crucial Summer	Crucial Winter	Crucial Year–long	Active Colonies	Areas within 2 Miles of Leks	Crucial Brooding	Crucial Winter	Occupied Habitat	Low Quality	Medium Quality	High Quality	Suitable Habitat	Suitable Habitat	Suitable Habitat	Grassland	Barren	Disturbed	Invasive Non-native Species	Agriculture	Mountain Shrub	Pinyon–Juniper	Riparian	Shrub Steppe	Aspen	Desert shrub	Noxious	Wildfire-affected Areas[1]	Big Sage
Alternative N1	120.6	–	33.4	69.9	–	–	7.4	7.4	–	66.6	32.7	21.3	25.4	5.1	–	2.4	0.9	4.3	5.3	–	0.5	18.6	–	19.9	–	31.6	–	16.2	20.8
Alternative N2	120.4	–	43.2	69.7	–	–	7.4	7.4	–	54.2	32.7	33.5	34.9	5.1	–	1.0	0.9	4.3	4.6	–	0.5	18.6	–	16.7	–	19.8	–	33.2	20.7
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	120.0	–	44.2	69.9	–	–	7.4	7.4	–	54.2	32.1	33.7	34.0	5.1	–	1.0	0.9	4.4	4.6	–	0.5	18.5	–	16.7	–	19.9	–	33.4	20.0
Alternative N3	117.2	–	55.3	58.7	1.6	8.2	20.3	7.3	–	13.3	43.9	60.0	53.7	5.1	–	0.9	0.9	4.3	5.0	–	0.5	21.4	–	8.0	–	9.4	–	32.1	34.7
Alternative N4	109.4	–	41.1	48.3	–	–	7.4	7.4	–	40.9	32.7	35.8	19.0	5.1	–	1.0	0.9	4.3	4.6	0.2	0.5	18.9	–	16.7	–	19.8	2.0	19.7	20.7
Alternative N5	106.2	–	53.2	37.3	1.6	8.2	20.3	7.3	–	–	43.9	62.3	37.8	5.1	–	0.9	0.9	4.3	5.0	0.2	0.5	21.7	–	8.0	–	9.4	2.0	18.6	34.7
Alternative N6 (Proponent's Preferred Alternative)	105.4	–	56.6	36.7	1.5	8.3	20.7	7.4	–	–	43.7	61.7	36.6	5.1	–	1.0	0.8	4.4	4.1	0.2	0.5	24.7	–	6.4	–	8.7	2.0	18.8	33.8

NOTE: [1]Reseeded through emergency stabilization and rehabilitation areas.

TABLE 3-42
ALTERNATIVE ROUTE COMPARISON
FOR BIOLOGICAL RESOURCES RESIDUAL IMPACTS BY NORTHERN ALTERNATIVE ROUTES

Alternative Route	Big Game[1] (miles [percent])				Threatened and Endangered Species[2] (miles crossed [percent])				Sensitive Habitats[3] (miles [percent])				Vegetation[4] (miles [percent])			
	No Identifiable	Low	Moderate	High	No Identifiable	Low	Moderate	High	No Identifiable	Low	Moderate	High	No Identifiable	Low	Moderate	High
Alternative N1	20.8 [17.2]	99.8 [82.8]	–	–	113.2 [93.9]	–	–	7.4 [6.1]	–	90.3 [74.9]	30.3 [25.1]	–	–	10.6 [8.8]	110.0 [91.2]	–
Alternative N2	20.8 [17.3]	99.6 [82.7]	–	–	113.0 [93.9]	–	–	7.4 [6.1]	–	80.6 [66.9]	39.8 [33.1]	–	–	9.9 [8.2]	110.5 [91.8]	–
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	20.2 [16.8]	99.8 [83.2]	–	–	112.6 [93.8]	–	–	7.4 [6.2]	–	81.1 [67.6]	38.9 [32.4]	–	–	10.0 [8.3]	110.0 [91.7]	–
Alternative N3	22.8 [19.5]	94.4 [80.5]	–	–	96.1 [82.0]	–	–	21.1 [18.0]	–	58.6 [50.0]	58.6 [50.0]	–	–	10.2 [8.7]	107.0 [91.3]	–
Alternative N4	20.8 [19.0]	88.6 [81.0]	–	–	102.0 [93.2]	–	–	7.4 [6.8]	–	85.5 [78.2]	23.9 [21.8]	–	–	12.1 [11.1]	97.3 [88.9]	–
Alternative N5	22.8 [21.5]	83.4 [78.5]	–	–	85.1 [80.1]	–	–	21.1 [19.9]	–	63.5 [59.8]	42.7 [40.2]	–	–	12.4 [11.7]	93.8 [88.3]	–
Alternative N6 (Proponent's Preferred Alternative)	22.3 [21.2]	83.1 [78.8]	–	–	84.1 [79.8]	–	–	21.3 [20.2]	–	63.9 [60.6]	41.5 [39.4]	–	–	11.5 [10.9]	93.9 [89.1]	–

NOTES:
[1]Includes impacts on mule deer and pronghorn seasonal habitats.
[2]Includes impacts on Utah prairie dog, greater sage-grouse, and southwestern willow flycatcher.
[3]Includes impacts on raptor habitat, potential pygmy rabbit habitat, and sensitive plant habitat.
[4]Includes impacts on the following vegetation communities: grassland, barren, disturbed, invasive non-native species, agriculture, mountain shrub, pinyon-juniper, riparian, shrub steppe, aspen, desert shrub, noxious weeds, wildfire-affected areas reseeded through emergency stabilization, and rehabilitation areas.

Alternative N1 – Black Rock Road to IPP North of Milford Wind Farm

Affected Environment

Vegetation Communities

Alternative N1 crosses 120.6 miles. Vegetation communities along this alternative route include 2.4 miles of grassland, 0.9 mile of barren, 4.3 miles of disturbed, 5.3 miles of invasive, 0.5 mile of mountain shrub, 18.6 miles of pinyon-juniper, 19.9 miles of shrub steppe, 31.6 miles of desert shrub, 16.2 miles of wildfire-affected areas/reseeded through emergency stabilization and rehabilitation areas, and 20.8 miles of big sagebrush communities (Table 3-41; MV-6a through MV-6c). No agriculture, riparian, or aspen communities, or identified areas of noxious weeds are crossed by the alternative. However, information regarding the distribution of noxious weeds was not available for the entire study corridor.

Wildlife

Raptors and Other Migratory Birds

From Sigurd to Cove Fort, all alternative routes cross 27.7 miles of medium-quality habitat along Links 24, 26, 33, 30, 45, and 64 and 17.5 miles of high-quality habitats along Links 64, 63, and 66 (MV-7a). From Cove Fort to the Black Mountains, Alternative N1 crosses 3.8 miles of high-quality raptor habitats along Link 305, 5.0 miles of medium-quality habitats along Link 160, and 66.6 miles of low-quality habitats along Black Rock Road (Links 305, 320, 330, 350, 360, and 365) and the IPP corridor (Links 380, 381, and 155) (MV-7b through MV-7c). Alternative N1 crosses the largest amount of low-quality raptor habitats.

Big Game

From Sigurd to Cove Fort, all alternative routes cross 24.5 miles of mule deer crucial winter habitat along Links 27, 30, 33, 45, 63, 64 and 68 (MV-8a). From Cove Fort to the Black Mountains, Alternative N1 crosses 8.9 miles of crucial mule deer winter habitat along Links 305 and 320 (MV-8a), and 69.9 miles of crucial year-long pronghorn habitat along Black Rock Road and the existing IPP (Links 155, 160, 305, 320, 330, 350, 360, 365, 380, and 381; MV-8b through MV-8c). Alternative N1 does not cross crucial summer mule deer habitat. None of the alternative routes cross crucial elk habitat.

Special Status Species

Federally Listed and Candidate Species

Alternative N1 crosses 7.4 miles of crucial greater sage-grouse brooding habitat and 7.4 miles of crucial winter habitat located along Link 360 (MV-7b), but does not cross within 2 miles of any known active leks. The total length of transmission line that would be constructed within 2, 4, and 11 miles of known leks under each alternative route is presented in Table 3-43.

Alternative N1 does not cross occupied habitat for the southwestern willow flycatcher or occupied habitat for the Utah prairie dog.

TABLE 3-43
SUMMARY OF SAGE-GROUSE LEK DISTANCES TO ALTERNATIVE ROUTE CENTERLINES

Alternative Route	Route Length (miles)	Number of Leks within 2 miles	Length of alternative route within 2 miles of leks (miles)	Number of leks within 4 miles	Length of alternative route within 4 miles of leks (miles)	Number of leks within 11 miles	Length of alternative route within 11 miles of leks (miles)
N1	120.6	–	–	1	3.8	3	25.7
N2	120.4	–	–	1	3.8	3	25.7
N2-A	120.0	–	–	1	3.8	3	25.7
N3	117.2	2	8.2	3	16.0	6	32.3
N4	109.4	–	–	1	3.8	3	25.7
N5	106.2	2	8.2	3	16.0	6	32.3
N6	105.4	2	8.3	3	16.1	6	32.2

TABLE 3-43
SUMMARY OF SAGE-GROUSE LEK DISTANCES TO ALTERNATIVE ROUTE CENTERLINES

Alternative Route	Route Length (miles)	Number of Leks within 2 miles	Length of alternative route within 2 miles of leks (miles)	Number of leks within 4 miles	Length of alternative route within 4 miles of leks (miles)	Number of leks within 11 miles	Length of alternative route within 11 miles of leks (miles)
S1	55.9	–	–	1	1.7	1	9.1
S2	49.6	–	–	1	1.7	1	9.1
S3	57.4	–	–	1	1.7	1	9.1
S4	48.9	–	–	1	1.7	1	9.1
S5	59.0	–	–	1	1.7	1	9.5
S6	61.8	–	–	1	1.7	1	9.5
S7	49.8	–	–	1	1.7	1	9.1
S7-A	49.8	–	–	1	1.7	1	9.1

BLM, USFS, and State Sensitive Species

Alternative N1 crosses 5.1 miles of suitable habitat for Elsinore buckwheat, Ward's beardtongue, and Utah phacelia along Links 30 and 45 (MV-7a). The number of miles of suitable habitat for these sensitive plant species crossed is the same for all alternative routes considered for the northern area.

Alternative N1 crosses 25.4 miles of suitable habitat for the pygmy rabbit interspersed along the entire alternative (MV-7a through MV-7c).

Other sensitive wildlife species are known or likely would occur along Alternative N1; however, spatial data were not available for all alternatives and consequently, quantitative descriptions of the potential effects of each alternative route on these species could not be developed. Wildlife species (e.g., the American white pelican and bald eagle) could forage, but are not known to nest, within the study corridors. Suitable nesting habitat for the burrowing owl, ferruginous hawk, and long-billed curlew also is present in lower elevation valleys (e.g., Milford Valley). Townsend's big-eared bat, dark kangaroo mouse, and kit fox are known to occur in the study corridor for Alternative N1 (UNHP 2009). Sensitive fish, including the Bonneville cutthroat trout and Southern leatherside chub, are known to occur in aquatic habitats crossed by this route. The likelihood of occurrence of sensitive species is shown by alternative route in Table 3-40.

Wild Horses and Burros

Alternative N1 does not cross the Chloride Canyon HMA.

Environmental Effects

Overall, impacts on biological resources with implementation of Alternative N1 would include 7.4 miles of high impacts, 140.3 miles of moderate impacts, and 200.7 miles of low impacts. Alternative N1 would parallel the existing IPP corridor for 41.5 miles. Benefits of colocation would include reducing new disturbance in previously undisturbed habitats, thereby reducing fragmentation of habitat for some plant and wildlife species.

Vegetation Communities

The types of potential effects on vegetation communities that could occur under Alternative N1 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on vegetation communities under Alternative N1 could include 10.6 miles of low impacts, 110.0 miles of moderate impacts, and no identifiable high impacts (Table 3-42; MV-6a, MV-6b and MV-6c). Criteria for assessing intensity of impacts are presented in Table 3-38. Alternative N1 would result in an estimated 352.6 acres of permanent ground disturbance from access road and tower construction, 1,099.5 acres of temporary disturbance, and 364.6 acres of vegetation clearing (Table 3-2).

Wildlife

The types of potential effects on wildlife that could occur under Alternative N1 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Wildlife species that may be affected by Alternative N1 are listed in Tables D-1, D-2, D-3, D-4, and D-5. Effects on wildlife would not be anticipated to cause a loss in population or species viability in the Project area.

Raptors and Other Migratory Birds

The types of potential effects on raptors and other migratory birds that could occur under Alternative N1 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation, impacts on raptors and migratory birds under Alternative N1 could include 120.6 miles of low impacts on areas designated by UDWR as low-, medium-, and high-quality raptor habitat along the entire alternative route. The quantity of low-, medium-, and high-quality raptor habitat crossed is presented in Table 3-41. Criteria for assessing intensity of impacts are presented in Table 3-38.

Big Game

The types of potential effects on big game that could occur under Alternative N1 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on big game under Alternative N1 could include 99.8 miles of low impacts within crucial seasonal habitats for mule deer and pronghorn. Low impacts on mule deer could occur within 33.4 miles of crucial winter habitat between Sigurd and the Mineral Mountains (MV-8a and MV-8b). Low impacts on pronghorn could occur within 69.9 miles of crucial year-long habitat between Cove Fort and the Black Mountains (MV-8b and MV-8c). Criteria for assessing intensity of impacts on big game are presented in Table 3-38.

Special Status Species

Federally Listed and Candidate Species

The types of potential effects on greater sage-grouse that could occur under Alternative N1 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on sage-grouse would be anticipated to include 7.4

miles of high impacts within crucial brood-rearing habitat and crucial winter habitat along Link 160. Criteria for assessing intensity of impacts are presented in Table 3-38.

No identifiable impacts on the southwestern willow flycatcher or Utah prairie dog would be anticipated under Alternative N1.

BLM, USFS, and State Sensitive Species

After application of selective mitigation measures, impacts on BLM and USFS sensitive species under Alternative N1 could include 5.1 miles of moderate impacts on suitable habitat for Ward's beardtongue, Elsinore buckwheat, and Utah phacelia and 25.4 miles of moderate impacts on potential pygmy rabbit habitat interspersed along the entire alternative route (MV MV-7a, MV-7b, and MV-7c). All BLM, USFS, and state sensitive species that could be affected under this alternative are identified in Table 3-40.

The types of potential effects on all BLM, USFS, and state sensitive species that could occur under Alternative N1 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Additional analysis of effects on USFS sensitive species and MIS, including species-specific findings required to demonstrate compliance with the USFS LRMPs, is included in Appendix E.

Wild Horses and Burros

No identifiable impacts on wild horses would be anticipated under Alternative N1.

Alternative N2 – Black Rock Road to IPP South of Milford Wind Farm

Affected Environment

Vegetation Communities

Alternative N2 crosses 120.4 miles. Vegetation communities along this alternative include 1.0 mile of grassland, 0.9 mile of barren, 4.3 miles of disturbed, 4.6 miles of invasive, 0.5 mile of mountain shrub, 18.6 miles of pinyon-juniper, 16.7 miles of shrub steppe, 19.8 miles of desert shrub, 33.2 miles of wildfire-affected areas/reseeded through emergency stabilization and rehabilitation areas, and 20.7 miles of big sagebrush communities (Table 3-41; MV-6a through MV-6b). No agriculture, aspen, or ponderosa pine vegetation communities, or identified populations of noxious weeds are crossed by Alternative N2. However, information regarding the distribution of noxious weeds was not available for the entire study corridor.

Wildlife

Raptors and Other Migratory Birds

From Sigurd to Cove Fort, all alternative routes cross 27.5 miles of medium-quality raptor habitats areas along Links 24, 26, 33, 30, 45, and 64 and 17.5 miles of high-quality habitats along Links 64, 63, 66, and 68 (MV-7a). From Cove Fort to the Black Mountains, Alternative N2 crosses 16.0 miles of high-quality raptor habitat along the Mineral Mountains (Link 305, 345, and 450); 5.0 miles of medium-quality habitat along Link 160; and 54.2 miles of low-quality habitat along Black Rock Roads and the existing IPP (Links 385, 386, 381, and 155) (MV-7b).

Big Game

From Sigurd to Cove Fort, all alternative routes cross 24.5 miles of mule deer crucial winter habitat along Links 30, 33, 45, and 64 (MV-8a). From Cove Fort to the Black Mountains, Alternative N2 crosses 18.7 miles of crucial mule deer winter habitat along Links 305, 320, 330, 345, and 450 (MV-8b), and 69.7 miles of crucial year-long pronghorn habitat along Links 320, 330, 350, 345, 450, 385, 386, 381, 155, 160, and 165 (MV-8b). Alternative N2 does not cross crucial summer mule deer habitat. None of the alternative routes cross crucial elk habitat.

Special Status Species

Federally Listed and Candidate Species

Alternative N2 crosses 7.4 miles of crucial greater sage-grouse brooding habitat and 7.4 miles of crucial winter habitat located along Link 160 (MV-7b), but does not cross within 2 miles of any known active leks. The total length of transmission line that would be constructed within 2, 4, and 11 miles of known leks under each alternative route is presented in Table 3-43.

Alternative N2 does not cross occupied habitat for the southwestern willow flycatcher or occupied habitat for the Utah prairie dog.

BLM, USFS, and State Sensitive Species

Alternative N2 crosses 5.1 miles of suitable habitat for Elsinore buckwheat, Ward's beardtongue, and Utah phacelia along Links 30, 45, and 64 (MV-7a). The number of miles of suitable habitat for these sensitive plant species crossed is the same for all alternative routes considered for the northern area. Alternative N2 crosses 34.9 miles of suitable habitat for the pygmy rabbit interspersed along the entire alternative route (MV-7a through MV-7b).

Other sensitive wildlife species are known or likely would occur along Alternative N2; however, spatial data were not available for all alternatives, therefore, no quantitative descriptions of impacts relative to other alternatives could be reasonably portrayed. Wildlife species (e.g., American white pelican and bald eagle) could forage, but are not known to nest, within the study corridors. Suitable nesting habitat for the burrowing owl, ferruginous hawk, and long-billed curlew also is present in lower elevation valleys (e.g., Milford Valley). Townsend's big-eared bat, dark kangaroo mouse, and kit fox are known to occur in the study corridor for Alternative N2 (UNHP 2009). Sensitive fish, including the Bonneville cutthroat trout, are known to occur in aquatic habitats crossed by the route. The likelihood of occurrence of sensitive species is shown by alternative in Table 3-40.

Wild Horses and Burros

Alternative N2 does not cross the Chloride Canyon HMA.

Environmental Effects

Overall impacts on biological resources associated with implementation of Alternative N2 would include 190.1 miles of low impacts, 150.3 miles of moderate impacts, and 7.4 miles of high impacts. Alternative N2 would parallel the existing IPP corridor for 36.4 miles (10 fewer miles than Alternative N1). Similar

to Alternative N1, benefits of colocation would include reducing new disturbance in previously undisturbed habitats, thereby reducing fragmentation of habitat for some plant and wildlife species.

Vegetation Communities

The types of potential effects on vegetation communities that could occur under Alternative N2 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation, impacts on vegetation communities under Alternative N2 could include 9.9 miles of low impacts, 110.5 miles of moderate impacts, and no identifiable high impacts (Table 3-42; MV-6a, MV-6b and MV-6c). Criteria for assessing intensity of impacts are presented in Table 3-38. Alternative N2 would result in an estimated 344.0 acres of permanent ground disturbance from access road and tower construction, 1,103.0 acres of temporary disturbance, and 364.6 acres of vegetation clearing (Table 3-2).

Wildlife

The types of potential effects on wildlife that could occur under Alternative N2 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Wildlife species that may be affected by Alternative N1 are presented in Tables D-1, D-2, D-3, D-4, and D-5. Effects on wildlife would not be anticipated to cause a loss in population or species viability in the Project area.

Raptors and Other Migratory Birds

The types of potential effects on raptors and other migratory birds that could occur under Alternative N2 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on raptors and migratory birds under Alternative N2 could include 120.4 miles of low impacts on areas designated by UDWR as low-, medium-, and high-quality raptor habitat along the entire alternative route. The quantity of low-, medium-, and high-quality raptor habitat crossed is presented in Table 3-41. Criteria for assessing intensity of impacts are presented in Table 3-38.

Big Game

The types of potential effects on big game that could occur under Alternative N2 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on big game under Alternative N2 could include 99.6 miles of low impacts within crucial seasonal habitats for mule deer and pronghorn. Low impacts on mule deer could occur within 43.2 miles of crucial winter habitat between Sigurd and the Mineral Mountains (MV-8a and MV-8b). Low impacts on pronghorn could occur within 69.7 miles of crucial year-long habitat between Cove Fort and the Black Mountains (MV-8b and MV-8c). Criteria for assessing intensity of impacts on big game are presented in Table 3-38.

Special Status Species

Federally Listed and Candidate Species

The types of potential effects on greater sage-grouse that could occur under Alternative N2 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on sage-grouse would be anticipated to include 7.4 miles of high impacts within crucial brood-rearing habitat and crucial winter habitat along Link 160. Criteria for assessing intensity of impacts are presented in Table 3-38.

No identifiable impacts on the southwestern willow flycatcher or Utah prairie dog would be anticipated under Alternative N2.

BLM, USFS, and State Sensitive Species

After application of selective mitigation measures, impacts on BLM and USFS sensitive species under Alternative N2 could include 5.1 miles of moderate impacts on suitable habitat for Ward's beardtongue, Elsinore buckwheat, and Utah phacelia and 34.9 miles of moderate impacts on potential pygmy rabbit habitat interspersed along the entire alternative route (MV-7a, MV-7b, and MV-7c). All BLM, USFS, and state sensitive species that could be affected under this alternative are identified in Table 3-40.

The types of potential effects on all BLM, USFS, and state sensitive species that could occur under Alternative N2 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Additional analysis of effects on USFS sensitive species and MIS, including species-specific findings required to demonstrate compliance with the USFS LRMPs, is included in Appendix E.

Wild Horses and Burros

No identifiable impacts on wild horses would be anticipated under Alternative N2.

Alternative N2-A (Route Variation of Alternative N2) – Black Rock Road to IPP South of Milford Wind Farm 1,500 Feet East of Kern River Pipeline (Agency Preferred Alternative)

Affected Environment

Vegetation Communities

Alternative N2-A crosses 120.0 miles. Vegetation communities along this alternative include 1.0 mile of grassland, 0.9 mile of barren, 4.4 miles of disturbed, 4.6 miles of invasive, 0.5 mile of mountain shrub, 18.5 miles of pinyon-juniper, 16.7 miles of shrub steppe, 19.9 miles of desert shrub, 33.4 miles of wildfire-affected areas/reseeded through emergency stabilization and rehabilitation areas, and 20.0 miles of big sagebrush communities (Table 3-41; MV-6a through MV-6b). No agriculture, aspen, or ponderosa pine vegetation communities, or identified populations of noxious weeds are crossed by Alternative N2. However, information regarding the distribution of noxious weeds was not available for the entire study corridor.

Wildlife

Raptors and Other Migratory Birds

From Sigurd to Cove Fort, all alternative routes cross 27.5 miles of medium-quality raptor habitats areas along Links 24, 26, 33, 30, 45, and 64 and 17.5 miles of high-quality habitats along Links 64, 63, 66, and 68 (MV-7a). From Cove Fort to the Black Mountains, Alternative N2-A crosses 16.2 miles of high-quality raptor habitat along the Mineral Mountains (Link 305, 345, and 348); 4.6 miles of medium-quality habitat along Link 160; and 54.2 miles of low-quality habitat along Black Rock Roads and the existing IPP (Links 385, 386, 381, and 155) (MV-7b).

Big Game

From Sigurd to Cove Fort, all alternative routes cross 24.5 miles of mule deer crucial winter habitat along Links 30, 33, 45, and 64 (MV-8a). From Cove Fort to the Black Mountains, Alternative N2-A crosses 19.7 miles of crucial mule deer winter habitat along Links 305, 320, 330, 345, and 348 (MV-8b), and 69.9 miles of crucial year-long pronghorn habitat along Links 320, 330, 350, 345, 348, 385, 386, 381, 155, 160, and 165 (MV-8b). Alternative N2-A does not cross crucial summer mule deer habitat. None of the alternative routes cross crucial elk habitat.

Special Status Species

Federally Listed and Candidate Species

Alternative N2-A crosses 7.4 miles of crucial greater sage-grouse brooding habitat and 7.4 miles of crucial winter habitat located along Link 160 (MV-7b), but does not cross within 2 miles of any known active leks. The total length of transmission line that would be constructed within 2, 4, and 11 miles of known leks under each alternative route is presented in Table 3-43.

Alternative N2-A does not cross occupied habitat for the southwestern willow flycatcher or occupied habitat for the Utah prairie dog.

BLM, USFS, and State Sensitive Species

Alternative N2-A crosses 5.1 miles of suitable habitat for Elsinore buckwheat, Ward's beardtongue, and Utah phacelia along Links 30, 45, and 64 (MV-7a). The number of miles of suitable habitat for these sensitive plant species crossed is the same for all alternative routes considered for the northern area. Alternative N2-A crosses 34.0 miles of suitable habitat for the pygmy rabbit interspersed along the entire alternative route (MV-7a through MV-7b).

Other sensitive wildlife species are known or likely would occur along Alternative N2-A; however, spatial data were not available for all alternatives, and consequently, quantitative descriptions of the potential effects of each alternative route on these species could not be developed. Wildlife species (e.g., American white pelican and bald eagle) could forage, but are not known to nest, within the study corridors. Suitable nesting habitat for the burrowing owl, ferruginous hawk, and long-billed curlew also is present in lower elevation valleys (e.g., Milford Valley). Townsend's big-eared bat, dark kangaroo mouse, and kit fox are known to occur in the study corridor for Alternative N2-A (UNHP 2009). Sensitive

fish, including the Bonneville cutthroat trout, are known to occur in aquatic habitats crossed by the route. The likelihood of occurrence of sensitive species is shown by alternative in Table 3-40.

Wild Horses and Burros

Alternative N2-A does not cross the Chloride Canyon HMA.

Environmental Effects

Overall impacts on biological resources associated with implementation of Alternative N2-A would include 191.5 miles of low impacts, 148.9 miles of moderate impacts, and 7.4 miles of high impacts. Alternative N2-A would parallel the existing IPP corridor for 36.4 miles (10 fewer miles than Alternative N1). Similar to Alternative N1, benefits of colocation would include reducing new disturbance in previously undisturbed habitats, thereby reducing fragmentation of habitat for some plant and wildlife species.

Vegetation Communities

The types of potential effects on vegetation communities that could occur under Alternative N2-A and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on vegetation communities under Alternative N2-A could include 10.0 miles of low impacts, 110.0 miles of moderate impacts, and no identifiable high impacts (Table 3-42; MV-6a, MV-6b and MV-6c). Criteria for assessing intensity of impacts are presented in Table 3-38. Alternative N2-A would result in an estimated 344.4 acres of permanent ground disturbance from access road and tower construction, 1,099.8 acres of temporary disturbance, and 362.7 acres of vegetation clearing (Table 3-2).

Wildlife

The types of potential effects on wildlife that could occur under Alternative N2-A and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Wildlife species that may be affected by Alternative N2-A are listed in Tables D-1, D-2, D-3, D-4, and D-5. Effects on wildlife would not be anticipated to cause a loss in population or species viability in the Project area.

Raptors and Other Migratory Birds

The types of potential effects on raptors and other migratory birds that could occur under Alternative N2-A and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on raptors and migratory birds under Alternative N2-A could include 120.0 miles of low impacts on areas designated by UDWR as low-, medium-, and high-quality raptor habitat along the entire alternative route. The quantity of low-, medium-, and high-quality raptor habitat crossed is presented in Table 3-41. Criteria for assessing intensity of impacts are presented in Table 3-38.

Big Game

The types of potential effects on big game that could occur under Alternative N2-A and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on big game under Alternative N2-A could include 99.8 miles of low impacts within crucial seasonal habitats for mule deer and pronghorn. Low impacts on mule deer could occur within 44.2 miles of crucial winter habitat between Sigurd and the Mineral Mountains (MV-8a and MV-8b). Low impacts on pronghorn could occur within 69.9 miles of crucial year-long habitat between Cove Fort and the Black Mountains (MV-8b and MV-8c). Criteria for assessing intensity of impacts on big game are presented in Table 3-38.

Special Status Species

Federally Listed and Candidate Species

The types of potential effects on greater sage-grouse that could occur under Alternative N2-A and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on sage-grouse would be anticipated to include 7.4 miles of high impacts within crucial brood-rearing habitat and crucial winter habitat along Link 160. Criteria for assessing intensity of impacts are presented in Table 3-38.

No identifiable impacts on the southwestern willow flycatcher or Utah prairie dog would be anticipated under Alternative N2-A.

BLM, USFS, and State Sensitive Species

After application of selective mitigation measures, impacts on BLM and USFS sensitive species under Alternative N2-A could include 5.1 miles of moderate impacts on suitable habitat for Ward's beardtongue, Elsinore buckwheat, and Utah phacelia and 34.0 miles of moderate impacts on potential pygmy rabbit habitat interspersed along the entire alternative route (MV-7a, MV-7b, and MV-7c). All BLM, USFS, and state sensitive species that could be affected under this alternative are identified in Table 3-40.

The types of potential effects on all BLM, USFS, and state sensitive species that could occur under Alternative N2-A and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Additional analysis of effects on USFS sensitive species and MIS, including species-specific findings required to demonstrate compliance with the USFS LRMPs, is included in Appendix E.

Wild Horses and Burros

No identifiable impacts on wild horses would be anticipated under Alternative N2-A.

Alternative N3 – Black Rock Road Parallel to Kern River Pipeline

Alternative N3 diverts from Alternative N1, following the western flank of the Mineral Mountains before bisecting the Black Mountains. The alternative route follows Links 460, 470, 475, 480, and 490 (instead of Links 385, 386, 381, 155, and 160).

Affected Environment

Vegetation Communities

Alternative N3 crosses 117.2 miles. Vegetation communities include 0.9 mile of grassland, 0.9 mile of barren, 4.3 miles of disturbed, 5.0 miles of invasive, 0.5 mile of mountain shrub, 21.4 miles of pinyon-juniper, 8.0 miles of shrub steppe, 9.4 miles of desert shrub, 32.1 miles of wildfire-affected areas/reseeded through emergency stabilization and rehabilitation areas, and 34.7 miles of big sagebrush communities (Table 3-41; MV-6a through MV-6b). No agriculture, riparian, or aspen vegetation communities, or identified areas of noxious weeds are crossed by Alternative N3. However, information regarding the distribution of noxious weeds was not available for the entire study corridor.

Wildlife

Raptors and Other Migratory Birds

From Sigurd to Cove Fort, all alternative routes cross 27.5 miles of medium-quality raptor habitat areas along Links 24, 26, 33, 30, 45, 63, 64, 66, and 68 and 17.5 miles of high-quality habitats along Links 64, 63, 66, 68, and 305 (MV-7a). From Cove Fort to the Black Mountains, Alternative N3 crosses 42.5 miles of high-quality raptor habitat along the Mineral Mountains (Link 345, 450, 460, 470, 475, 480, and 490), 16.4 miles of medium-quality habitat along Links 490 and 397, and 13.3 miles of low-quality habitat along Black Rock Road (Links 320, 330, 350, and 345) (MV-7b).

Big Game

From Sigurd to Cove Fort, all alternative routes cross 24.5 miles of mule deer crucial winter habitat along Links 27, 30, 33, 45, 63, 64, 66, and 68 (MV-8a). From Cove Fort to the Black Mountains, Alternative N3 crosses 30.8 miles of crucial mule deer winter habitat along Links 305, 320, 345, 450, 460, and 490 (MV-8b), and 58.7 miles of crucial year-long pronghorn habitat along Links 320, 330, 350, 345, 450, 460, 470, 475, 480, 490, and 397 (MV-8b). Alternative N3 does not cross crucial summer mule deer habitat. None of the alternative routes cross crucial elk habitat.

Special Status Species

Federally Listed and Candidate Species

Alternative N3 crosses 20.3 miles of crucial sage-grouse brooding habitat and 7.3 miles of crucial winter habitat located along Links 397, 470, 480, and 490. In addition, two active leks have been identified within 2 miles of the reference centerline. The total length of transmission line that would be constructed within 2, 4, and 11 miles of known leks under each alternative route is presented in Table 3-43.

Alternative N3 also crosses 1.6 miles of occupied habitat within an active Utah prairie dog colony, which includes 870 acres of inactive burrows within 0.5 mile of the reference centerline. Alternative N3 does not cross occupied habitat for the southwestern willow flycatcher.

BLM, USFS, and State Sensitive Species

Alternative N3 crosses 5.1 miles of suitable habitat for Elsinore buckwheat, Ward's beardtongue, and Utah phacelia along Links 30, 45, and 64 (MV-7a). The number of miles of suitable habitat for these sensitive plant species crossed is the same for all alternative routes considered for the northern area.

Alternative N3 crosses 53.7 miles of suitable habitat for the pygmy rabbit interspersed along the entire alternative route (MV-7a through MV-7b).

Other sensitive wildlife species are known or likely would occur along Alternative N3; however, spatial data were not available for all alternatives, and consequently, quantitative descriptions of the potential effects of each alternative route on these species could not be developed. Wildlife species (e.g., the American white pelican and bald eagle) could forage, but are not known to nest, within the study corridors. Suitable nesting habitat for the burrowing owl, ferruginous hawk, and long-billed curlew also is present in lower elevation valleys (e.g., Milford Valley). Townsend's big-eared bat, dark kangaroo mouse, and kit fox are known to occur in the study corridor for Alternative N3 (UNHP 2009). Sensitive fish, including the Bonneville cutthroat trout, are known to occur in the Beaver River (crossed by Link 475). The likelihood of occurrence of sensitive species is shown by alternative in Table 3-40.

Wild Horses and Burros

Alternative N3 does not cross the Chloride Canyon HMA.

Environmental Effects

Overall, impacts on biological resources associated with implementation of Alternative N3 would include 163.6 miles of low impacts, 165.6 miles of moderate impacts, and 21.1 miles of high impacts. Unlike Alternatives N1 and N2, Alternative N3 does not parallel the existing IPP.

Vegetation Communities

The types of potential effects on vegetation communities that could occur under Alternative N3 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on vegetation communities under Alternative N3 could include 10.2 miles of low impacts, 107.0 miles of moderate impacts, and no identifiable high impacts (Table 3-42; MV-6a, MV-6b and MV-6c). Criteria for assessing intensity of impacts are presented in Table 3-38. Alternative N3 would result in an estimated 303.8 acres of permanent ground disturbance from access road and tower construction, 1,077.3 acres of temporary disturbance, and 418.1 acres of vegetation clearing (Table 3-2).

Wildlife

The types of potential effects on wildlife that could occur under Alternative N3 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Wildlife species that may be affected by Alternative N3 are listed in Tables D-1, D-2, D-3, D-4, and D-5. Effects on wildlife would not be anticipated to cause a loss in population or species viability in the Project area.

Raptors and Other Migratory Birds

The types of potential effects on raptors and other migratory birds that could occur under Alternative N3 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on raptors and migratory birds under Alternative N3 could include 117.2 miles of low impacts on areas designated by UDWR as low-, medium-, and high-quality raptor habitat along the entire alternative route. The quantity of low-, medium-, and high-quality raptor habitat crossed is presented in Table 3-41. Criteria for assessing intensity of impacts are presented in Table 3-38.

Big Game

The types of potential effects on big game that could occur under Alternative N3 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on big game under Alternative N3 could include 94.4 miles of low impacts within crucial seasonal habitats for mule deer and pronghorn. Low impacts on mule deer could occur within 55.3 miles of crucial winter habitat between Sigurd and the Mineral Mountains (MV-8b). Low impacts on pronghorn could occur within 58.7 miles of crucial year-long habitat between Cove Fort and the Black Mountains (MV-8b). Criteria for assessing intensity of impacts on big game are presented in Table 3-38.

Special Status Species

Federally Listed and Candidate Species

The types of potential effects on greater sage-grouse that could occur under Alternative N3 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on sage-grouse would be anticipated to include 20.3 miles of high impacts within crucial brood-rearing habitat, crucial winter habitat, and areas within 2 miles of leks. Criteria for assessing intensity of impacts are presented in Table 3-38.

The types of potential effects on Utah prairie dog that could occur under Alternative N3 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on Utah prairie dog would be anticipated to include 1.6 miles of high impacts within an active colony. Criteria for assessing intensity of impacts are presented in Table 3-38.

No identifiable impacts on the southwestern willow flycatcher would be anticipated under Alternative N3.

BLM, USFS, and State Sensitive Species

After application of selective mitigation measures, impacts on BLM and USFS sensitive species under Alternative N3 could include 5.1 miles of moderate impacts on suitable habitat for Ward's beardtongue, Elsinore buckwheat, and Utah phacelia and 53.7 miles of moderate impacts on potential pygmy rabbit habitat interspersed along the entire alternative route (MV-7a, MV-7b, and MV-7c). All BLM, USFS, and state sensitive species that could be affected under this alternative are identified in Table 3-40.

The types of potential effects on all BLM, USFS, and state sensitive species that could occur under Alternative N3 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Additional analysis of effects on USFS sensitive species and MIS, including species-specific findings required to demonstrate compliance with the USFS LRMPs, is included in Appendix E.

Wild Horses and Burros

No identifiable impacts on wild horses would be anticipated under Alternative N3.

Alternative N4 – Mineral Mountains to IPP South of Milford Wind Farm

Affected Environment

Vegetation Communities

Alternative N4 crosses 109.4 miles. Vegetation communities include 1.0 mile of grassland, 0.9 mile of barren, 4.3 miles of disturbed, 4.6 miles of invasive, 0.2 mile of agriculture, 0.5 mile of mountain shrub, 18.9 miles of pinyon-juniper, 16.7 miles of shrub steppe, 19.8 miles of desert shrub, 2.0 miles of identified areas of noxious weeds, 19.7 miles of wildfire-affected areas/reseeded through emergency stabilization and rehabilitation areas, and 20.7 miles of big sagebrush communities (Table 3-41; MV-6a through MV-6b). No riparian or aspen vegetation communities are crossed by Alternative N4. However, information regarding the distribution of noxious weeds was not available for the entire study corridor.

Wildlife

Raptors and Other Migratory Birds

From Sigurd to Cove Fort, all alternative routes cross 27.7 miles of medium-quality raptor habitats areas along Links 24, 26, 33, 30, 45, and 64 and 17.5 miles of high-quality habitats along Links 64, 63, 66, and 68 (MV-7a). From Cove Fort to the Black Mountains, Alternative N4 crosses 18.3 miles of high-quality raptor habitat along the Mineral Mountains (Link 75 and 455), 5.0 miles of medium-quality habitat along Links 490 and 397, and 40.9 miles of low-quality habitat along the existing IPP (Links 381, 155, and 160) (MV-7b).

Big Game

From Sigurd to Cove Fort, all alternative routes cross 24.5 miles of mule deer crucial winter habitat along Links 27, 30, 33, 45, 63, 64, 66, and 68 (MV-8a). From Cove Fort to the Black Mountains, Alternative N4 crosses 16.6 miles of crucial mule deer winter habitat along Links 75 and 455 (MV-8a), and 48.3 miles of crucial year-long pronghorn habitat along Links 75, 455, 385, 386, 381, 155, and 160 (MV-7b). Alternative N4 does not cross crucial summer mule deer habitat. None of the alternative routes cross crucial elk habitat.

Special Status Species

Federally Listed and Candidate Species

Alternative N4 crosses 7.4 miles of crucial greater sage-grouse brooding habitat and 7.4 miles of crucial winter habitat located along Link 160 (MV-7b), but does not cross within 2.0 miles of any known leks. The total length of transmission line that would be constructed within 2, 4, and 11 miles of known leks under each alternative route is presented in Table 3-43.

Alternative N4 does not cross occupied habitat for the southwestern willow flycatcher or occupied habitat for the Utah prairie dog.

BLM, USFS, and State Sensitive Species

Alternative N4 crosses 5.1 miles of suitable habitat for Elsinore buckwheat, Ward's beardtongue, and Utah phacelia along Links 30, 45, and 64 (MV-7a). The number of miles of suitable habitat for these sensitive plant species crossed is the same for all alternative routes considered for the northern area.

Alternative N4 crosses 19.0 miles of suitable habitat for the pygmy rabbit interspersed along the entire alternative route (MV-7a through MV-7b).

Other sensitive wildlife species are known or likely would occur along Alternative N4; however, spatial data were not available for all alternatives and consequently, quantitative descriptions of the potential effects of each alternative route on these species could not be developed. Wildlife species (e.g., the American white pelican and bald eagle) could forage, but are not known to nest, within the study corridors. Suitable nesting habitat for the burrowing owl, ferruginous hawk, and long-billed curlew also is present in lower elevation valleys (e.g., Milford Valley). Townsend's big-eared bat, dark kangaroo mouse, and kit fox are known to occur in the study corridor for Alternative N4 (UNHP 2009). Sensitive fish, including the Bonneville cutthroat trout, are known to occur in the Beaver River (crossed by Link 385). The likelihood of occurrence of sensitive species is shown by alternative in Table 3-40.

Wild Horses and Burros

Alternative N4 does not cross the Chloride Canyon HMA.

Environmental Effects

Overall, impacts on biological resources associated with implementation of Alternative N4 would include 185.8 miles of low impacts, 121.1 miles of moderate impacts, and 7.4 miles of high impacts. Alternative N4 would parallel the existing IPP corridor for 40 miles. Similar to Alternatives N1 and N2, benefits of colocation would include a new corridor, reducing new disturbance in previously undisturbed habitats thereby reducing fragmentation of habitat for some plant and wildlife species.

As a design alternative to this alternative route, the Project could be colocated with the existing Cove Fort to Blundell 46kV transmission line along Link 75. Short-term disturbance associated with construction and use of new access roads, wire pulling, and staging areas would have the same impacts on biological resources as construction of the Project within a new right-of-way. However, more long-term impacts,

such as habitat fragmentation, would be lower if the Project were colocated with the existing transmission line in the same or wider right-of-way.

Vegetation Communities

The types of potential effects on vegetation communities that could occur under Alternative N4 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on vegetation communities under Alternative N4 could include 12.1 miles of low impacts, 97.3 miles of moderate impacts, and no identifiable high impacts (Table 3-42; MV-6a, MV-6b and MV-6c). Criteria for assessing intensity of impacts are presented in Table 3-38. Alternative N4 would result in an estimated 351.2 acres of permanent ground disturbance from access road and tower construction, 1,010.6 acres of temporary disturbance, and 370.4 acres of vegetation clearing (Table 3-2).

Wildlife

The types of potential effects on wildlife that could occur under Alternative N4 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Wildlife species that may be affected by Alternative N4 are listed in Tables D-1, D-2, D-3, D-4, and D-5. Effects on wildlife would not be anticipated to cause a loss in population or species viability in the Project area.

Raptors and Other Migratory Birds

The types of potential effects on raptors and other migratory birds that could occur under Alternative N4 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on raptors and migratory birds under Alternative N4 could include 109.4 miles of low impacts on areas designated by UDWR as low-, medium-, and high-quality raptor habitat along the entire alternative route. The quantity of low-, medium-, and high-quality raptor habitat crossed is presented in Table 3-41. Criteria for assessing intensity of impacts are presented in Table 3-38.

Big Game

The types of potential effects on big game that could occur under Alternative N4 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on big game under Alternative N4 could include 88.6 miles of low impacts within crucial seasonal habitats for mule deer and pronghorn. Low impacts on mule deer could occur within 41.4 miles of crucial winter habitat between Sigurd and the Mineral Mountains (MV-8a and MV-8b). Low impacts on pronghorn could occur within 48.3 miles of crucial year-long habitat between Cove Fort and the Black Mountains (MV-8b and MV-8c). Criteria for assessing intensity of impacts on big game are presented in Table 3-38.

Special Status Species

Federally Listed and Candidate Species

The types of potential effects on greater sage-grouse that could occur under Alternative N4 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on sage-grouse would be anticipated to include 7.4 miles of high impacts within crucial brood-rearing habitat and crucial winter habitat along Link 160. Criteria for assessing intensity of impacts are presented in Table 3-38.

No identifiable impacts on the southwestern willow flycatcher or Utah prairie dog would be anticipated under Alternative N4.

BLM, USFS, and State Sensitive Species

After application of selective mitigation measures, impacts on BLM and USFS sensitive species under Alternative N4 could include 5.1 miles of moderate impacts on suitable habitat for Ward's beardtongue, Elsinore buckwheat, and Utah phacelia and 19.0 miles of moderate impacts on potential pygmy rabbit habitat interspersed along the entire alternative route (MV-7a, MV-7b, and MV-7c). All BLM, USFS, and state sensitive species that could be affected under this alternative are identified in Table 3-40.

The types of potential effects on all BLM, USFS, and state sensitive species that could occur under Alternative N4 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Additional analysis of effects on USFS sensitive species and MIS, including species-specific findings required to demonstrate compliance with the USFS LRMPs, is included in Appendix E.

Wild Horses and Burros

No identifiable impacts on wild horses would be anticipated under Alternative N4.

Alternative N5 – Mineral Mountains Parallel to Kern River Pipeline

Affected Environment

Vegetation Communities

Alternative N5 crosses 106.2 miles. Vegetation communities include 0.9 mile of grassland, 0.9 mile of barren, 4.3 miles of disturbed, 5.0 miles of invasive, 0.2 mile of agriculture, 0.5 mile of mountain shrub, 21.7 miles of pinyon-juniper, 8.0 miles of shrub steppe, 9.4 miles of desert shrub, 2.0 miles of identified areas of noxious weeds, 18.6 miles of wildfire-affected areas/reseeded through emergency stabilization and rehabilitation areas, and 34.7 miles of big sagebrush communities (Table 3-41; MV-6a through MV-6b). No riparian or aspen communities are crossed by Alternative N5. However, information regarding the distribution of noxious weeds was not available for the entire study corridor.

Wildlife

Raptors and Other Migratory Birds

From Sigurd to Cove Fort, all alternative routes cross 27.7 miles of medium-quality raptor habitats along Links 24, 26, 33, 30, 45, and 64 and 17.5 miles of high-quality habitat along Links 64, 63, 66, and 68 (MV-7a through MV-8b). From Cove Fort to the Black Mountains, Alternative N5 crosses 44.8 miles of high-quality raptor habitats along the Mineral Mountains (Link 75, 455, 460, 470, 475, 480, and 490), 16.2 miles of medium-quality habitat along Links 490 and 397, and no low-quality habitat (MV-7b).

Big Game

From Sigurd to Cove Fort, all alternative routes cross 24.5 miles of mule deer crucial winter habitat along Links 27, 30, 33, 45, 64, 66, and 68 (MV-8a through MV-8b). From Cove Fort to the Black Mountains, Alternative N5 crosses 28.7 miles of crucial mule deer winter habitat along Links 75, 455, 460, 470, and 490 (MV-8a), and 37.3 miles of crucial year-long pronghorn habitat along Links 75, 455, 460, 470, 475, 480, 490, and 397 (MV-8b). Alternative N5 does not cross crucial summer mule deer habitat. None of the alternative routes cross crucial elk habitat.

Special Status Species

Federally Listed and Candidate Species

Alternative N5 crosses 20.3 miles of crucial sage-grouse brooding habitat and 7.3 miles of crucial winter habitat located along Links 397, 470, 480, and 490. In addition, two active leks have been identified within 2 miles of the reference centerline. The total length of transmission line that would be constructed within 2, 4, and 11 miles of known leks under each alternative route is presented in Table 3-43.

Alternative N5 also crosses 1.6 miles of occupied habitat by an active Utah prairie dog colony, which includes 870.0 acres of active burrows within 0.5 mile of the reference centerline.

Alternative N5 does not cross occupied habitat for the southwestern willow flycatcher.

BLM, USFS, and State Sensitive Species

Alternative N5 crosses 5.1 miles of suitable habitat for Elsinore buckwheat, Ward's beardtongue, and Utah phacelia along Links 30, 45, and 64 (MV-7a). Alternative N5 crosses 37.8 miles of suitable habitat for the pygmy rabbit interspersed along the entire alternative route (MV-7a through MV-7b).

Other sensitive wildlife species are known or likely would occur along Alternative N5; however, spatial data were not available for all alternatives and consequently, quantitative descriptions of the potential effects of each alternative route on these species could not be developed. Wildlife species (e.g., the American white pelican and bald eagle) could forage, but are not known to nest, within the study corridors. Suitable nesting habitat for the burrowing owl, ferruginous hawk, and long-billed curlew also is present in lower elevation valleys (e.g., Milford Valley). Townsend's big-eared bat, dark kangaroo mouse, and kit fox are known to occur in the study corridor for Alternative N5 (UNHP 2009). Sensitive fish, including the Bonneville cutthroat trout, are known to occur in the Beaver River (crossed by Link 475). The likelihood of occurrence of sensitive species is shown by alternative in Table 3-40.

Wild Horses and Burros

Alternative N5 does not cross the Chloride Canyon HMA.

Environmental Effects

Overall, impacts on biological resources associated with implementation of Alternative N5 would include 159.3 miles of low impacts, 136.5 miles of moderate impacts, and 21.1 miles of high impacts. Unlike Alternatives N1, N2, and N4, Alternative N5 does not parallel the existing IPP corridor.

Similar to Alternative N4, a design alternative to this route could include colocation of the Project with the existing Cove Fort to Blundell 46kV transmission line along Link 75. Short-term disturbance associated with construction and use of new access roads, wire pulling, and staging areas would have the same impacts on biological resources as construction of the Project within a new right-of-way. However, more long-term impacts, such as habitat fragmentation, would be lower if the Project were colocated with the existing transmission line in the same or wider right-of-way.

Vegetation Communities

The types of potential effects on vegetation communities that could occur under Alternative N5 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2 (refer to Impact Assessment and Mitigation Planning). After application of selective mitigation measures, impacts on vegetation communities under Alternative N5 could include 12.4 miles of low impacts, 93.8 miles of moderate impacts, and no identifiable high impacts (Table 3-42; MV-6a, MV-6a, MV-6b and MV-6c). Criteria for assessing intensity of impacts are presented in Table 3-38. Alternative N5 would result in an estimated 311.0 acres of permanent ground disturbance from access road and tower construction, 985.4 acres of temporary disturbance, and 423.8 acres of vegetation clearing (Table 3-2).

Wildlife

The types of potential effects on wildlife that could occur under Alternative N5 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Wildlife species that may be affected by Alternative N5 are listed in Tables D-1, D-2, D-3, D-4, and D-5. Effects on wildlife would not be anticipated to cause a loss in population or species viability in the Project area.

Raptors and Other Migratory Birds

The types of potential effects on raptors and other migratory birds that could occur under Alternative N5 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on raptors and migratory birds under Alternative N5 could include 106.2 miles of low impacts on areas designated by UDWR as low-, medium-, and high-quality raptor habitat along the entire alternative route. The quantity of low-, medium-, and high-quality raptor habitat crossed is presented in Table 3-41. Criteria for assessing intensity of impacts are presented in Table 3-38.

Big Game

The types of potential effects on big game that could occur under Alternative N5 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on big game under Alternative N5 could include 83.4 miles of low impacts within crucial seasonal habitats for mule deer and pronghorn. Low impacts on mule deer could occur within 53.2 miles of crucial winter habitat between Sigurd and the Mineral Mountains (MV-8a and MV-8b). Low impacts on pronghorn could occur within 37.3 miles of crucial year-long habitat between Cove Fort and the Black Mountains (MV-8b and MV-8c). Criteria for assessing intensity of impacts on big game are presented in Table 3-38.

Special Status Species

Federally Listed and Candidate Species

The types of potential effects on greater sage-grouse that could occur under Alternative N5 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on sage-grouse would be anticipated to include 21.1 miles of high impacts within crucial brood-rearing habitat, crucial winter habitat, and areas within 2 miles of leks. Criteria for assessing intensity of impacts are presented in Table 3-38.

The types of potential effects on Utah prairie dog that could occur under Alternative N5 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on Utah prairie dog would be anticipated to include 1.6 miles of high impacts within an active colony. Criteria for assessing intensity of impacts are presented in Table 3-38.

No identifiable impacts on the southwestern willow flycatcher would be anticipated under Alternative N5.

BLM, USFS, and State Sensitive Species

After application of selective mitigation measures, impacts on BLM and USFS sensitive species under Alternative N5 could include 5.1 miles of moderate impacts on suitable habitat for Ward's beardtongue, Elsinore buckwheat, and Utah phacelia and 37.8 miles of moderate impacts on potential pygmy rabbit habitat interspersed along the entire alternative route (MV-7a, MV-7b, and MV-7c). All BLM, USFS, and state sensitive species that could be affected under this alternative are identified in Table 3-40.

The types of potential effects on all BLM, USFS, and state sensitive species that could occur under Alternative N5 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Additional analysis of effects on USFS sensitive species and MIS, including species-specific findings required to demonstrate compliance with the USFS LRMPs, is included in Appendix E.

Wild Horses and Burros

No identifiable impacts on wild horses would be anticipated under Alternative N5.

Alternative N6 – Mineral Mountains 1,500 Feet East of Kern River Pipeline (Proponent's Preferred Action)

Affected Environment

Vegetation Communities

Alternative N6 crosses 105.4 miles. Vegetation communities along this alternative route include 1.0 mile of grassland, 0.8 mile of barren, 4.4 miles of disturbed, 4.1 miles of invasive, 0.2 mile of agriculture, 0.5 mile of mountain shrub, 24.7 miles of pinyon-juniper, 6.4 miles of shrub steppe, 8.7 miles of desert shrub, 2.0 miles of identified areas of noxious weeds, 18.8 miles of wildfire-affected areas/reseeded through emergency stabilization and rehabilitation areas, and 33.8 miles of big sagebrush vegetation communities (Table 3-41; MV-6a through MV-6b). No riparian or aspen vegetation communities are crossed by Alternative N6. However, information regarding the distribution of noxious weeds was not available for the entire study corridor.

Raptors and Other Migratory Birds

From Sigurd to Cove Fort, all alternative routes cross 27.7 miles of medium-quality raptor habitats along Links 24, 26, 33, 30, 45, and 64, and 17.5 miles of high-quality habitats along Links 64, 63, 66, and 68 (MV-7a). From Cove Fort to the Black Mountains, Alternative N6 crosses 44.2 miles of high-quality raptor habitats along the Mineral Mountains (Link 75, 349, 390, 475, 395, and 396), 16.0 miles of medium-quality habitat along Links 396 and 397, and no low-quality habitat (MV-7b).

Big Game

From Sigurd to Cove Fort, Alternative N6 crosses 24.5 miles of mule deer crucial winter habitat along Links 27, 30, 33, 45, 64, 66, and 68 (MV-8a through MV-8b). From Cove Fort to the Black Mountains, Alternative N6 crosses 32.1 miles of crucial mule deer winter habitat along Links 75, 349, 390, and 396 (MV-8a), and 36.7 miles of crucial year-long pronghorn habitat along Links 75, 390, 475, 396, and 397 (MV-8b). None of the northern alternatives cross crucial summer mule deer habitat. None of the alternative routes cross crucial elk habitat.

Special Status Species

Federally Listed and Candidate Species

Alternative N6 crosses 20.7 miles of crucial sage-grouse brooding habitat and 7.4 miles of crucial winter habitat located along Links 390, 395, 396, and 397. In addition, two active leks have been identified within 2 miles of the reference centerline. The total length of transmission line that would be constructed within 2, 4, and 11 miles of known leks under each alternative route is presented in Table 3-43.

Alternative N6 also crosses 1.5 miles of occupied habitat within an active Utah prairie dog colony, which includes 875.5 acres of active burrows within 0.5 mile of the reference centerline.

Alternative N6 does not cross occupied habitat for the southwestern willow flycatcher.

BLM, USFS, and State Sensitive Species

Alternative N6 crosses 5.1 miles of suitable habitat for Elsinore buckwheat, Ward's beardtongue, and Utah phacelia along Links 30, 45, and 64 (MV-7a). Alternative N3 crosses 36.6 miles of suitable habitat for the pygmy rabbit interspersed along the entire alternative route (MV-7a through MV-7b).

Other sensitive wildlife species are known or likely could occur along Alternative N6; however, spatial data were not available for all alternatives and consequently, quantitative descriptions of the potential effects of each alternative route on these species could not be developed. Wildlife species (e.g., the American white pelican and bald eagle) could forage, but are not known to nest, within the study corridors. Suitable nesting habitat for the burrowing owl, ferruginous hawk, and long-billed curlew also is present in lower elevation valleys (e.g., Milford Valley). Townsend's big-eared bat, dark kangaroo mouse, and kit fox are known to occur in the study corridor for Alternative N6 (UNHP 2009). Sensitive fish, including the Bonneville cutthroat trout, are known to occur in the Beaver River (crossed by Link 475). The likelihood of occurrence of sensitive species is shown by alternative in Table 3-40.

Wild Horses and Burros

Alternative N6 does not cross the Chloride Canyon HMA.

Environmental Effects

Overall, impacts on biological resources associated with implementation of Alternative N6 would include 158.5 miles of low impacts, 135.4 miles of moderate impacts, and 21.3 miles of high impacts. Unlike Alternatives N1, N2, and N4, Alternative N6 does not parallel the existing IPP corridor.

Similar to Alternatives N4 and N5, a design alternative to this alternative route could include colocation of the Project with the existing Cove Fort to Blundell 46kV transmission line along Link 75. Short-term disturbance associated with construction activities would have the same impacts on biological resources as construction of the Project within a new right-of-way. However, more long-term impacts, such as habitat fragmentation, would be lower if the Project were colocated with the existing transmission line in the same or wider right-of-way.

Vegetation Communities

The types of potential effects on vegetation communities that could occur under Alternative N6 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on vegetation communities under Alternative N6 could include 11.5 miles of low impacts, 93.9 miles of moderate impacts, and no identifiable high impacts (Table 3-42; MV-6a, MV-6b and MV-6c). Criteria for assessing intensity of impacts are presented in Table 3-38. Alternative N6 would result in an estimated 371.2 acres of permanent ground disturbance from access road and tower construction, 977.3 acres of temporary disturbance, and 481.1 acres of vegetation clearing (Table 3-2).

Wildlife

The types of potential effects on wildlife that could occur under Alternative N6 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Wildlife species that may be affected by Alternative N6 are listed in Tables D-1, D-2, D-3, D-4, and D-5. Effects on wildlife would not be anticipated to cause a loss in population or species viability in the Project area.

Raptors and Other Migratory Birds

The types of potential effects on raptors and other migratory birds that could occur under Alternative N6 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on raptors and migratory birds under Alternative N6 could include 105.4 miles of low impacts on areas designated by UDWR as low-, medium-, and high-quality raptor habitat along the entire alternative route. The quantity of low-, medium-, and high-quality raptor habitat crossed is presented in Table 3-41. Criteria for assessing intensity of impacts are presented in Table 3-38.

Big Game

The types of potential effects on big game that could occur under Alternative N6 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on big game under Alternative N6 could include 83.1 miles of low impacts within crucial seasonal habitats for mule deer and pronghorn. Low impacts on mule deer could occur within 56.6 miles of crucial winter habitat between Sigurd and the Mineral Mountains (MV-8a and MV-8b). Low impacts on pronghorn could occur within 36.7 miles of crucial year-long habitat between Cove Fort and the Black Mountains (MV-8b and MV-8c). Criteria for assessing intensity of impacts on big game are presented in Table 3-38.

Special Status Species

Federally Listed and Candidate Species

The types of potential effects on greater sage-grouse that could occur under Alternative N6 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on sage-grouse would be anticipated to include 21.3 miles of high impacts within crucial brood-rearing habitat, crucial winter habitat, and areas within 2 miles of leks. Criteria for assessing intensity of impacts are presented in Table 3-38.

The types of potential effects on Utah prairie dog that could occur under Alternative N6 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on Utah prairie dog would be anticipated to include 1.5 miles of high impacts within an active colony. Criteria for assessing intensity of impacts are presented in Table 3-38.

No identifiable impacts on the southwestern willow flycatcher would be anticipated under Alternative N6.

BLM, USFS, and State Sensitive Species

After application of selective mitigation measures, impacts on BLM and USFS sensitive species under Alternative N6 could include 5.1 miles of moderate impacts on suitable habitat for Ward's beardtongue, Elsinore buckwheat, and Utah phacelia and 36.6 miles of moderate impacts on potential pygmy rabbit habitat interspersed along the entire alternative route (MV-7a, MV-7b, and MV-7c). All BLM, USFS, and state sensitive species that could be affected under this alternative are identified in Table 3-40.

The types of potential effects on all BLM, USFS, and state sensitive species that could occur under Alternative N6 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Additional analysis of effects on USFS sensitive species and MIS, including species-specific findings required to demonstrate compliance with the USFS LRMPs, is included in Appendix E.

Wild Horses and Burros

No identifiable impacts on wild horses would be anticipated under Alternative N6.

Southern Area – South of the Black Mountains to Red Butte Substation

The baseline resource inventory and residual impacts for alternative routes considered in the southern area are presented in Tables 3-44 and 3-45, respectively.

Alternative S1 – Pinto Creek

Affected Environment

Vegetation Communities

Alternative S1 crosses 55.9 total miles. Vegetation communities along this alternative route include 0.3 mile of grassland, 1.0 mile of mountain shrub, 16.1 miles of pinyon-juniper, 0.1 mile of riparian, 1.7 miles of shrub steppe, 0.1 mile of aspen, 10.0 miles of desert shrub, and 22.5 miles of big sage communities. Additionally, 0.7 mile of barren lands and 3.4 miles of invasive non-native species are crossed (Table 3-44; MV-6c through MV-6d). No agriculture, known populations of noxious weeds, or wildfire-affected areas/reseeded through emergency stabilization and rehabilitation areas are crossed by any of the southern alternatives. However, information regarding the distribution of noxious weeds was not available for the entire study corridor. BLM has mapped noxious weeds in areas adjacent to the Project in the vicinity of Newcastle.

Wildlife

Raptors and Other Migratory Birds

Alternative S1 crosses 31.5 miles of medium-quality raptor habitats along Links 163, 165, 220, 240, and 260 (MV-7c through MV-7d) and 24.4 miles of high-quality raptor habitats along the Pinto Creek corridor (Links 240, 245, and 260; MV-7c through MV-7d). No low-quality raptor habitats are crossed by any of the southern alternatives.

Big Game

Alternative S1 crosses 9.0 miles of mule deer crucial summer habitat, located only on the Dixie National Forest (Link 260), and 8.7 miles of crucial winter habitat at the base of the Antelope Range and near the Red Butte Substation (Links 220, 240, and 260; MV-8c through MV-8d). Alternative S1 also crosses 21.7 miles of crucial pronghorn year-long habitat located along the IPP (Links 163 and 165; MV-8c through MV-8d). None of the alternative routes cross crucial elk habitat.

Special Status Species

Federally Listed and Candidate Species

Alternative S1 crosses 4.2 miles of crucial greater sage-grouse brooding and 4.3 miles of crucial winter habitat located along Links 163 and 165 (MV-7c), but does not cross within 2 miles of any known active leks. The total length of transmission line that would be constructed within 2, 4, and 11 miles of known leks under each alternative route is presented in Table 3-43.

Alternative S1 also crosses 0.2 mile of occupied habitat for the southwestern willow flycatcher. There are 100 acres of suitable breeding habitat for the southwestern willow flycatcher within 0.25 mile of the alternative route. Surveys conducted during the breeding season of 2010 indicated at least one pair nested, and up to five other individuals were using the habitat.

Alternative S1 does not cross occupied habitat for the Utah prairie dog.

BLM, USFS, and State Sensitive Species

Alternative S1 crosses 16.3 miles of suitable habitat for the pygmy rabbit interspersed along the entire alternative route (MV-7c through MV-7d). No suitable sensitive plant habitat is crossed by the alternative.

Other sensitive wildlife species are known or likely would occur along Alternative S1; however, spatial data were not available for all alternatives and consequently, quantitative descriptions of the potential effects of each alternative route on these species could not be developed. Wildlife species, including the burrowing owl and ferruginous hawk, could be located in suitable habitats along the entire alternative. The Arizona toad potentially occurs along Link 260, the Bonneville cutthroat trout could occur in aquatic habitats along Link 245, and wintering bald eagles could be located along Link 260. Likelihood of occurrence of all sensitive species by alternative is presented in Table 3-40.

Wild Horses and Burros

Alternative S1 crosses 9.3 miles in the Chloride Canyon HMA located along Link 220.

Environmental Effects

Overall impacts on biological resources with implementation of Alternative S1 would include 83.1 miles of low impacts, 68.1 miles of moderate impacts, and 4.5 miles of high impacts. Alternative S1 parallels the existing IPP corridor for 18.9 miles. Benefits of colocation would include reducing new disturbance in previously undisturbed habitats, thereby reducing fragmentation of habitat for some plant and wildlife species.

TABLE 3-44
ALTERNATIVE ROUTE COMPARISON
FOR BIOLOGICAL RESOURCES INVENTORY DATA BY SOUTHERN ALTERNATIVE ROUTES

Alternative Route	Total Miles	Initial Impacts																										
		Big Game (miles crossed)			Threatened and Endangered Species (miles crossed)					Sensitive Species – Wildlife and Plants (miles crossed)						Vegetation Community or Habitat Type (miles crossed)												
		Mule Deer		Pronghorn	Utah Prairie Dog	Sage-grouse			Southwestern Willow Flycatcher	Raptor			Pygmy Rabbit	Ward's Beardtongue/ Elsinore Buckwheat	Pinyon Penstemon													
		Crucial Summer	Crucial Winter	Crucial Year–long	Active Colonies	Areas within 2 Miles of Leks	Crucial Brooding	Crucial Winter	Occupied Habitat	Low Quality	Medium Quality	High Quality	Suitable Habitat	Suitable Habitat	Suitable Habitat	Grassland	Barren	Disturbed	Invasive Non-native Species	Agriculture	Mountain Shrub	Pinyon–Juniper	Riparian	Shrub Steppe	Aspen	Desert shrub	Noxious	Wildfire- affected Areas[1]	Big Sage
Alternative S1	55.9	9.0	8.7	21.7	–	–	4.2	4.3	0.2	–	31.5	24.4	16.3	–	–	0.3	0.7	–	3.4	–	1.0	16.1	0.1	1.7	0.1	10.0	–	–	22.5
Alternative S2	49.6	5.6	10.8	21.7	–	–	4.2	4.3	–	–	49.6	–	20.6	–	–	0.5	0.7	0.3	3.4	–	0.7	7.4	0.3	1.2	–	9.5	–	–	25.6
Alternative S3	57.4	8.0	9.1	21.7	–	–	4.2	4.3	–	–	45.2	12.2	19.9	–	–	0.2	0.9	0.3	3.4	–	1.7	15.6	0.3	1.4	0.2	9.8	–	–	23.6
Alternative S4	48.9	5.6	11.1	21.7	–	–	4.2	4.3	–	–	48.9	–	14.6	–	5.1	0.2	0.7	–	3.4	–	0.5	14.8	0.2	1.2	–	9.5	–		18.4
Alternative S5 (Proponent's Preferred Alternative)	59.0	9.0	3.1	18.4	–	–	4.1	4.1	0.2	–	26.8	32.2	19.3	–	5.1	1.5	0.3	–	3.1	–	1.0	21.0	0.1	2.0	0.1	6.2	–	–	23.7
Alternative S6	61.8	8.0	1.9	18.4	–	–	4.1	4.1	0.2	–	38.3	23.5	23.5	–	5.1	1.4	0.5	0.3	3.1	–	1.7	21.9	0.3	2.2	0.2	6.0	–	–	24.2
Alternative S7	49.8	5.6	10.8	21.7	–	–	4.2	4.3	–	–	49.8	–	19.2	–	–	0.2	0.7	0.3	3.4	–	0.5	10.3	–	1.4	–	9.5	–	–	23.3
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative)	49.8	5.6	10.8	21.7	–	–	4.2	4.3	–	–	49.8	–	19.0	–	–	0.2	0.7	0.3	3.4	–	0.5	10.0	0.1	1.4	–	9.5	–	–	23.7

NOTE: [1]Reseeded through emergency stabilization and rehabilitation areas.

Vegetation Communities

The types of potential effects on vegetation communities that could occur under Alternative S1 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on vegetation communities under Alternative S1 could include 4.1 miles of low impacts, 51.8 miles of moderate impacts, and no identifiable high impacts (Table 3-45; MV-6c and MV-6d). Criteria for assessing intensity of impacts are presented in Table 3-38. Alternative S1 would result in an estimated 195.6 acres of permanent ground disturbance from access road and tower construction, 526.0 acres of temporary disturbance, and 330.3 acres of vegetation clearing (Table 3-2).

TABLE 3-45
ALTERNATIVE ROUTE COMPARISON
FOR BIOLOGICAL RESOURCES RESIDUAL IMPACTS BY SOUTHERN ALTERNATIVE ROUTES

Alternative Route	Big Game[1] (miles [percent])				Threatened and Endangered Species[2] (miles [percent])				Sensitive Habitats[3] (miles [percent])				Vegetation[4] (miles [percent])			
	No Identifiable	Low	Moderate	High	No Identifiable	Low	Moderate	High	No Identifiable	Low	Moderate	High	No Identifiable	Low	Moderate	High
Alternative S1	16.5 [29.5]	39.4 [70.5]	–	–	51.4 [91.9]	–	–	4.5 [8.1]	–	39.6 [70.8]	16.3 [29.2]	–	–	4.1 [7.3]	51.8 [92.7]	–
Alternative S2	11.5 [23.2]	38.1 [76.8]	–	–	45.3 [91.3]	–	–	4.3 [8.7]	–	29.0 [58.5]	20.6 [41.5]	–	–	4.4 [8.9]	45.2 [91.1]	–
Alternative S3	18.6 [32.4]	38.8 [67.6]	–	–	53.1 [92.5]	–	–	4.3 [7.5]	–	37.5 [65.3]	19.9 [34.7]	–	–	4.6 [8.0]	52.8 [92.0]	–
Alternative S4	10.5 [21.5]	38.4 [78.5]	–	–	44.6 [91.2]	–	–	4.3 [8.8]	–	29.5 [60.3]	19.4 [39.7]	–	–	4.1 [8.4]	44.8 [91.6]	–
Alternative S5 (Proponent's Preferred Alternative)	28.5 [48.3]	30.5 [51.7]	–	–	54.7 [92.7]	–	–	4.3 [7.3]	–	36.2 [61.4]	22.8 [38.6]	–	–	3.4 [5.8]	55.6 [94.2]	–
Alternative S6	33.5 [54.2]	28.3 [45.8]	–	–	57.5 [93.0]	–	–	4.3 [7.0]	–	34.8 [56.3]	27.0 [43.7]	–	–	3.9 [6.3]	57.9 [93.7]	–
Alternative S7	11.7 [23.5]	38.1 [76.5]	–	–	45.5 [91.4]	–	–	4.3 [8.6]	–	30.6 [61.4]	19.2 [38.6]	–	–	4.4 [8.8]	45.4 [91.2]	–
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative)	11.7 [23.5]	38.1 [76.5]	–	–	45.5 [91.4]	–	–	4.3 [8.6]	–	30.8 [61.8]	19.0 [38.2]	–	–	4.4 [8.8]	45.4 [91.2]	–

NOTES:
[1] Includes impacts on mule deer and pronghorn seasonal habitats.
[2] Includes impacts on Utah prairie dog, greater sage-grouse, and southwestern willow flycatcher.
[3] Includes impacts on raptor habitat, potential pygmy rabbit habitat, and sensitive plant habitat.
[4] Includes impacts on the following vegetation communities: grassland, barren, disturbed, invasive non-native species, agriculture, mountain shrub, pinyon-juniper, riparian, shrub steppe, aspen, desert shrub, noxious weeds, wildfire-affected areas reseeded through emergency stabilization, and rehabilitation areas.

Wildlife

The types of potential effects on wildlife that could occur under Alternative S1 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Wildlife species that may be affected by Alternative S1 are listed in Tables D-1, D-2, D-3, D-4, and D-5. Effects on wildlife would not be anticipated to cause a loss in population or species viability in the Project area.

Raptors and Other Migratory Birds

The types of potential effects on raptors and other migratory birds that could occur under Alternative S1 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on raptors and migratory birds under Alternative S1 could include 55.9 miles of low impacts on areas designated by UDWR as low-, medium-, and high-quality raptor habitat along the entire alternative route. The quantity of low-, medium-, and high-quality raptor habitat crossed is presented in Table 3-44. Criteria for assessing intensity of impacts are presented in Table 3-38.

Big Game

The types of potential effects on big game that could occur under Alternative S1 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on big game under Alternative S1 could include 39.4 miles of low impacts within crucial seasonal habitats for mule deer and pronghorn. Low impacts on mule deer could occur within 9.0 miles of crucial summer habitat along Link 260 (MV-8d) and 8.7 miles of crucial winter habitat along Links 220, 240, and 260 (MV-8d). Low impacts on pronghorn could occur within 21.7 miles of crucial year-long habitat along Links 163 and 165 (MV-8c and MV-8d). Criteria for assessing intensity of impacts on big game are presented in Table 3-38.

Special Status Species

Federally Listed and Candidate Species

The types of potential effects on greater sage-grouse that could occur under Alternative S1 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on sage-grouse would be anticipated to include 4.3 miles of high impacts within crucial brood-rearing habitat and crucial winter habitat. Criteria for assessing intensity of impacts are presented in Table 3-38.

The types of potential effects on southwestern willow flycatcher that could occur under Alternative S1 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on southwestern willow flycatcher would be anticipated to include 0.2 mile of high impacts within occupied breeding habitat. Criteria for assessing intensity of impacts are presented in Table 3-38.

No identifiable impacts on the Utah prairie dog would be anticipated under Alternative S1.

BLM, USFS, and State Sensitive Species

After application of selective mitigation measures, impacts on BLM and USFS sensitive species under Alternative S1 could include 16.3 miles of moderate impacts on potential pygmy rabbit habitat interspersed along the entire alternative route (MV-7c and MV-7d). All BLM, USFS, and state sensitive species that could be affected under this alternative are identified in Table 3-40.

The types of potential effects on all BLM, USFS, and state sensitive species that could occur under Alternative S1 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Additional analysis of effects on USFS sensitive species and MIS, including species-specific findings required to demonstrate compliance with the USFS LRMPs, is included in Appendix E.

Wild Horses and Burros

The types of potential effects on wild horses and burros that could occur under Alternative S1 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Impacts on wild horses and burros under Alternative S1 could include 9.3 miles of low impacts on the Chloride Canyon HMA along Link 220.

Alternative S2 – IPP West

Affected Environment

Vegetation Communities

Alternative S2 crosses 49.6 total miles. Vegetation communities along this alternative route include 0.5 mile of grassland, 0.7 mile of mountain shrub, 7.4 miles of pinyon-juniper, 0.3 mile of riparian, 1.2 miles of shrub steppe, 9.5 miles of desert shrub, and 25.6 miles of big sage communities (Table 3-44; MV-6c through MV-6d). Additionally, 0.7 mile of barren lands, 0.3 mile of disturbed land, and 3.4 miles of invasive non-native species are crossed. No aspen communities are crossed by Alternative S2. No agriculture, known populations of noxious weeds, or wildfire-affected areas/reseeded through emergency stabilization and rehabilitation areas are crossed by any of the southern alternatives. However, information regarding the distribution of noxious weeds was not available for the entire study corridor. BLM has mapped noxious weeds in areas adjacent to the Project in the vicinity of Newcastle.

Wildlife

Raptors and Other Migratory Birds

Alternative S2 crosses 49.6 miles of medium-quality raptor habitats for all links (MV-7c through MV-7d). Alternative S2 is colocated with the IPP for the entire alternative route and no high-quality raptor habitats are crossed. No low-quality raptor habitats are crossed by any of the southern alternatives.

Big Game

Alternative S2 crosses 5.6 miles of mule deer crucial summer habitat, located only on the Dixie National Forest (Links 443 and 444), and 10.8 miles of crucial winter habitat at the base of the Antelope Range and near the Red Butte Substation (Links 220, 221, and 441; MV-8c through MV-8d). Alternative S2 also

crosses 21.7 miles of crucial pronghorn year-long habitat located along the IPP (Links 163, 165, and 220; MV-8c through MV-8d). None of the alternative routes cross crucial elk habitat.

Special Status Species

Federally Listed and Candidate Species

Alternative S2 crosses 4.2 miles of crucial greater sage-grouse brooding habitat and 4.3 miles of crucial winter habitat located along Links 163 and 165 (MV-7c), but does not cross within 2 miles of any known active leks. The total length of transmission line that would be constructed within 2, 4, and 11 miles of known leks under each alternative route is presented in Table 3-43.

Alternative S2 does not cross occupied habitat for the southwestern willow flycatcher or occupied habitat for the Utah prairie dog.

BLM, USFS, and State Sensitive Species

Alternative S2 crosses 20.6 miles of suitable habitat for the pygmy rabbit interspersed along the entire alternative route (MV-7c through MV-7d). No suitable sensitive plant habitat is crossed by the alternative.

Other sensitive wildlife species are known or likely would occur along Alternative S2; however, spatial data were not available for all alternatives and consequently, quantitative descriptions of the potential effects of each alternative route on these species could not be developed. Wildlife species, including the burrowing owl and ferruginous hawk, could be located in suitable habitats along the entire alternative. Likelihood of occurrence of all sensitive species by alternative is presented in Table 3-40.

Wild Horses and Burros

Alternative S2 crosses 9.3 miles in the Chloride Canyon HMA located along Link 220.

Environmental Effects

Overall impacts on biological resources with implementation of Alternative S2 would include 71.5 miles of low impacts, 65.8 miles of moderate impacts, and 4.3 miles of high impacts. Alternative S2 would parallel the existing IPP corridor the entire alternative route. Benefits of colocation would include reducing new disturbance in previously undisturbed habitats, thereby reducing fragmentation of habitat for some plant and wildlife species.

Vegetation Communities

The types of potential effects on vegetation communities that could occur under Alternative S2 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on vegetation communities under Alternative S2 could include 4.4 miles of low impacts, 45.2 miles of moderate impacts, and no identifiable high impacts (Table 3-45; MV-6c and MV-6d). Criteria for assessing intensity of impacts are presented in Table 3-38. Alternative S2 would result in an estimated 157.9 acres of permanent ground disturbance

from access road and tower construction, 499.3 acres of temporary disturbance, and 184.2 acres of vegetation clearing (Table 3-2).

Wildlife

The types of potential effects on wildlife that could occur under Alternative S2 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Wildlife species that may be affected by Alternative S2 are listed in Tables D-1, D-2, D-3, D-4, and D-5. Effects on wildlife would not be anticipated to cause a loss in population or species viability in the Project area.

Raptors and Other Migratory Birds

The types of potential effects on raptors and other migratory birds that could occur under Alternative S2 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on raptors and migratory birds under Alternative S2 could include 49.6 miles of low impacts on areas designated by UDWR as low-, medium-, and high-quality raptor habitat along the entire alternative route. The quantity of low-, medium-, and high-quality raptor habitat crossed is presented in Table 3-44. Criteria for assessing intensity of impacts are presented in Table 3-38.

Big Game

The types of potential effects on big game that could occur under Alternative S2 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on big game under Alternative S2 could include 38.1 miles of low impacts within crucial seasonal habitats for mule deer and pronghorn. Low impacts on mule deer could occur within 5.6 miles of crucial summer habitat along Link 444 (MV-8d) and 10.8 miles of crucial winter habitat along Links 220, 221, 275, and 441 (MV-8d). Low impacts on pronghorn could occur within 21.7 miles of crucial year-long habitat along Links 163 and 165 (MV-8c and MV-8d). Criteria for assessing intensity of impacts on big game are presented in Table 3-38.

Special Status Species

Federally Listed and Candidate Species

The types of potential effects on greater sage-grouse that could occur under Alternative S2 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on sage-grouse would be anticipated to include 4.3 miles of high impacts within crucial brood-rearing habitat and crucial winter habitat. Criteria for assessing intensity of impacts are presented in Table 3-38.

No identifiable impacts on the Utah prairie dog or southwestern willow flycatcher would be anticipated under Alternative S2.

BLM, USFS, and State Sensitive Species

After application of selective mitigation measures, impacts on BLM and USFS sensitive species under Alternative S2 could include 20.6 miles of moderate impacts on potential pygmy rabbit habitat interspersed along the entire alternative route (MV-7c and MV-7d). All BLM, USFS, and state sensitive species that could be affected under this alternative are identified in Table 3-40.

The types of potential effects on all BLM, USFS, and state sensitive species that could occur under Alternative S2 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Additional analysis of effects on USFS sensitive species and MIS, including species-specific findings required to demonstrate compliance with the USFS LRMPs, is included in Appendix E.

Wild Horses and Burros

The types of potential effects on wild horses and burros that could occur under Alternative S2 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Impacts on wild horses and burros under Alternative S2 could include 9.3 miles of low impacts on the Chloride Canyon HMA along Link 220.

Alternative S3 – Ox Valley

Affected Environment

Vegetation Communities

Alternative S3 crosses 57.4 total miles. Vegetation communities along this alternative route include 0.2 mile of grassland, 1.7 miles of mountain shrub, 15.6 miles of pinyon-juniper, 0.3 mile of riparian, 1.4 miles of shrub steppe, 0.2 mile of aspen, 9.8 miles of desert shrub, and 23.6 miles of big sage communities (Table 3-44; MV-6c through MV-6d). Additionally, 0.9 mile of barren lands, 0.3 mile of disturbed land, and 3.4 miles of invasive non-native species are crossed. No agriculture, known populations of noxious weeds, or wildfire-affected areas/reseeded through emergency stabilization and rehabilitation areas are crossed by any of the southern alternatives. However, information regarding the distribution of noxious weeds was not available for the entire study corridor. BLM has mapped noxious weeds in areas adjacent to the Project in the vicinity of Newcastle.

Wildlife

Raptors and Other Migratory Birds

Alternative S3 crosses 45.2 miles of medium-quality raptor habitats along Links 163, 165, 220, 221, 280, 441, 442, 285, and 290 and 12.2 miles of high-quality raptor nesting habitat along the Ox Valley portion of the route (Links 280 and 285; MV-7c through MV-7d). No low-quality raptor habitats are crossed by any of the southern alternatives.

Big Game

Alternative S3 crosses 8.0 miles of mule deer crucial summer habitat, located only on the Dixie National Forest (Link 285), and 9.1 miles of crucial winter habitat at the base of the Antelope Range and near the

Red Butte Substation (Links 220, 221, and 441; MV-8c through MV-8d). Alternative S3 also crosses 21.7 miles of crucial pronghorn year-long habitat located along the IPP (Links 163 and 165; MV-8c through MV-8d). None of the alternative routes cross crucial elk habitat.

Special Status Species

Federally Listed and Candidate Species

Alternative S3 crosses 4.2 miles of crucial greater sage-grouse brooding habitat and 4.3 miles of crucial winter habitat located along Links 163 and 165 (MV-7c), but does not cross within 2 miles of any known active leks. The total length of transmission line that would be constructed within 2, 4, and 11 miles of known leks under each alternative route is presented in Table 3-43.

Alternative S3 does not cross occupied habitat for the southwestern willow flycatcher or occupied habitat for the Utah prairie dog.

BLM, USFS, and State Sensitive Species

Alternative S3 crosses 19.9 miles of suitable habitat for the pygmy rabbit interspersed along the entire alternative route (MV-7c through MV-7d). No suitable sensitive plant habitat is crossed by the alternative.

Other sensitive wildlife species are known or likely would occur along Alternative S3; however, spatial data were not available for all alternatives, and consequently, quantitative descriptions of the potential effects of each alternative route on these species could not be developed. Wildlife species, including the burrowing owl and ferruginous hawk, could be located in suitable habitats along the entire alternative. The likelihood of occurrence of all sensitive species by alternative is presented in Table 3-40.

Wild Horses and Burros

Alternative S3 crosses 9.3 miles in the Chloride Canyon HMA located along Link 220.

Environmental Effects

Overall impacts on biological resources with implementation of Alternative S3 would include 80.9 miles of low impacts, 72.7 miles of moderate impacts, and 4.3 miles of high impacts. In addition, Alternative S3 would parallel the existing IPP corridor for 24.5 miles. Benefits of colocation would include reducing new disturbance in previously undisturbed habitats, thereby reducing fragmentation of habitat for some plant and wildlife species.

Vegetation Communities

The types of potential effects on vegetation communities that could occur under Alternative S3 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on vegetation communities under Alternative S3 could include 4.6 miles of low impacts, 52.8 miles of moderate impacts, and no identifiable high impacts (Table 3-45; MV-6c and MV-6d). Criteria for assessing intensity of impacts are presented in Table 3-38. Alternative S3 would result in an estimated 223.4 acres of permanent ground disturbance

from access road and tower construction, 536.9 acres of temporary disturbance, and 339.8 acres of vegetation clearing (Table 3-2).

Wildlife

The types of potential effects on wildlife that could occur under Alternative S3 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Wildlife species that may be affected by Alternative S3 are listed in Tables D-1, D-2, D-3, D-4, and D-5. Effects on wildlife would not be anticipated to cause a loss in population or species viability in the Project area.

Raptors and Other Migratory Birds

The types of potential effects on raptors and other migratory birds that could occur under Alternative S3 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on raptors and migratory birds under Alternative S3 could include 57.4 miles of low impacts on areas designated by UDWR as low-, medium-, and high-quality raptor habitat along the entire alternative route. The quantity of low-, medium-, and high-quality raptor habitat crossed is presented in Table 3-44. Criteria for assessing intensity of impacts are presented in Table 3-38.

Big Game

The types of potential effects on big game that could occur under Alternative S3 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on big game under Alternative S3 could include 38.8 miles of low impacts within crucial seasonal habitats for mule deer and pronghorn. Low impacts on mule deer could occur within 8.0 miles of crucial summer habitat along Link 285 (MV-8d) and 9.1 miles of crucial winter habitat along Links 220, 221, and 441 (MV-8d). Low impacts on pronghorn could occur within 21.7 miles of crucial year-long habitat along Links 163 and 165 (MV-8c and MV-8d). Criteria for assessing intensity of impacts on big game are presented in Table 3-38.

Special Status Species

Federally Listed and Candidate Species

The types of potential effects on greater sage-grouse that could occur under Alternative S3 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on sage-grouse would be anticipated to include 4.3 miles of high impacts within crucial brood-rearing habitat and crucial winter habitat. Criteria for assessing intensity of impacts are presented in Table 3-38.

No identifiable impacts on the southwestern willow flycatcher and Utah prairie dog would be anticipated under Alternative S3.

BLM, USFS, and State Sensitive Species

After application of selective mitigation measures, impacts on BLM and USFS sensitive species under Alternative S3 could include 19.9 miles of moderate impacts on potential pygmy rabbit habitat

interspersed along the entire alternative route (MV-7c and MV-7d). All BLM, USFS, and state sensitive species that could be affected under this alternative are identified in Table 3-40.

The types of potential effects on all BLM, USFS, and state sensitive species that could occur under Alternative S3 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Additional analysis of effects on USFS sensitive species and MIS, including species-specific findings required to demonstrate compliance with the USFS LRMPs, is included in Appendix E.

Wild Horses and Burros

The types of potential effects on wild horses and burros that could occur under Alternative S3 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Impacts on wild horses and burros under Alternative S3 could include 9.3 miles of low impacts on the Chloride Canyon HMA along Link 220.

Alternative S4 – IPP East

Affected Environment

Vegetation Communities

Alternative S4 crosses 48.9 miles. Vegetation communities along this alternative route include 0.2 mile of grassland, 0.5 mile of mountain shrub, 14.8 miles of pinyon-juniper, 0.2 mile of riparian, 1.2 miles of shrub steppe, 9.5 miles of desert shrub, and 18.4 miles of big sage communities (Table 3-44; MV-6c through MV-6d). Additionally, 0.7 mile of barren lands and 3.4 miles of invasive non-native species are crossed. No aspen communities are crossed by this alternative. No agriculture, known populations of noxious weeds, or wildfire-affected areas/reseeded through emergency stabilization and rehabilitation areas are crossed by any of the southern alternatives. However, information regarding the distribution of noxious weeds was not available for the entire study corridor. BLM has mapped noxious weeds in areas adjacent to the Project in the vicinity of Newcastle.

Wildlife

Raptors and Other Migratory Birds

Alternative S4 crosses 48.9 miles of medium-quality raptor habitats along the entire alternative route (MV-7c through MV-7d). Alternative S4 is colocated with the IPP for the entire alternative route and no high-quality raptor habitats are crossed. No low-quality raptor habitats are crossed by any of the southern alternatives.

Big Game

Alternative S4 crosses 5.6 miles of mule deer crucial summer habitat, located only on the Dixie National Forest (Links 270 and 271), and 11.1 miles of crucial winter habitat at the base of the Antelope Range and near the Red Butte Substation (Links 220, 221, and 441; MV-8c through MV-8d). Alternative S4 also crosses 21.7 miles of crucial pronghorn year-long habitat located along the IPP (Links 163 and 165; MV-8c through MV-8d). None of the alternative routes cross crucial elk habitat.

Special Status Species

Federally Listed and Candidate Species

Alternative S4 crosses 4.2 miles of crucial greater sage-grouse brooding habitat, does not cross occupied habitat, crosses 4.3 miles of crucial winter habitat located along Links 163 and 165 (MV-7c), but does not cross within 2 miles of any known active leks. The total length of transmission line that would be constructed within 2, 4, and 11 miles of known leks under each alternative route is presented in Table 3-43.

Alternative S4 does not cross occupied habitat for the endangered southwestern willow flycatcher or occupied habitat for the Utah prairie dog.

BLM, USFS, and State Sensitive Species

Alternative S4 crosses 5.1 miles of suitable habitat for the sensitive plant species pinyon penstemon along Link 443 (MV-7c through MV-7d). Alternative S4 crosses 14.6 total miles of suitable habitat for the pygmy rabbit interspersed along the entire alternative (MV-7c through MV-7d).

Other sensitive wildlife species are known or likely would occur along Alternative S4; however, spatial data were not available for all alternatives and, consequently, quantitative descriptions of the potential effects of each alternative route on these species could not be developed. Wildlife species, including the burrowing owl and ferruginous hawk could be located along the entire alternative route. The likelihood of occurrence of all sensitive species by alternative is presented in Table 3-40.

Wild Horses and Burros

Alternative S4 crosses 9.3 miles in the Chloride Canyon HMA located along Link 220.

Environmental Effects

Overall impacts on biological resources with implementation of Alternative S4 would include 72.0 miles of low impacts, 64.2 miles of moderate impacts, and 4.3 miles of high impacts. Alternative S4 would parallel the existing IPP corridor for the entire alternative route. Benefits of colocation would include reducing new disturbance in previously undisturbed habitats, thereby reducing fragmentation of habitat for some plant and wildlife species.

Vegetation Communities

The types of potential effects on vegetation communities that could occur under Alternative S4 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on vegetation communities under Alternative S4 could include 4.1 miles of low impacts, 44.8 miles of moderate impacts, and no identifiable high impacts (Table 3-45; MV-6c and MV-6d). Criteria for assessing intensity of impacts are presented in Table 3-38. Alternative S4 would result in an estimated 147.0 acres of permanent ground disturbance from access road and tower construction, 547.9 acres of temporary disturbance, and 320.3 acres of vegetation clearing (Table 3-2).

Wildlife

The types of potential effects on wildlife that could occur under Alternative S4 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Wildlife species that may be affected by Alternative S4 are listed in Tables D-1, D-2, D-3, D-4, and D-5. Effects on wildlife would not be anticipated to cause a loss in population or species viability in the Project area.

Raptors and Other Migratory Birds

The types of potential effects on raptors and other migratory birds that could occur under Alternative S4 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on raptors and migratory birds under Alternative S4 could include 48.9 miles of low impacts on areas designated by UDWR as low-, medium-, and high-quality raptor habitat along the entire alternative route. The quantity of low-, medium-, and high-quality raptor habitat crossed is presented in Table 3-44. Criteria for assessing intensity of impacts are presented in Table 3-38.

Big Game

The types of potential effects on big game that could occur under Alternative S4 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on big game under Alternative S4 could include 38.4 miles of low impacts within crucial seasonal habitats for mule deer and pronghorn. Low impacts on mule deer could occur within 5.6 miles of crucial summer habitat along Links 270 and 271 (MV-8d) and 11.1 miles of crucial winter habitat along Links 220, 221, 222, and 275 (MV-8d). Low impacts on pronghorn could occur within 21.7 miles of crucial year-long habitat along Links 163 and 165 (MV-8c and MV-8d). Criteria for assessing intensity of impacts on big game are presented in Table 3-38.

Special Status Species

Federally Listed and Candidate Species

The types of potential effects on greater sage-grouse that could occur under Alternative S4 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on sage-grouse would be anticipated to include 4.3 miles of high impacts within crucial brood-rearing habitat and crucial winter habitat. Criteria for assessing intensity of impacts are presented in Table 3-38.

No identifiable impacts on the southwestern willow flycatcher and Utah prairie dog would be anticipated under Alternative S4.

BLM, USFS, and State Sensitive Species

After application of selective mitigation measures, impacts on BLM and USFS sensitive species under Alternative S4 could include 5.1 miles of moderate impacts on suitable habitat for the pinyon penstemon along Links 222 and 225 and 14.6 miles of moderate impacts on potential pygmy rabbit habitat

interspersed along the entire alternative route (MV-7c and MV-7d). All BLM, USFS, and state sensitive species that could be affected under this alternative are identified in Table 3-40.

The types of potential effects on all BLM, USFS, and state sensitive species that could occur under Alternative S4 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Additional analysis of effects on USFS sensitive species and MIS, including species-specific findings required to demonstrate compliance with the USFS LRMPs, is included in Appendix E.

Wild Horses and Burros

The types of potential effects on wild horses and burros that could occur under Alternative S4 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Impacts on wild horses and burros under Alternative S1 could include 9.3 miles of low impacts on the Chloride Canyon HMA along Link 220.

Alternative S5 – Iron Springs and Pinto Creek (Proponent's Preferred Alternative)

Affected Environment

Vegetation Communities

Alternative S5 crosses 59.0 miles. Vegetation communities along this alternative route include 1.5 miles of grassland, 1.0 mile of mountain shrub, 21.0 miles of pinyon-juniper, 0.1 mile of riparian, 2.0 miles of shrub steppe, 0.1 mile of aspen, 6.2 miles of desert shrub, and 23.7 miles of big sage communities (Table 3-44; MV-6c through MV-6d). Additionally, 0.3 mile of barren lands and 3.1 miles of invasive non-native species are crossed. No agriculture, known populations of noxious weeds, or wildfire-affected areas/reseeded through emergency stabilization and rehabilitation areas are crossed by any of the southern alternatives. However, information regarding the distribution of noxious weeds was not available for the entire study corridor.

Wildlife

Raptors and Other Migratory Birds

Alternative S5 crosses 26.8 miles of medium-quality raptor habitats along Links 163, 430, 435, 438, and 260 and 32.2 miles of high-quality raptor nesting habitat near the Antelope Mountains and along the Pinto Creek corridor (Links 438, 245, and 260; MV-7c through MV-7d). Alternative S5 is not colocated with the IPP and crosses more high-quality raptor habitats than any other southern alternative. No low-quality raptor habitats are crossed by any of the southern alternatives.

Big Game

Alternative S5 crosses 9.0 miles of mule deer crucial summer habitat, located only on the Dixie National Forest (Link 260), and 3.1 miles of crucial winter habitat near the Red Butte Substation (Links 260 and 275; MV-8c through MV-8d). Alternative S5 also crosses 18.4 miles of crucial pronghorn year-long habitat (Links 163, 430, 435, and 438; MV-8c through MV-8d). None of the alternative routes cross crucial elk habitat.

Special Status Species

Federally Listed and Candidate Species

Alternative S5 crosses 4.1 miles of crucial greater sage-grouse brooding habitat and 4.1 miles of crucial winter habitat located along Links 163 and 430 (MV-7c), but does not cross within 2 miles of any known active leks. The total length of transmission line that would be constructed within 2, 4, and 11 miles of known leks under each alternative route is presented in Table 3-43.

Alternative S5 crosses 0.2 mile of occupied habitat for the southwestern willow flycatcher. There are 100.0 acres of suitable breeding habitat for the southwestern willow flycatcher within 0.25 mile of the alternative route. Surveys conducted during the breeding season of 2010 indicated at least one pair nested and up to five other individuals were using the habitat.

Alternative S5 does not cross occupied habitat for the Utah prairie dog.

BLM, USFS, and State Sensitive Species

Alternative S5 crosses 5.1 miles of suitable habitat for the sensitive plant species pinyon penstemon along Link 438 (MV-7c through MV-7d). Alternative S5 crosses 19.3 total miles of suitable habitat for the pygmy rabbit interspersed along the entire alternative route (MV-7c through MV-7d).

Other sensitive wildlife species are known or likely would occur along Alternative S5; however, spatial data were not available for all alternatives and consequently, quantitative descriptions of the potential effects of each alternative route on these species could not be developed. Wildlife species, including the burrowing owl and ferruginous hawk, could be located in suitable habitats along the entire alternative. The Arizona toad potentially occurs along Link 260 and wintering bald eagles could be located along Link 260. The likelihood of occurrence for all sensitive species by alternative is presented in Table 3-40.

Wild Horses and Burros

Alternative S5 crosses 8.4 miles in the Chloride Canyon HMA located along Link 438.

Environmental Effects

Overall impacts on biological resources with implementation of Alternative S5 would include 70.1 miles of low impacts, 78.4 miles of moderate impacts, and 4.3 miles of high impacts. Alternative S5 would parallel the existing IPP corridor for 10.5 miles. Benefits of colocation would include reducing new disturbance in previously undisturbed habitats, thereby reducing fragmentation of habitat for some plant and wildlife species.

Vegetation Communities

The types of potential effects on vegetation communities that could occur under Alternative S5 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on vegetation communities under Alternative S5 could include 3.4 miles of low impacts, 55.6 miles of moderate impacts, and no identifiable high impacts (Table 3-45; MV-6c and MV-6d). Criteria for assessing intensity of impacts are presented in

Table 3-38. Alternative S5 would result in an estimated 197.1 acres of permanent ground disturbance from access road and tower construction, 553.2 acres of temporary disturbance, and 423.8 acres of vegetation clearing (Table 3-2)

Wildlife

The types of potential effects on wildlife that could occur under Alternative S5 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Wildlife species that may be affected by Alternative S5 are listed in Tables D-1, D-2, D-3, D-4, and D-5. Effects on wildlife would not be anticipated to cause a loss in population or species viability in the Project area.

Raptors and Other Migratory Birds

The types of potential effects on raptors and other migratory birds that could occur under Alternative S5 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on raptors and migratory birds under Alternative S5 could include 59.0 miles of low impacts on areas designated by UDWR as low-, medium-, and high-quality raptor habitat along the entire alternative route. The quantity of low-, medium-, and high-quality raptor habitat crossed is presented in Table 3-44. Criteria for assessing intensity of impacts are presented in Table 3-38.

Big Game

The types of potential effects on big game that could occur under Alternative S5 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on big game under Alternative S5 could include 30.5 miles of low impacts within crucial seasonal habitats for mule deer and pronghorn. Low impacts on mule deer could occur within 9.0 miles of crucial summer habitat along Link 260 (MV-8d) and 3.1 miles of crucial winter habitat along Link 260 (MV-8d). Low impacts on pronghorn could occur within 18.4 miles of crucial year-long habitat along Links 163, 430, and 435 (MV-8c and MV-8d). Criteria for assessing intensity of impacts on big game are presented in Table 3-38.

Special Status Species

Federally Listed and Candidate Species

The types of potential effects on greater sage-grouse that could occur under Alternative S5 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on sage-grouse would be anticipated to include 4.1 miles of high impacts within crucial brood-rearing habitat and crucial winter habitat. Criteria for assessing intensity of impacts are presented in Table 3-38.

The types of potential effects on southwestern willow flycatcher that could occur under Alternative S5 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on southwestern willow flycatcher would be anticipated to include 0.2 mile of high impacts within occupied breeding habitat. Criteria for assessing intensity of impacts are presented in Table 3-38.

No identifiable impacts on the Utah prairie dog would be anticipated under Alternative S5.

BLM, USFS, and State Sensitive Species

After application of selective mitigation measures, impacts on BLM and USFS sensitive species under Alternative S5 could include 5.1 miles of moderate impacts on suitable habitat for the pinyon penstemon along Link 438 and 19.3 miles of moderate impacts on potential pygmy rabbit habitat interspersed along the entire alternative route (MV-7c and MV-7d). All BLM, USFS, and state sensitive species that could be affected under this alternative are identified in Table 3-40.

The types of potential effects on all BLM, USFS, and state sensitive species that could occur under Alternative S5 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Additional analysis of effects on USFS sensitive species and MIS, including species-specific findings required to demonstrate compliance with the USFS LRMPs, is included in Appendix E.

Wild Horses and Burros

The types of potential effects on wild horses and burros that could occur under Alternative S5 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Impacts on wild horses and burros under Alternative S1 could include 8.4 miles of low impacts on the Chloride Canyon HMA along Link 220.

Alternative S6 – Iron Springs and Ox Valley

Affected Environment

Vegetation Communities

Alternative S6 crosses 61.8 miles. Vegetation communities along this alternative route include 1.4 miles of grassland, 1.7 miles of mountain shrub, 21.9 miles of pinyon-juniper, 0.3 mile of riparian, 2.2 miles of shrub steppe, 0.2 mile of aspen, 6.0 miles of desert shrub, and 24.2 miles of big sage communities (Table 3-44; MV-6c through MV-6d). Additionally, 0.5 mile of barren lands, 0.3 mile of disturbed land, and 3.1 miles of invasive non-native species are crossed. No agriculture, known populations of noxious weeds, or wildfire-affected areas/reseeded through emergency stabilization and rehabilitation areas are crossed by any of the southern alternatives. However, information regarding the distribution of noxious weeds was not available for the entire study corridor.

Wildlife

Raptors and Other Migratory Birds

Alternative S6 crosses 38.3 miles of medium-quality raptor habitats (Links 163, 430, 435, 438, 441, 442, 280, and 285) and 23.5 miles of high-quality raptor habitat near the Antelope Mountains and along the Ox Valley portion of the route (Links 438, 245, 250, 280, and 285; MV-7c through MV-7d). No low-quality raptor habitats are crossed by any of the southern alternatives.

Big Game

Alternative S6 crosses 8.0 miles of mule deer crucial summer habitat, located only on the Dixie National Forest (Links 285 and 280), and 1.9 miles of crucial winter habitat along Links 250 and 441 (MV-8c

through MV-8d). Alternative S6 also crosses 18.4 miles of crucial pronghorn year-long habitat (Links 163, 430, 435, and 438; MV-8c through MV-8d). None of the alternative routes cross crucial elk habitat.

Special Status Species

Federally Listed and Candidate Species

Alternative S6 crosses 4.1 miles of crucial greater sage-grouse brooding habitat and 4.1 miles of crucial winter habitat located along Links 163 and 165 (MV-7c), but does not cross within 2 miles of any known active leks. The total length of transmission line that would be constructed within 2, 4, and 11 miles of known leks under each alternative route is presented in Table 3-43.

Alternative S6 crosses 0.2 mile of occupied habitat for the southwestern willow flycatcher. There are 100.0 acres of suitable breeding habitat for the species within 0.25 mile of the alternative route. Surveys conducted during the breeding season of 2010 indicated at least one pair nested and up to five other individuals were using the habitat.

Alternative S6 does not cross occupied habitat for the Utah prairie dog.

BLM, USFS, and State Sensitive Species

Alternative S6 crosses 5.1 miles of suitable habitat for the sensitive plant species pinyon penstemon along Link 438 (MV-7c through MV-7d). Alternative S6 crosses 23.5 total miles of suitable habitat for the pygmy rabbit interspersed along the entire alternative route (MV-7c through MV-7d).

Other sensitive wildlife species are known or likely would occur along Alternative S6; however, spatial data were not available for all alternatives and, consequently, quantitative descriptions of the potential effects of each alternative route on these species could not be developed. Wildlife species, including the burrowing owl and ferruginous hawk could be located in suitable habitats along the entire alternative. A hibernacula for the Townsend's big-eared bat is known to occur in the vicinity of the alternative route. The likelihood of occurrence of all sensitive species by alternative is presented in Table 3-40.

Wild Horses and Burros

Alternative S6 crosses 8.4 miles in the Chloride Canyon HMA located along Link 438.

Environmental Effects

Overall impacts on biological resources with implementation of Alternative S6 would include 67.0 miles of low impacts, 84.9 miles of moderate impacts, and 4.3 miles of high impacts. In addition, Alternative S6 parallels the existing IPP corridor for 9.3 miles. Benefits of colocation would include reducing new disturbance in previously undisturbed habitats, thereby reducing fragmentation of habitat for some plant and wildlife species.

Vegetation Communities

The types of potential effects on vegetation communities that could occur under Alternative S6 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on vegetation communities under Alternative S6 could include 3.9 miles of low impacts, 57.9 miles of moderate impacts, and no identifiable high impacts (Table 3-45; MV-6c and MV-6d). Criteria for assessing intensity of impacts are presented in Table 3-38. Alternative S6 would result in an estimated 228.3 acres of permanent ground disturbance from access road and tower construction, 573.5 acres of temporary disturbance, and 460.1 acres of vegetation clearing (Table 3-2).

Wildlife

The types of potential effects on wildlife that could occur under Alternative S6 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Wildlife species that may be affected by Alternative S6 are listed in Tables D-1, D-2, D-3, D-4, and D-5. Effects on wildlife would not be anticipated to cause a loss in population or species viability in the Project area.

Raptors and Other Migratory Birds

The types of potential effects on raptors and other migratory birds that could occur under Alternative S6 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on raptors and migratory birds under Alternative S6 could include 61.8 miles of low impacts on areas designated by UDWR as low-, medium-, and high-quality raptor habitat along the entire alternative route. The quantity of low-, medium-, and high-quality raptor habitat crossed is presented in Table 3-44. Criteria for assessing intensity of impacts are presented in Table 3-38.

Big Game

The types of potential effects on big game that could occur under Alternative S6 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on big game under Alternative S6 could include 28.3 miles of low impacts within crucial seasonal habitats for mule deer and pronghorn. Low impacts on mule deer could occur within 8.0 miles of crucial summer habitat along Link 285 (MV-8d) and 1.9 miles of crucial winter habitat along Links 250 and 441 (MV-8d). Low impacts on pronghorn could occur within 18.4 miles of crucial year-long habitat along Links 163, 430, and 435 (MV-8c and MV-8d). Criteria for assessing intensity of impacts on big game are presented in Table 3-38.

Special Status Species

Federally Listed and Candidate Species

The types of potential effects on greater sage-grouse that could occur under Alternative S6 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on sage-grouse would be anticipated to include 4.1 miles of high impacts within crucial brood-rearing habitat and crucial winter habitat. Criteria for assessing intensity of impacts are presented in Table 3-38.

The types of potential effects on southwestern willow flycatcher that could occur under Alternative S6 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on southwestern willow flycatcher would be anticipated to include 0.2 mile of high impacts within occupied breeding habitat. Criteria for assessing intensity of impacts are presented in Table 3-38.

No identifiable impacts on the Utah prairie dog would be anticipated under Alternative S6.

BLM, USFS, and State Sensitive Species

Except for USFS sensitive plants and pygmy rabbit (also a USFS sensitive species), data were not available to quantitatively asses impacts on BLM sensitive species. After application of selective mitigation measures, impacts on BLM and USFS sensitive species under Alternative S6 could include 5.1 miles of moderate impacts on suitable habitat for the pinyon penstemon along Link 438 and 23.5 miles of moderate impacts on potential pygmy rabbit habitat interspersed along the entire alternative route (MV-7c and MV-7d). All BLM, USFS, and state sensitive species that could be affected under this alternative are identified in Table 3-40.

The types of potential effects on all BLM, USFS, and state sensitive species that could occur under Alternative S6 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Additional analysis of effects on USFS sensitive species and MIS, including species-specific findings required to demonstrate compliance with the USFS LRMPs, is included in Appendix E.

Wild Horses and Burros

The types of potential effects on wild horses and burros that could occur under Alternative S6 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Impacts on wild horses and burros under Alternative S6 could include 8.4 miles of low impacts on the Chloride Canyon HMA along Link 438.

Alternative S7 – Middle Hybrid Route

Affected Environment

Vegetation Communities

Alternative S7 crosses 49.8 miles. Vegetation communities along this alternative route include 0.2 mile of grassland, 0.5 mile of mountain shrub, 10.3 miles of pinyon-juniper, 0.2 mile of riparian, 1.4 miles of shrub steppe, 9.5 miles of desert shrub, and 23.3 miles of big sage communities (Table 3-44; MV-6c through MV-6d). Additionally, 0.7 mile of barren lands, 0.3 mile of disturbed, and 3.4 miles of invasive non-native species are crossed. No aspen communities are crossed by Alternative S7. No known populations of noxious weeds or wildfire-affected areas/reseeded through emergency stabilization and rehabilitation areas are crossed by any of the southern alternatives. However, information regarding the distribution of noxious weeds was not available for the entire study corridor. BLM has mapped noxious weeds in areas adjacent to the Project in the vicinity of Newcastle.

Wildlife

Raptors and Other Migratory Birds

Alternative S7 crosses 49.8 miles of medium-quality raptor habitats for all links (MV-7c through MV-7d). Alternative S7 is colocated with the IPP utility corridor for the entire alternative route and no high-quality raptor habitats are crossed. No low-quality raptor habitats are crossed by any of the southern alternatives.

Big Game

Alternative S7 crosses 5.6 miles of mule deer crucial summer habitat located only on the Dixie National Forest (Links 270 and 271) and 10.8 miles of crucial winter habitat at the base of the Antelope Range and near the Red Butte Substation (Links 165, 220, 221, and 441; MV-8c through MV-8d). Alternative S7 also crosses 21.7 miles of crucial pronghorn year-long habitat located along the IPP (Links 163 and 165; MV-8c through MV-8d). None of the alternative routes cross crucial elk habitat.

Special Status Species

Federally Listed and Candidate Species

Alternative S7 crosses 4.2 miles of crucial greater sage-grouse brooding habitat and 4.3 miles of crucial winter habitat located along Links 163 and 165 (MV-7c), but does not cross within 2 miles of any known active leks. The total length of transmission line that would be constructed within 2, 4, and 11 miles of known leks under each alternative route is presented in Table 3-43.

Alternative S7 does not cross occupied habitat for the southwestern willow flycatcher or occupied habitat for the Utah prairie dog.

BLM, USFS, and State Sensitive Species

Alternative S7 crosses 19.2 miles of suitable habitat for the pygmy rabbit interspersed along the entire alternative route (MV-7c through MV-7d). Alternative S7 does not cross suitable habitat for the sensitive plant habitat species pinyon penstemon.

Other sensitive wildlife species are known or likely would occur along Alternative S7; however, spatial data were not available for all alternatives and, consequently, quantitative descriptions of the potential effects of each alternative route on these species could not be developed. Wildlife species, including the burrowing owl and ferruginous hawk, could be located in suitable habitats along the entire alternative. The likelihood of occurrence of all sensitive species by alternative is presented in Table 3-40.

Wild Horses and Burros

Alternative S7 crosses 9.3 miles in the Chloride Canyon HMA located along Link 220.

Environmental Effects

Overall impacts on biological resources with implementation of Alternative S7 would include 73.1 miles of low impacts, 64.6 miles of moderate impacts, and 4.3 miles of high impacts. Alternative S7 would

parallel the existing IPP corridor for the entire alternative route. Benefits of colocation would include reducing new disturbance in previously undisturbed habitats, thereby reducing fragmentation of habitat for some plant and wildlife species.

Vegetation Communities

The types of potential effects on vegetation communities that could occur under Alternative S7 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on vegetation communities under Alternative S7 could include 4.4 miles of low impacts, 45.4 miles of moderate impacts, and no identifiable high impacts (Table 3-45; MV-6c and MV-6d). Criteria for assessing intensity of impacts are presented in Table 3-38. Alternative S7 would result in an estimated 162.6 acres of permanent ground disturbance from access road and tower construction, 518.7 acres of temporary disturbance, and 234.4 acres of vegetation clearing (Table 3-2).

Wildlife

The types of potential effects on wildlife that could occur under Alternative S7 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Wildlife species that may be affected by Alternative S7 are listed in Tables D-1, D-2, D-3, D-4, and D-5. Effects on wildlife would not be anticipated to cause a loss in population or species viability in the Project area.

Raptors and Other Migratory Birds

The types of potential effects on raptors and other migratory birds that could occur under Alternative S7 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on raptors and migratory birds under Alternative S7 could include 49.8 miles of low impacts on areas designated by UDWR as low-, medium-, and high-quality raptor habitat along the entire alternative route. The quantity of low-, medium-, and high-quality raptor habitat crossed is presented in Table 3-44. Criteria for assessing intensity of impacts are presented in Table 3-38.

Big Game

The types of potential effects on big game that could occur under Alternative S7 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on big game under Alternative S7 could include 38.1 miles of low impacts within crucial seasonal habitats for mule deer and pronghorn. Low impacts on mule deer could occur within 5.6 miles of crucial summer habitat along Links 270 and 271 (MV-8d) and 10.8 miles of crucial winter habitat along Links 220, 221, 275 and 441 (MV-8d). Low impacts on pronghorn could occur within 21.7 miles of crucial year-long habitat along Links 163 and 165 (MV-8c and MV-8d). Criteria for assessing intensity of impacts on big game are presented in Table 3-38.

Special Status Species

Federally Listed and Candidate Species

The types of potential effects on greater sage-grouse that could occur under Alternative S7 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on sage-grouse are anticipated to include 4.3 miles of high impacts within crucial brood-rearing habitat and crucial winter habitat. Criteria for assessing intensity of impacts are presented in Table 3-38.
No identifiable impacts on the Utah prairie dog would be anticipated under Alternative S7 on southwestern willow flycatcher or Utah prairie dog.
BLM, USFS, and State Sensitive Species

After application of selective mitigation measures, impacts on BLM and USFS sensitive species under Alternative S7 could include 19.2 miles of moderate impacts on potential pygmy rabbit habitat interspersed along the entire alternative route (MV-7c and MV-7d). All BLM, USFS, and state sensitive species that could be affected under this alternative are identified in Table 3-40.

The types of potential effects on all BLM, USFS, and state sensitive species that could occur under Alternative S7 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Additional analysis of effects on USFS sensitive species and MIS, including species-specific findings required to demonstrate compliance with the USFS LRMPs, is included in Appendix E.

Wild Horses and Burros

The types of potential effects on wild horses and burros that could occur under Alternative S7 and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Impacts on wild horses and burros under Alternative S7 could include 9.3 miles of low impacts on the Chloride Canyon HMA along Link 220.

Alternative S7-A (Route Variation of Alternative S7) – Middle Hybrid Route 300 Feet East of Sigurd to Red Butte No. 1 Transmission Line Adjacent to Atchinson IRA (Agency Preferred Alternative)

Affected Environment

Vegetation Communities

Alternative S7-A crosses 49.8 miles. Vegetation communities along this alternative route include 0.2 mile of grassland, 0.5 mile of mountain shrub, 10.0 miles of pinyon-juniper, 0.1 mile of riparian, 1.4 miles of shrub steppe, 9.5 miles of desert shrub, and 23.7 miles of big sage communities (Table 3-44; MV-6c through MV-6d). Additionally, 0.7 mile of barren lands, 0.3 mile of disturbed, and 3.4 miles of invasive non-native species are crossed. No aspen communities are crossed by Alternative S7-A. No known populations of noxious weeds or wildfire-affected areas/reseeded through emergency stabilization and rehabilitation areas are crossed by any of the southern alternatives. However, information regarding the distribution of noxious weeds was not available for the entire study corridor. BLM has mapped noxious weeds in areas adjacent to the Project in the vicinity of Newcastle.

Wildlife

Raptors and Other Migratory Birds

Alternative S7-A crosses 49.8 miles of medium-quality raptor habitats for all links (MV-7c through MV-7d). Alternative S7-A is colocated with the IPP utility corridor for the entire alternative route and no high-quality raptor habitats are crossed. No low-quality raptor habitats are crossed by any of the southern alternatives.

Big Game

Alternative S7-A crosses 5.6 miles of mule deer crucial summer habitat located only on the Dixie National Forest (Links 270 and 272) and 10.8 miles of crucial winter habitat at the base of the Antelope Range and near the Red Butte Substation (Links 165, 220, 221, and 441; MV-8c through MV-8d). Alternative S7-A also crosses 21.7 miles of crucial pronghorn year-long habitat located along the IPP (Links 163 and 165; MV-8c through MV-8d). None of the alternative routes cross crucial elk habitat.

Special Status Species

Federally Listed and Candidate Species

Alternative S7-A crosses 4.2 miles of crucial greater sage-grouse brooding habitat and 4.3 miles of crucial winter habitat located along Links 163 and 165 (MV-7c), but does not cross within 2 miles of any known active leks. The total length of transmission line that would be constructed within 2, 4, and 11 miles of known leks under each alternative route is presented in Table 3-43.

Alternative S7-A does not cross occupied habitat for the southwestern willow flycatcher or occupied habitat for the Utah prairie dog.

BLM, USFS, and State Sensitive Species

Alternative S7-A crosses 19.0 miles of suitable habitat for the pygmy rabbit interspersed along the entire alternative route (MV-7c through MV-7d). Alternative S7-A does not cross suitable habitat for the sensitive plant habitat species pinyon penstemon.

Other sensitive wildlife species are known or likely would occur along Alternative S7-A; however, spatial data were not available for all alternatives and, consequently, quantitative descriptions of the potential effects of each alternative route on these species could not be developed. Wildlife species, including the burrowing owl and ferruginous hawk, could be located in suitable habitats along the entire alternative. The likelihood of occurrence of all sensitive species by alternative is presented in Table 3-40.

Wild Horses and Burros

Alternative S7-A crosses 9.3 miles in the Chloride Canyon HMA located along Link 220.

Environmental Effects

Overall impacts on biological resources with implementation of Alternative S7-A would include 73.0 miles of low impacts, 64.7 miles of moderate impacts, and 4.3 miles of high impacts. Alternative S7-A

would parallel the existing IPP corridor for the entire alternative route. Benefits of colocation would include reducing new disturbance in previously undisturbed habitats, thereby reducing fragmentation of habitat for some plant and wildlife species.

Vegetation Communities

The types of potential effects on vegetation communities that could occur under Alternative S7-A and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on vegetation communities under Alternative S7-A could include 4.4 miles of low impacts, 45.4 miles of moderate impacts, and no identifiable high impacts (Table 3-45; MV-6c and MV-6d). Criteria for assessing intensity of impacts are presented in Table 3-38. Alternative S7-A would result in an estimated 161.7 acres of permanent ground disturbance from access road and tower construction, 506.2 acres of temporary disturbance, and 226.8 acres of vegetation clearing (Table 3-2).

Wildlife

The types of potential effects on wildlife that could occur under Alternative S7-A and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Wildlife species that may be affected by Alternative S7-A are listed in Tables D-1, D-2, D-3, D-4, and D-5. Effects on wildlife would not be anticipated to cause a loss in population or species viability in the Project area.

Raptors and Other Migratory Birds

The types of potential effects on raptors and other migratory birds that could occur under Alternative S7-A and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on raptors and migratory birds under Alternative S7-A could include 49.8 miles of low impacts on areas designated by UDWR as low-, medium-, and high-quality raptor habitat along the entire alternative route. The quantity of low-, medium-, and high-quality raptor habitat crossed is presented in Table 3-44. Criteria for assessing intensity of impacts are presented in Table 3-38.

Big Game

The types of potential effects on big game that could occur under Alternative S7-A and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on big game under Alternative S7-A could include 38.1 miles of low impacts within crucial seasonal habitats for mule deer and pronghorn. Low impacts on mule deer could occur within 5.6 miles of crucial summer habitat along Link 270 (MV-8d) and 10.8 miles of crucial winter habitat along Links 220, 221, 275 and 441 (MV-8d). Low impacts on pronghorn could occur within 21.7 miles of crucial year-long habitat along Links 163 and 165 (MV-8c and MV-8d). Criteria for assessing intensity of impacts on big game are presented in Table 3-38.

Special Status Species

Federally Listed and Candidate Species

The types of potential effects on greater sage-grouse that could occur under Alternative S7-A and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. After application of selective mitigation measures, impacts on sage-grouse are anticipated to include 4.3 miles of high impacts within crucial brood-rearing habitat and crucial winter habitat. Criteria for assessing intensity of impacts are presented in Table 3-38.

No identifiable impacts on the Utah prairie dog would be anticipated under Alternative S7-A on southwestern willow flycatcher or Utah prairie dog.

BLM, USFS, and State Sensitive Species

After application of selective mitigation measures, impacts on BLM and USFS sensitive species under Alternative S7-A could include 19.0 miles of moderate impacts on potential pygmy rabbit habitat interspersed along the entire alternative route (MV-7c and MV-7d). All BLM, USFS, and state sensitive species that could be affected under this alternative are identified in Table 3-40.

The types of potential effects on all BLM, USFS, and state sensitive species that could occur under Alternative S7-A and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Additional analysis of effects on USFS sensitive species and MIS, including species-specific findings required to demonstrate compliance with the USFS LRMPs, is included in Appendix E.

Wild Horses and Burros

The types of potential effects on wild horses and burros that could occur under Alternative S7-A and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Impacts on wild horses and burros under Alternative S7-A could include 9.3 miles of low impacts on the Chloride Canyon HMA along Link 220.

3.2.4.6 Summary

Similar types of impacts on biological resources associated with the construction, operation, and maintenance of a new overhead transmission line would be anticipated for all alternative routes. Differences in impacts anticipated between individual alternative routes are driven by the presence and quantity of biological resources along specific alternative routes and the degree to which anticipated impacts can be mitigated or avoided in Project design.

West-wide Energy Corridor Colocation

Alternatives N1, N2, and N4 parallel the IPP in the WWEC. Because the area has been disturbed previously by construction of the IPP line, the impacts on wildlife would be less than Alternatives N3, N5, and N6, which do not parallel the IPP. Similarly, Alternatives S1, S2, S3, S4, and S7 parallel existing transmission lines in the WWEC for a large portion of the alternative routes and would result in less impact than Alternative S6, which parallels existing transmission lines for about 14.0 miles, and Alternative S5, which parallels existing transmission lines for about 5 miles.

Vegetation Communities

Alternatives N3, N5, N6, S5, and S6 would result in the most acres of vegetation clearing. Alternatives N6 and S6 would result in the most permanent disturbance of vegetation. However, there is not a large variation in acres to be cleared among alternative routes in this category (i.e., ranging from 303.3 to 370.7 acres among the alternative routes considered for the northern segment and from 147.2 to 228.3 acres among alternative considered for the southern segment). Alternative routes were not ranked by quantity of temporary disturbance because impacts would be mitigated by reclamation following the completion of construction activities.

Wildlife

Raptors and Other Migratory Birds

In the Project area, the highest-quality raptor nesting habitats are found along the Tushar and Mineral mountains and Pine and Ox valleys. Medium-quality habitats are found on the east side of the Tushar Mountains, the Horse Valley, and south of the Black Mountains along the existing utility corridor and Iron Springs routes. The lowest-quality habitat is located along Black Rock Road and north of the Black Mountains along the IPP, where man-made structures are abundant. Alternatives N3, N5, and N6 cross the most high-quality raptor habitat among alternatives considered for the northern segment of the Project. Alternatives S2, S4, S7, and S7-A would avoid high-quality raptor habitat. All alternative routes would have some impact on raptor habitats.

Big Game

Mule Deer

For the northern alternative routes, Alternatives N3, N5, and N6 cross the most crucial winter habitat because of proximity to the Mineral Mountains. No crucial year-long or summer habitats would be crossed by the northern alternatives. For the southern alternative routes, the alternatives colocated with the IPP line, S1, S2, S3, S4, S7, and S7-A cross more crucial winter habitats. The Ox and Pine valley routes, Alternatives S1, S3, S5, and S6, cross more crucial summer habitats. The Ox Valley routes, Alternatives S3 and S6, cross the most crucial year-long habitats.

Pronghorn

Crucial year-long habitats are located primarily in the Milford and Horse valleys south to the Escalante Desert. Northern Alternatives N1 and N2 follow Black Rock Road, eventually colocating with the IPP line, and cross more crucial habitat than other alternatives. Alternatives N5 and N6, going over the Mineral Mountains, cross the least. Impacts along the southern alternative routes would not vary greatly, although the alternatives colocated with the IPP line along the Antelope Mountains, Alternatives S1, S2, S3, S4, S7, and S-7A cross slightly more crucial year-long habitats than the Iron Springs route. There are no crucial winter or summer habitats in the study corridors.

Elk

Crucial winter habitat is located along the Sigurd to Cove Fort segment, but is not crossed by the referenced centerline. Crucial elk habitats are not anticipated to be affected by this Project.

Special Status Species

A summary of Special Status Species by alternative is presented in Table 3-40.

Federally Listed and Candidate Species

Utah Prairie Dog (Federally threatened)

Alternatives N3, N5, and N6 cross an active Utah prairie dog colony. The other alternative routes does not cross this resource and would not affect this species.

Southwestern Willow Flycatcher (Federally endangered)

Alternatives S1, S5, and S6 cross habitat where the southwestern willow flycatcher is known to breed and forage. The other alternative routes do not cross this resource and would not affect this species.

Sage-grouse (Federal candidate)

Alternatives N3, N5, and N6 pass within 2.0 miles of active sage-grouse leks. These same alternative routes would have the most impact on designated crucial brooding habitat. All northern and southern alternative routes would affect a similar amount of crucial winter habitat. All northern and southern alternatives would affect designated crucial brooding and winter habitat.

BLM, USFS, and State Sensitive Species

Sensitive Plants

The Elsinore buckwheat, Utah phacelia, and Ward's beardtongue all occur in similar habitats found only along the Sigurd to Cove Fort segment of the study corridors. All alternatives along this segment share the same alignment; therefore all northern alternative routes would result in the same amount of disturbance to sensitive plant populations. For the southern alternative routes, Alternatives S4, S5, and S6 cross suitable sensitive plant habitat for the pinyon penstemon. This habitat is avoided by Alternatives S1, S2, S3, S7, and S7-A.

Pygmy Rabbit

Impacts on pygmy rabbit habitat are fairly equal among the alternative routes. Of the northern alternative routes, Alternative N3 crosses the most modeled habitat. Of the southern alternative routes, Alternative S6 crosses the most modeled habitat.

Other BLM-, state-, and USFS-sensitive species could be affected by all of the alternative routes. Table 3-40 identifies sensitive species that could be affected by each alternative route. Types of potential effects on these species and the degree to which these effects would be mitigated or avoided are described in detail in Section 3.2.4.4.2. Site-specific information required to quantify impacts on all BLM, USFS, and state, sensitive species by alternative is not available. Except where differences have been identified for specific species, habitats crossed by the alternative routes are generally similar and impacts on BLM, USFS, and state sensitive species are anticipated to be similar between alternative routes.

Additional analysis of effects on USFS sensitive species and MIS, including species-specific findings required to demonstrate compliance with the USFS LRMPs, is included in Appendix E.

Wild Horses and Burros

All southern alternative routes would affect the Chloride Canyon HMA. Impact on wild horses would be common to all alternative routes.

3.2.5 Cultural Resources

Cultural resources include archaeological, historical, or architectural sites, districts, buildings, structures, places, and objects. They also include areas of traditional use, referred to as traditional cultural properties (TCP) . However, not all cultural resources are considered significant; the significance of a cultural resource depends on whether or not it is *listed or eligible for listing on the NRHP*. Properties eligible for listing on the NRHP (referred to herein as "historic properties") must demonstrate importance in American history, architecture, archaeology, engineering, or culture. Per 36 CFR 60.4 properties are considered significant in these categories if they meet one or more of the following criteria:

> (A) are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (B) are associated with the lives of persons significant in our past; or
>
> (C) 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) have yielded, or may be likely to yield, information important in prehistory or history.

In addition to demonstrating significance in one or more of the categories previously listed, a property must demonstrate integrity. Integrity is evaluated based on the following seven aspects: location, setting, design, materials, workmanship, feeling, and association.

A cultural resource must be a preservable entity that demonstrates the qualities that make it significant. The significance of cultural resources is determined by agencies in consultation with the SHPO. Cultural resources determined significant are referred to as historic properties.

Federal agencies must consider the effects of their actions on historic properties under NEPA and Section 106 of the NHPA (16 U.S.C. 470; 36 CFR 800). As lead federal agency for compliance with Section 106

of the NHPA, BLM initiated Section 106 consultation with the SHPO, PLPCO, SITLA, USFS, NPS, and the Advisory Council on Historic Preservation (ACHP) pursuant to 36 CFR Part 800.6 and 800.14 (b) of the ACHP's regulations implementing Section 106 of the NHPA in April 2010. The Section 106 process is separate from but often conducted parallel with the preparation of an EIS. Consultation under Section 106 of the NHPA is ongoing and as allowed under the law (36 CFR 800.4(c)2), BLM can implement a phased approach to cultural resources studies. For the Project, these studies will be conducted concurrently with the EIS phases of Project implementation and the RODs will not be issued prior to completion of the Section 106 process.

Cultural Resources Task Group

Early in the EIS process, the BLM initiated contact with cooperating agencies in accordance with various environmental laws and Executive Orders to form a specialized task group, composed primarily of professional archaeologists and historians, for the purpose of identifying, assessing, and resolving cultural resource issues associated with the Project. This formalized group, known as the CRTG, meets once a month to discuss Project status, issues, methodologies, and approaches. Participants in the CRTG include representatives from BLM, USFS, SITLA, PLPCO, SHPO, Utah Department of Transportation, NPS, and ACHP. The BLM Cedar City Field Office is serving as the lead agency for the CRTG.

A primary task of the CRTG is to negotiate a Programmatic Agreement. The purpose of the Programmatic Agreement is to fulfill BLM's Section 106 responsibilities through development of a phased approach that includes consultation with consulting parties. The Programmatic Agreement will outline the stipulations that would be followed concerning the identification, assessment, and treatment of cultural resources for the Project in accordance with 36 CFR 800.14(b). A Programmatic Agreement is being developed among the various agencies and consulting parties (including special interest organizations and the Proponent) involved with authorizing the Project. The BLM Color Country District is serving as the lead agency and office. The Programmatic Agreement is provided in Appendix G.

The Programmatic Agreement outlines a phased approach to the identification, assessment, and treatment of cultural resources for the Project, which includes a combination of Class I, Class II, and Class III cultural resource data collection to be conducted at specific stages of the Project.

A Class I cultural resource inventory (literature search) was conducted during preparation of the EIS to identify previously documented cultural resource sites within a distance specified by the BLM of each alternative route. Class I data were used to identify cultural resource intensity zones and areas lacking existing data along proposed routes. Where there were Class I data gaps, a Class II cultural resource inventory (reconnaissance) also was performed during preparation of the EIS.

Class I and Class II cultural resource data collected were then used to identify and assess potential impacts the Project may have on cultural resources and to support the evaluation of the alternative routes for the EIS. The Class I and Class II data also will be included in a separate technical cultural report developed to facilitate consultation, as required by Section 106 of the NHPA.

As part of the BLM's phased approach to fulfill its responsibilities to the Section 106 of the NHPA, the BLM must complete Class III cultural resource inventory (intensive pedestrian survey) of the route selected for construction of the transmission line, and the results of the survey must be presented in a technical report. To accommodate the Proponent's construction schedule and in-service date of June 2015, the Proponent funded Class III inventory of nearly all alternative routes rather than waiting until a route is selected. The Class III inventory has been completed and the technical report is being prepared. The final Class III technical report will enable the BLM, in consultation with the SHPO, to identify

historic properties and make determinations on potential effects on those properties. With approval from participating agencies and concurrence of the SHPO, a HPTP comprehensively addressing effects of the Proposed Action on historic properties would be prepared and would be implemented in consultation with the BLM, SHPO, and other participating agencies. The Class III inventory and all associated technical reports, including the HPTP (if needed), will be completed before construction of the Project begins.

Sensitive Cultural Resources and Issues Identified During Scoping

Issues raised by the public and agencies during Project scoping and preparation of the EIS related to potentially significant effects on cultural resources include impacts on archaeological and historic sites. Specific key resources cited were the Mountain Meadows Historic Site and the Mountain Meadows Massacre Site NHL, remnants of the Old Spanish NHT, the Cove Fort Historic Site, the Mineral Mountains obsidian sources, and historic properties listed on the NRHP. A description of these key resources follows.

Mountain Meadows Massacre Site National Historic Landmark and Mountain Meadows Historic Site National Register Property

The Mountain Meadows Massacre Site NHL and the NRHP property, Mountain Meadows Historic Site, are located in a high valley between the Pine Valley and Bull Valley mountains, along SR 18, approximately 7 miles south of Enterprise, Utah, and about 30 miles north of St. George, Utah. In September 1857, approximately 120 wagon train emigrants, on their way to California, were besieged and killed by local residents in the Mountain Meadows Valley. The siege ended when the emigrants surrendered their weapons and were separated into groups: those wounded, women and children over the age of six, men and boys, and infants and toddlers. The 17 infants and toddlers were loaded onto a wagon that headed out of the meadow towards Cedar City. The women and remaining older children were sent by foot, escorted by Mormon militiamen, shortly after the wagon. A wagon of the wounded emigrants followed the women, and the men were paced a couple hundred feet behind the rest. When the groups were out of view of each other, an order was given and all but the infants and toddlers were slain. The men were shot at close range and the women and children were bludgeoned (Reed 2010). John D. Lee, a respected local Mormon leader who spearheaded the settlement of southern Utah, was charged with responsibility for the massacre and in 1877 was executed by firing squad at the Mountain Meadows Massacre Site (Reed 2010).

In 1975, a parcel of approximately 3,000 acres was listed on the NRHP under the name Mountain Meadows Historic Site. The NRHP site sits on land currently owned by the Church of Jesus Christ of Latter-day Saints (LDS) or various private parties or is administered by the Dixie National Forest.

On June 23, 2011, two parcels of land adjacent to and within the larger NRHP Historic Site were designated a NHL under the name Mountain Meadows Massacre Site by the Secretary of the Interior. The NHL parcels total 760 acres. The northern parcel (the Men's Massacre Site) includes the men's massacre site and burials and a trail trace. The southern parcel (the Encampment/Siege Site) includes the emigrants' encampment, the Indians' encampment, the siege site, burials, a privy, the access road, the parking lot, the concrete path, the wooden bridge, and the 1990 and 1999 monuments (Reed 2010). The Mountain Meadows Massacre Site NHL is owned and managed by the LDS Church and the Dixie National Forest. According to the NPS, the federal agency responsible for the management of NHL program:

> National Historic Landmarks are nationally significant historic places designated by the Secretary of the Interior because they possess exceptional value or quality in illustrating

or interpreting the heritage of the United States. Today, fewer than 2,500 historic places bear this national distinction (NPS 2012).

NHL's are afforded special protection under Section 110 (f) of the NHPA and that protection is codified in 36 CFR 800.10, *Special Requirements for Protecting National Historic Landmarks*. The law states that "the agency official, to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm to any National Historic Landmark that may be directly and adversely affected by an undertaking." As further outlined in Appendix A(c)(1) of 36 CFR 800, the ACHP may choose to participate in Section 106 consultation efforts to resolve adverse effects on NHLs. The ACHP will provide "written comments or any memoranda of agreement to which it is a signatory, to the Secretary [of the Interior], and the head of the agency responsible for the undertaking." (36 CFR 800.10(d))

Old Spanish National Historic Trail

The Old Spanish NHT is a 1,200-mile-long trail that once was a major caravan trade route between Santa Fe, New Mexico, and Los Angeles, California. The route was used primarily between 1829 and 1848.

Designated by Congress as the fifteenth NHT in December of 2002, the Old Spanish NHT is administered by the BLM and the NPS, working with other federal, state, and local government agencies, as well as private landowners. The BLM states: "Today, only a few remnant traces of the trail can be seen where hundreds of fast trotting mules and their tired drivers once traversed the high country of the Southwest on their way to California's fertile trading fields" (BLM 2010d).

The Old Spanish NHT traverses much of southern Utah, with approximately one-third of the trail system located in southern Utah. Within the Project area, the trail is located near Sigurd, Richfield, Elsinore, Joseph, Newcastle, and Central.

Cove Fort Historic Site

The Cove Fort Historic Site is located just north of the junction between I-15 and I-70, in southeastern Millard County approximately 25 miles north of Beaver, Utah. The historic fortification at Cove Fort was erected in 1867 on the site of Fort Willden, which was the fortified ranch of the Charles W. Willden family between 1860 and 1865. Cove Fort was constructed by members of the LDS Church, under the direction of church leader Brigham Young, for the purposes of providing travelers with safe accommodations. The fort is one of the few pioneer fortifications constructed during the territorial days that remains standing and in good condition (Porter 1994:119-120).

Mineral Mountains Obsidian Sources

The Mineral Mountains obsidian source sites, the Negro Mag source and Wildhorse Canyon source, are located in the Mineral Mountains of Beaver County, approximately 10 miles east of Milford, Utah, and approximately 10 miles west of Beaver, Utah. The sources are named based on the topographic features in which the obsidian flows originate, the Negro Mag Wash and Wildhorse Canyon. Portions of the Wildhorse Canyon site are listed on the NRHP; however, the area listed in not within the Project study area.

As identified in the Class I data, these sites are two extraordinarily large prehistoric lithic procurement and reduction sites, which combined encompass an area greater than 20 square miles. Currently defined in the Class I data, the archaeological site boundaries of each represent a combination of the geological extent of the obsidian flows and the presence of discrete cultural site locations. Within the boundary of each site, there are hundreds of small sites representing discrete episodes of lithic procurement and reduction activities. More than 150 smaller sites scattered throughout the vicinity have been subsumed into the boundaries of these very large sites. A cultural resource inventory of these sites has not been completed to identify with some precision the actual number of cultural sites. As such, it is unknown how many sites are present and what the locations and spatial extents of the sites are. Based on the presence of diagnostic lithic tools, it appears these obsidian sources have been used as lithic procurement areas for at least 10,000 years (Janetski, et al. 1988).

Historic Properties Listed on the National Register of Historic Places

A search of the NRHP records identified 12 historic properties within the study area. This includes 11 historic buildings and one archaeological site, the Mountain Meadows Historic Site. Although the Mountain Meadows Massacre NHL was listed on the NRHP at the same time as NHL designation in 2011, the NRHP database has not been updated to reflect that. The NHL is thus not included in the NRHP counts, but is identified separately.

3.2.5.1 Regulatory Framework and Permits

Federal legislation applicable to cultural resources in the Project area includes:

- NHPA (16 U.S.C. 470; 36 CFR 800), specifically Section 106 of the Act, directs federal agencies to take into account the effects of their actions on historic properties and provide the ACHP a reasonable opportunity to comment.

- Archaeological Resources Protection Act of 1979 (ARPA) (16 U.S.C. 470aa to 470ee) authorizes federal land-management agencies to manage through a permit process the excavation and/or removal of archaeological resources on federal lands. The land-management agencies must consult with American Indian tribes with interests in resources prior to issuance of permits.

- Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (25 U.S.C. 3001-3002) provides a process through which federal agencies consult with affected Native Americans regarding the treatment and return of human remains, funerary objects, sacred objects, and items of cultural patrimony identified on federal lands as a result of a federal action.

- The American Antiquities Act of 1906 (16 U.S.C. 432-433) authorizes federal land-management agencies to manage through a permit process the excavation and/or and removal of archaeological resources on federal lands.

- Executive Order 13007, issued in 1996, directs federal land-management agencies to accommodate access to, and ceremonial use of, Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, agencies shall maintain the confidentiality of sacred sites.

- Executive Order 11593, issued in 1971, directs federal land-management agencies to (1) administer the cultural properties under their control in a spirit of stewardship and trusteeship for

future generations, (2) initiate measures necessary to direct their policies, plans and programs in such a way that federally owned sites, structures, and objects of historical, architectural, or archaeological significance are preserved, restored, and maintained for the inspiration and benefit of the people, and (3) in consultation with the ACHP (16 U.S.C. 470i), institute procedures to assure that federal plans and programs contribute to the preservation and enhancement of non-federally owned sites, structures, and objects of historical, architectural, or archaeological significance.

State statutes and guidelines include the following:

- UAC Sections 9-8-305 and R 694-1 require a permit be obtained from PLPCO to survey or excavate on any lands owned or controlled by the state, its political subdivisions, or by SITLA.
- UAC Section 9-8-309 provides a process through which landowners or land management agencies consult with the state regarding the treatment of human remains discovered on nonfederal lands that are not state owned.
- UAC Section 9-8-404 establishes agency responsibilities where the SHPO will comment on state-funded undertakings. Specifically, this portion of Utah Code directs state agencies to take into account the effects of their actions on historic properties, and provide the SHPO and PLPCO a reasonable opportunity to comment.
- UAC Section 9-8-403 provides a process for the ownership and disposition of Native American human remains discovered on nonfederal lands that are not state owned.
- UAC Section 76-9-704 provides the definitions and penalties for the abuse or desecration of a dead human body.
- UAC Section R212-4 provides a process to assure the respectful, lawful, and scientifically sound treatment of Native American burial sites discovered on nonfederal state lands and provides procedures for the final disposition of unidentified or unaffiliated Native American remains discovered on nonfederal state-owned lands.
- UAC Section R230-1 requires that if human remains are discovered in conjunction with a project subject to Section 106, the project proponent is responsible for all efforts associated with the excavation, analysis, curation, or repatriation of the human remains and for notifying the Utah SHPO.

3.2.5.2 Cultural Context

Prehistory

Prehistoric Overview

The prehistory of the eastern Great Basin and northern Colorado Plateau is commonly divided into several periods, each thought to represent a distinct subsistence strategy and way of life. While terminology and temporal ranges sometimes differ between researchers, the basic periods are:

- **Paleoindian (12,000 to 8,500 Before Present [B.P.])**. Characterized by hunting (and probably gathering) prior to the onset of hunting and gathering adapted to fully desert conditions

- **Archaic (8,500-1,600 B.P.)**. Characterized by small groups were entirely or mostly dependent on wild plants and animals
- **Formative (1,600 to 700 B.P.)**. Characterized by dependence on cultigens, most commonly associated with Ancestral Puebloan (Fremont or Anasazi) populations
- **Late Prehistoric (600 to 150 B.P.)**. Characterized by the abandonment of agriculture and the appearance of hunting and gathering strategies practiced through historic times by Paiute and Ute groups in the region

The following is a brief summary of the archaeological and ethnographic evidence of the prehistoric groups that inhabited the region traversed by the areas of potential effect (APE). Many descriptions of these archaeological complexes have appeared elsewhere, and should be consulted for a fine-grained and comprehensive description of each (Aikens and Madsen 1986; Graf and Schmitt 2007; Grayson 1993; Janetski et al. 2012; Jennings 1986 and 1978; Madsen and Simms 1998; Marwitt 1986; I.T. Kelly 1964; R.L. Kelly 1997; Kelly and Fowler 1986; Simms 2008; Talbott et al. 1998). Table 3-46 provides a summary and brief description of the temporal frameworks found in the APE, as derived from the Class I data available.

TABLE 3-46
SUMMARY OF PREHISTORIC CULTURAL PHASES

Temporal Period	Generalized Lifeways	Diagnostic Artifacts	Local Manifestations	References
Paleoindian (ca. 12,000 to 8,000 B.P.)	Small groups practicing a highly mobile subsistence strategy that included large game mammals, (e.g., giant bison, mammoth, and camel) and a wide variety of small game and plants.	Fluted and stemmed projectile points including: Clovis, Folsom, Lake Mojave, and Great Basin Stemmed.	Few surface sites and isolated finds of Clovis, Folsom, and Great Basin Stemmed projectile points.	Beck and Jones 1997; Beck and Jones 2009; Graff and Schmitt 2007; Grayson 1993; Madsen 1982; Zier 1984
Archaic (ca. 8000 B.P. to 1500 B.P.) (Early Archaic, Middle Archaic, Late Archaic, and Terminal Archaic)	Continued (and in some cases increased) emphasis on large game (particularly artiodactyls) with an increased focus on smaller game and a greater dependence on plant resources (Early); growing populations leading to refinement of social organization and settlement and subsistence patterns; expansion into upland pinyon-juniper communities using milling stones, atlatls, and small game traps, (Middle – Late); sedentary subsistence patterns, manufacturing of pottery, and the introduction of domesticated maize (Terminal).	Elko Corner-notched, Pinto, Bitterroot Side-notched, Northern Side-notched, Humboldt, Gypsum and Gatecliff projectile points, pottery, and coiled basketry.	Lithic, tool, and ceramic scatters and complex campsites.	Aikens and Madsen 1986; Holmer 1986; Holmer 1978; Janetski et al. 2000; Jennings 1978; Price 2008; Reed et al. 2005; Simms 2008

TABLE 3-46
SUMMARY OF PREHISTORIC CULTURAL PHASES

Temporal Period	Generalized Lifeways	Diagnostic Artifacts	Local Manifestations	References
Formative (ca. 1500 B.P. to 700 B.P.) (Sevier and Parowan Fremont)	Increased sedentism, cultivation of domesticated plants, the appearance of villages; and increased social complexity and trade (turquoise and shell); architecture includes semi-subterranean pit-houses, slab or clay- lined storage pits, and aboveground adobe or jacal structures (including rectangular surface storage structures).	Small corner-notched (Rose Spring Corner-notched, Parowan Basal-notched, and Eastgate Expanding-stem) and side-notched projectile points (Uinta and Nawthis Side-notched), Bull Creek, Cottonwood triangular series points; thin-walled grayware ceramics, clay figurines, distinctive moccasins	Small villages situated on alluvial fans near canyon mouths and permanent water sources; satellite sites and temporary encampments also common.	Holmer and Weder 1980; Janetski et al. 2000; Jennings 1978; Madsen 1982; Madsen and Simms 1998; Marwitt 1970 and 1986; Price 2008
Late Prehistoric and Protohistoric (ca. 1300 A.D. to 1847 A.D.)	Small mobile hunting and gathering populations living in temporary wickiups and rock shelters.	Small triangular projectile points such as the Desert Side-notched and Cottonwood Triangular, basketry, and utilitarian and Brownware ceramics.	Lithic, tool, and ceramic scatters and campsites.	Aikens and Witherspoon 1986; Baumhoff and Bettinger 1982; Janetski 1986; Jennings 1986; Lyneis 1982; Madsen 1975; Rhode and Madsen 1994

NOTES:
A.D. = Anno domini
B.P. = Before present

History

General Historical Overview

Utah state and county histories, including railroad, mining, and transportation, have been documented thoroughly in several recent reports. Two of the most recent, comprehensive treatments available for this region are the 2008 report for the UNEV Pipeline Project (Price et al. 2008:132-188) and the Kern River 2003 Expansion Pipeline Project report (Reed et al. 2005). As the Project overlaps many of the same regions of the state, portions of the chronology have been adapted from these reports. For further reading into the history of the state or the Project area, consult Alder and Brooks 1996, Bishop 1997, Black and Metcalf 1986, Bradley 1999, Hull and Avery 1980, Lyman and Newell 1999, Poll et al. 1978, and Powell 1994. The history of southern Utah can be divided into five major time periods associated with significant events and activities:

- **Exploration Period** (1776 to 1847). Characterized by the earliest exploration of the area by Spaniards and Euro-Americans.
- **Settlement Period** (1847 to 1870). Characterized by the arrival and settlement of pioneers.
- **Community and Business Development** (1870 to 1929). Characterized by the development of a vast railroad network and the mining/industrial boom associated with World War I.

- **Depression Era**. (1929 to 1940). Characterized by the bust of the local mining and agricultural industries as a result of the stock market crash.

- **World War II and the Post-War Era**. (1941 to the present). Characterized by the economic recovery resulting from the war overseas, the rise of defense-related industries in Utah, and the increase in urbanization.

Exploration Period (1776 to 1847)

- **1776**. Dominguez-Escalante Expedition: earliest known exploration into the Great Basin by nonindigenous peoples. They were in search of a route from Santa Fe, New Mexico, to the California coast (Black and Metcalf 1986:18; Velez de Escalante 1995:xii).

- **1826**. Jedediah Smith led expeditions through central and southwestern Utah, including Sevier, Millard, and Beaver counties, in search of good trapping territory (Morgan 1953:196-197; Southworth and Farnsworth 2008:151).

- **1829 to 1848**. The Old Spanish Trail was used, primarily during this time, as a commercial trade route between Mexican territories and California (Bradley 1999:42; Crampton 1979:361). The trail followed Indian trails, with local tribes serving as guides, and also portions of the route that the Dominguez-Escalante Expedition followed. The Old Spanish Trail traverses much of the Project area and is recognized as a NHT near Sigurd, Cedar City, Newcastle, Enterprise, Central, and Veyo.

- **1844**. John C. Fremont, a captain in the Army Corps of Topographical Engineers, was charged with exploring, mapping, and describing the interior West. He journeyed into southern Utah on two of his expeditions: first in 1844 and again a decade later during his winter expedition of 1853 to 1854 (Alder and Brooks 1996:8; Newell and Talbot 1998:54).

Settlement Period (1847 to 1870)

- **1847**. The main group of Mormon pioneers (members of the LDS church) arrived in the Salt Lake Valley. Shortly after, their religious leader, Brigham Young, sent a number of families to explore and settle portions of the territory.

- **1851 to 1874**. Parowan and Cedar City were settled in 1851, Beaver in 1856, Minersville in 1859, Richfield in 1863, Circleville in 1864, Milford in 1873, Newhouse (ca. 1870s), and Sigurd in 1874 (Bradley 1999; Van Cott 1990).

- **1857**. Mountain Meadows Massacre Mormon militiamen, who may have been assisted by surrounding area Native Americans, attacked the Baker-Fancher wagon party at the Mountain Meadows encampment site. The siege lasted for five days ending on September 11, 1857, with the murder of approximately 120 men, women, and children (Reed and Wallace 2010).

- **1857 to 1858**. War of Utah: The conflict between Utah settlers and the U.S. Government over the issue of territorial governorship where 30,000 residents from northern Utah were ordered south by Young to seek refuge from Johnston's Army in communities farther south (Hull and Avery 1980:50). Many of these refugees remained in the area following the conclusion of the conflict.

- **1865 to 1868**. Black Hawk War: During the course of the war, Mormon settlers banded together in a series of forts established throughout the area. Under the leadership of Black Hawk, the Ute Indians united with the Paiute and Navajo tribes to raid Mormon settlements (Peterson 1994:44). The war ended with the signing of a peace treaty in 1868. One of the forts constructed during the war for the defense of the settlers was Cove Fort, built in 1867 (Southworth and Farnsworth 2008:153; Van Cott 1990:94). Hostilities continued until 1872 when federal troops were ordered to engage the Indians (Peterson 1994:44).

Community and Business Development (1870 to 1929)

- **1860s to 1900**. In Washington County, the primary industry was cotton production. The cotton industry had been established during the Civil War, but was maintained and thrived through much of the last part of the 19th century (Southworth and Farnsworth 2008:182, 183).

- **1870s to 1880s**. During the 1870s, many mining districts were formed in Millard and Beaver counties, including the South Star, Beaver Lake, North Star, Lincoln, the San Francisco, Pruess, Rocky Mining, and the Bradshaw District (Bradley 1999:101-178). These mines produced salt, copper, silver, and gold (Bishop 1997:143; Southworth and Farnsworth 2008:174).

- **1879**. Denver and Rio Grande Railway began to build a line from Colorado to Salt Lake City via Salina (Bishop 1997:133).

- **1880**. Utah Southern Railroad Extension line came to Milford; it established the town as a major import and export hub for the region (Bradley 1994:365; Southworth and Farnsworth 2008:173).

- **1880s to 1900s**. Sevier County saw the construction of small salt and gypsum mining operations. Coal was also an industry that was established in Sevier County and produced several different ventures in coal mining throughout this time period (Bishop 1997: 104, 143, 164).

- **1891**. Sevier County Railway Company began construction of its own line between Salina and Marysvale (Bishop 1997:135).

- **1890s to 1910s**. In Iron County, the iron industry provided the basis for the local economy. This industry was centered in Cedar City and the area immediately surrounding it (Southworth and Farnsworth 2008:184).

- **1900 to 1920s**. Establishment of the Dixie National Forest, Manti La Sal National Forest, and Fishlake National Forest increased government control of lands (Bishop 1997:153; Southworth and Farnsworth 2008:174, 175, 186).

- **1910 to 1920**. Increased use of industrial ores during World War I created an economic mini-boom in mining towns. While miners and mining companies were the obvious beneficiaries of this war-time demand, area ranchers also enjoyed economic prosperity by selling larger quantities of beef to feed mine workers. Many Utah towns reached the height of their social and economic growth during this boom period.

- **1923**. Union Pacific opened a subsidiary that took tourists from the station at Lund and transported them to Cedar City where they then traveled to the various tourist destinations in the area (Southworth and Farnsworth 2008:186).

Depression Era (1929 to 1940)

- **1929**. The stock market crash in October heralded the onset of the Great Depression.
- **1934**. The Taylor Grazing Act of 1934 was intended to stabilize the economically volatile livestock industry and to stop the misuse of public lands through regulatory control of those lands by the Grazing Service. Many ranchers, however, could not afford permit fees to graze their livestock on public lands, and many were forced to sell off their herds (Hull and Avery 1980:56).
- **1935 to 1940**. The U.S. Government established programs of institutional relief. As part of President Franklin Roosevelt's New Deal, various forms of federal aid poured into struggling communities. In general, western states received more financial support than eastern states, with Utah ranking ninth overall in federal aid per capita (Holzapfel 1999:215).

World War II and the Post-War Era (1941 to Present)

- **1941 to 1944**. The war produced an increased demand for mineral and agricultural products and southern Utah was able to see a boom in the economy created by that demand (Southworth and Farnsworth 2008:176).
- **1945.** Sevier County saw the establishment of a German prisoner of war camp, which brought in cheap labor and some revenue above the agricultural businesses of the county (Bishop 1997:200).
- **1945 to Present**. Today, much of the economy for these counties is based on tourism and recreation (Southworth and Farnsworth 2008:177, 188). Sevier County, however, is also one of the strongest manufacturing counties in Utah (Bishop 1997:242, 283). With increased tourism and recreational opportunities, there has been a general trend towards population growth in the region in the last 20 years (U.S. Census 2000a). According to the 2000 census data, approximately 7 percent of the state's 2.2 million residents live within Sevier, Millard, Beaver, Iron, and Washington counties.

Old Spanish National Historic Trail

The Old Spanish NHT is a 1,200-mile long trail that once was a major caravan trade route connecting Santa Fe, New Mexico, and Los Angeles, California. The Old Spanish NHT Trail traverses much of the Project area and is recognized as a NHT near Sigurd, Richfield, Elsinore, Joseph, Newcastle, and Central.

The earliest known exploration of this trail system by nonindigenous peoples was the 1776 Dominguez-Escalante expedition (Black and Metcalf 1986:18; Velez de Escalante 1995:xii). The Spanish friars were led by indigenous guides along the pathways that had already been in use for hundreds of years.

Between 1776 and the 1820s, the trail network was used extensively by fur trappers, traders, and explorers.

In 1829, commercial pack-mule caravans began making the trek to Los Angeles to trade goods. Highly valued commercial goods (e.g., raw wool and woven textiles) were transported from the New Mexico province to California where they were exchanged for horses and mules, which were equally highly valued in the deserts of the Southwest (Bradley 1999:42). It was during this time the trail was earning its namesake.

Some portions of the trail corridor began to see wagon traffic in the late 1840s. The Old Spanish Trail was used by Mormons expanding settlement and by emigrants traveling west from Utah to California. From that point, several segments of the trail are referred to commonly as The Mormon Trail and/or The Salt Lake Trail to Southern California (Crampton 1979:14).

In December of 2002, Congress designated the Old Spanish Trail as the fifteenth NHT. The Old Spanish NHT is administered by the BLM and the NPS, working with other federal, state, and local government agencies, as well as private landowners. The BLM states: "Today, only a few remnant traces of the trail can be seen where hundreds of fast trotting mules and their tired drivers once traversed the high country of the Southwest on their way to California's fertile trading fields" (BLM 2010d).

Mountain Meadows Massacre Site

This section has been adapted from several written works on the topic. For further reading from the most current works see:

- 2006 Shannon A. Novak and Lars Rodseth, *Remembering Mountain Meadows: Collective Violence and the Manipulation of Social Boundaries*
- 2008 Shannon A. Novak, *House of Mourning: A Biocultural History of the Mountain Meadows Massacre*
- 2008 Ronald W. Walker, Richard E. Turley, and Glen M. Leonard, *Massacre at Mountain Meadows*
- 2010 Paula S. Reed and Edith Wallace, Mountain Meadows Massacre Site National Historic Landmark Nomination Form

The Mountain Meadows Massacre Site is located approximately 7 miles south of Enterprise, Utah, and about 30 miles north of St. George, Utah, in a high valley in the northern part of the Pine Valley Mountains. The encampment site is situated at the bottom of the valley near a plentiful fresh water spring and adjacent to a small gully. The surrounding area provided abundant bunch grasses for the animals to graze. Mountain Meadows is located along part of the Old Spanish Trail, and was well known by travelers heading to California as a place to rest before embarking on the arduous passing of the Mojave Desert.

In late summer of 1857, a wagon train of approximately 120 emigrants from Arkansas and Missouri, known as the Baker-Fancher wagon train, were traveling through Utah west to California. The wagon party decided to take the southern route from Salt Lake City to ensure a safe passage as the colder months were approaching quickly (Reed and Wallace 2010). After passing through Cedar City the Baker-Fancher wagon party pushed on and made camp at Mountain Meadows.

Earlier in the same year, the U.S. Government declared the Mormons of Utah as "rebels" and sent a federal army west to ensure their compliance by replacing the Governor at the time, Brigham Young. Because of the likely confrontation with the U.S. military, the Mormons were told by their leaders not to trade or sell any goods to the wagon parties that passed through their settlements but to preserve what provisions they had (Reed and Wallace 2010). This made travel through Utah very difficult, which raised tensions between the Mormons and the emigrants.

On September 7, 1857, a group of Mormon militiamen attacked the Baker-Fancher encampment at Mountain Meadows (Novak and Rodseth 2006). A defense strategy was employed by the wagon party and members of both sides had been wounded and/or killed. The attack was said to have been due to several factors, including the tensions arising from the forecast of the Utah War. The fight continued for

five days and on September 11, Mormon militiamen convinced the desperate emigrants they would lead them to the safety of Cedar City (Reed and Wallace 2010). The emigrants surrendered their weapons and were separated into groups: those wounded, women and children over the age of six, men and boys, and infants and toddlers. The infants and toddlers, totaling 17, were loaded onto a wagon that headed out of the meadow towards Cedar City. The women and remaining older children were sent by foot, escorted by militiamen, shortly after the wagon. A wagon of the wounded emigrants followed the women and the men were paced a couple hundred feet behind the rest. When they were out of view of each other, an order was given and all but the infants and toddlers were slain at the hands of the Mormon militiamen. The men were shot at close range and the women and children had been bludgeoned to death (Reed and Wallace 2010). John D. Lee, a respected Mormon leader who spearheaded the settlement of southern Utah, was charged with the responsibility of the massacre, and in 1877, was executed by firing squad at the Mountain Meadows site (Reed and Wallace 2010).

Initially following the massacre, many of the remains were placed into shallow graves and scattered in the nearby gullies and ravines. Consequently, scavenging animals dug up some of the bones and distributed them elsewhere (Reed and Wallace 2010). In the summer of 1859, Brevet Major J.H. Carleton with his regiment of First Dragoons arrived at the site to bury the remains of the victims with help from Captain Ruben P. Campbell and three additional companies of troops (Reed and Wallace 2010). After scouring the meadow for human remains, Major Carleton and his troops placed what they had found in a mass grave at the encampment site and built a monument constructed of loosely placed local basalt boulders with an inscribed large wooden cross at the top (Reed and Wallace 2010).

In May of 1864, the original monument had toppled and a replacement was constructed by the U.S. Army. In the years that followed, the monument was neglected and reduced to a small pile of rubble until 1931 when Frank Beckwith Sr. of Utah wrote several newspaper articles encouraging people to resurrect the monument. On August 25, 1932, local residents constructed a new monument at the same site as the previous two (Reed and Wallace 2010). In 1990, a monument located on top of Dan Sill Hill overlooking the encampment site and 1932 monument was constructed from a slab of granite inscribed with the known names of the victims. In 1999, the Mountain Meadows Association along with the LDS Church erected a new monument over the site of the 1932 monument and the original 1859 mass gravesite (Reed and Wallace 2010).

On June 23, 2011, portions of the Mountain Meadows Massacre site were designated an NHL by the Secretary of the Interior.

3.2.5.3 Study Methodology

Inventory

Baseline cultural resource data were collected within a 4-mile-wide study corridor (2 miles on either side of the reference centerline) for each alternative route. Baseline data consists of Class I data (previously recorded cultural resource sites on file with the Utah Division of State History, Utah SHPO in Salt Lake City), NRHP-listed properties, NHLs, and Class II data (reconnaissance-level field-survey data). The Class II survey was conducted only on alternative routes with less than 30 percent previous inventory.

Class I Literature Search

A Class I cultural resources inventory for the Project involved obtaining existing information on known sites and previous cultural resource projects and published sources from the files of a number of agencies

and institutions, including the SHPO, BLM, and other appropriate land-management agencies. In addition to this information, the NRHP and the county historic files of the SHPO also were reviewed to identify historic properties located within the study corridor.

Class II Cultural Resources Inventory

A Class II cultural resource inventory was conducted for areas where an insufficient body of data existed to complete analysis for comparing the alternative routes for the EIS. Class II data will be incorporated into the Class III inventory, where applicable. Those alternative route link segments identified as having less than 30 percent acceptable previous cultural resource survey coverage, as determined by the involved land-management agencies, were considered data gaps for the purposes of the present study methodology. These areas were divided into 1-mile-long segments and a random sample of 20 percent of those segments identified as data gaps were selected for inventory. Class II inventory segments were selected randomly from a GIS analysis of federal lands filtered to exclude areas where data gaps have not been identified. The selected segments were inventoried at a Class III level within a 350-foot-wide corridor. This inventory consisted of parallel transects spaced 15 meters apart, centered on the reference centerline along the alternate route. All sites located during the inventory were documented fully and will be reported in the Class II Cultural Resource Report.

Cultural Resource Sites Selected for Cultural Resource Visual Effects Study

In addition to identifying cultural resource sites and historic properties associated with alternative routes, a methodology has been developed to identify cultural resource sites that could be visually affected by the Project. Under ACHP guidelines, a visual effect must alter, directly or indirectly, a characteristic of that property that qualifies it for inclusion to the NRHP, and do so in a manner that would diminish that property's integrity of setting, feeling, and/or association (ACHP 2010).

Assessment of visual effects on historic properties is based in part on the NRHP evaluation of integrity. According to the NRHP guidelines, integrity is defined as the ability of an historic property to convey its own significance and evaluations of integrity must always be grounded in an understanding of a property's physical features and how they relate to its significance (NPS 1995:44). A historic property's integrity encompasses seven unique aspects: location, setting, design, material, feeling, workmanship, and association. Setting, feeling, and association are related closely to a property's physical environment and aesthetic character and help convey a property's historic character; as such, these aspects of integrity are considered visually sensitive. A historic property's setting is the physical environment of that property and refers to the character of the place in which the property played its historic role. A historic property's feeling and/or association is the property's own expression of the historic sense of a particular period of time and results from the presence of physical features of the property that, taken together, convey the property's historic character and association (NPS 1995:44-48).

Based on these considerations, all sites within the Class I 4-mile study corridor that meet the following criteria are considered visually sensitive:

- NHTs
- NHLs
- TCPs
- Historic properties listed on the NRHP
- Historic properties determined/recommended eligible to the NRHP under Criteria A, B, or C

In addition, BLM could include other site types as determined appropriate through Section 106 consultation with American Indian tribes, interested parties, or other cooperating agencies.

A summary of sites that could be visually adversely affected by the Project is presented in Section 3.2.5.4. It is important to note that for the purposes of the EIS, classification as a visually sensitive site does not equate with a visual impact. It is unknown at this time if visually sensitive sites will in fact be visually affected by the Project.

As required by the Programmatic Agreement (Appendix G), once a route is selected, the CRTG will develop a methodology, which will be reviewed by the cooperating agencies and approved by the BLM, for the Cultural Resources Visual Effects Study to be completed as part of the Class III studies. The results of the study will be reported in an addendum to the Class III Technical Report.

It should be noted that the cultural-visual study is a separate and unrelated study from the visual resource inventory and impact assessment based on the construction, operation, and maintenance of the proposed Project (refer to Section 3.2.8). The visual resource inventory and impact assessment were focused within a 6-mile-wide visual resource study corridor centered on the reference centerline for each alternative route under consideration within this EIS. Visual resources on BLM-administered lands are managed within the context of the Visual Resource Management (VRM) system as described in the *BLM Manual 8400 – Visual Resource Management*. The system includes a Visual Resource Inventory (VRI) of scenic values based on the following factors: (1) diversity of landscape elements that define and characterize landscapes in a given planning area (scenic quality); (2) public concern for the landscapes that make up a planning area (sensitivity levels); and (3) landscape visibility from public viewing locations (distance zones). The Scenery Management System (SMS) is used to manage visual resources on USFS-administered lands. SIOs are analyzed and prepared during the forest planning process using the SMS (Landscape Aesthetics) Manual. SIOs establish management goals and objectives (including appropriate levels of mitigation) for a given landscape based on desired future conditions. Consistency with SIOs is determined by evaluating modifications to scenic integrity generated by a project. Per guidance provided in both the Dixie and Fishlake National Forests LRMPs, as amended, a project is considered compliant with the forest plan unless the resulting scenic integrity would not meet the management objectives defined for the landscape crossed.

Impact Assessment and Mitigation Planning

As outlined in the Programmatic Agreement (Appendix G), direct and indirect impacts on cultural resources would be assessed after completion of the EIS and addressed in a treatment plan. For the purposes of this EIS, a cultural intensity assessment methodology was developed to identify and evaluate the potential for impacts on cultural resources associated with implementation of the alternative routes considered in this EIS. Once a route has been selected, the BLM would continue to consult with appropriate agencies, tribal governments, and consulting parties. A Class III inventory (intensive pedestrian survey) of the selected route and associated access roads, substations, and ancillary facilities would be conducted. All cultural resources identified during the intensive surveys would be evaluated for eligibility to the NRHP based on criteria set forth in the federal regulation 36 CFR 60.4. The results of the Class III inventory would be presented in a separate technical report. The final Class III Technical Report would facilitate BLM, in consultation with the SHPO, to identify historic properties and make determinations on eligibility of, and potential effects on, those properties. Following completion of the Class III Technical Report, a comprehensive treatment plan addressing the effects of the proposed undertaking on identified historic properties would be prepared and implemented in consultation with the BLM, SHPO, other involved agencies, and consulting parties.

Types of Potential Environmental Effects

The construction, operation, and maintenance of the Project could result in both direct and indirect effects on cultural resources related to the loss or degradation of prehistoric and historic archaeological sites. The types of potential impacts on archaeological sites include:

1. Direct and permanent ground disturbance of sites resulting in damage to intact surface and subsurface cultural materials, such as artifacts and features during construction of access roads, ancillary facilities, and tower locations

2. Direct and long-term visual and auditory intrusions, which could compromise aspects of site integrity, such as setting, feeling, and association, which are components of NRHP eligibility

3. Indirect and permanent disturbances of sites due to changes in public accessibility (e.g., unauthorized use of access roads)

Criteria for Assessing Intensity of Impacts

The cultural resource methodology for assessing the potential for impacts was developed in collaboration with the CRTG. The overall methodology involved a two-step process: (1) assignment of intensity levels and (2) calculation of overall intensity for each alternative route. The first step was to identify the extent of cultural resource intensity (described in the following) along each alternative based on the presence of known cultural resource sites. Criteria were developed to evaluate the extent of cultural resource intensity of each alternative route in 0.1-mile segments.

Cultural intensity levels are based on location of cultural resources within the Project area and were assigned a high, moderate, or low cultural intensity level using the following criteria:

High Cultural Intensity. Includes any cultural resource site (regardless of NRHP eligibility) within the proposed 350-foot cultural resource intensive pedestrian survey corridor in the Project APE (i.e., 175 feet on either side of the reference centerline). Based on NRHP eligibility, site complexity, and the location of these resources within the Project APE, this impact level will include three different categories:

a) Sites eligible for the NRHP that are more difficult to avoid by construction and avoidance may or may not eliminate adverse effects.

b) Sites eligible for the NRHP that are more easily avoided by construction and are expected to result in few, if any, adverse effects.

c) Sites not eligible for the NRHP; therefore, no adverse effects would occur to the sites.

Moderate Cultural Intensity. Includes any cultural resource site (regardless of NRHP eligibility) located within 500 feet of the proposed Project APE (i.e., between 175 and 675 feet from either side of the reference centerline).

Low Cultural Intensity. Includes any cultural resource site (regardless of NRHP eligibility) located more than 675 feet from the centerline up to the extent of the 4-mile-wide study corridor (i.e., to 10,560 feet on either side of the reference centerline).

This information was then compiled, and the length of each intensity level was calculated for each alternative route (refer to Table 3-47). Then, based on the natural and significant of the cultural resources present and the calculated mileages of cultural resource intensity, an overall assessment of cultural resource intensity was assigned for each alternative. It is important to note that the mileages of cultural resource intensity do not correlate directly with an equal number of miles in impacts on cultural resources. Rather, these calculations were used to identify potential initial impacts on cultural resources related to implementation of the Project without avoidance or other mitigation planning that would be addressed in the HPTP.

Data Gaps and Limitations

The baseline Class I and Class II data used in this study represent the most current information available regarding known cultural resources within the 4-mile-wide study corridors for each alternative. These data are being used for the purposes of the EIS analysis to assess the initial impacts on cultural resources along the alternatives. In this study, initial impacts on cultural resources are defined as those impacts that would occur to cultural resources without the application of mitigation measures such as avoidance or data recovery.

There are limitations of using the Class I and Class II data that should be noted. The Class I and Class II data represent only the *known* and *documented* cultural resources within the study corridors and are indicative of where cultural resource Class III intensive inventories have occurred. Without additional Class III intensive inventories, which would be required under the Programmatic Agreement (Appendix G) in compliance with the Section 106 process, the extent or lack of cultural resources along many miles of each alternative is not known for consideration in the EIS. Comparisons among the alternatives are also limited by the fact that each alternative has a different amount of previous Class III intensive survey coverage. For example, among the northern alternatives (N1 to N6), each of the six alternatives has been fairly well surveyed at a Class III intensive level; the least amount of survey conducted for an alternative is 46 percent (Alternative N1) and the most is 65 percent (Alternative N6). The southern alternatives (Alternatives S1 to S6), however, are far less equally balanced; less than 5 percent of Alternative S5 has been surveyed, while 93 percent of Alternative S2 has been surveyed.

The existing data also presents limitations in some instances. A large number of sites in the area under discussion were documented prior to implementation of Intermountain Antiquities Computer System, and the lack of relevant data on most site forms does not allow for interpretive discussions, even in general terms, or subsequent research. Many of the pre-Intermountain Antiquities Computer System documentations have neither NRHP recommendations nor any temporal or cultural affiliations. The available data allows little interpretation beyond the presence (or absence) of sites. Additionally, this data only relates to those areas where cultural resources surveys have been conducted. The absence of sites in areas where cultural resources surveys have not been conducted does not necessarily mean an absence of cultural resource sites in those locations. The locations are essentially data gaps. Class III cultural resource inventories include rerecording previously documented sites, as necessary, to meet the current recordation standards required by agencies and SHPO. The Class III inventory and all associated technical reports, including the HPTP (if needed), will be completed for the entire length of the selected route before construction of the Project begins, eliminating any data gaps that might exist along that route.

Effects Analysis

Assessment of Initial Impacts

Initial cultural resource intensity levels are the basis for assessing initial impacts on cultural resources associated with implementation of the Project. The initial cultural resource intensity levels were assigned using the previously presented criteria. Table 3-47 summarizes the initial cultural resource intensity levels that provided the basis for assessing initial impacts on cultural resources.

TABLE 3-47
SUMMARY OF ESTIMATED CULTURAL RESOURCE IMPACTS

Alternative Route[1]	Alternative length (miles)	Low Impacts[2]	Moderate Impacts[2]	High Impacts[2]
Alternative N1	120.6	98.8	10.2	11.6
Alternative N2	120.4	91.0	11.7	17.7
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	120.0	90.2	12.1	17.7
Alternative N3	117.2	68.1	19.6	29.5
Alternative N4	109.4	86.8	10.7	11.9
Alternative N5	106.2	63.9	18.6	23.7
Alternative N6 (Proponent's Preferred Alternative)	105.4	80.1	10.9	14.4
Alternative S1	55.9	52.5	0.9	2.5
Alternative S2	49.6	41.5	2.1	6.0
Alternative S3	57.4	54.5	1.9	1.0
Alternative S4	48.9	47.4	0.4	1.1
Alternative S5 (Proponent's Preferred Alternative)	59.0	55.0	0.9	3.1
Alternative S6	61.8	58.2	1.9	1.7
Alternative S7	49.8	44.7	2.5	2.6
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative)	49.8	43.6	2.5	3.7

NOTES:
[1]Alternative routes pass near a key cultural resource, as identified in scoping (refer to the Sensitive Cultural Resources and Issues Identified During Scoping subheading).
[2]All impacts are estimated as miles crossed.

Mitigation Planning

In consultation with appropriate land-management agencies and SHPO and in accordance with the Programmatic Agreement (Appendix G) entered into by the Proponent, BLM, USFS, and the State of Utah (Section 3.2.5), specific mitigation measures for cultural resources would be developed and implemented to mitigate any identified adverse impacts. These may include Project modifications to avoid adverse impacts, monitoring of construction activities, and data recovery studies.

Impacts on significant cultural resource properties can be reduced effectively and, in some instances, eliminated through Project planning. Avoidance is the preferred mitigation for cultural resources. Spanning of the sites and the selective alignment of new access roads likely would provide adequate avoidance and reduce the impacts on cultural properties. If avoidance is not possible, other mitigation efforts would be necessary. All mitigation efforts will be in accordance with the requirements of the Programmatic Agreement negotiated for this Project and documented in a HPTP. The HPTP is confidential and, as identified in the Programmatic Agreement, will provide information on the following:

- A brief description of the Proposed Action
- A list of the properties where data recovery is to be carried out
- A list of properties that will require archaeological monitoring during construction
- An archaeological construction monitoring plan
- Research questions to be addressed
- Methods to be used during fieldwork for data recovery
- A cultural resource unanticipated discovery plan
- Methods to be used during analysis
- Reporting and curation of artifacts
- Schedule for the submission of progress reports
- Recommendations for treatment of cultural resources during operation and maintenance of the Project
- Qualifications of consultants employed to undertake the work
- Training protocols for contractors

3.2.5.4 Results

Sites and Historic Properties

Class I and Class II Inventory

The Class I inventory resulted in the identification of 1,847 previously recorded cultural resources within the 4-mile-wide study corridor. The sites consist of 1,435 prehistoric sites, 287 historic sites, and 125 multi-component sites (prehistoric and historic components). The Class II inventory resulted in the identification of 22 newly recorded cultural resources within the 350-foot APE study corridor. The sites consist of 19 prehistoric sites, 1 historic site, and 2 multi-component sites (prehistoric and historic components). These cultural resources include prehistoric sites such as artifact scatters, lithic quarries, storage sites, short- and long-term habitation sites, rock shelter and cave sites, rock art sites, burials, and villages. Historic sites largely comprise artifact scatters/dumps, short- and long-term habitation sites, rock art, trails and roads, ditches and canals, utility lines, railroads, cemeteries, and town sites. These sites encompass a broad range of cultural occupations spanning the Paleoindian Period to the historical period (mid-20th century). Table 3-48 provides a summary of the Class I and Class II inventory data for each alternative route, and the inventory results for each alternative route is summarized in subsequent paragraphs.

Historic Properties Listed on the National Register of Historic Places

As previously stated, a search of the NRHP records identified 12 historic properties listed on the NRHP within the study area. This includes 11 historic buildings and 1 archaeological site, the Mountain Meadows Historic Site. Although the Mountain Meadows Massacre NHL was listed on the NRHP at the same time as NHL designation in 2011, the NRHP database has not been updated to reflect that. The NHL is thus not included in the NRHP counts, but is identified separately.

TABLE 3-48
CULTURAL RESOURCES CLASS I AND CLASS II INVENTORY DATA

Alternative Route	Intensive Pedestrian Inventory Status		National Register Eligible Sites			Not Eligible Sites			Unevaluated Sites			Total Number of Sites
	Percent Inventoried	Percent Not Inventoried	Number of Prehistoric Sites	Number of Historic Sites	Number of Multi-component Sites	Number of Prehistoric Sites	Number of Historic Sites	Number of Multi-component Sites	Number of Prehistoric Sites	Number of Historic Sites	Number of Multi-component Sites	
Alternative N1	46	54	231	51	40	210	101	14	118	7	9	781
Alternative N2	49	51	288	50	40	375	127	20	144	8	12	1,064
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	49	51	289	50	40	374	127	20	146	8	12	1,066
Alternative N3	59	41	324	41	45	409	132	28	142	7	11	1,139
Alternative N4	53	47	191	45	30	305	96	7	128	8	5	815
Alternative N5	64	36	227	36	35	339	100	15	126	7	4	889
Alternative N6 (Proponent's Preferred Alternative)	65	35	225	36	35	333	99	14	127	7	4	880
Alternative S1	47	53	35	9	4	36	13	2	42	1	1	143
Alternative S2	93	7	48	11	8	60	19	3	33	0	1	183
Alternative S3	78	22	32	8	8	52	19	3	85	2	1	210
Alternative S4	70	30	48	11	8	60	18	3	28	0	1	177
Alternative S5 (Proponent's Preferred Alternative)	5	95	35	8	4	44	17	1	42	1	0	152
Alternative S6	27	73	34	8	8	60	24	2	85	2	0	223
Alternative S7	71	29	48	11	8	60	19	3	33	0	1	183
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative)	71	29	48	11	8	60	19	3	33	0	1	183

The Old Spanish NHT is administered by the BLM in cooperation with the NPS, working with other federal, state, and local government agencies, as well as private landowners. The designation as an NHT requires that BLM and USFS ensure project-level decisions comply with management prescriptions established in relevant land use plans (e.g., BLM RMPs or USFS LRMPs).

One segment of the Old Spanish NHT has been formally recorded as a cultural resource site within the Project area and is included in the Class I data and analysis. It should be noted, however, that this recorded segment is not listed on the NRHP. This 0.5-mile-long trail segment has been directly affected by two pipeline corridors. Extant segments of the Old Spanish NHT are rare and difficult to identify with confidence. Several later historic transportation corridors (post-1850) generally follow the route traversed by the Old Spanish NHT and have been documented in the Project area. It is likely much of the Old Spanish NHT was subsumed into the local historic wagon road network as the area was settled prior to the turn-of-the-century. Though some evidence remains of these early wagon roads, many have been replaced subsequently by paved roads or destroyed through modern development. The highest probability for the identification of extant remains of the Old Spanish NHT exists in remote undeveloped areas along the historic trail route.

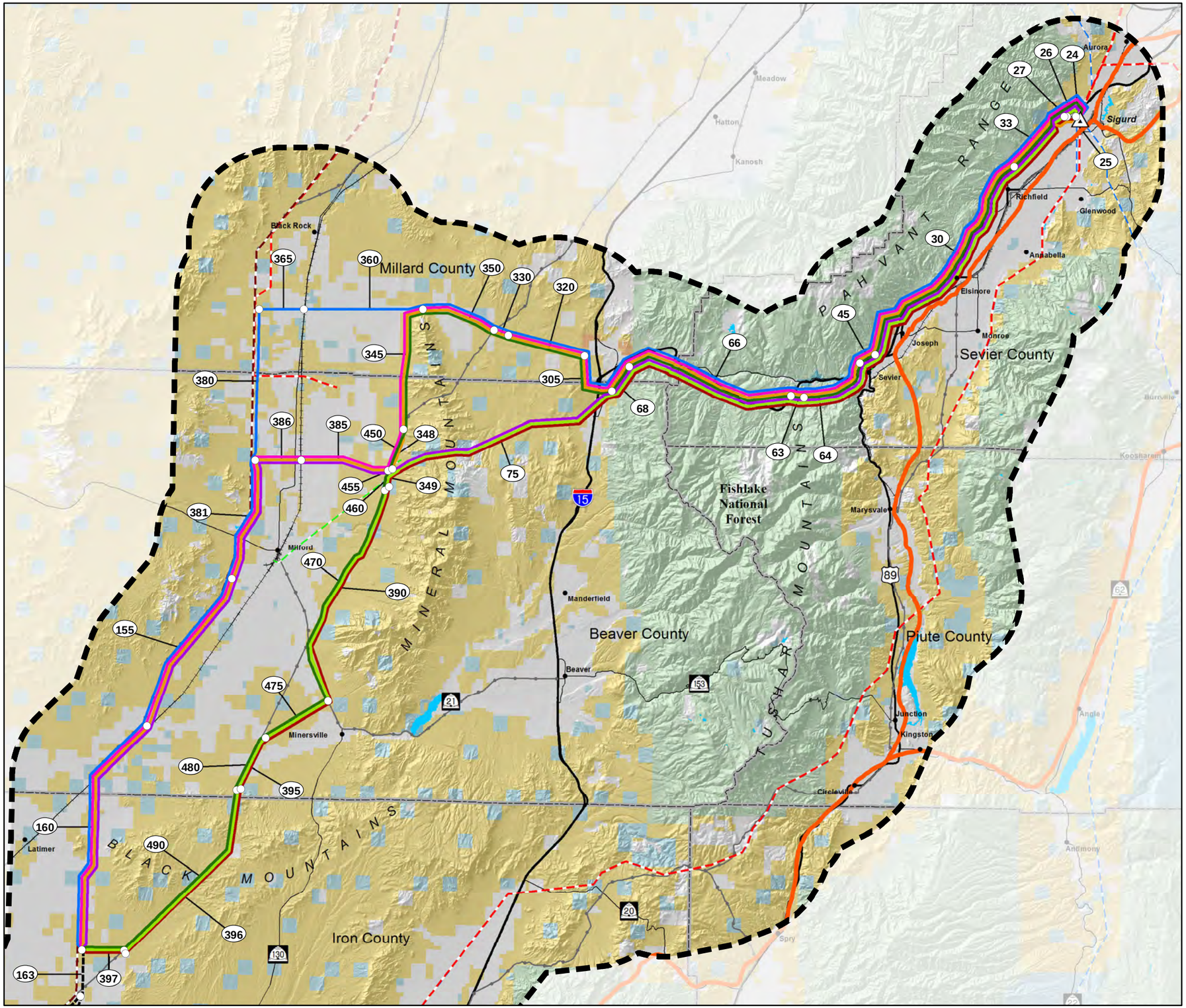
If a route is selected, field visits will be conducted along the Old Spanish Trail route in all locations where intact trail segments could remain and be visible in the form of swales, ruts, and so forth. If physical evidence of the trail is identified, the trail segment will be documented as an archaeological site, evaluated for NRHP eligibility, evaluated for project affect, and reported in the Class III Technical Report.

National Historic Landmark

One NHL is located within the Project area (Map 3-6). As discussed in the section Sensitive Cultural Resources and Issues Identified During Scoping, a portion of the Mountain Meadows Historic Site has been designated an NHL. A designation as an NHL requires BLM and USFS, “to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm to any National Historic Landmark that may be affected directly and adversely by an undertaking” (36 CFR 800.10). Additionally, the designation as an NHL requires BLM and USFS ensure project-level decisions comply with management prescriptions established in relevant land use plans (e.g., BLM RMPs, USFS LRMPs, or NPS general management plans).

Cultural Resource Sites with Visual Sensitivity

The cultural visual resource study identified 96 visually sensitive cultural resource sites. These sites are eligible for, or listed on, the NRHP listing under criteria A, B, or C and meet the integrity criteria discussed in Section 3.2.5.3. Prehistoric sites that meet the criteria include cave complexes and rock shelters, as well as rock art. Historic sites that meet the criteria include town sites, homesteads/farmsteads, inscriptions, cemeteries, mines, and General Land Office linear features (e.g., railroads, canals, roads and trails, and utility lines).



MAP 3-4
NORTHERN ALTERNATIVE ROUTES SIGURD SUBSTATION TO SOUTH OF THE BLACK MOUNTAINS OLD SPANISH NATIONAL HISTORIC TRAIL

OLD SPANISH NATIONAL HISTORIC TRAIL

- Old Spanish National Historic Trail

ALTERNATIVE ROUTES

- N1
- N2
- N2-A - Agency Preferred Alternative
- N3
- N4
- N5
- N6 - Proponent's Preferred Alternative
- Southern Alternatives

GENERAL REFERENCE FEATURES

- Project Study Area
- Link Number
- Link Node
- Bureau of Land Management
- Indian Reservation
- National Park Service
- Private
- State of Utah Trust Lands
- State Park
- U.S. Forest Service
- Substation
- 500kV +/- DC Transmission Line
- 345kV Transmission Line
- 230 to 287kV Transmission Line
- 138 to 161kV Transmission Line
- Pipeline
- County
- Interstate & U.S. Highway
- State Highway
- Railroad
- Lake or Reservoir

SOURCES:
Old Spanish National Historic Trail: BLM, 2002
Transportation: Streetmap 50K to 250K, 2008
Land Jurisdiction: BLM State Office Utah, 2009
POWERmap, powermap.platts.com
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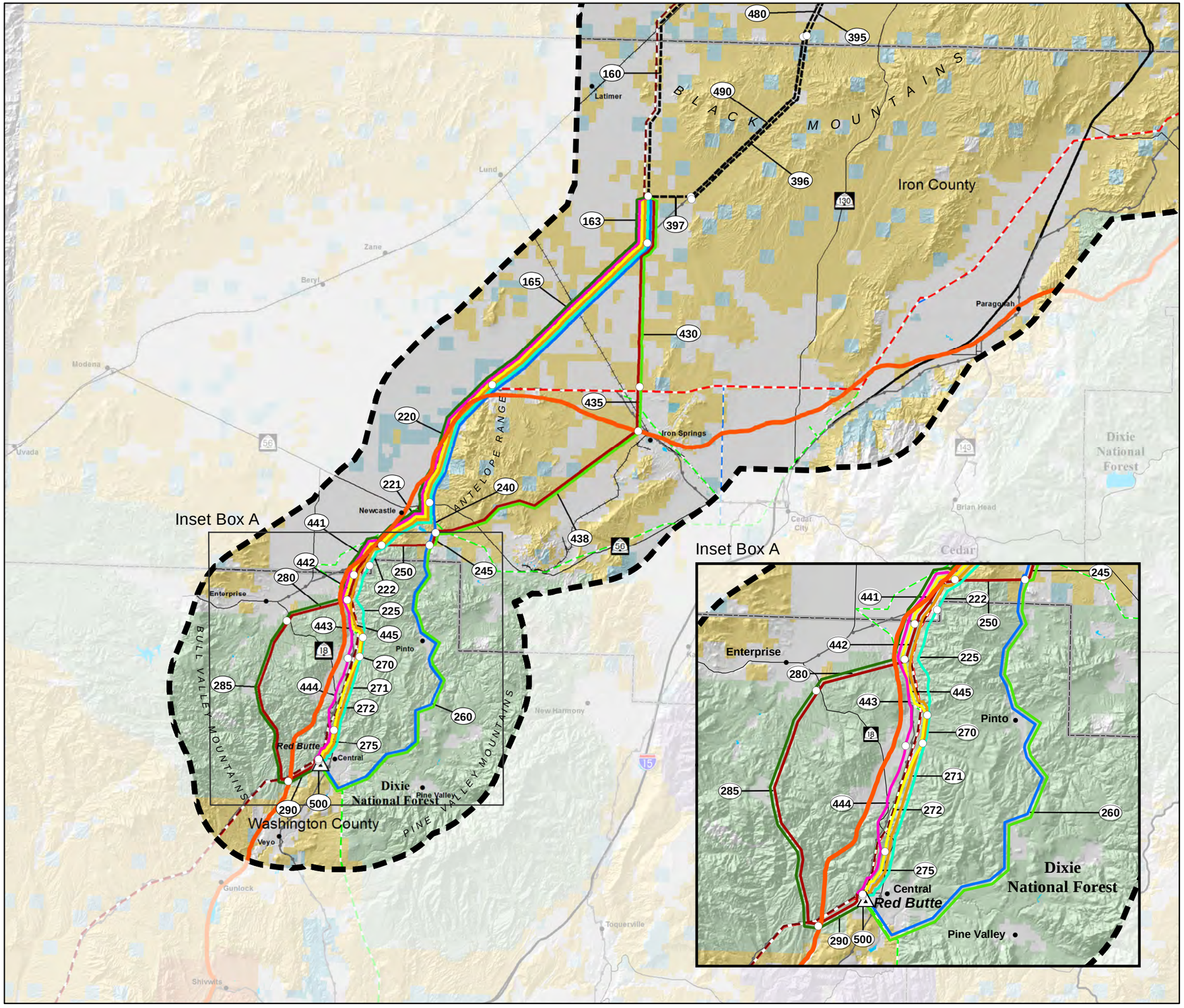
NOTES:
Route colors are representative of the centerline, but multiple options are being considered.

0 2.5 5 10 15 20 Miles

October 2012 **Final EIS**

SIGURD TO RED BUTTE NO. 2 345kV TRANSMISSION PROJECT

Path: Q:\SRB\FEIS\Apps\FEIS_2_Apps\Volume_1_Old_Spanish_Trail_North_1117.mxd



MAP 3-5
SOUTHERN ALTERNATIVE ROUTES SOUTH OF THE BLACK MOUNTAINS TO RED BUTTE SUBSTATION
OLD SPANISH NATIONAL HISTORIC TRAIL

OLD SPANISH NATIONAL HISTORIC TRAIL

- Old Spanish National Historic Trail

ALTERNATIVE ROUTES

- S1
- S2
- S3
- S4
- S5 - Proponent's Preferred Alternative
- S6
- S7
- S7-A - Agency Preferred Alternative
- Northern Alternatives

GENERAL REFERENCE FEATURES

- Project Study Area
- Link Number
- Link Node
- Bureau of Land Management
- Indian Reservation
- National Park Service
- Private
- State of Utah Trust Lands
- State Park
- U.S. Forest Service
- Substation
- 500kV +/- DC Transmission Line
- 345kV Transmission Line
- 230 to 287kV Transmission Line
- 138 to 161kV Transmission Line
- Pipeline
- County
- Interstate & U.S. Highway
- State Highway
- Railroad
- Lake or Reservoir

SOURCES:
Old Spanish National Historic Trail: BLM, 2002
Transportation: Streetmap 50K to 250K, 2008
Land Jurisdiction: BLM State Office Utah, 2009
POWERmap, powermap.platts.com
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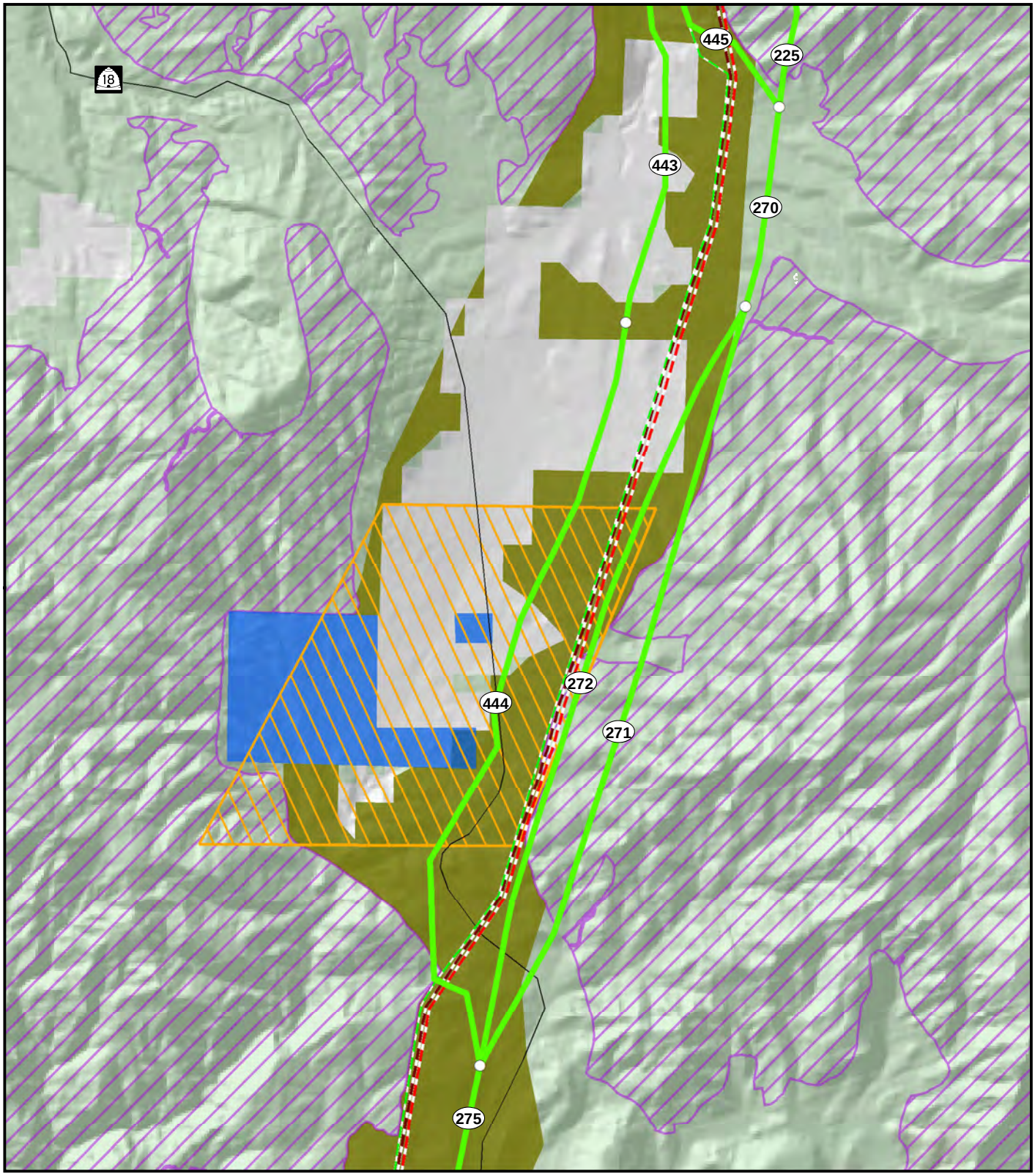
NOTES:
Route colors are representative of the centerline, but multiple options are being considered.

0 2.5 5 10 15 20 Miles

October 2012 — Final EIS

SIGURD TO RED BUTTE NO. 2 345kV TRANSMISSION PROJECT

Path: Q:\SRB\FEIS\Apps\FEIS_2_Apps\Volume_1_Old_Spanish_Trail_South_1117.mxd



Legend

MOUNTAIN MEADOWS

- Mountain Meadows Historic Site
- Mountain Meadows Massacre Site National Historic Landmark

GENERAL REFERENCE FEATURES

- Route Centerline
- # Link Number
- Link Node
- 500kV +/- DC Transmission Line
- 345kV Transmission Line
- 138 to 161kV Transmission Line
- West-wide Energy Corridor
- Inventoried Roadless Area
- State Highway
- Private
- U.S. Forest Service

MAP 3-6
OVERVIEW OF MOUNTAIN MEADOWS AREA

SIGURD TO RED BUTTE NO. 2
345kV TRANSMISSION PROJECT

October 2012
Final EIS

0 0.5 1 2 Miles

Cultural Resource Intensity

Based on the presence and locations of known cultural resources identified during the Class I and Class II inventories, impacts on cultural resources generally were rated as low-to-moderate throughout the Project area. Design features of the Proposed Action (refer to Table 2-6) incorporated into the Project description would reduce impacts further. The selected route would be subject to Class III (intensive) investigations and a comprehensive treatment plan addressing the effects of the proposed undertaking on historic properties would be prepared and implemented prior to Project construction. A summary of the estimated impacts associated with each alternative route is presented in Table 3-47.

No Action Alternative

Under this alternative, the environment would remain as it presently exists. This option would forego the opportunity to develop cultural resource inventories along the route approved for construction and any collection of cultural resource data that might be discovered during Project construction.

Northern – Sigurd Substation to South of the Black Mountains

Alternative N1 – Black Rock Road to IPP North of Milford Wind Farm

Affected Environment

Cultural Sites

A total of 781 sites were identified in the Class I and Class II inventories conducted for Alternative N1, including 559 prehistoric sites, 159 historic sites, and 63 multi-component sites (Table 3-48). Eighty-seven percent (n=679) are located in the area classified as the low cultural resource intensity zone, meaning these sites are outside the Project APE. Eight percent (n=59) are located in the area classified as the moderate cultural resource intensity zone, meaning these sites are located in an area outside the Project APE but adjacent to the boundary of the Project APE. Five percent (n=43) are located within the Project APE, including 18 prehistoric lithic scatters and campsites, 7 historic linear sites (e.g., road and railroad segments), 10 historic trash scatters, 6 prehistoric lithic scatters and historic trash scatters, 1 historic farmstead, and 1 Fremont rock art site.

In addition, although no segments have been formally documented along Alternative N1, the Old Spanish NHT is located within the study area. The trail route is located in a low cultural resource intensity zone, east and south of the alternative, near the communities of Sigurd, Richfield, Elsinore, and Joseph, Utah.

Historic Properties Listed in the National Register of Historic Places

The NRHP records search identified 11 historic properties along Alternative N1. All of these historic properties are located within the low cultural resource intensity zone, beyond the Project APE. The properties, and the estimated times they were constructed or completed, are as follows: Cove Fort (1867), Elsinore Sugar Factory (early 1900s), Elsinore White Rock Schoolhouse (1896), Ralph Ramsay pioneer home (1873 and 1874), Richfield Carnegie Library (1913), Richfield U.S. Post Office (early 1900s), Joseph William Parker Home (1875), Glenwood Cooperative Store (1878), Young Block building (1907), Jens Larson Jenson Limekiln (1903), and Sevier Ward Church (1930).

Cultural Visual Study

A total of 91 historic properties associated with Alternative N1 are identified as visual sensitive cultural resources. These sites include 11 NRHP-listed properties: the Star Cemetery, the Sulphurdale Processing Plant, mine sites associated with the North Star Mining District, homesteads or farmsteads, canals, General Land Office roads, railroads, and a rock art site. In addition, the Old Spanish NHT is a visually sensitive cultural resource along this alternative.

Environmental Effects

Of the alternative routes considered for the Northern – Sigurd Substation to south of the Black Mountains segment, Alternative N1 has the fewest miles of high cultural resource intensity. It has 11.6 miles of high, 10.2 miles of moderate, and 98.8 miles of low cultural resource intensity (Table 3-47). As a reminder, it is important to note that the mileages of cultural resource intensity do not correlate directly with an equal number of miles in impacts on cultural resources. The 11.6 miles of high cultural intensity is the result of 43 known sites located within the Project APE along the alternative. Potential impacts on these sites could be direct and permanent ground disturbance associated with the construction of tower locations and access roads and indirect and permanent disturbances due to changes in public accessibility (i.e., the introduction of new or improved access roads).

Key resources along this alternative are the 11 NRHP-listed properties and the Old Spanish NHT. These resources, however, are located beyond the Project APE.

If this alternative were selected, a complete Class III intensive pedestrian inventory would be conducted along the entire alternative as part of the Class III study. All sites located in the high intensity cultural resource zone would be documented and evaluated for eligibility to the NRHP. The potential for the Project to cause adverse and visual effects on sites would be evaluated. All site information would be provided in the Class III inventory report that would be reviewed by the agencies and the SHPO. The agencies and the SHPO would then determine if the Project has the potential to have an adverse effect (i.e., direct and permanent ground disturbance, direct and long-term visual and auditory intrusions, and indirect and permanent disturbances due to changes in public accessibility) on these sites. Prior to construction activities in the area, any adverse effects on the sites would need to be resolved per 36 CFR Part 800.6.

Alternative N2 – Black Rock Road to IPP South of Milford Wind Farm

Affected Environment

Cultural Sites

A total of 1,064 sites were identified by the Class I and II inventoried conducted for Alternative N2, including 807 prehistoric sites, 185 historic sites, and 72 multi-component sites (Table 3-48). Eighty-eight percent (n=936) are located in the area classified as the low cultural resource intensity zone, meaning these sites are located outside the Project APE. Approximately 7 percent (n=71) are located in the area classified as the moderate cultural resource intensity zone, meaning these sites are located in an area outside the Project APE but adjacent to the boundary of the Project APE. Five percent (n=57) are located within the Project APE, including 21 prehistoric lithic scatters and campsites, 11 historic trash scatters, 10 historic linear sites (e.g., road and railroad segments), 7 prehistoric lithic scatters and historic trash scatters, 3 prehistoric lithic quarries, 1 prehistoric lithic scatter and historic homestead, 1 historic

farmstead, 1 historic mine, 1 prehistoric habitation and historic artifact scatter, and 1 Fremont rock art site.

In addition, although no segments have been formally documented along Alternative N2, the Old Spanish NHT is located in proximity to the alternative. The trail route is located east and south of the alternative, near the communities of Sigurd, Richfield, Elsinore, and Joseph, Utah.

Historic Properties Listed in the National Register of Historic Places

Alternative N2 is the same as Alternative N1.

Cultural Visual Study

A total of 90 historic properties associated with Alternative N2 are identified as visually sensitive. cultural resources. The site types are the same as Alternative N1. In addition, the Old Spanish NHT is a visually sensitive cultural resource along this alternative.

Environmental Effects

Of the alternative routes considered for the Northern – Sigurd Substation to south of the Black Mountains segment, Alternative N2 has fewer miles of high cultural resource intensity than two other alternatives (N3 and N5). It has 17.7 miles of high, 11.7 miles of moderate, and 91.0 miles of low cultural resource intensity (Table 3-47). As a reminder, it is important to note that the mileages of cultural resource intensity do not correlate directly with an equal number of miles in impacts on cultural resources. The 17.7 miles of high cultural intensity is a result of 57 known sites within the Project APE along the alternative. Potential impacts on these sites could be direct and permanent ground disturbance associated with the construction of tower locations and access roads and indirect and permanent disturbances due to changes in public accessibility (i.e., the introduction of new or improved access roads).

Key resources along this alternative are 11 NRHP-listed properties and the Old Spanish NHT. All of these properties are located in the low cultural resource intensity zone, beyond the Project APE. The alternative, however, bisects the two Mineral Mountains obsidian sources as identified in the Class I data. The archaeological boundaries of each represent a combination of the geological extent of the obsidian flows and the presence of discrete cultural site locations. However, the origination points of the two obsidian flows are located in the low cultural resource intensity zone, beyond the Project APE. Potential impacts on these sites could be direct and permanent ground disturbance associated with the construction of tower locations and access roads, as well as indirect and permanent disturbances due to changes in public accessibility (i.e., the introduction of new or improved access roads).

If this alternative were selected, the same procedures outlined in Alternative N1 would be employed.

Alternative N2-A (Route Variation of Alternative N2) – Black Rock Road to IPP South of Milford Wind Farm 1,500 Feet East of Kern River Pipeline (Agency Preferred Alternative)

Affected Environment

Cultural Sites

A total of 1,066 sites were identified by the Class I and Class II inventories conducted for Alternative N2-A, including 809 prehistoric sites, 185 historic sites, and 72 multi-component sites (Table 3-48). Eighty-seven percent (n=930) are located in the area classified as the low cultural resource intensity zone, meaning these sites are located outside the Project APE. Seven percent (n=79) are located in the area classified as the moderate cultural resource intensity zone, meaning these sites are located in an area outside the Project APE but adjacent to the boundary of the Project APE. Approximately 5 percent (n=57) are located within the Project APE, including 22 prehistoric lithic scatters and campsites, 11 historic trash scatters, 9 historic linear sites (e.g., road and railroad segments), 6 prehistoric lithic scatters and historic trash scatters, 3 prehistoric lithic quarries, 1 prehistoric lithic scatter and historic homestead, 1 historic farmstead, 1 historic mine, 1 prehistoric habitation and historic trash scatter, 1 prehistoric quarry, and 1 Fremont rock art site.

In addition, although no segments have been formally documented along Alternative N2-A, the Old Spanish NHT is located in proximity to the alternative. The trail route is located east and south of the alternative, near the communities of Sigurd, Richfield, Elsinore, and Joseph, Utah.

Historic Properties Listed in the National Register of Historic Places

Alternative N2-A is the same as Alternative N1.

Cultural Visual Study

A total of 90 historic properties associated with Alternative N2-A were identified as visually sensitive cultural resources. The site types are the same as Alternative N1. In addition, the Old Spanish NHT is a visually sensitive cultural resource along this alternative.

Environmental Effects

Of the alternative routes considered for the Northern – Sigurd Substation to south of the Black Mountains segment, Alternative N2-A has fewer miles of high cultural resource intensity than two other alternatives (N3 and N5). It has 17.7 miles of high, 12.1 miles of moderate, and 90.2 miles of low cultural resource intensity (Table 3-47). As a reminder, it is important to note that the mileages of cultural resource intensity do not correlate directly with an equal number of miles in impacts on cultural resources. The 17.7 miles of high cultural intensity is a result of 57 known cultural resource sites within the Project APE along the alternative. Potential impacts on these sites could be direct and permanent ground disturbance associated with the construction of tower locations and access roads and indirect and permanent disturbances due to changes in public accessibility (i.e., the introduction of new or improved access roads).

Key resources along this alternative are the same as Alternative N2.

If this alternative is selected, the same procedures outlined in Alternative N1 would be employed.

Alternative N3 – Black Rock Road Parallel to Kern River Pipeline

Affected Environment

Cultural Sites

A total of 1,139 sites were identified by the Class I and Class II inventories conducted for Alternative N3, including 875 prehistoric sites, 180 historic sites, and 84 multi-component sites (Table 3-48). Eighty-five percent (n=966) are located in the area classified as the low cultural resource intensity zone, meaning these sites are located outside the Project APE. Approximately 7 percent (n=78) are located in the area classified as the moderate cultural resource intensity zone, meaning these sites are located in an area outside the Project APE but adjacent to the boundary of the Project APE. Eight percent (n=95) are located within the Project APE, including 40 prehistoric lithic scatters and campsites, 17 historic linear sites (e.g., road and railroad segments), 14 historic trash scatters, 12 prehistoric lithic scatters and historic trash scatters, 4 prehistoric lithic quarries, 2 prehistoric habitation sites and historic trash scatters, 2 historic habitation sites, 1 historic farmstead, 1 historic mine, 1 prehistoric lithic scatter and historic homestead, and 1 Fremont rock art site.

In addition, although no segments have been formally documented along Alternative N3, the Old Spanish NHT is located in proximity to the alternative. The trail route is located east and south of the alternative, near the communities of Sigurd, Richfield, Elsinore, and Joseph, Utah.

Historic Properties Listed in the National Register of Historic Places

Alternative N3 is the same as Alternative N1.

Cultural Visual Study

A total of 78 historic properties associated with Alternative N3 were identified as visually sensitive cultural resources. The site types are the same as Alternative N1. In addition, the Old Spanish NHT is a visually sensitive cultural resource along this alternative.

Environmental Effects

Of the alternative routes considered for the Northern – Sigurd Substation to south of the Black Mountains segment, Alternative N3 has the highest amount of high cultural resource intensity. It has 29.5 miles of high, 19.6 miles of moderate, and 68.1 miles of low cultural resource intensity (Table 3-47). As a reminder, it is important to note that the mileages of cultural resource intensity do not correlate directly with an equal number of miles in impacts on cultural resources. The 29.5 miles of high cultural intensity is a result of 95 known sites within the Project APE along the alternative. Potential impacts on these sites could be direct and permanent ground disturbance associated with the construction of tower locations and access roads and indirect and permanent disturbances due to changes in public accessibility (i.e., the introduction of new or improved access roads).

Key resources along this alternative are the same as those for Alternative N2.

If this alternative is selected, the same procedures outlined in Alternative N1 would be employed.

Alternative N4 – Mineral Mountains to IPP South of Milford Wind Farm

Affected Environment

Cultural Sites

A total of 815 sites were identified by the Class I and Class II inventories conducted for Alternative N4, including 624 prehistoric sites, 149 historic sites, and 42 multi-component sites (Table 3-48). Eighty-seven percent (n=710) are located in the area classified as the low cultural resource intensity zone, meaning these sites are located outside the Project APE. Eight percent (n=62) are located in the area classified as the moderate cultural resource intensity zone, meaning these sites are located in an area outside the Project APE. Five percent (n=43) are located within the Project APE, including 14 prehistoric lithic scatters and campsites, 9 historic trash scatters, 5 historic linear sites (e.g., road and railroad segments), 6 prehistoric lithic quarries, 4 prehistoric lithic scatters and historic trash scatters, 1 historic farmstead, 1 prehistoric lithic scatter and historic homestead, 1 prehistoric lithic quarry and historic campsite, 1 prehistoric habitation and historic trash scatter, and 1 Fremont rock art site.

In addition, although no segments have been formally documented along Alternative N4, the Old Spanish NHT is located in proximity to the alternative. The trail route is located east and south of the alternative, near the communities of Sigurd, Richfield, Elsinore, and Joseph, Utah.

Historic Properties Listed in the National Register of Historic Places

Alternative N4 is the same as Alternative N1.

Cultural Visual Study

A total of 86 historic properties associated with Alternative N4 were identified as visually sensitive cultural resources. The site types are the same as Alternative N1. In addition, the Old Spanish NHT is a visually sensitive cultural resource along this alternative.

Environmental Effects

Of the alternative routes considered for the Northern – Sigurd Substation to south of the Black Mountains segment, Alternative N4 has the second fewest amount of high cultural resource intensity. It has 11.9 miles of high, 10.7 miles of moderate, and 86.8 miles of low cultural resource intensity (Table 3-47). As a reminder, it is important to note that the mileages of cultural resource intensity do not correlate directly with an equal number of miles in impacts on cultural resources. The 11.9 miles of high cultural intensity is a result of 43 known sites within the Project APE along the alternative. Potential impacts on these sites could be direct and permanent ground disturbance associated with the construction of tower locations and access roads and indirect and permanent disturbances due to changes in public accessibility (i.e., the introduction of new or improved access roads).

Key resources along this alternative are the same as Alternative N2.

If this alternative is selected, the same procedures outlined in Alternative N1would be employed.

Alternative N5 – Mineral Mountains Parallel to Kern River Pipeline

Affected Environment

Cultural Sites

A total of 889 sites were identified by the Class I and Class II inventories conducted for Alternative N5, including 692 prehistoric sites, 143 historic sites, and 54 multi-component sites (Table 3-48). Eighty-three percent (n=74) are located in the area classified as the low cultural resource intensity zone, meaning these sites are located outside the Project APE. Eight percent (n= 69) are located in the area classified as the moderate cultural resource intensity zone, meaning these sites are located in an area outside the Project APE but adjacent to the boundary of the Project APE. Some of these sites could fall within the Project APE. Nine percent (n=80) are located within the Project APE, including 32 prehistoric lithic scatters and campsites, 14 historic linear sites (e.g., road and railroad segments), 12 historic trash scatters, 9 prehistoric lithic scatters and historic trash scatters, 6 prehistoric quarries, 2 prehistoric habitations and historic campsites, 1 historic habitation, 1 historic farmstead, 1 prehistoric quarry and historic campsite, 1 prehistoric campsite and historic homestead, and 1 Fremont rock art site.

In addition, although no segments have been formally documented along Alternative N5, the Old Spanish NHT is located in proximity to the alternative. The trail route is located east and south of the alternative, near the communities of Sigurd, Richfield, Elsinore, and Joseph, Utah.

Historic Properties Listed in the National Register of Historic Places

Alternative N5 is the same as Alternative N1.

Cultural Visual Study

A total of 74 historic properties associated with Alternative N5 were identified as visually sensitive cultural resources. The site types are the same as Alternative N1. In addition, the Old Spanish NHT is a visually sensitive cultural resource along this alternative.

Environmental Effects

Of the alternative routes considered for the Northern – Sigurd Substation to south of the Black Mountains segment, Alternative N5 has the highest amount of high cultural resource intensity. It has 23.7 miles of high, 18.6 miles of moderate, and 63.9 miles of low cultural resource intensity (Table 3-47). As a reminder, it is important to note that the mileages of cultural resource intensity do not correlate directly with an equal number of miles in impacts on cultural resources. The 23.7 miles of high cultural intensity is a result of 80 known sites within the Project APE along the alternative. Potential impacts on these sites could be direct and permanent ground disturbance associated with the construction of tower locations and access roads, and indirect and permanent disturbances due to changes in public accessibility (i.e., the introduction of new or improved access roads).

Key resources along this alternative are the same as those for Alternative N2.

If this alternative is selected, the same procedures outlined in Alternative N1 would be employed.

Alternative N6 – Mineral Mountains 1,500 Feet East of Kern River Pipeline (Proponent's Preferred Alternative)

Affected Environment

Cultural Sites

A total of 880 sites were identified by the Class I and Class II inventories conducted for Alternative N6, including 685 prehistoric sites, 142 historic sites, and 53 multi-component sites (Table 3-48). Eighty-seven percent (n=763) are located in the area classified as the low cultural resource intensity zone, meaning these sites are located outside the Project APE. Approximately 7 percent (n=65) are located in the area classified as the moderate cultural resource intensity zone, meaning these sites are located in an area outside the Project APE but adjacent to the boundary of the Project APE. Six percent (n=52) are located within the Project APE, including 20 prehistoric lithic scatters and campsites, 9 historic linear sites (e.g., road and railroad segments), 8 historic trash scatters, 5 prehistoric lithic scatters and historic trash scatters, 3 prehistoric quarries, 1 historic farmstead, 1 prehistoric habitation and historic artifact scatter, 1 prehistoric quarry and historic campsite, 1 prehistoric campsite and historic homestead, and 2 Fremont rock art sites.

In addition, although no segments have been formally documented along Alternative N6, the Old Spanish NHT is located in proximity to the alternative. The trail route is located east and south of the alternative, near the communities of Sigurd, Richfield, Elsinore, and Joseph, Utah.

Historic Properties Listed in the National Register of Historic Places

Alternative N6 is the same as Alternative N1.

Cultural Visual Study

A total of 74 historic properties associated with Alternative N6 were identified as visually sensitive cultural resources. The site types are the same as Alternative N1. In addition, the Old Spanish NHT is a visually sensitive cultural resource along this alternative.

Environmental Effects

Of the alternative routes considered for the Northern – Sigurd Substation to south of the Black Mountains segment, Alternative N6 has the third fewest miles of high cultural resource intensity. It has 14.4 miles of high, 10.9 miles of moderate, and 80.1 miles of low cultural resource intensity (Table 3-47). As a reminder, it is important to note that the mileages of cultural resource intensity do not correlate directly with an equal number of miles in impacts on cultural resources. The 14.4 miles of high cultural intensity is a result of 52 known sites within the Project APE along the alternative. Potential impacts on these sites could be direct and permanent ground disturbance associated with the construction of tower locations and access roads and indirect and permanent disturbances due to changes in public accessibility (i.e., the introduction of new or improved access roads).

Key resources along this alternative are the same as those for Alternative N2.

If this alternative is selected, the same procedures outlined in Alternative N1 would be employed.

Southern Area – South of the Black of the Mountains to Red Butte Substation

Alternative S1 – Pinto Creek

Affected Environment

Cultural Sites

A total of 143 sites were identified by the Class I and Class II inventories conducted for Alternative S1, including 113 prehistoric sites, 23 historic sites, and 7 multi-component sites (Table 3-48). Eighty percent (n=114) are located in the area classified as the low cultural resource intensity zone, meaning that these sites are located outside the Project APE. Seven percent (n=10) are located in the area classified as the moderate cultural resource intensity zone, meaning these sites are located in an area outside the Project APE but adjacent to the boundary of the Project APE. Thirteen percent (n=19) are located within the Project APE, including 14 prehistoric lithic scatters and campsites, 1 prehistoric lithic scatter and historic trash scatter, 3 historic linear sites (e.g., road and trail segments), and 1 prehistoric rock shelter/rock art site.

In addition, although no segments have been formally documented along Alternative S1, the Old Spanish NHT is located within in the high cultural resource intensity zone along this alternative. The alternative crosses the trail route approximately 10 miles northeast of the community of Newcastle.

Historic Properties Listed in the National Register of Historic Places

There are no listed historic properties along Alternative S1.

Cultural Visual Study

A total of 8 historic properties associated with Alternative S1 were identified as visually sensitive cultural resources. These sites include the NRHP-listed property, 2 canals, 2 rock art sites, 1 homestead, 1 utility line, and 1 road. In addition, the Old Spanish NHT is a visually sensitive cultural resource along this alternative.

Environmental Effects

Of the alternative routes considered for the Southern – South of the Black Mountains to Red Butte Substation segment, Alternative S1 has higher cultural resource intensity than three other alternatives (S3, S4, and S6). It has 2.5 miles of high, 0.9 mile of moderate, and 52.5 miles of low cultural resource intensity (Table 3-47). As a reminder, it is important to note that the mileages of cultural resource intensity do not correlate directly with an equal number of miles in impacts on cultural resources. The 2.5 miles of high cultural intensity is a result of 19 known sites within the Project APE along the alternative. Potential impacts on these sites could be direct and permanent ground disturbance associated with the construction of tower locations and access roads and indirect and permanent disturbances due to changes in public accessibility (i.e., the introduction of new or improved access roads).

The key resource along this alternative is the Old Spanish NHT, which is bisected by the alternative northeast of Enterprise. Potential impacts on this site could be direct and long-term visual and auditory intrusions.

If this alternative were selected, a complete Class III intensive pedestrian inventory would be conducted along the entire alternative as part of the Class III study. All sites located in the high intensity cultural resource zone identified in this study would be documented and evaluated for eligibility for the NRHP. The potential for the Project to cause adverse visual effects on sites would be evaluated. All site information would be provided in the Class III inventory report that would be reviewed by the agencies and the SHPO. The agencies and the SHPO would then determine if the Project has the potential to have an adverse effect (i.e., direct and permanent ground disturbance, direct and long-term visual and auditory intrusions, and indirect and permanent disturbances due to changes in public accessibility) on these sites. Prior to construction activities in the area, any adverse effects on the sites would need to be resolved per 36 CFR Part 800.6.

Alternative S2 – IPP West

Affected Environment

Cultural Sites

A total of 183 sites were identified by the Class I and Class II inventories conducted for Alternative S2, including 141 prehistoric sites, 30 historic sites, and 12 multi-component sites (Table 3-48). Seventy-seven percent (n=140) are located in the area classified as the low cultural resource intensity zone, meaning these sites are located outside the Project APE. The northern parcel of the Mountain Meadows Massacre Site NHL property boundary also is located within this zone. Approximately 10 percent (n=18) are located in the area classified as the moderate cultural resource intensity zone, meaning these sites are located in an area outside the Project APE but adjacent to the boundary of the Project APE. The southern parcel of the Mountain Meadows Massacre Site NHL is located within this zone. Approximately 14 percent (n=25) are located within the Project APE, including the NRHP-listed Mountain Meadows Historic Site, a formally documented segment of the Old Spanish Trail, and the Hamblin Town site. The remaining sites include: 16 prehistoric lithic scatters and campsites, 3 historic linear sites, 1 prehistoric habitation, 1 prehistoric storage cist, and 1 prehistoric lithic scatters and historic lean-to structure.

In addition to the one formally documented segment of the Old Spanish Trail along Alternative S2, the alternative crosses the trail route at three locations in the vicinity of Newcastle.

Historic Properties Listed in the National Register of Historic Places

The NRHP records search identified one historic property, the Mountain Meadows Historic Site along Alternative S2. A smaller area within the NRHP site was designated an NHL in 2011, after the NRHP records search was conducted for this Project. Although the Mountain Meadows Massacre NHL was listed on the NRHP at the same time as NHL designation in 2011, the NRHP database has not been updated to reflect that. The NHL is thus not included in the NRHP counts, but is identified separately. The NRHP property is within the high cultural resource intensity zone, while NHL parcels are within the moderate and low cultural resource intensity zones.

Cultural Visual Study

A total of 11 historic properties associated with Alternative S2 were identified as visually sensitive cultural resources. These sites include the Mountain Meadows Historic Site, the Hamblin Town site, the Hamblin Cemetery, a documented segment of the Old Spanish NHT/Mormon Trail, 3 roads, 1 homestead,

1 rock art site, and 1 canal. In addition, the Old Spanish NHT and the Mountain Meadows Massacre Site NHL have been identified as visually sensitive cultural resources along this alternative.

Environmental Effects

Of the alternative routes considered for the Southern – South of the Black Mountains to Red Butte Substation segment, Alternative S2 has the highest amount of high cultural resource intensity. It has 6.0 miles of high, 2.1 miles of moderate, and 41.5 miles of low cultural resource intensity (Table 3-47). As a reminder, it is important to note that the mileages of cultural resource intensity do not correlate directly with an equal number of miles in impacts on cultural resources. The 6.0 miles of high cultural intensity is a result of 25 known sites within the Project APE along the alternative. Potential impacts on these sites could be direct and permanent ground disturbance associated with the construction of tower locations and access roads and indirect and permanent disturbances due to changes in public accessibility (i.e., the introduction of new or improved access roads).

Key resources along this alternative are the NRHP-listed Mountain Meadows Historic Site and the Mountain Meadows Massacre Site NHL. Approximately 2.4 miles of Alternative S2 transects north-south through the NRHP-listed property, 1,458 feet (0.25 mile) east of the northern NHL parcel and less than 700 feet (0.13 mile) east of the southern NHL parcel. As stated previously, the Mountain Meadows Massacre Site NHL is afforded special protection under 36 CFR 800.10, which states that "the agency official, to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm to any National Historic Landmark that may be affected directly and adversely by an undertaking." In addition, the alternative crosses three segments of the Old Spanish NHT.

If this alternative is selected, the same procedures outlined in Alternative S1 would be employed.

Alternative S3 – Ox Valley

Affected Environment

Cultural Sites

A total of 210 sites were identified by the Class I and Class II inventories conducted for Alternative S3, including 169 prehistoric sites, 29 historic sites, and 12 multi-component sites (Table 3-48). Ninety-three percent (n=195) are located in the area classified as the low cultural resource intensity zone, meaning these sites are located outside the Project APE. Five percent (n=10) are located in the area classified as the moderate cultural resource intensity zone, meaning these sites are located in an area outside the Project APE but adjacent to the boundary of the Project APE. Two percent (n=5) are located within the Project APE, including 2 prehistoric campsites, 2 roads, and 1 utility line.
In addition, although no segments have been formally documented along Alternative S3, the Old Spanish NHT is located in the high cultural resource intensity zone along this alternative. The alternative crosses the trail route at five locations: three in the vicinity of Newcastle, one east of Enterprise, and one southwest of Central, Utah.

Historic Properties Listed in the National Register of Historic Places

There are no listed historic properties along Alternative S3.

Cultural Visual Study

A total of 7 historic properties associated with Alternative S3 were identified as visually sensitive cultural resources. These sites include 2 road segments, 2 rock art sites, 1 homestead, 1 utility line, and 1 canal. In addition, the Old Spanish NHT is a visually sensitive cultural resource along this alternative.

Environmental Effects

Of the alternative routes considered for the Southern – South of the Black Mountains to Red Butte Substation segment, Alternative S3 has the least amount of high cultural resource intensity. It has 1.0 mile of high, 1.9 miles of moderate, and 54.5 miles of low and cultural resource intensity (Table 3-47). As a reminder, it is important to note that the mileages of cultural resource intensity do not correlate directly with an equal number of miles in impacts on cultural resources. The 1.0 mile of high cultural intensity is a result of five known sites within the Project APE along the alternative. Potential impacts on these sites could be direct and permanent ground disturbance associated with the construction of tower locations and access roads and indirect and permanent disturbances due to changes in public accessibility (i.e., the introduction of new or improved access roads).

The key resource along this alternative is the Old Spanish NHT, which is bisected by the alternative in five locations. Potential impacts on this site could be direct and long-term visual and auditory intrusions. If this alternative is selected, the same procedures outlined in Alternative S1 would be employed.

Alternative S4 – IPP East

Affected Environment

Cultural Sites

A total of 177 sites were identified by the Class I and Class II inventories conducted for Alternative S5, including 136 prehistoric sites, 29 historic sites, and 12 multi-component sites (Table 3-48). Ninety-three percent (n=164) are located in the area classified as the low cultural resource intensity zone, meaning these sites are located outside the Project APE. Three percent (n=5) are located in the area classified as the moderate cultural resource intensity zone, meaning these sites are located in an area outside the Project APE but adjacent to the boundary of the Project APE. Five percent (n=8) are located within the Project APE, including 4 prehistoric campsites, 2 historic roads (including a road segment that overlays the possible alignment of the Old Spanish NHT), 1 prehistoric quarry, and 1 historic utility line.
In addition to being near the one formally documented segment of the Old Spanish Trail along Alternative S4, the alternative crosses the trail route approximately 10 miles northeast of the community of Newcastle.

Historic Properties Listed in the National Register of Historic Places

The NRHP records search identified one historic property, the Mountain Meadows Historic Site along Alternative S4. A smaller area within the NRHP site was designated an NHL in 2011 after the NRHP records search was conducted for this Project. Although the Mountain Meadows Massacre NHL was listed on the NRHP at the same time as NHL designation in 2011, the NRHP database has not been updated to reflect that. The NHL is thus not included in the NRHP counts, but is identified separately.

The NRHP property and the NHL are within the low cultural resource intensity zone beyond the Project APE.

Cultural Visual Study

Alternative S4 is the same as Alternative S2.

Environmental Effects

Of the alternative routes considered for the Southern – South of the Black Mountains to Red Butte Substation segment, Alternative S4 has the second fewest miles of high cultural resource intensity. It has 1.0 mile of high, 0.4 mile of moderate, and 47.4 miles of low cultural resource intensity (Table 3-47). As a reminder, it is important to note that the mileages of cultural resource intensity do not correlate directly with an equal number of miles in impacts on cultural resources. The 1.1 miles of high cultural intensity is a result of eight known sites within the Project APE along the alternative. Potential impacts on these sites could be direct and permanent ground disturbance associated with the construction of tower locations and access roads and indirect and permanent disturbances due to changes in public accessibility (i.e., the introduction of new or improved access roads).

Key resources along this alternative are the Mountain Meadows Historic Site, the Mountain Meadows Massacre Site NHL, and the Old Spanish NHT. Most important, however, is the location of the alternative near the Mountain Meadows Massacre Site NHL. As stated previously, the Mountain Meadows Massacre Site NHL is afforded special protection under 36 CFR 800.10, which states that "the agency official, to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm to any National Historic Landmark that may be affected directly and adversely by an undertaking." The alternative does not transect the NHL boundary; however, it is located less than 1 mile east of the NHL. The alternative does not cross the Mountain Meadows Historic Site. In addition, the alternative bisects the Old Spanish NHT in one location. Potential impacts on this site could be direct and long-term visual or auditory intrusions.

If this alternative is selected, the same procedures outlined in Alternative S1 would be employed.

Alternative S5 – Iron Springs and Pinto Creek (Proponent's Preferred Alternative)

Affected Environment

Cultural Sites

A total of 152 sites were identified by the Class I and Class II inventories conducted for Alternative N5, including 121 prehistoric sites, 26 historic sites, and 5 multi-component sites (Table 3-48). Seventy-eight percent (n=119) are located in the area classified as the low cultural resource intensity zone, meaning these sites are located outside the Project APE. Seven percent (n=10) are located in the area classified as the moderate cultural resource intensity zone, meaning these sites are located in an area outside the Project APE but adjacent to the boundary of the Project APE. Fifteen percent (n=23) are located within the Project APE, including 16 prehistoric lithic scatters and campsites, 2 historic roads, 2 prehistoric lithic scatter and historic trash scatter, 1 historic trash scatter, 1 historic utility line, and 1 rock shelter and rock art site.

In addition, although no segments have been formally documented along Alternative S5, the Old Spanish NHT is located within the high cultural resource intensity zone along this alternative. The alternative crosses the trail route approximately 17 miles northeast of the community of Newcastle.

Historic Properties Listed in the National Register of Historic Places

There are no listed historic properties along Alternative S5.

Cultural Visual Study

A total of 6 historic properties associated with Alternative S5 were identified as visually sensitive cultural resources. These sites include 2 rock art sites, 2 canals, 1 road, and 1 utility line. In addition, the Old Spanish NHT is a visually sensitive cultural resource along this alternative.

Environmental Effects

Of the alternative routes considered for the Southern – South of the Black Mountains to Red Butte Substation segment, Alternative S5 has the third highest amount of high resource intensity. It has 3.1 miles of high, 0.9 mile of moderate, and 55.0 miles of low cultural resource intensity (Table 3-47). As a reminder, it is important to note that the mileages of cultural resource intensity do not correlate directly with an equal number of miles in impacts on cultural resources. The 3.1 miles of high cultural intensity is a result of 23 known sites within the Project APE along the alternative. Potential impacts on these sites could be direct and permanent ground disturbance associated with the construction of tower locations and access roads and indirect and permanent disturbances due to changes in public accessibility (i.e., the introduction of new or improved access roads).

The key resource along this alternative is the Old Spanish NHT, which is bisected by the alternative in one location. Potential impacts on the site could be direct and long-term visual and auditory intrusions.

If this alternative is selected, the same procedures outlined in Alternative S1 would be employed.

Alternative S6 – Iron Springs and Ox Valley

Affected Environment

Cultural Sites

A total of 223 sites were identified by the Class I and Class II inventories conducted for Alternative S6, including 179 prehistoric sites, 34 historic sites, and 10 multi-component sites (Table 3-48). Ninety-one percent (n=203) are located in the area classified as the low cultural resource intensity zone, meaning these sites are located outside the Project APE. Approximately 4 percent (n=10) are located in the area classified as the moderate cultural resource intensity zone, meaning these sites are located in an area outside the Project APE but adjacent to the boundary of the Project APE. Four percent (n=10) are located within the Project APE, including 4 prehistoric lithic scatters and campsites, 3 historic roads, 1 historic trash scatter, 1 historic utility line, and 1 prehistoric lithic scatter and historic trash scatter.

In addition, although no segments have been formally documented along Alternative S6, the Old Spanish NHT is located in the high cultural resource intensity zone along this alternative. The alternative crosses

the trail route at five locations: three in the vicinity of Newcastle, one 17 miles northeast of Newcastle, and one southwest of Central.

Historic Properties Listed in the National Register of Historic Places

There are not listed historic properties along Alternative S6.

Cultural Visual Study

A total of 6 historic properties associated with Alternative S6 were identified as visually sensitive cultural resources. These sites include 2 rock art sites, 2 roads, 1 utility line, and 1 canal. In addition, the Old Spanish NHT is a visually sensitive cultural resource along this alternative.

Environmental Effects

Of the alternative routes considered for the Southern – South of the Black Mountains to Red Butte Substation segment, Alternative S6 has the fewest miles of high cultural resource intensity. It has 1.7 miles of high, 1.9 miles of moderate, and 58.2 miles of low cultural resource intensity (Table 3-47). As a reminder, it is important to note that the mileages of cultural resource intensity do not correlate directly with an equal number of miles in impacts on cultural resources. The 1.7 miles of high cultural intensity is a result of 10 known sites within the Project APE along the alternative. Potential impacts on these sites could be direct and permanent ground disturbance associated with the construction of tower locations and access roads and indirect and permanent disturbances due to changes in public accessibility (i.e., the introduction of new or improved access roads).

The key resource along this alternative is the Old Spanish NHT, which is bisected by the alternative in one location. Potential impacts on this site could be direct and long-term visual and auditory intrusions.

If this alternative is selected, the same procedures outlined in Alternative S1 would be employed.

Alternative S7 – Middle Hybrid Route

Cultural Sites

A total of 183 sites were identified by the Class I and Class II inventories conducted for Alternative S7, including 141 prehistoric sites, 30 historic sites, and 12 multi-component sites (Table 3-48). Approximately 85 percent (n=156) are located in the area classified as the low cultural resource intensity zone, meaning these sites are located outside the Project APE. Seven percent (n=13) of the 183 sites are located in the area classified as the moderate cultural resource intensity zone, meaning these sites are located in an area outside the Project APE, but adjacent to the boundary of the Project APE. Eight percent (n=14) are located within the Project APE, including 8 prehistoric lithic scatters and campsites, 2 utility line segments, 3 road segments, and 1 multi-component prehistoric and historic campsite.

In addition to being near the one formally documented segment of the Old Spanish Trail along Alternative S7, the alternative crosses the trail route at three locations in the vicinity of Newcastle.

Historic Properties Listed in the National Register of Historic Places

The NRHP records search identified one historic property, the Mountain Meadows Historic Site, along Alternative S7. A smaller area within the NRHP site was designated an NHL in 2011 after the NRHP records search was conducted for this Project. Although the Mountain Meadows Massacre NHL was listed on the NRHP at the same time as NHL designation in 2011, the NRHP database has not been updated to reflect that. The NHL is thus not included in the NRHP counts, but is identified separately. The NRHP property and the NHL are within the low cultural resource intensity zone beyond the Project APE.

Cultural Visual Study

A total of 11 historic properties associated with Alternative S1 were identified as visually sensitive cultural resources. These sites include the historic Mountain Meadows Historic Site, the Hamblin Town site, the Hamblin Cemetery, a documented segment of the Old Spanish NHT/Mormon Trail, as well as 3 roads, 1 homestead, 1 rock art site, 1 utility line, and 1 canal. In addition, the Old Spanish NHT and the Mountain Meadows Massacre Site NHL have been identified as visually sensitive cultural resource along this alternative.

Environmental Effects

Of the alternative routes considered for the Southern – South of the Black Mountains to Red Butte Substation segment, Alternative S7 has fewer miles of high cultural resource intensity than three other alternatives (S2, S5, and S7-A). It has 2.6 miles of high, 2.5 miles of moderate, and 44.7 miles of low cultural resource intensity (Table 3-47). As a reminder, it is important to note that the mileages of cultural resource intensity do not correlate directly with an equal number of miles of impacts on cultural resources. The 2.6 miles of high cultural intensity is a result of 14 known sites within the Project APE along the alternative. Potential impacts on these sites could be direct and permanent ground disturbance associated with the construction of tower locations and access roads and indirect and permanent disturbances due to changes in public accessibility (i.e., the introduction of new or improved access roads).

The key resource along this alternative is the Old Spanish NHT, which is bisected by the alternative in three locations. Potential impacts on this site could be direct and long-term visual and auditory intrusions. If this alternative is selected, the same procedures outlined in Alternative S1 would be employed.

Alternative S7-A (Route Variation of Alternative S7) – Middle Hybrid Route 300 Feet East of Sigurd to Red Butte No. 1 Transmission Line Adjacent to Atchinson IRA (Agency Preferred Alternative)

Cultural Sites

A total of 183 sites were identified by the Class I and Class II inventories conducted for Alternative S7-A, including 141 prehistoric sites, 30 historic sites, and 12 multi-component sites (Table 3-48). Eighty-one percent (n=148) are located in the area classified as the low cultural resource intensity zone, meaning these sites are located outside the Project APE. Ten percent (n=19) of the 183 sites are located in the area classified as the moderate cultural resource intensity zone, meaning these sites are located in an area outside the Project APE, but adjacent to the boundary of the Project APE. Nine percent (n=16) are located

within the Project APE, including 9 prehistoric lithic scatters and campsites, 2 historic utility line segments, 3 historic road segments, and 1 multi-component prehistoric and historic campsite.

In addition to being near the one formally documented segment of the Old Spanish Trail along Alternative S7-A, the alternative crosses the trail route at three locations in the vicinity of Newcastle.

Historic Properties Listed in the National Register of Historic Places

The NRHP records search identified one historic property, the Mountain Meadows Historic Site, along Alternative S7-A. A smaller area within the NRHP site was designated an NHL in 2011 after the NRHP records search was conducted for this Project. Although the Mountain Meadows Massacre NHL was listed on the NRHP at the same time as NHL designation in 2011, the NRHP database has not been updated to reflect that. The NHL is thus not included in the NRHP counts, but is identified separately. The NRHP property and the NHL are within the low cultural resource intensity zone beyond the Project APE.

Cultural Visual Study

A total of 11 historic properties associated with Alternative S1 were identified as visually sensitive cultural resources. These sites include the historic Mountain Meadows Historic Site, the Hamblin Town site, the Hamblin Cemetery, a documented segment of the Old Spanish NHT/Mormon Trail, as well as 3 roads, 1 homestead, 1 rock art site, 1 utility line, and 1 canal. In addition, the Old Spanish NHT and the Mountain Meadows Massacre Site NHL have been identified as visually sensitive cultural resources along this alternative.

Environmental Effects

Of the alternative routes considered for the Southern – South of the Black Mountains to Red Butte Substation segment, Alternative S7-A has the second highest miles of high cultural resource intensity. It has 3.7 miles of high, 2.5 miles of moderate, and 43.6 miles of low cultural resource intensity (Table 3-47). As a reminder, it is important to note that the mileages of cultural resource intensity do not correlate directly with an equal number of miles of impacts on cultural resources. The 3.7 miles of high cultural intensity is a result of 16 known sites within the Project APE along the alternative. Potential impacts on these sites could be direct and permanent ground disturbance associated with the construction of tower locations and access roads and indirect and permanent disturbances due to changes in public accessibility (i.e., the introduction of new or improved access roads).

The key resource along this alternative is the Old Spanish NHT, which is bisected by the alternative in three locations. Potential impacts on this site could be direct and long-term visual and auditory intrusions.

If this alternative is selected, the same procedures outlined in Alternative S1 would be employed.

3.2.5.5 Summary

For this Project, baseline cultural resource data were collected within a 4-mile-wide study corridor (i.e., 2 miles on either side of the reference centerline for each alternative route). Baseline data consisted of Class I data (previously recorded cultural resources sites on file with the Utah Division of State History, SHPO,

NRHP-listed properties, NHTs, and NHLs). In addition, the county historic files of the SHPO also were reviewed to identify historic architectural properties located within each study corridor. These data sources provided information on the presence of recorded sites in locations that have been surveyed for cultural resources; however, it is important to note that the absence of sites in areas where cultural resources surveys have not been conducted is not indicative of an absence of cultural resources sites in those locations.

The Class I inventory resulted in the identification of 1,847 previously recorded sites: 1,435 prehistoric sites, 287 historic sites, and 125 multi-component sites. In addition, there are 12 historic properties listed on the NRHP within the study area. This includes 11 historic buildings and 1 archaeological site, the Mountain Meadows Historic Site. There is also one NHL, the Mountain Meadows Massacre Site, and one NHT, the Old Spanish Trail within the study area. Although the Mountain Meadows Massacre NHL was listed on the NRHP at the same time as NHL designation in 2011, the NRHP database has not been updated to reflect that. The NHL is thus not included in the NRHP counts, but is identified separately.

Issues raised by the public and agencies during Project scoping and preparation of the EIS related to potentially significant effects on cultural resources include potential impacts on archaeological and historic sites. Specific resources cited were the Mountain Meadows Massacre Site, remnants of the Old Spanish NHT, the Cove Fort Historic Site, the Mineral Mountains obsidian sources, and historic properties listed on the NRHP.

The key issues for cultural resources in the northern Project area (Sigurd Substation to South of the Black Mountains) are the potential impacts of the Project on sensitive cultural resources, such as Cove Fort (Alternatives N1 through N6), the Old Spanish NHT (Alternatives N1 through N6), Fremont Indian State Park (Alternatives N1 through N6), and the Mineral Mountains obsidian sources (Alternatives N2 through N6). The alternatives pass south of Cove Fort; however, the site is listed on the NRHP and, as such, is a highly sensitive cultural resource. The Old Spanish NHT is located to the east and south of the alternatives, but it is not within the Project APE. The alternatives also pass south of Fremont Indian State Park; however, the entire area is expected to have high potential for prehistoric cultural resource sites. The Mineral Mountains obsidian sources contain numerous significant prehistoric cultural resource sites.

Alternative N1 would have the lowest number of miles of route through areas of high cultural resource intensity (11.6 miles); other alternatives would range between 11.9 miles (N4) and 29.5 miles (N3) of high cultural resource intensity (Table 3-47). Alternative N1 also has the fewest number of recorded cultural resource sites located within the Project APE (Table 3-48). The Project APE for nearly half of Alternative N1 (46 percent) has been inventoried previously at the Class III intensive pedestrian level. Much of Alternative N1 is located along existing transportation corridors and/or existing corridors for other development projects (e.g., wind farms, pipelines, fiber optic lines, and transmission lines). In addition, Alternative N1 avoids the Mineral Mountains obsidian sources, which cover large areas and were used extensively during prehistory and therefore have high site densities in their vicinities. Other alternative routes considered for the northern segment of the Project, Alternatives N2 to N6, bisect this important cultural resource area.

The key issues for cultural resources on the southern Project area (South of the Black Mountains to Red Butte Substation) are the proximity of the Project to sensitive cultural resources such as the Mountain Meadows Massacre Site NHL (Alternatives S2, S4, S7 and S7-A), and the Mountain Meadows Historic Site (Alternatives S2, S4, S7, and S7-A), and segments of the Old Spanish NHT (Alternatives S1 through S7).

As previously mentioned (refer to Section 3.2.5), the Mountain Meadows Massacre Site NHL is afforded special protection under 36 CFR 800.10, *Special Requirements for Protecting National Historic*

Landmarks. The law states that "the agency official, to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm to any National Historic Landmark that may be directly and adversely affected by an undertaking." Throughout the Section 106 consultation process, the avoidance of the NHL has been a high priority of the BLM. Based on the NPS Old Spanish NHT alignment, one segment of the Old Spanish NHT has been formally recorded as a cultural resource site within the southern Project area. It should be noted, however, that this recorded segment is not listed on the NRHP. Based on the NPS alignment of the Old Spanish NHT, alternative routes cross this historic trail between one (S1 and S5) and five (S3) times. Extant segments of the Old Spanish NHT are rare and difficult to identify with confidence. The highest probability for the identification of extant remains of the Old Spanish NHT exists in remote undeveloped areas along the historic trail route.

Alternative S3 has the lowest number of miles of route through areas of high cultural resource intensity (1.0 mile); to other alternatives would range between 1.1 miles (S4) and 6.0 miles (S2) of high cultural resource intensity (Table 3-47). For this alternative, 78 percent of the Project APE has been inventoried previously at the Class III intensive pedestrian level. Also, portions of the alternative are located along existing transportation corridors and/or existing corridors for other development projects (e.g., wind farms, pipelines, fiber optic lines, and transmission lines).

This alternative avoids the sensitive cultural resources of Mountain Meadows Massacre Site NHL and the Mountain Meadows Historic Site; Alternatives S2, S4, S7, and S7-A each would affect these highly sensitive locations to varying degrees. It should be noted, however, that Alternative S3 bisects the Old Spanish NHT in five locations. If this alternative was selected, these historic trail segments would be evaluated during the Class III studies and appropriate avoidance or mitigation methods would be developed in consultation with the SHPO.

3.2.6 Tribal Consultation

3.2.6.1 Area of Analysis

In accordance with 36 CFR 800, the lead federal agency must consult with American Indian tribes throughout the NHPA Section 106 process when the federal agency undertaking may affect historic properties when (1) they are located on tribal lands or (2) any tribe attaches religious or cultural significance to the historic property, regardless of the property's location. In such cases, the federal agency must notify the potentially affected tribes of the undertaking and give those tribes the opportunity to consult should they wish to do so.

Early in the EIS process, the BLM initiated contact with several American Indian tribes in accordance with various environmental laws and Executive Orders. While no American Indian reservations or lands owned in fee by tribes are crossed by the Project, BLM identified several American Indian tribes whose traditional territories are within the Project area. These tribes were contacted to inform them of, and determine their interest in, the Project or preparation of the EIS (refer to Section 5.2.2.2). The tribes also were asked to determine the need for further study related to the identification of TCPs in the Project area that may be affected by the Project.

3.2.6.2 Regulatory Framework and Permits

Federal legislation applicable to tribal consultation in the Project area includes:

- NHPA (16 U.S.C. 470; 36 CFR Part 800), specifically Section 106 of the Act, directs federal agencies to take into account the effects of their actions on historic properties and provide the tribes a reasonable opportunity to comment.

- ARPA (16 U.S.C. 470aa to 470ee) authorizes federal land-management agencies to manage through a permit process the excavation and/or and removal of archaeological resources on federal lands. The land-management agencies must consult with American Indian tribes with interests in resources prior to issuance of permits.

- American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996) requires federal lead agencies and/or federal land-management agencies to consult with affected American Indian tribes regarding federal actions that would pose potential conflicts with freedom to practice traditional American Indian religions.

- NAGPRA (25 U.S.C. 3001-3002) provides a process through which federal agencies consult with affected Native Americans regarding the treatment and return of human remains, funerary objects, sacred objects, and items of cultural patrimony identified on federal lands as a result of a federal action.

- Executive Order 13007, issued in 1996, directs federal land-management agencies to accommodate access to, and ceremonial use of, Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, agencies shall maintain the confidentiality of sacred sites.

State statutes and guidelines include:

- UAC Section R212-4 requires that if human remains are discovered in conjunction with a project subject to Section 106 the project proponent is responsible for all efforts associated with the excavation, analysis, curation, or repatriation of the human remains and for notifying the Utah SHPO.

- UAC Section 9-8-309 provides a process through which landowners or land management agencies consult with the State regarding the treatment of human remains discovered on nonfederal lands that are not state owned.

3.2.6.3 Consultations Overview

In October 2009, BLM requested and conducted meetings with eight tribes, including the following:

- Confederated Tribes of Goshute Reservation
- Hopi Tribe
- Kaibab Band of Paiute Indians
- Moapa Band of Paiutes
- Navajo Nation
- Northwestern Band of Shoshone Nation
- Paiute Indian Tribe of Utah
- Ute Indian Tribe

At that time, five of the tribes (Hopi Tribe, Moapa Band of Paiutes, Kaibab Band of Paiute Indians, Ute Indian Tribe, and Northwestern Band of Shoshone Nation) verbally deferred to the Paiute Indian Tribe of

Utah to represent their interests and concerns regarding the Project during consultation with BLM. Two of the tribes, the Paiute Indian Tribe of Utah and the Navajo Nation, requested to consult on the Project. One tribe, the Confederate Tribes of the Goshute Reservation, informed the BLM that they did not intend to consult on the Project.

In December 2009, BLM sent letters and Project maps to 13 tribes (Confederated Tribes of Goshute Reservation, Hopi Tribe, Kaibab Band of Paiute Indians, Moapa Band of Paiute Indians, Navajo Nation, Navajo Utah Commission, Northwestern Band of Shoshone Nation, Paiute Indian Tribe of Utah, San Juan Southern Paiute Tribe, Southern Ute Tribe, Ute Indian Tribe, Ute Mountain Ute Tribe, White Mesa Ute Tribe) notifying them about the Project and inviting them to participate in Section 106 consultation. BLM received no responses from the 10 tribes (Confederated Tribes of the Goshute Reservation, Kaibab Band of Paiute Indians, Moapa Band of Paiute Indians, Northwest Band of Shoshone Nation, Navajo Utah Commission, Southern Ute Tribe, San Juan Southern Paiute Tribe, Ute Mountain Ute Tribe, Mountain Ute Tribe, and White Mesa Ute Tribe). At the time of the mailing, BLM consultation with the Paiute Indian Tribe of Utah was ongoing. The Hopi Nation, which had previously deferred to the Paiute Indian Tribe of Utah, informed BLM that they intended to consult. The Navajo Nation responded in February 2010 that the tribe had no objections to the Project at that time.

In May 2010, BLM provided four tribes (Paiute Indian Tribe of Utah, Skull Valley Band of Goshute Indians, Confederated Tribes of the Goshute Reservation, Ute Indian Ute Tribe) copies of the Draft EIS for review and comment. These tribes had notified the BLM, either during Project Scoping or during Section 106 consultation, of their interest in receiving copies of the document. BLM received comments from the Paiute Indian Tribe of Utah in November 2010.

In October 2010, a second consultation letter was mailed reiterating BLM's interest in soliciting input from the tribes regarding to the Project. This second letter was sent to the 13 tribes originally contacted and the Fallon-Paiute-Shoshone Tribe, Skull Valley Goshute Tribe, and Utah Division of Indian Affairs. BLM received no responses and, as a result, continued its ongoing consultation only with those tribes that had previously expressed interest in being consulted.

Between May 2010 and May 2011, BLM and the Paiute Indian Tribe of Utah met several times to discuss the status of the Project. Table 3-49 in Section 3.2.6.4 is a list of the meetings and the reasons for each meeting. Section 3.2.6.6 discusses the Native American ethnographic studies.

In May 2011, seven tribes (Hopi Tribe, Kaibab Band of Paiute Indians, Moapa Band of Paiute Indians, Navajo Nation, Navajo Utah Commission, Paiute Indian Tribe of Utah and Ute Indian Tribe) were invited to participate in the development of the Programmatic Agreement. Six of the seven tribes declined to participate. One tribe, the Paiute Indian Tribe of Utah, agreed to participate in development of the Programmatic Agreement (Appendix G) as a concurring party.

In August 2011, a special-interest group of descendants of Mountain Meadows massacre victims, a consulting party to the Programmatic Agreement, raised concerns regarding the potential for the discovery of human remains in the vicinity of the Mountain Meadows Historic Site. The special-interest group of descendants requested BLM consult with the tribe specifically because of their belief that the remains could include individuals with Cherokee lineage or membership. BLM contacted the Tribal Historic Preservation Office (THPO) of the Eastern Band of Cherokee Indians to discuss the Mountain Meadows Massacre site, the Project, and to inquire about the tribe's interest in consulting on the Project and participating in development of the Programmatic Agreement. The THPO informed BLM that the tribe had no interest in participating nor did the tribe wish to receive any additional information or updates regarding the Project. The THPO suggested BLM also contact the Cherokee Nation to discuss the same issues.

BLM contacted the Cherokee Nation to discuss the Mountain Meadows Massacre site, the Project, and to inquire about the tribe's interest in consulting on the Project and participating in the development of the Programmatic Agreement. The Cherokee Nation informed BLM that the tribe had no interest in participating in the Project nor did the tribe wish to receive any additional information or updates regarding the Project.

3.2.6.4 Summary of Specific Tribal Consultations

A summary of tribal consultation activities is presented in Table 3-49.

3.2.6.5 Current Status

To date, BLM has conducted more than 30 meetings with tribal representatives as part of ongoing government-to-government and/or Section 106 consultations. These consultations have spanned the duration of the Project and will continue after the EIS process is complete. In summary, the consultations results are:

- Six tribes (Paiute Indian Tribe of Utah, Kaibab Band of Paiute Indians, Moapa Band of Paiute Indians, Navajo Nation, Hopi Nation, Northwest Band of the Shoshone Nation) have been consulted.
- Four tribes (Kaibab Band of Paiute Indians, Moapa Band of Paiute Indians, Northwestern Band of Shoshone Nation, and Ute Indian Tribe) have verbally deferred to the Paiute Indian Tribe of Utah to represent their interests and concerns regarding the Project during consultation with BLM.
- One tribe, the Paiute Indian Tribe of Utah, is participating in development of the Programmatic Agreement as a concurring party.
- BLM is conducting an ethnographic overview in consultation with the Paiute Indian Tribe of Utah (Section 3.2.6.6).
- Ten tribes (Confederated Tribes of Goshute Reservation, Skull Valley Goshute Tribe, Fallon Paiute-Shoshone, San Juan Southern Paiute Tribe, Southern Ute Tribe, Ute Mountain Ute Tribe, White Mesa Ute Tribe, Utah Division of Indian Affairs, Zuni Pueblo, Cherokee Nation, Eastern Band of Cherokee Indians) have declined to participate in the Project.

3.2.6.6 Native American Ethnographic Studies

At the request of the Paiute Indian Tribe of Utah, BLM agreed to conduct and the Proponent agreed to fund ethnographic fieldwork in response to the tribe's concerns regarding potential effects of the Project on TCPs important to the tribe. These concerns were expressed to the BLM during a tribal consultation meeting between the BLM and the Paiute Indian Tribe held on April 14, 2010; during a Paiute Indian Tribal Council meeting attended by the BLM on August 2, 2010; and as discussed by the CRTG during the agency ID Team Meeting No. 4 on November 9, 2010.

In January 2011, an ethnographer of the tribe's choice met with the Paiute Tribe's Director of Cultural Resources and a representative of the BLM to (1) discuss the purpose of and develop an appropriate plan for conducting the ethnographic fieldwork, (2) identify tribal elders and other knowledgeable informants to participate in the fieldwork, and (3) identify areas of concern for potential field visits. Nine areas were

TABLE 3-49
TRIBAL CONTACTS AND CONSULTATION

Date	Activity	Description	Type of Consultation			Concerns Expressed
			Government-to-government Consultation[1]	Section 106		
				Consultation[2]	Ethnographic Work[3]	
Confederated Tribes of Goshute Nation						
October 1, 2010	Letter	Bureau of Land Management (BLM) sent a letter to the tribe regarding the preparation of an environmental impact statement (EIS) and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
Fallon Paiute-Shoshone						
October 1, 2010	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
Hopi Tribe						
October 7, 2009	Meeting	BLM met with the tribe to discuss the Project.		✓		The tribe expressed no concerns regarding the Project and verbally deferred to the Paiute Indian Tribe of Utah (Paiute Tribe) to represent the Hopi during consultations.
December 17, 2009	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
December 28, 2009	Letter	Hopi requested ongoing consultations for the Project.	✓	✓		
October 1, 2010	Letter	BLM sent a follow-up letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		

TABLE 3-49
TRIBAL CONTACTS AND CONSULTATION

Date	Activity	Description	Type of Consultation			Concerns Expressed
			Government-to-government Consultation[1]	Section 106		
				Consultation[2]	Ethnographic Work[3]	
May 19, 2011	Letter	BLM invited the tribe to participate in the development of the Project Programmatic Agreement and to sign the agreement as a concurring party.		✓		
June 6, 2011	Call	BLM invited tribe to participate in an August 2, 2011, meeting regarding the Programmatic Agreement.		✓		
July 5, 2011	Letter	Hopi Tribe requested additional information to facilitate consultations.	✓	✓		
July 20, 2011	Meeting	BLM provided an update on the status of the Project to the tribe.				
Kaibab Band of Paiute Indians						
October 14, 2009	Meeting	BLM met with the tribe to discuss the Project.		✓		The tribe expressed no concerns regarding the Project and verbally deferred to the Paiute Tribe to represent the Kaibab Band during consultations.
December 17, 2009	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
April 1, 2010	Meeting	BLM provided an update on the status of the Project to the tribe.		✓		
October 1, 2010	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
May 19, 2011	Letter	BLM invited the tribe to participate in the development of the Project Programmatic Agreement and to sign the agreement as a concurring party.		✓		
June 22, 2011	Meeting	BLM provided an update on the status of the Project to the tribe.		✓		

TABLE 3-49
TRIBAL CONTACTS AND CONSULTATION

Date	Activity	Description	Type of Consultation			Concerns Expressed
			Government-to-government Consultation[1]	Section 106		
				Consultation[2]	Ethnographic Work[3]	
Moapa Band of Paiute Indians						
October 8, 2009	Meeting	BLM met with the tribe to discuss the Project.		✓		The tribe expressed no concerns regarding the Project and verbally deferred to the Paiute Tribe to represent the Moapa Band during consultations.
December 17, 2009	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
October 1, 2010	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
May 19, 2011	Letter	BLM invited the tribe to participate in the development of the Project Programmatic Agreement and to sign the agreement as a concurring party.		✓		
June 21, 2011	Meeting	BLM provided an update on the status of the Project to the tribe.		✓		
Navajo Nation						
October 7, 2009	Meeting	BLM met with the tribe to discuss the Project.		✓		The tribe expressed no concerns regarding the Project and verbally deferred to the Paiute Tribe to represent the Navajo Nation during consultations.
December 17, 2009	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		

TABLE 3-49
TRIBAL CONTACTS AND CONSULTATION

Date	Activity	Description	Type of Consultation			Concerns Expressed
			Government-to-government Consultation[1]	Section 106		
				Consultation[2]	Ethnographic Work[3]	
February 8, 2010	Letter	Navajo Nation sent a letter to BLM notifying the BLM that the Project would not impact Navajo traditional cultural properties.	✓	✓		
May 25, 2010	Meeting	BLM provided an update on the status of the Project to the tribe.		✓		The Navajo expressed concerns regarding several areas along the proposed routes.
October 1, 2010	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
May 19, 2011	Letter	BLM invited the tribe to participate in the development of the Project Programmatic Agreement and to sign the agreement as a concurring party.		✓		
July 21, 2011	Meeting	BLM provided an update on the status of the Project to the tribe. Also discussed where areas sensitive to the tribe in Washington County and the tribe's interest in participating in the development of the Programmatic Agreement.		✓		
August 2011	Call	BLM provided an update on the status of the Project to the tribe and invited the tribe to participate in the August 2, 2011 Programmatic Agreement meeting with the Consulting Parties.		✓		The Navajo requested that, if ceremonial objects were identified during Class III surveys, those objects not be disturbed or photographed.
August 2, 2011	Call	Representatives of the Navajo Nation joined Programmatic Agreement consulting parties meeting via conference call.		✓		
August 31, 2011	Email	BLM provided the tribe with an updated Project map.		✓		

TABLE 3-49
TRIBAL CONTACTS AND CONSULTATION

Date	Activity	Description	Type of Consultation			Concerns Expressed
			Government-to-government Consultation[1]	Section 106		
				Consultation[2]	Ethnographic Work[3]	
Northwestern Band of Shoshone Nation						
October 14, 2009	Meeting	BLM met with the tribe to discuss the Project.		✓		The tribe expressed no concerns regarding the Project and verbally deferred to the Paiute Tribe to represent the Northwestern Band of Shoshone Nation during consultations.
December 17, 2009	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
April 7, 2010	Meeting	BLM provided an update on the status of the Project to the tribe.		✓		
October 1, 2010	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
October 6, 2011	Meeting	BLM provided an update on the status of the Project to the tribe.		✓		
Paiute Indian Tribe of Utah						
October 9, 2009	Meeting	BLM met with the tribe to discuss the Project.		✓		
December 1, 2009	Call	BLM met with the tribe to discuss the Project.		✓		
December 17, 2009	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		

TABLE 3-49
TRIBAL CONTACTS AND CONSULTATION

Date	Activity	Description	Type of Consultation			Concerns Expressed
			Government-to-government Consultation[1]	Section 106		
				Consultation[2]	Ethnographic Work[3]	
April 14, 2010	Meeting	BLM met with the tribe to update the status of the Project and to discuss the tribe's request for an ethnographic overview.		✓	✓	
May 26, 2010	Meeting	BLM met with the tribe to update the status of the Project and to discuss the tribe's request for ethnographic work.		✓	✓	
June 30, 2010	Meeting	BLM met with the tribe to discuss the request for an ethnographic overview.	✓	✓	✓	
July 15, 2010	Meeting	Representatives from the tribe participated in the agency Interdisciplinary team meeting Cultural Resources Task Group break-out session.	✓	✓		
August 2, 2010	Meeting	BLM formally addressed Tribal Council to discuss status of Project; Tribal Council requested ethnographic work.	✓	✓		
October 1, 2010	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
January 4, 2011	Meeting	BLM and ethnographer met with Tribal Cultural Resource Coordinator to discuss approach for ethnographic work.			✓	
March 22, 2011	Meeting	BLM and ethnographer presented approach for ethnographic overview to Tribal Council.		✓	✓	
March to June 2011	Mitigation	Based on concerns expressed by U.S. Forest Service, Proponent moved alternative transmission line route alignment to avoid a traditionally used cultural site.		✓		

TABLE 3-49
TRIBAL CONTACTS AND CONSULTATION

Date	Activity	Description	Type of Consultation			Concerns Expressed
			Government-to-government Consultation[1]	Section 106		
				Consultation[2]	Ethnographic Work[3]	
April 25, 2011	Field visit	Field visit conducted with members of Shivwits Band to sites in Washington County.			✓	
May 19, 2011	Letter	BLM invited the tribe to participate in the development of the Project Programmatic Agreement and to sign the agreement as a concurring party.		✓		
June 19, 2011	Field visit	Field visit conducted with members of Koosharem Band to sites in Sevier and Millard counties.			✓	
June 23, 2011	Meeting	BLM met with the tribe to discuss the Programmatic Agreement.		✓		
July 31, 2011	Field visit	Field visit conducted with members of Koosharem Band to sites in Sevier, Millard, and Beaver counties.		✓	✓	
August 2011	Email	BLM provided an update on the status of the Project to the tribe and invited the tribe to participate in the August 2, 2011, Programmatic Agreement meeting with the Consulting Parties.				
August 2, 2011	Call	Representatives of the Paiute Tribe joined Programmatic Agreement consulting parties meeting via conference call.		✓		
September 16, 2011	Meeting	BLM provided update to Tribal Council on status of Project and ethnographic work.	✓	✓	✓	
September 29, 2011	Meeting	BLM provided update to Tribal Council on status of Project and ethnographic work.	✓	✓	✓	
November 1, 2011	Letter	Letter from Tribal Chairperson prompts modification of scope for ethnographic work.		✓	✓	
November 16, 2011	Field visit	Field visit conducted with members of Koosharem Band to sites in Sevier, Millard, and Beaver counties.			✓	

TABLE 3-49
TRIBAL CONTACTS AND CONSULTATION

Date	Activity	Description	Type of Consultation			Concerns Expressed
			Government-to-government Consultation[1]	Section 106		
				Consultation[2]	Ethnographic Work[3]	
December 1, 2011	Meeting	BLM representatives and ethnographer met with Tribal Council to discuss modifying scope for ethnographic work.		✓	✓	
December 2, 2011	Meeting	Ethnographer met with Tribal Cultural Resource Coordinator to develop revised scope for ethnographic work.		✓	✓	
March 2, 2012	Meeting	BLM provided Tribal Council an update of the Project; the ethnographer presented the revised approach for the ethnographic work.	✓	✓	✓	
March 5, 2012	Meeting	BLM provided Band Council an update of the project; the ethnographer presented the revised approach for the ethnographic work.	✓	✓	✓	
March 23 to 24, 2012	Meeting, field visit	Meeting conducted on March 23, 2012, with the Cedar Band in Cedar City to prepare for field visit in Iron and Beaver counties the following day (March 24, 2012).			✓	Concerns expressed regarding the potential traditional cultural properties located outside the Project area.
March 30 to 31, 2012	Meeting, field visit	Meeting conducted on March 30, 2012, with Koosharem Band in Richfield to prepare for field visit in Sevier, Millard, and Beaver counties the following day (March 31, 2012).			✓	
April 16, 2012	Meeting	BLM provided Tribal Council a copy of the draft Programmatic Agreement for review.	✓	✓		
April 27 to 28, 2012	Meeting, field visit	Meeting conducted on April 27, 2012, with Shivwits Band in Sham to prepare for field visit in Washington County the following day (April 28, 2012).			✓	
May 2012	Meeting	Tribal Council will provide BLM comments on the Programmatic Agreement.	✓	✓		

TABLE 3-49
TRIBAL CONTACTS AND CONSULTATION

Date	Activity	Description	Type of Consultation			Concerns Expressed
			Government-to-government Consultation[1]	Section 106		
				Consultation[2]	Ethnographic Work[3]	
San Juan Southern Paiute						
December 17, 2009	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
October 1, 2010	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
Southern Ute Tribe						
December 17, 2009	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
October 1, 2010	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
Ute Indian Tribe						
October 14, 2009	Call	BLM met with the tribe to discuss the Project.		✓		The tribe expressed no concerns regarding the Project and verbally deferred to the Paiute Tribe to represent the Ute Indian Tribe during consultations.

TABLE 3-49
TRIBAL CONTACTS AND CONSULTATION

Date	Activity	Description	Type of Consultation			Concerns Expressed
			Government-to-government Consultation[1]	Section 106		
				Consultation[2]	Ethnographic Work[3]	
December 17, 2009	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
May 27, 2010	Meeting	BLM provided an update on the status of the Project to the tribe.				
October 1, 2010	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
May 19, 2011	Letter	BLM invited the tribe to participate in the development of the Project Programmatic Agreement and to sign the agreement as a concurring party.		✓		
Ute Mountain Ute Tribe						
December 17, 2009	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
October 1, 2010	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		

TABLE 3-49
TRIBAL CONTACTS AND CONSULTATION

Date	Activity	Description	Type of Consultation			Concerns Expressed
			Government-to-government Consultation[1]	Section 106		
				Consultation[2]	Ethnographic Work[3]	
White Mesa Ute Tribe (Band of Ute Mountain Ute)						
December 17, 2009	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		
October 1, 2010	Letter	BLM sent a letter to the tribe regarding the preparation of an EIS and requesting Section 106 consultations and government-to-government consultations with the tribe.	✓	✓		

NOTES:
[1]Pursuant to Executive Order 13175, government-to-government consultation must be conducted between officials of federal agencies and Indian tribes regarding proposed federal actions and is intended to ensure meaningful and timely input by tribal officials.
[2]In accordance with 36 CFR 800, the lead federal agency must consult with Indian tribes throughout the National Historic Preservation Act Section 106 process when the federal agency undertaking may affect historic properties when (1) they are location on tribal land or (2) any tribe attaches religious of cultural significance to the historic property, regardless of the property's location.
[3]As part of tribal consultation, the Paiute Tribal Council requested ethnographic work be conducted to identify locations important to the tribe that may require mitigation to avoid Project effects.

identified, including the general areas of Cove Fort, Fremont State Park, Cedar Grove, Milford, the Black Mountains, Mountain Meadows, and the areas of three specific archaeological sites.

Also in January 2011, the ethnographer met with the USFS lead archaeologist to discuss several areas known to have high densities of Protohistoric/Historic Paiute archaeological sites and to identify additional locations for potential field visits within the Project area in Washington County. Through this discussion, literature review, and interviews with tribal members, a site traditionally used by the Paiute Tribe was identified on the Dixie National Forest. One of the transmission line alternative routes crossed the site; however, in coordination with the USFS and BLM, the Proponent realigned the alternative route to avoid the site and move the route out of view from the site. Additionally, the USFS requested the site be fully documented during Class III studies. In 2012, the ethnographer was asked to document the site as a TCP and evaluate its significance for the NRHP.

In March 2011, representatives of the BLM and the ethnographer presented the proposed approach for the ethnographic fieldwork to the Paiute Tribal Council. The Council approved the approach and, between March 2011 and July 2011, three field visits were conducted. However, poor weather and road conditions precluded access to the areas of concern along the alternative routes.

In Fall 2011, the Proponent agreed to fund another season of fieldwork and, in Winter 2012, the ethnographer, in coordination with the tribe's Director of Cultural Resources, revised the plan for the fieldwork to be conducted Spring 2012. The plan included provisions for three Paiute coordinators to support the ethnographer with the fieldwork and a meeting the evening prior to each of three field visits. The purpose of each meeting was to (1) brief the tribal participants about the project and to plan the next day's field visits; (2) provide an opportunity for tribal participants to ask the Proponent technical questions about the Project and ask the BLM and/or USFS representatives about the EIS and/or Section 106 processes; and (3) share information about their areas of interest and concern. The day following each meeting, the participants traveled by vehicles to visit the areas of interest, stopping as requested by tribal participants to view known cultural sites, hiking into sites if necessary, and discussing the area as the ethnographer documented the comments. The three sets of meetings and field visits, conducted in March and April 2012, are listed in Table 3-50.

TABLE 3-50
MEETINGS AND FIELD VISITS WITH BANDS OF THE PAIUTE INDIAN TRIBE OF UTAH

Date	Activity	Attendance
Cedar Band		
March 23, 2012	Pre-field meeting in Cedar City, Utah	6
March 24, 2012	Field visit to areas in Iron and Beaver counties	7
Koosharem Band		
March 30, 2012	Pre-field meeting in Richfield, Utah	5
March 31, 2012	Field visit in Sevier, Millard, and Beaver counties	7
Shivwits Band		
April 27, 2012	Pre-field meeting in Sham, Utah	6
April 28, 2012	Field visit in Washington County	8

The ethnographer is preparing a report documenting the fieldwork and results of the fieldwork. The report, which will record information regarding locations and sites culturally significant to the Paiute Tribe, will be reviewed and approved by the Paiute Tribe. Depending on the sensitivity of the content, the tribe may request that the report remain confidential. If any cultural site or location identified as part of the ethnographic fieldwork warrants treatment and/or mitigation due to potential effects of the Project, the treatment and/or mitigation will be included in the HPTP being prepared in compliance with Section 106

of the NHPA, which will be appended to the POD that directs activities of construction, operation, and maintenance of the transmission line.

In a letter from the Paiute Tribe Director of Cultural Resources dated May 7, 2012, the Paiute Tribe, in support of identification and avoidance of prehistoric archaeological sites and TCPs, expressed support for the Agency Preferred Alternative (Alternatives N2-A and S7-A). As expressed to the ethnographer, the tribe specifically supports the portion of the Agency Preferred Alternative from the northern end of the Mineral Mountains to Red Butte Substation, as it avoids four places of cultural and spiritual importance to the Paiute Tribe. Within Washington County, Alternative S7-A is the only acceptable alternative to the tribe because this portion of the route was realigned by the Proponent to avoid a spring and associated archaeological site that are culturally significant to the tribe. Segments of Alternatives N3, N4, N5, and N6 are not acceptable to the tribe because they would cross the Mineral Mountains, an important area to the tribe, and may result in unanticipated discoveries of cultural resources. Representatives of the Paiute Tribe also voiced concerns for the preservation of obsidian quarries and archaeological sites located within the Project study area. As part of ongoing consultations, the Paiute Tribe will be given the opportunity to review and comment on the HPTP, if one is required.

Ethnographic Literature Review Summaries

Based on existing ethnographic and historical literature, this ethnographic summary describes the Southern Paiute and Ute cultural groups, two highly mobile Indian populations, prior to sustained Euro-American contact. This summary also describes the effects of socioeconomic, political, and cultural exchanges on traditional lifeways within the study area defined for this Project. In addition, this ethnographic outline identifies the longstanding relationships and dynamics of the Southern Paiute and the Ute with their own, other native groups, and non-native populations. Among the sources of ethnographic information available for the Ute and Southern Paiute, O.C. Stewart's (1942) pioneering work, *Culture Element Distributions: XVIII Ute Southern Paiute*, is particularly noteworthy. This ethnography was published in 1942 and is based on fieldwork conducted during the summer of 1936. Earlier and subsequent cultural studies in the two cultural regions have complemented and updated Stewart's work. Most are thematic studies or compilations of ethnographic and ethnohistoric data (e.g., Cuch 2000; D'Azevedo 1986; Inter-Tribal Council of Nevada 1976; Jefferson et al. 1972; Lyman and Denver 1970; Sapir 1930; Smith 1974; and Steward 1997).

Southern Paiute

The Southern Paiute Sub-Groups, Language, and Territory

The Southern Paiute refer to themselves in their own language as *nïwï* person or people (Kelly 1934:548). The social and cultural identity of the sub-groups within this large cultural group, known as "Southern Paiute," was primarily linguistic and geographical. Like their neighbors to the northeast and east, the Ute, and the groups to the north and northwest, the Shoshone, the Southern Paiute speak one of the northern Numic branches of the Ute-Aztecan language (Sapir 1930). A comprehensive discussion of Southern Paiute language is beyond the scope of this summary, but this matter has been documented in several cultural and linguistic works by Edward Sapir (refer to Bright 1992).

The traditional territory occupied by Southern Paiute extends from the western Colorado Plateaus flowing west and southwest, through large canyons and a succession of mountain ranges and arid valleys. Southern Paiute territory in southern Utah embraces a portion of the Great Basin and the Colorado Plateau (Steward 1997:180). Several rivers, springs, and drainages sprinkled across the region offered a fair

habitat for plants and wildlife and a reliable source of local, natural resources. Although some Southern Paiute people adapted to the arid desert environment, part of the population was concentrated along main water sources, such as the Virgin River in the southwestern corner of Utah.

An anthropological account by Isabel T. Kelly (1934:550) reports the Southern Paiute region was divided into 15 sub-groups, bands, or tribes defined as "dialectic units with political concomitants." Each one of these groups was defined in close connection with the territory they were occupying. The 15 groups mapped by Kelly (1934) are the San Juan, the Kaiparowits, the Panguitch, the Kaibab, the Uinkaret, the Shivwitz, the Saint George, the Gunlock, the Cedar, the Beaver, the Panaca, the Paranigat (Pahraganat), the Moapa, Las Vegas, and the Chemehuevi. Kelly's Southern Paiute sub-group structure was revised and updated in Kelly and Fowler (1986:368-369). An additional unit, the Antarianunts group, which Kelly thought was Ute, has been included as unequivocally Southern Paiute by O.C. Stewart (1942:237) and referred to as the sixteenth Southern Paiute group (Kelly and Fowler 1986:368). In an analysis of linguistic and ethnographic data, Kelly and Fowler (1986) have suggested it is possible the Antarianunts group, as well as the Beaver, Cedar, and Kaiparowits groups, should be considered transitional Southern Paiute-Ute, if considering the similarities of the groups' common language and cultural traits. Of the 15 Southern Paiute groups, the Panguitch, the Kaibab, the Uinkaret, the Shivwitz, the Saint George, the Gunlock, the Cedar, and the Beaver group are located within the Southern Paiute region, as defined for this Project.

Over the years, social scientists have attempted to come to a consensus on the subject of how many Southern Paiute groups or "economic clusters" co-existed in the region. Some researchers have focused on several well-organized local groups, while others defined native Southern Paiute by their main area of activity (geographic units) (refer to Steward 1997; Tom and Holt 2000). Although each recognized group was associated with a specific geographic area within the region, the boundaries separating physical and political territories possibly grew less precise as one moved further away from the core of the group and shared occupancy and use of a specific physical area, making it difficult to identify individual cultural units within the larger Southern Paiute populations.

Southern Paiute Cultural Traits

When the Spaniards and Mormon settlers entered the region, the Southern Paiutes were a relatively peaceful and industrious people. Subsistence practices of the Southern Paiute were similar to those of other native groups contained within the Great Basin cultural region (Kelly and Fowler 1986). The Southern Paiute subsistence economy, prior to direct contact with non-native populations, was based on a cyclical pattern of hunting and gathering (Kelly and Fowler 1986:370-371; Steward 1997:180-181).

According to Kelly and Fowler (1986: 370-371), small-game hunting and plant foraging provided for the main dietary sources of the Southern Paiute people. They used most of the varieties of fauna and edible plants found within their territory (Kelly and Fowler 1986: 370-371; Stoffle and Evans 1976:175). They did, however, fish wherever available and hunt large game such as bear and antelope (Kelly and Fowler 1986: 370-371; Tom and Holt 2000). It has been mentioned that horticulture was practiced near permanent water sources, but it seems to have been a supplement to the well-established hunting and gathering activities (Steward 1997:180-181; Stoffle and Evans 1976:175-176). Numerous ethnographic accounts chronicled the Southern Paiutes as cultivating the irrigable lands within their territory (Euler 1966:33; Stewart 1942: 254-256; Stoffle and Evans 1976:175-176). Regarding the use of the horse, the Southern Paiute, in contrast to the Western Ute, apparently lacked horses until more recent times (Steward 1997:181).

Southern Paiute lifestyle appears to have been dominated by the seasons, levels of group mobility, and intensity of cultural exchange. Sharing patterns, and a fairly evident hierarchy, characterized the Southern Paiute sociopolitical organization, which has been labeled, in some instances, as bands (Kelly 1934). The family was the social unit with small groups loosely bound into larger ones by blood relationships. Most marriages were monogamous; however, marriage variants such as sororal polyandry and polygamy have been reported (Stewart 1942). Exchange marriages were fairly common (Kelly and Fowler 1986:377).

Historical data defined Southern Paiute settlements as being composed of three to five households; however, some sources report that "size varied from one or two households to 'many,' which seems to have meant about 10; the maximum number reported was 20" (Kelly and Fowler 1986:380). Groups were not fixed, due to their highly mobile lifestyle and occasional intermarriages. Even though settlement was mobile, recurrent residence in at least one previously habituated area was common after extended hunting and gathering trips (Kelly and Fowler 1986: 380).

Southern Paiute groups were under no central political control. Instead, there were several leaders or headmen, each of whom was limited in influence to a local group or group of camps (Kelly and Fowler 1986; Inter-Tribal Council of Nevada 1976). Historically, these leaders served as advisors and were consulted for everyday concerns. Leadership roles changed with arrival of the European and Mormon settlers. Major decisions were made in council meetings, with members of the community and other interested parties present; the chief would be identified by each community and would lead by example and through consensus (Tom and Holt 2000:127). As early as 1855, Mormon settlers were appointing leaders to gain better control of the native population (Tom and Holt 2000:127).

Regarding religious beliefs, Kelly and Fowler (1986) mentioned little is known of Southern Paiute world views. Despite the relatively small bulk of information regarding this matter, it is known that, for the Paiutes, there was a highly elaborated supernatural world consisting of a powerful spirit (the creator), mythic animal heroes, and the spirits of all living organisms (Kelly and Flower 1986; Tom and Holts 2000). Stories among the Paiute people played an important role in the diffusion of traditional beliefs, ethnical and ethical values, and maintaining social cohesion. Shamanism also constituted one of the most important aspects of Southern Paiute religious life. Shamans' or Medicine Men's principal function was healing; however, they were believed to cause illness (Kelly and Fowler 1986:383).

The nature of the cultural, sociopolitical, and economical structure of the Southern Paiutes appears to have been guided by their natural surroundings, available food supply, and the nature of their intra- and inter-ethnical relationships. When times became difficult, they managed to survive and adjust to new situations to preserve their own identity. New connections with other Paiute and non-Paiute groups, as well as with the newcomers (e.g., Mexican traders, Mormons, prospectors, soldiers, federal bureaucrats, and missionaries), were largely established and manipulated to endure as a cultural unit.

Inter-Cultural Contact and Its Consequences

Southern Paiutes were first recorded by European explorers in 1776 when two Franciscan Friars, Francisco Athanasio Dominguez and Silvestre Velez de Escalante, traveled through Southern Paiute territory to find a route between the missions in Santa Fe to the Spanish settlements at Monterey on the Pacific Coast (Euler 1966; Hafen 1948). At that time, only a few scattered European settlements were in place along the Southern Paiutes' land. Father Escalante's diary of the expedition contains valuable accounts about the Southern Paiute lifestyle prior to non-native cultural exchange. Following the Dominguez-Escalante exploration, a high number of adventurers, merchants, and prospectors wandered into Southern Paiute territory seeking furs and minerals, as well as other lucrative resources (Hafen 1948). Impacts of direct contact, soon after the Escalante-Dominguez exploration, were notorious; Indian slave

trade (both intra- and inter-cultural) and clandestine goods trading were enhanced throughout the entire region; extensive trade networks had moved Spanish horses and goods; and diseases had reduced the native population (Hafen 1948:152; Kelly and Fowler 1986; Tom and Holt 2000:123).

By the mid-1800s, Euro-American incursions into the Southern Paiutes' territory had been carried out on an incomprehensible scale. In 1830, The Spanish Trail was definitely opened and extensively used by native and non-native peoples, bringing with it significant changes in the lives of the Southern Paiutes (Hafen 1948; Tom and Holt 2000:129). Because there was so much traffic along the trail, native groups living in an area that is now nearby the study corridors were forced to abandon their traditional lands and/or required to perform forced labor (Hafen 1948; Kelly and Fowler 1986; Tom and Holt 2000).

Mormon emigration onto Southern Paiute country was initiated in 1847. Soon after, their continuous expansion quest caused both positive and negative effects on the Indian people's livelihood. Historical references mention active measures were taken by the Mormon Church and the territorial legislature to end slavery practices along the territory and protect Southern Paiutes from the depredations of other non-Paiute native peoples and Euro-American adventurers and settlers (Kelly and Fowler 1986:386-387). Despite the intensions of the Mormons, the expansive wave of settlers obscured this measure and resulted in fierce economic competition, political and judicial control over the native population, military conflict, and intents on acculturation (Hafen 1948; Kelly and Fowler 1986; Tom and Holt 2000).

In 1865, Utah Superintendent of Indian Affairs, O.H. Irish, suggested problems in southern Utah and southern Nevada might best be solved by removing their traditional inhabitants from their ancestral lands, and placing them on "Reservations" (Kelly and Fowler 1986:387; Inter-Tribal Council of Nevada 1976:83). Even though a series of negotiations took place between O.H. Irish and Southern Paiute headmen, nothing was accomplished. Constant and bloody inter-ethnical hostilities remained (Kelly and Fowler 1986:387; Inter-Tribal Council of Nevada 1976:83-89). Reservations eventually were instituted in the states of Utah, Nevada, and Arizona: the Moapa River Reservation, located on the Upper Muddy River in Nevada (1872); the Shivwits Reservation, located west of St. George, Utah (1891); the Kaibab Reservation, west of Fredonia, Arizona (1907); the Indian Peaks Reservation, northwest of Cedar City, Utah (1915); the Koosharem Band of Paiutes/Utes, southeast of Richfield, Utah (1928), and the Kanosh Reservation, near Kanosh, Utah (1984) (Inter-Tribal Council of Nevada 1976:83-89; Kelly and Fowler 1986:387-390; Tom and Holt 2000: 139-142).

The Termination Act was passed on February 15, 1954, which set in motion the termination of the federal trust relationship between the federal government and the Indian people (Tom and Holt 2000). The Utah Southern Paiute bands and reservations were scheduled for termination. Although the bands brought suit against the federal government for compensation for the loss of their lands, they received only 27.3 cents per acre for about 26.4 million acres. Eventually, federal status was restored to the Paiute bands, which united under one tribal government (1976). In 1984, the Paiute Indian Tribe of Utah was provided with a reservation of 4,770 acres of land, a third of what they had been promised as part of their federal restoration status (Tom and Holt 2000).

The Ute Bands

The Ute Peoples Sub-Groups, Language, and Territory

In anthropological literature, a distinction is drawn between Ute and Southern Paiute cultural groups based on linguistic differences, equestrian mobility for the Ute, and agriculture practices for the Southern Paiute. Like their neighbors to the north and northwest, the Shoshone, and the groups to the southwest, the Southern Paiute, the Ute speak one of the northern Numic branches of the Ute-Aztecan languages

(Bright 1992; Kroeber 1908). The Ute language forms part of what has been called the Ute-Chemehuevi dialectic division, extending from Colorado to Southern California (Kroeber 1908:74).

Prior to the arrival of the Europeans to the Ute homeland, Ute people occupied an area of about 130,000 square miles between the Oquirrh Mountains to the west, the Salt Lake Desert to the northwest, the Uintah Mountains and the Yampa River to the north, and the San Juan River to the south. The eastern limit is defined by the Colorado Rocky Mountains (Callaway et al. 1986:336-337). Other historic sources defined the Ute's cultural region as occupying an area of about 225,000 square miles between Fillmore, Utah, in the west, to Colorado Springs, in the east, and from Baggs, Wyoming, to Abiquiu, New Mexico, from north to south (Duncan 2000:173-174). Historic maps of the area show portions of southern Idaho, northeastern Arizona, northern New Mexico, southwestern Texas and Oklahoma, and western Kansas, as designated "Indian Hunting Grounds" (Jefferson et al. 1972: xi; Lyman and Denver 1970:viii).

The Utes were widely scattered over the territory in small, loose, and highly mobile family groups or bands with sufficient political and economic independence. As with the Southern Paiute, researchers interested in the Ute cultural region generally agree on the difficulty in assigning a specific territory and name to a specific band due to changes and inconsistencies in group nomenclature and their highly residential mobility, mostly after Euro-American contact and Indian settlement on reservations (Callaway et al. 1986: 338-340; Stewart 1942:235-239).

At the arrival of the Europeans, there were at least 11 distinct bands in what is now the State of Utah and Colorado. The bands are the Moache, Capote (Kapota), Weeminuche, Uncompahgre (Tabaguache), White River (Parusanuch and Yamparika), Uintah, Pahvant, Timanogots, Sanpits or San Pitch, Moanumts, and Sheberetch (Callaway et al. 1986: 338-340; Duncan 2000:176; Stewart 1942:235-239). Of the 11 Ute bands, the Pahvant and the Moanumts bands are located within the Ute region, as defined for the Project area.

The Pahvant band occupied the area along Sevier Lake and the lower Sevier River, just west of the Wasatch Mountains (Callaway et al. 1986:340; Stewart 1942:236). The government moved many to the Uintah Reservation, but small remnants remained in their old territory. In the 1980s, their descendants survived at Kanosh, Koosharem, and other small settlements in Utah, where they were largely intermixed with Southern Paiutes in groups known officially as Utah Paiutes (Callaway et al. 1986:340). Regarding the Moanunts band, they were the inhabitants of the upper Sevier River and Otter Creek region, south of the town of Salina, Utah. They were known as the "Fish Ute" due to the role of Fishlake as a spring-summer habitation site (Callaway et al. 1986:340). Along with the Pahvant, the Moanunts were relocated to the Uintah Reservation, but small groups of people remained in their territory.

Utes Cultural Traits

The Ute people's subsistence economy, prior to contact with Europeans, was based on a cyclical pattern of hunting, gathering, fishing, and well-structured trade. While territorial boundaries were established, access to productive natural resources was communal and equitable (Callaway et al. 1986). Natural resources were processed and stored for winter (Stewart 1942:249-250). Ute peoples acquired horses from the Spanish during the 17th century; however, they were used especially used in the eastern areas (Callaway et al. 1986:340-341; Jefferson et al. 1972:ix-iix). The acquisition of the horse allowed Ute people to gather in larger bands, increase their trade, increase intra- and inter-ethnical interaction, and enhance mobility in the search for better hunting grounds (Jefferson et al. 1972:ix-iix). Economic interactions were an important measure of the enduring ties between Ute bands and the non-Ute population (Callaway et al. 1986:340).

In contrast with their neighbors, the Southern Paiute, Ute groups usually were composed of several residential units (from 50 to 100 people, all year round) related through matrilineal ties and joined under the leadership of a headman who solicited advice from a council of other kin unit (deme) leaders (Callaway et al. 1986:352, 354). Independent nuclear households were the prevalent habitation form and the predominant form of prenuptial residence was matrilocal. Most marriages among the Western Ute people were monogamous, but marriage variations, such as sororal polygyny have been reported (Stewart 1942:296).

Families were held together by their respect for the deme headman whose status usually was usually derived from his general knowledge, hunting skills and success, and ability to coordinate the movement of his own people. Ute demes were kin units that demonstrated descent from a common ancestor and share a common residence (Callaway et al. 1986:352-353). Relationships within the deme were purely egalitarian. Anne M. Smith (1974:127), who worked among the Northern Utes during the summers of 1936 and 1937, stated the importance of chiefs or headmen grew during the period of Mormon contact, both because of the influence of the use of horses in the Ute social organization and the need of an intermediary between native and non-native populations.

Regarding tradition and religious beliefs of the Utes, there were three powerful animal-peoples who kept the world in balance before humans were created (Duncan 2000:167). As with the Southern Paiute, stories were the basis of Ute history and culture, and defined the relationships of Ute Indians with all living elements, both spiritually and physically (Duncan 2000:167-168). Historic Ute religion was dominated by shamans who received their supernatural powers through dreams. They were believed to cure illness, lead collective hunts, and often, direct the movements of the local groups (Jefferson et al. 1972:68-71; Smith 1974:152-162). Plants also were used and are still used as medicinal agents. Even though western medicine had largely been introduced, traditional practices were not abandoned (Jefferson et al. 1972:64-65).

Inter-Cultural Contact and Its Consequences

Constant interactions between the Utes, neighboring tribes, and non-native populations in the region began no later than the early 1700s as sporadic encounters with explorers, prospectors, and treasure hunters wandered into eastern Utah (Callaway et al. 1986:354). Earlier days have been reported for the Eastern Paiute (early 1600s). The pace accelerated after the Dominguez-Escalante expedition of 1776-1777 and the entrance of Mormon settlers in the mid-1840s in the area. By the time of the Dominguez-Escalante exploration, the Utes had acquired the horse (mainly those in the Uintah Basin) and reinforced their trade networks (Smith 1974). Additionally, they had engaged in a trading and raiding relationships with other cultural groups identified as Pueblo, Apache, Hopi, and Navajo (Callaway et al. 1986:340).

Escalante's diary provides the first description of the Ute cultural region and its inhabitants. Several accounts of incessant, inter-ethnical conflicts, and sporadic alliances and estrangements, between the Ute people and the Spaniards, and the Ute People and other native groups (e.g., Navajo, Plains groups, and Northern and Eastern Shoshone) were reported preceding the Dominguez-Escalante journey. Duncan (2000) cited secondary sources or records of these cultural exchanges and the nature of these encounters.

The Mormons came into Ute traditional territory in 1847 and rapidly settled in the area and beyond its borders. It was there that land-related conflict between the Mormons and the Utes arose and intensified. In 1853 and 1854, two major Mormon-Ute conflicts, the Walker War and the Utah War, erupted in violence (Duncan 2000:188-189) because of retaliation by the Utes to protect their homeland against the control of Euro-American settlers. As a consequence of these waves of violence and failed resolutions, the Mormon settlers pressured the federal government to relocate Indians onto reservations and, in 1861, shortly after

the Civil War had begun, the Secretary of the Interior wrote to President Lincoln recommending the Uintah Valley be made an Indian reservation for the Ute people (Lyman and Denver 1970: 45). The Uintah Reservation was established by Executive Order in 1864. After the reservation was established, and the Ute people continued to be removed from their traditional lands, crisis among Indians and non-native populations reached great proportions. Soon after, other reservations were established, also by Executive Orders. Many other Utes were evicted from their ancestral lands and forced to combine with other groups on the reservation lands (Lyman and Denver 1970:45-48). In 1886, The Uintah Reservation and the Uncompahgre Reservation, which was not conducive to settlement since its creation, were combined into the Uintah and Ouray Reservation, located in Northeastern Utah (Fort Duchesne) (Lyman and Denver 1970:45-48). By the mid-1880s, many Utes had relocated to the reservations and had adopted agriculture and cattle-raising as their main productive activities (Lyman and Denver 1970).

During the mid-19th century, Mormon settlers continued to displace Utes from their territory and farms established years earlier by the federal government (Callaway et al. 1986). By the 1870s, through Mormon and governmental persuasion, Utes in Utah became ever more restricted to the Uintah Reservation. By the mid-1870s, these Utes had been restricted to about 9 percent of their aboriginal range (Callaway et al. 1986:356). By 1930, thousands of acres were given to individuals or alienated through sales (Callaway et al. 1986:356).

Following provisions of the Indian Reorganization Act of 1934, the federal government began to purchase Indian land sold to non-Indians to buy land from White farmers as an attempt to undo past wrongs of the federal government (Callaway et al. 1986:356). According to Clifford Duncan (2000:208-212), the Indian Reorganization Act of 1934 allowed the Indians control over taxation, tribal membership, law and order on the reservation, and assured the Indian right to self-government. Nonetheless, the act "stopped short of abolishing the Bureau of Indian Affairs (BIA), which maintained its role of facilitator between the Indian tribes and the federal government. This severely watered down the status of Indian tribes as sovereign nations, ostensibly one of the main goals of the act (Duncan 2000:209)." The author also stated in the 20th century, the Ute people had gained some money in claims and other payments, as the government finally agreed to fulfill promises it had made through treaties and agreements. Additionally, the government began a "Thirteen Year Program" to prepare the Utes for termination, which was designed to educate and offer plans for economic and social development. Over the next few years, 494 Northern Utes, 27 percent of the tribe, were terminated. The next 7 years were spent separating tribal assets between the terminated and non-terminated Utes (Duncan 2000:212-214).

3.2.6.7 Summary

The BLM will continue ongoing consultations with the tribes and in doing so will keep all the tribes informed regarding the current status of Project.

3.2.7 Paleontological Resources

General concern about potential effects on paleontological resources was expressed as an issue during agency and public scoping for the Project. Paleontological resources are any fossilized remains, traces, or imprints of organisms preserved in the Earth's crust and provide information about the history of life on Earth. Fossils include bones, teeth, shells, leaves, wood, and trackways originally buried in sedimentary deposits. Paleontological resources include not only the actual fossils, but also the sedimentary deposits that contain the fossils.

3.2.7.1 Regulatory Framework

Paleontological resources occurring on federal and state lands are afforded protection by federal and state law and regulation. Protections for paleontological resources include requirements for the (1) assessment of areas containing significant paleontological resources that could be directly or indirectly affected, damaged, or destroyed by development prior to, and as a consequence of, authorization of ground-disturbing activities; and (2) formulation and implementation of measures to mitigate potentially adverse impacts, including permanent preservation of the discovered sites and/or permanent preservation of salvaged materials at federal- and state-approved institutions.

Federal

The Antiquities Act of 1906 and Omnibus Public Land Management Act-Paleontological Resource Preservation (OPLMA-PRP) serve as the primary federal legislation that provides for the protection and conservation of paleontological resources occurring on federally administered lands. The Antiquities Act of 1906 (16 U.S.C. 431-433) provides for protection of both historic and prehistoric items on federal lands. OPLMA-PRP was enacted as part of the 2009 OPLMA-PRP and codified specific protection for resources of paleontological interest and that provide information about the history of life on earth. OPLMA-PRP created criteria for the issuance of paleontological collection permits and directed the U.S. Secretaries of the Interior and Agriculture to ensure paleontological resources discovered on federal lands are curated properly into the collections of approved repository institutions. Other laws also may apply in special circumstances.

BLM's policy for addressing potential impacts on paleontological resources on lands they administer also applies, which is included in the following documents: (1) *Paleontological Resource Management Handbook* (H-8270), (2) *General Procedural Guidance for Paleontological Resource Management* (H-8270-1), (3) *PFYC System for Paleontological Resources on Public Lands* (WO IM 2008-009), and (4) *Assessment and Mitigation of Potential Impacts to Paleontological Resources* (WO IM 2009-011).

State

Utah State Code (63-73-11 through 63-73-19) requires the preservation of significant fossil resources on state lands and mandates that individuals removing or excavating significant fossils on Utah state lands be qualified and permitted under joint jurisdictional cooperation from the Utah Geological Survey, Utah Museum of Natural History, and SITLA. Utah State Code (53B-17-603) also requires important fossils be curated by an approved and qualified institution.

3.2.7.2 Regional Setting

The Project area is located along the eastern margin of the Basin and Range Physiographic Province, which is characterized by mostly parallel, north-south trending mountain ranges separated by desert basins and valleys (Fenneman 1931). The Basin and Range Physiographic Province is bordered on its eastern margin by the Wasatch Mountains and the Colorado Plateau Physiographic Province. The Project area is bounded by the Pahvant Range, Sevier Desert, Escalante Desert, and Beaver Lake Mountains to the west and by the Sevier Plateau, Parowan Valley, Harmony Mountains, and Pine Valley Mountains to the east. The Pahvant Range and Sevier Desert also form the northern boundary, and the Red Mountains form the southern boundary of the Project area. Mountain ranges traversed by the Project include the

Tushar, Mineral, and Bull Valley mountains. Elevation ranges from 4,869 feet above mean sea level in the Beaver Bottoms to more than 7,550 feet above mean sea level in the Tushar Mountains.

Geological units in the Project area range in age from Proterozoic to Cenozoic (Table 3-51). There are 16 known fossil localities that occur within these geological units in the study corridor (i.e., within 1 mile of the reference centerline) and 20 known fossil localities that occur within the Project area. Some of these fossil localities are considered by the BLM, USFS, and the State of Utah to be scientifically significant because they contain vertebrate fossils and/or scientifically significant invertebrate or plant fossils.

TABLE 3-51
GEOLOGICAL UNITS AND PALEONTOLOGICAL RESOURCES IN THE PROJECT AREA

Age	Geological Unit	Lithology	Fossils found in the Project Area	Number of Localities	PFYC[1]	Paleontological Potential
Cenozoic Era						
Quaternary	Terrace and alluvial deposits	Sand, silt, and gravel	*Equus* sp., mammal limb bone	4	2	Low
	Surficial older alluvium and colluvium	Sand, silt, and gravel	None	0	2	Low
Miocene	Sevier River Formation	Sandstone, conglomerate, mudstone, and siltstone	Rodents, rabbits, camelids, carnivores, felids, and gomphotheres	4	4	High
Miocene-Pliocene	Salt Lake Formation and other valley-filling sediments	Siltstone, shale, limestone, sand, silt, conglomerate, tuff, and volcanics	None	0	3	Undetermined
Eocene-Oligocene	Crazy Hollow Formation	Sandstone, siltstone, and shale	None	0	5	Very High
Eocene	Green River Formation	Shale and limestone	None	0	4	High
Cretaceous-Eocene	Wasatch, Flagstaff, and Claron formations	Limestone, shale, sandstone, gypsum, siltstone, and conglomerate	None	0	4	High
Mesozoic Era						
Cretaceous	Iron Springs Formation	Sandstone, conglomerate, siltstone, and mudstone	Indeterminate vertebrate	2	3	Undetermined

TABLE 3-51
GEOLOGICAL UNITS AND PALEONTOLOGICAL RESOURCES IN THE PROJECT AREA

Age	Geological Unit	Lithology	Fossils found in the Project Area	Number of Localities	PFYC[1]	Paleontological Potential
Cretaceous	Frontier, Indianola, Mancos, Mowry, Wahweep, and Straight Cliffs formations	Sandstone, shale, mudstone, and limestone	None	0	3	Undetermined
Jurassic	Arapien Shale	Shale, sandstone, limestone, and gypsum	Gastropods	3	3	Undetermined
	Carmel Formation	Silty limestone, mudstone, siltstone, and sandstone	Invertebrates	3	3	Undetermined
Paleozoic Era						
Permian	Kaibab, Toroweap, Park City, and other formations	Dolomitic limestone, gypsiferous siltstone, sandstone, and shale	Unknown	1	2	Low
Pennsylvanian	Unnamed rocks		Unknown	1	3	Undetermined
Devonian	Pilot Shale	Limestone, shale, and conglomerate	Conodonts	1	2	Low
Unknown	Unnamed rocks		*Aviculopecten*, *Spirifer*, *Composita* (bivalves, brachiopods)	1	2	Low
Proterozoic Era						
Proterozoic	Unnamed rocks	Sedimentary and metamorphic rocks	None	0	1	Low

NOTE: [1]Potential fossil yield classification (PFYC) numbers represent class levels of potential (1 = very low, 2 = low, 3 = moderate or unknown, 4 = high, and 5 = very high). For more explanation, refer to Section 3.2.7.3.

Proterozoic Rocks

The oldest geological units within the study corridors are Proterozoic in age (2.5 billion to 544 million years ago). Two small outcrops of sedimentary and meta-sedimentary Proterozoic rocks occur along the San Francisco Mountains near Black Rock between Milford and Minersville. Fossils have not been reported from these Proterozoic rocks.

Paleozoic Rocks

The Paleozoic Era occurred from 543 to 250 million years ago, when much of western Utah was covered by a sea. Organisms that lived in this sea during the Paleozoic Era include corals, trilobites, ostracodes, brachiopods, pelecypods, gastropods, conodonts, and primitive fish (Sheehan and Harris 1997). Paleozoic rocks crop out in small areas within the Project area near the communities of Milford, Sulphurdale, Black Rock, and Minersville. The Kaibab, Toroweap, and Park City formations, as well as the Pilot Shale, are Paleozoic in age (Hintze et al. 2000).

Mesozoic Rocks

The Mesozoic Era ranges in age from 250 to 65 million years ago. The study corridor contains several geologic formations of Mesozoic age (Table 3-51). The Arapien Shale and Carmel Formation were deposited in a shallow continental sea during the Jurassic Period. These formations contain fossil ammonoids, crinoids, echinoids, snails, and fish (Gillette and Hayden 1997; Hardy 1949). The Frontier, Indianola, Mancos, Mowry, Wahweep, and Straight Cliffs formations represent a group of formations formed in or along the Cretaceous Interior Seaway during the Cretaceous Period. These formations contain fossil invertebrates, fish, reptiles, amphibians, crocodiles, dinosaurs, and mammals (Cobban et al. 2000; Eaton 2006; Kirkland et al. 2006). The Iron Springs Formation consists of terrestrial deposits that contain fossil dinosaurs and mammals of Cretaceous age (Eaton 1999; Milner et al. 2006; Vice et al. 2003).

Cenozoic Sediments

The Cenozoic Era ranges in age from 65 million years ago to the present. The Project area contains several formations of Cenozoic age, including the Green River, Claron, Flagstaff, Crazy Hollow, Sevier River, and Salt Lake formations, as well as Miocene volcanic and intrusive rocks (Hintze et al. 2000). The Claron Formation consists of lacustrine deposits that contain plant and snail fossils of Cretaceous to Eocene age (Rowley et al. 2005; Taylor 1993). The Flagstaff Formation consists of lacustrine deposits that contain rare fossils of mollusks, turtles, and land mammals (a miacid carnivore) of Eocene age (Fouch et al. 1987; Gillette and Hayden 1997; La Rocque 1951; McCullough 1977; Rich and Collinson 1973). The Green River Formation in Utah consists of lacustrine shale and limestone beds deposited in ancient Lake Uinta (Nelson et al. 1980). Fossils consist of plants, fish, amphibians, reptiles, and land mammals of Eocene age (Gardner 1999; Grande 1984; Hesse 1939; Lucas and Schoch 1989; Nelson et al. 1980; Olson and Matsuoka 2005). The Crazy Hollow Formation consists of fluvial and lacustrine deposits that contain invertebrate fossils of Eocene to Oligocene age (Rasmussen et al. 1999; Rasmussen et al. 1999; Weiss 1982). The Sevier River Formation is Miocene in age (13.8 to 6.9 million years old) and consists of fluvial and lacustrine deposits that contain fossil rodents, lagomorphs, camelids, felids, mustelids, and gomphotheres (De Blieux et al. 2002; Kirkland et al. 2006; Korth and De Blieux 2010; Rowley et al. 1979). The Salt Lake Formation consists of lacustrine deposits of limestone and tuff that contain rare fossils of mollusks, fish, beaver, other rodents, lagomorphs, and horse of Miocene to Pliocene age (Tedrow and Robison 1999). Overlying older basin-filling deposits are Quaternary alluvial, fluvial, piedmont, and terrace deposits (Hintze et al. 2000). These deposits locally contain Pleistocene mammals, such as rodents, rabbits, ground sloth, camel, horse, mastodon, mammoth, and carnivores (Gillette and Miller 1999; Larson 1999; Miller 1983). A Pleistocene camel (*Camelops* sp.) was found recently at the Milford Wind Farm in Quaternary sediments, which were considered to be ancient Lake Bonneville shoreline deposits (Strauss et al. 2010).

3.2.7.3 Study Methodology

Inventory

Information for the paleontological inventory was obtained from a review of the scientific literature and geological maps and from record searches at paleontological institutions and governmental agencies. Agencies and institutions contacted include the USGS, BLM, Utah Geological Survey, Museum of Northern Arizona, Brigham Young University, Raymond M. Alf Museum of Paleontology, and the Paleobiology Database operated by the University of California at Santa Barbara. Fieldwork was not conducted as part of the inventory.

Information about the geological units and known fossil localities in the region were used to identify the paleontological potential of areas within 1 mile of the centerline. Paleontological potential levels were assigned to each geological unit using the potential fossil yield classification (PFYC) system adopted by the BLM in 2007 for assessing paleontological potential on federal land (BLM 2008b). The PFYC system is a five-tiered system that classifies geological units based on the relative abundance of vertebrate fossils or scientifically significant invertebrate and plant fossils and their potential to be adversely affected, with a higher class number indicating a higher potential level. This classification system is applied to the geological formation, member, or other distinguishable map unit, preferably at the most detailed level possible. This approach was followed in recognition of the direct relationship that exists between paleontological resources and the geological units within which fossils are entombed. By knowing the geology of a particular area and the fossil productivity of particular geological units that occur in the area, it is possible to predict where fossils likely will be found. Each class is defined briefly as follows:

Class 1 – Very Low Potential. Geological units not likely to contain recognizable fossil remains. These units include igneous, metamorphic, and Precambrian rocks.

Class 2 – Low Potential. Sedimentary geological units not likely to contain vertebrate fossils or scientifically significant nonvertebrate fossils. These units include eolian, diagenetically altered, and Holocene sediments.

Class 3 – Moderate or Unknown Potential. Fossiliferous sedimentary geological units where fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential. Class 3 is divided into two parts:

Class 3a – Moderate Potential. Units are known to contain vertebrate fossils or scientifically significant nonvertebrate fossils, but these occurrences are widely scattered. Common invertebrate or plant fossils may be found in the area.

Class 3b – Unknown Potential. Units exhibit geological features that suggest significant fossils could be present, but little information about the paleontological resources of the unit or area is known. This may indicate the unit or area is poorly studied and field surveys may uncover significant fossils.

Class 4 – High Potential. Geological units that contain a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability.

Class 5 – Very High Potential. Highly fossiliferous geological units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils.

Impact Assessment and Mitigation Planning

The methodology for assessing the potential impacts on paleontological resources associated with implementing the Project include (1) identifying the types of potential effects on paleontological resources that could result from construction, operation, and maintenance of the proposed transmission line and associated facilities; (2) classifying the sensitivity of geological formations based on PFYC; and (3) developing criteria for assessing the intensity of a potential effect on a paleontological resource.

Types of Potential Environmental Effects

The construction, operation, and maintenance of the Project would result in both direct and indirect adverse effects on paleontological resources. Direct effects associated with construction activities could include the loss of paleontological resources as a result of excavation and construction of facilities, staging areas, and road construction or road improvement.

Direct effects associated with the operation and maintenance of the facilities and the presence of the transmission line would not be anticipated. Indirect effects associated with the construction, operation, and maintenance of the Project include loss of paleontological resources resulting from increases in the following:

- Access of the general public to sensitive geological formations and unauthorized collection or vandalism from the construction of permanent access roads
- Erosion from construction activities

Mitigation Planning

The loss of paleontological resources due to construction and ground-disturbing activities resulting from implementation of the Project is the primary potential adverse environmental effect on paleontological resources. As a design feature of the Proposed Action (refer to number 19 in Table 2-6), a PRTP would be developed in consultation with the appropriate land-management agencies to mitigate any potential adverse impacts on paleontological resources.

Criteria for Assessing Intensity of Impacts

Criteria for assessing the relative sensitivity of paleontological resources associated with each geological unit that could be affected by the Project included PFYC and density of recorded fossil localities. Literature research, institutional record searches, and PFYC provided the information necessary to assign a sensitivity level of high, low, or moderate/undetermined to portions of the study corridors. Mitigation of potentially adverse impacts on scientifically significant paleontological resources exposed during construction-related activities would be based on the determination of sensitivity level and treatment during other specific cases (e.g., chance discoveries of paleontological resources in areas with low sensitivity). For the analysis, sensitivity levels were defined as follows:

> **High Sensitivity Level**. Geological units with a high potential for containing significant paleontological resources were determined to have a high sensitivity level. In these cases, the geological unit contains a high density of recorded fossil localities, has produced fossil remains in or near the vicinity of the Project, or is very likely to yield additional

remains during construction. Areas identified as having a PFYC 4 or 5 were considered to have a high sensitivity level.

Moderate/Undetermined Sensitivity Level. The geological unit has limited exposure in the Project area, is poorly studied, or contains no recorded paleontological resource localities. However, in other areas, the same or similar geological units may contain sufficient paleontological localities to suggest exposures of the unit in the Project area would have at least a moderate potential for yielding fossil remains. Areas with a PFYC 3 were considered to have a moderate or undetermined sensitivity level.

Low Sensitivity Level. The geological unit contains very low or no density of recorded fossil localities, has produced little or no fossil remains in the vicinity of the Project, or is not likely to yield any fossil remains. Nevertheless, geological units with few or no prior recorded fossil localities could prove fossiliferous during construction. Areas identified as having a PFYC 1 or 2 were considered to have a low sensitivity level.

Effects Analysis

Assessment of the Intensity of Impacts

The resource sensitivity level assigned to a geological unit was used to indicate the intensity of impacts on paleontological resources in that geological unit associated with implementation of the Project.

Due to the development and implementation of the PRTP, low residual impacts on paleontological resources would be anticipated as described in Section 3.2.7.4 (Tables 3-54 and 3-55).

3.2.7.4 Results

Paleontological sensitivity ranges from low-to-high within the study corridors. A summary of the paleontological sensitivity associated with each alternative route is presented in Table 3-52 and shown in Map MV-9. A summary of baseline resource inventory and results of the effects analysis are presented in Tables 3-54 and 3-55 and described in this section. Table 2-11 presents a comparison of results of the effects analysis for the alternative routes and Table 2-12 presents a summary of the information presented in Table 2-11.

TABLE 3-52
COMPARISON OF PALEONTOLOGICAL SENSITIVITY (IN MILES)

Alternative Route	Total Miles	Low Sensitivity (miles)	Moderate/ Undetermined Sensitivity (miles)	High Sensitivity (miles)	Number of Fossil Localities Occurring in Study Corridor
Alternative N1	120.6	110.2	–	10.4	7
Alternative N2	120.4	110.0	–	10.4	7
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	120.0	109.6	–	10.4	7
Alternative N3	117.2	105.5	–	11.7	5
Alternative N4	109.4	99.0	–	10.4	7
Alternative N5	106.2	94.5	–	11.7	5
Alternative N6 (Proponent's Preferred Alternative)	105.4	93.1	–	12.3	5
Alternative S1	55.9	51.4	1.3	3.2	1
Alternative S2	49.6	48.0	1.1	0.5	4
Alternative S3	57.4	48.9	7.6	0.9	1
Alternative S4	48.9	43.4	4.5	1.0	4
Alternative S5 (Proponent's Preferred Alternative)	59.0	51.5	1.5	6.0	1
Alternative S6	61.8	49.4	8.5	3.9	1
Alternative S7	49.8	48.2	1.1	0.5	4
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative)	49.8	47.8	1.1	0.9	4

The geological units crossed for each alternative are shown in Table 3-53 and discussed in the affected environment section for each alternative.

No Action Alternative

Under this alternative, the environment would remain as it presently exists. This option would forego the opportunity to develop paleontological resource inventories along the route approved for construction and any collection of paleontological data that might be discovered during Project construction.

Northern Area - Sigurd Substation to South of the Black Mountains

The baseline resource inventory and residual impacts for alternative routes considered in the northern area are presented in Table 3-54.

TABLE 3-53
GEOLOGICAL UNITS CROSSED BY ALTERNATIVES

Alternative Route	Low PFYC								Moderate PFYC		High PFYC				Fossil Localities within 1 mile
	Permian Formations (P2)[1]	Surficial Alluvium (Qa)	Quaternary Basalt (Qb)	Quaternary Surficial Older Alluvium and Colluvium (Qao)	Tertiary Intrusive Rocks (Ti)	Miocene Volcanics (Tmv)	Oligocene Volcanic Rocks (Tov)	Tertiary Volcanic rocks (Tvu)	Iron Springs Formation and Mancos Shale (K2)	Salt Lake Formation (T4)	Claron and Flagstaff Formations (T1)	Green River Formation (T2)	Crazy Hollow Formation (T3)	Sevier River Formation (T5)	
Alternative N1	✓	✓	✓		✓	✓	✓				✓	✓	✓	✓	7
Alternative N2	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	7
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	7
Alternative N3		✓	✓	✓		✓	✓				✓	✓	✓	✓	5
Alternative N4	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	7
Alternative N5		✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	5
Alternative N6 (Proponent's Preferred Alternative)		✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	5
Alternative S1		✓	✓		✓	✓		✓	✓		✓				1
Alternative S2		✓					✓			✓	✓				4
Alternative S3		✓	✓			✓			✓	✓	✓				1
Alternative S4		✓	✓			✓			✓	✓	✓				4
Alternative S5 (Proponent's Preferred Alternative)		✓	✓			✓		✓	✓		✓				1
Alternative S6		✓	✓	✓		✓		✓	✓	✓	✓				1

TABLE 3-53
GEOLOGICAL UNITS CROSSED BY ALTERNATIVES

Alternative Route	Low PFYC								Moderate PFYC		High PFYC				Fossil Localities within 1 mile
	Permian Formations (P2)[1]	Surficial Alluvium (Qa)	Quaternary Basalt (Qb)	Quaternary Surficial Older Alluvium and Colluvium (Qao)	Tertiary Intrusive Rocks (Ti)	Miocene Volcanics (Tmv)	Oligocene Volcanic Rocks (Tov)	Tertiary Volcanic rocks (Tvu)	Iron Springs Formation and Mancos Shale (K2)	Salt Lake Formation (T4)	Claron and Flagstaff Formations (T1)	Green River Formation (T2)	Crazy Hollow Formation (T3)	Sevier River Formation (T5)	
Alternative S7		✓	✓			✓				✓	✓				4
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative)		✓	✓			✓				✓	✓				4

NOTES:
[1]Kaibab, Toroweap, and Park City formations
PFYC = Potential fossil yield classification

TABLE 3-54
ALTERNATIVE ROUTE COMPARISON
FOR PALEONTOLOGICAL RESOURCES INVENTORY DATA AND RESIDUAL IMPACTS
BY NORTHERN ALTERNATIVE ROUTES

Alternative Route	Total Miles	Paleontology (miles crossed)						Residual Impacts (miles [percent])			
		PFYC			Paleontological Density[1]						
		High Sensitivity	Moderate Sensitivity	Low Sensitivity	High Sensitivity	Moderate Sensitivity	Low Sensitivity	No identifiable	Low	Moderate	High
Alternative N1	120.6	10.4	–	110.2	1.6	5.8	–	–	120.6 [100.0]	0.0	0.0
Alternative N2	120.4	10.4	–	110.0	1.6	5.8	–	–	120.4 [100.0]	0.0	0.0
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	120.0	10.4	–	109.6	1.6	5.8	–	–	120.0 [100.0]	0.0	0.0
Alternative N3	117.2	11.7	–	105.5	1.6	3.2	–	–	117.2 [100.0]	0.0	0.0
Alternative N4	109.4	10.4	–	99.0	1.6	5.8	–	–	109.4 [100.0]	0.0	0.0
Alternative N5	106.2	11.7	–	94.5	1.6	3.2	–	–	106.2 [100.0]	0.0	0.0
Alternative N6 (Proponent's Preferred Alternative)	105.4	12.3	–	93.1	1.6	3.2	–	–	105.4 [100.0]	0.0	0.0

NOTES:
[1]Paleontological density is based on the number of localities within a square mile of the reference centerline for each alternative route
PFYC = Potential fossil yield classification

Alternative N1 – Black Rock Road to IPP North of Milford Wind Farm

Affected Environment

Alternative N1 crosses 10 geological units (Table 3-53). Of these geological units, Quaternary surficial alluvium, Miocene volcanics, Oligocene volcanics, Quaternary basalt, Tertiary intrusive rocks, and Permian formations have a low PFYC (Table 3-54). The Flagstaff, Green River, Crazy Hollow, and Sevier River formations have a high PFYC. There are seven fossil localities occurring within 1.0 mile of the reference centerline for this alternative route.

Environmental Effects

Alternative N1 crosses 0.5 mile of high and 45.8 miles of low sensitivity for paleontological resources on BLM-administered lands, 7.3 miles of high and 23.5 miles of low sensitivity on USFS land, 0.7 mile of high and 4.4 miles of low sensitivity on state land, and 1.9 miles of high and 36.5 miles of low sensitivity on private land. Alternative N1 crosses 10.4 miles of areas with high paleontological sensitivity, including portions of the route that cross the Green River, Crazy Hollow, Flagstaff, and Sevier River formations, as these areas could contain fossil land mammals or other vertebrates (MV-9). However, as a design feature of the Proposed Action (Table 2-6), all areas with high or moderate/undetermined sensitivity (i.e., PFYC 3, 4, and 5) would be surveyed prior to construction to support development of a PRTP to be implemented before and/or during construction. The PRTP will prescribe collecting scientifically significant fossils, monitoring of ground-disturbing activities during construction to collect scientifically significant fossils, curation of any fossils collected during the survey or monitoring, and deposition of the fossils into a federally approved repository for future scientific study and education. The implementation of the PRTP would minimize the potential for impacts on paleontological resources associated with this alternative route.

Alternative N2 – Black Rock Road to IPP South of Milford Wind Farm

Affected Environment

Alternative N2 crosses 11 geological units (Table 3-53). Of these geological units, Quaternary surficial alluvium, Quaternary surficial older alluvium and colluvium, Oligocene volcanics, Miocene volcanics, Quaternary basalt, Tertiary intrusive rocks, and Permian formations have a low PFYC. The Flagstaff, Green River, Crazy Hollow, and Sevier River formations have a high PFYC. There are seven fossil localities occurring within 1.0 mile of this alternative route.

Environmental Effects

Alternative N2 crosses 0.5 mile of high and 55.6 miles of low sensitivity for paleontological resources on BLM-administered lands, 7.3 miles of high and 23.6 miles of low sensitivity on USFS land, 0.7 mile of high and 3.2 miles of low sensitivity on state land, and 1.9 miles of high and 27.7 miles of low sensitivity on private land. The area that would be anticipated to have high and moderate paleontological sensitivity associated with Alternative N2 would be similar to that described for Alternative N1. Implementing design features of the Proposed Action (Table 2-6) would minimize the potential for impacts on paleontological resources associated with this alternative route.

Alternative N2-A (Route Variation of Alternative N2) – Black Rock Road to IPP South of Milford Wind Farm 1,500 Feet East of Kern River Pipeline (Agency Preferred Alternative)

Affected Environment

Alternative N2-A crosses 11 geological units (Table 3-53). Of these geological units, Quaternary surficial alluvium, Quaternary surficial older alluvium and colluvium, Oligocene volcanics, Miocene volcanics, Quaternary basalt, Tertiary intrusive rocks, and Permian formations have a low PFYC. The Flagstaff, Green River, Crazy Hollow, and Sevier River formations have a high PFYC. There are seven fossil localities occurring within 1.0 mile of this alternative route.

Environmental Effects

Alternative N2-A crosses 0.5 mile of high and 55.5 miles of low sensitivity for paleontological resources on BLM-administered lands, 7.3 miles of high and 23.5 miles of low sensitivity on USFS land, 0.7 mile of high and 3.2 miles of low sensitivity on state land, and 1.9 miles of high and 27.4 miles of low sensitivity on private land. The area that would be anticipated to have high and moderate paleontological sensitivity associated with Alternative N2-A would be similar to that described for Alternative N1. Implementing design features of the Proposed Action (Table 2-6) would minimize the potential for impacts on paleontological resources associated with this alternative route.

Alternative N3 – Black Rock Road Parallel to Kern River Pipeline

Affected Environment

Alternative N3 crosses nine geological units (Table 3-53). Of these geological units, Quaternary surficial alluvium, Quaternary surficial older alluvium and colluvium, Oligocene volcanics, Miocene volcanics, and Quaternary basalt have a low PFYC. The Flagstaff, Green River, Crazy Hollow, and Sevier River formations have a high PFYC. There are five fossil localities occurring within 1.0 mile of this alternative route.

Environmental Effects

Alternative N3 crosses 1.8 miles of high and 62.6 miles of low sensitivity for paleontological resources on BLM-administered lands, 7.3 miles of high and 23.5 miles of low sensitivity on USFS land, 0.7 mile of high and 5.9 miles of low sensitivity on state land, and 1.9 miles of high and 13.4 miles of low sensitivity on private land. Alternative N3 crosses 11.7 miles of areas with high paleontological sensitivity, including portions of the route that cross the Green River, Crazy Hollow, Flagstaff, and Sevier River formations, as these areas could contain fossil land mammals or other vertebrates (MV-9). However, as a design feature of the Proposed Action (Table 2-6), all areas with high or moderate/undetermined sensitivity (i.e., PFYC 3, 4, and 5) would be surveyed prior to construction to support development of a PRTP to be implemented before and/or during construction. The implementation of the PRTP would minimize the potential for impacts on paleontological resources associated with this alternative route.

Alternative N4 – Mineral Mountains to IPP South of Milford Wind Farm

Affected Environment

Alternative N4 crosses 11 geological units (Table 3-53). Of these geological units, Quaternary surficial alluvium, Quaternary surficial older alluvium and colluvium, Oligocene volcanics, Miocene volcanics, Quaternary basalt, Tertiary intrusive rocks, and Permian formations have a low PFYC. The Flagstaff, Green River, Crazy Hollow, and Sevier River formations have a high PFYC. There are seven fossil localities occurring within 1.0 mile of this alternative route.

Environmental Effects

Alternative N4 crosses 0.5 mile of high and 44.0 miles of low sensitivity for paleontological resources on BLM-administered lands, 7.3 miles of high and 23.5 miles of low sensitivity on USFS land, 0.7 mile of high and 4.7 miles of low sensitivity on state land, and 1.9 miles of high and 26.8 miles of low sensitivity on private land. The area that would be anticipated to have high and moderate paleontological sensitivity associated with Alternative N4 would be similar to that described for Alternative N1. Implementing design features of the Proposed Action (Table 2-6) would minimize the potential for impacts on paleontological resources associated with this alternative route.

Alternative N5 – Mineral Mountains Parallel to Kern River Pipeline

Affected Environment

Alternative N5 crosses 10 geological units (Table 3-53). Of these geological units, Quaternary alluvium, Quaternary surficial older alluvium and colluvium, Oligocene volcanics, Miocene volcanics, Quaternary basalt, and Tertiary intrusive rocks have a low PFYC. The Flagstaff, Green River, Crazy Hollow, and Sevier River formations have a high PFYC. There are five fossil localities occurring within 1.0 mile of this alternative route.

Environmental Effects

Alternative N5 crosses 1.8 miles of high and 51.1 miles of low sensitivity for paleontological resources on BLM-administered lands, 7.3 miles of high and 23.5 miles of low sensitivity on USFS land, 0.7 mile of high and 7.4 miles of low sensitivity on state land, and 1.9 miles of high and 12.5 miles of low sensitivity on private land. Alternative N5 crosses 11.7 miles of areas with high paleontological sensitivity, including portions of the route that cross the Green River, Crazy Hollow, Flagstaff, and Sevier River formations, as these areas could contain fossil land mammals or other vertebrates (MV-9). However, as a design feature of the Proposed Action (Table 2-6), all areas with high or moderate/undetermined sensitivity (i.e., PFYC 3, 4, and 5) would be surveyed prior to construction to support development of a PRTP to be implemented before and/or during construction. The implementation of the PRTP would minimize the potential for impacts on paleontological resources associated with this alternative route.

Alternative N6 – Mineral Mountains 1,500 Feet East of Kern River Pipeline (Proponent's Preferred Alternative)

Affected Environment

Alternative N6 crosses 10 geological units (Table 3-53). Of these geological units, Quaternary alluvium, Quaternary surficial older alluvium and colluvium, Oligocene volcanics, Miocene volcanics, Quaternary basalt, and Tertiary intrusive rocks have a low PFYC. The Flagstaff, Green River, Crazy Hollow, and Sevier River formations have a high PFYC. There are five fossil localities occurring within 1.0 mile of the reference centerline for this alternative route.

Environmental Effects

Alternative N6 crosses 1.8 miles of high and 50.7 miles of low sensitivity for paleontological resources on BLM-administered lands, 7.3 miles of high and 23.5 miles of low sensitivity on USFS land, 0.7 mile

of high and 7.2 miles of low sensitivity on state land, and 2.5 miles of high and 11.7 miles of low sensitivity on private land. Alternative N6 crosses 12.3 miles of areas with high paleontological sensitivity, including portions of the route that cross the Green River, Crazy Hollow, Flagstaff, and Sevier River formations, as these areas could contain fossil land mammals or other vertebrates (MV-9). However, as a design feature of the Proposed Action (Table 2-6), all areas with high or moderate/undetermined sensitivity (i.e., PFYC 3, 4, and 5) would be surveyed prior to construction to support development of a PRTP to be implemented before and/or during construction. The implementation of the PRTP would minimize the potential for impacts on paleontological resources associated with this alternative route.

Southern Area – South of the Black Mountains to Red Butte Substation

The baseline resource inventory and residual impacts for alternative routes considered in the southern area are presented in Table 3-55.

TABLE 3-55
ALTERNATIVE ROUTE COMPARISON
FOR PALEONTOLOGICAL RESOURCES INVENTORY DATA AND RESIDUAL IMPACTS
BY SOUTHERN ALTERNATIVE ROUTES

Alternative Route	Total Miles	Paleontology (miles crossed)						Residual Impacts (miles [percent])			
		PFYC			Paleontological Density[1]						
		High Sensitivity	Moderate Sensitivity	Low Sensitivity	High Sensitivity	Moderate Sensitivity	Low Sensitivity	No identifiable	Low	Moderate	High
Alternative S1	55.9	3.2	1.3	51.4	–	2.1	–	–	55.9 [100.0]	0.0	0.0
Alternative S2	49.6	0.5	1.1	48.0	1.5	1.1	–	–	49.6 [100.0]	0.0	0.0
Alternative S3	57.4	0.9	7.6	48.9	–	0.8	–	–	57.4 [100.0]	0.0	0.0
Alternative S4	48.9	1.0	4.5	43.4	0.4	1.8	–	–	48.9 [100.0]	0.0	0.0
Alternative S5 (Proponent's Preferred Alternative)	59.0	6.0	1.5	51.5	–	2.1	–	–	59.0 [100.0]	0.0	0.0
Alternative S6	61.8	3.9	8.5	49.4	–	0.8	–	–	61.8 [100.0]	0.0	0.0
Alternative S7	49.8	0.5	1.1	48.2	1.6	1.2	–	–	49.8 [100.0]	0.0	0.0
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative)	49.8	0.9	1.1	47.8	1.6	1.2	–	–	49.8	0	0

NOTES:
[1]Paleontological density is based on the number of localities within a square mile of the reference centerline for each alternative route
PFYC = Potential fossil yield classification

Alternative S1 – Pinto Creek

Affected Environment

Alternative S1 crosses seven geological units (Table 3-53). Of these geological units, Quaternary surficial alluvium, Tertiary volcanics rocks, Miocene volcanics, and Quaternary basalt have a low PFYC. The Iron Springs Formation and Mancos Shale have a moderate PFYC. The Claron and Flagstaff formations have a high PFYC. There is one fossil locality occurring within 1.0 mile of this alternative route.

Environmental Effects

Alternative S1 crosses 0.7 mile of moderate and 11.9 miles of low sensitivity for paleontological resources on BLM-administered lands; 3.2 miles of high, 0.6 mile of moderate, and 16.9 miles of low sensitivity on USFS land; 0.4 mile of low sensitivity on state land; and 22.2 miles of low sensitivity on private land. Alternative S1 crosses 3.2 miles of areas with high paleontological sensitivity and 1.3 miles of moderate/undetermined areas with paleontological sensitivity, including portions of the route that cross the Iron Springs Formation, Mancos Shale, and Claron and Flagstaff formations, as these areas could contain fossil land mammals or other vertebrates (MV-9). However, as a design feature of the Proposed Action (Table 2-6), all areas with high or moderate/undetermined sensitivity (i.e., PFYC 3, 4, and 5) would be surveyed prior to construction to support development of a PRTP to be implemented before and/or during construction. The implementation of the PRTP would minimize the potential for impacts on paleontological resources associated with this alternative route.

Alternative S2 – IPP West

Affected Environment

Alternative S2 crosses four geological units (Table 3-53). Of these geological units, Quaternary basalt and Miocene volcanics have a low PFYC. The Salt Lake Formation has a moderate PFYC. The Claron and Flagstaff formations have a high PFYC. There are four fossil localities occurring within 1.0 mile of this alternative route along Link 270.

Environmental Effects

Alternative S2 crosses 13.0 miles of low sensitivity for paleontological resources on BLM-administered lands; 0.5 mile of high, 1.1 miles of moderate, and 8.3 miles of low sensitivity on USFS land; 0.9 mile of low sensitivity on state land; and 25.8 miles of low sensitivity on private land. Alternative S2 crosses 0.5 mile of areas with high paleontological sensitivity and 1.1 miles of areas with moderate/undetermined paleontological sensitivity, including portions of the route that cross the Salt Lake, Claron, and Flagstaff formations, as these areas could contain fossil land mammals or other vertebrates (MV-9). However, as a design feature of the Proposed Action (Table 2-6), all areas with high or moderate/undetermined sensitivity (i.e., PFYC 3, 4, and 5) would be surveyed prior to construction to support development of a PRTP to be implemented before and/or during construction. The implementation of the PRTP would minimize the potential for impacts on paleontological resources associated with this alternative route.

Alternative S3 – Ox Valley

Affected Environment

Alternative S3 crosses six geological units (Table 3-53). Of these geological units, Quaternary alluvium, Miocene volcanics, and Quaternary basalt have a low PFYC. The Salt Lake and Iron Springs formations and the Mancos Shale have a moderate PFYC. The Claron and Flagstaff formations have a high PFYC. There is one fossil locality occurring within 1.0 mile of this alternative route.

Environmental Effects

Alternative S3 crosses 0.4 mile of moderate and 13.1 miles of low sensitivity for paleontological resources on BLM-administered lands; 0.9 mile of high, 7.0 mile of moderate, and 12.1 miles of low sensitivity on USFS land; 0.9 mile of low sensitivity on state land; and 0.2 mile of moderate and 22.8 miles of low sensitivity on private land. Alternative S3 crosses 0.9 mile of areas with high paleontological sensitivity and 7.6 miles of areas with moderate/undetermined paleontological sensitivity, including portions of the route that cross the Salt Lake, Iron Springs, Claron, and Flagstaff formations and the Mancos Shale, as these areas could contain fossil land mammals or other vertebrates (MV-9). However, as a design feature of the Proposed Action (Table 2-6), all areas with high or moderate/undetermined sensitivity (i.e., PFYC 3, 4, and 5) would be surveyed prior to construction to support development of a PRTP to be implemented before and/or during construction. The implementation of the PRTP would minimize the potential for impacts on paleontological resources associated with this alternative route.

Alternative S4 – IPP East

Affected Environment

Alternative S4 crosses six geological units (Table 3-53). Of these geological units, Quaternary alluvium, Miocene volcanics, and Quaternary basalt have a low PFYC. The Salt Lake and Iron Springs formations and the Mancos Shale have a moderate PFYC. The Claron and Flagstaff formations have a high PFYC. There are four fossil localities occurring within 1.0 mile of this alternative route along Link 270.

Environmental Effects

Alternative S4 crosses 12.3 miles of low sensitivity for paleontological resources on BLM-administered lands; 1.0 miles of high, 3.6 mile of moderate, and 10.6 miles of low sensitivity on USFS land; 0.4 mile of low sensitivity on state land; and 0.9 mile of moderate and 20.1 miles of low sensitivity on private land. Alternative S4 crosses 1.0 mile of areas with high paleontological sensitivity and 4.5 miles of areas with moderate/undetermined paleontological sensitivity, including portions of the route that cross the Salt Lake, Iron Springs, Claron and Flagstaff formations, and the Mancos Shale, as these areas could contain fossil land mammals or other vertebrates (MV-9). However, as a design feature of the Proposed Action (Table 2-6), all areas with high or moderate/undetermined sensitivity (i.e., PFYC 3, 4, and 5) would be surveyed prior to construction to support development of a PRTP to be implemented before and/or during construction. The implementation of the PRTP would minimize the potential for impacts on paleontological resources associated with this alternative route.

Alternative S5 – Iron Springs and Pinto Creek (Proponent's Preferred Alternative)

Affected Environment

Alternative S5 crosses six geological units (Table 3-53). Of these geological units, Quaternary surficial alluvium, Quaternary basalt, Miocene volcanics, and Tertiary volcanic rocks have a low PFYC. The Iron Springs Formation and Mancos Shale have a moderate PFYC. The Claron and Flagstaff formations have a high PFYC. There is one fossil locality occurring within 1.0 mile of this alternative route.

Environmental Effects

Alternative S5 crosses 2.7 miles of high, 0.9 mile of moderate, and 21.9 miles of low sensitivity for paleontological resources on BLM-administered lands; 3.2 miles of high, 0.6 mile of moderate, and 16.9 miles of low sensitivity on USFS land; 0.1 mile of high sensitivity and 2.1 miles of low sensitivity on state land; and 10.6 miles of low sensitivity on private land. Alternative S5 crosses 6.0 miles of areas with high paleontological sensitivity and 1.5 miles of areas with moderate/undetermined paleontological sensitivity, including portions of the route that cross the Iron Springs, Claron and Flagstaff formations, and the Mancos Shale, as these areas could contain fossil land mammals or other vertebrates (MV-9). However, as a design feature of the Proposed Action (Table 2-6), all areas with high or moderate/undetermined sensitivity (i.e., PFYC 3, 4, and 5) would be surveyed prior to construction to support development of a PRTP to be implemented before and/or during construction. The implementation of the PRTP would minimize the potential for impacts on paleontological resources associated with this alternative route.

Alternative S6 – Iron Springs and Ox Valley

Affected Environment

Alternative S6 crosses eight geological units (Table 3-53). Of these geological units, Quaternary surficial alluvium, Quaternary surficial older alluvium and colluvium, Tertiary volcanic rocks, Miocene volcanics, and Quaternary basalt have a low PFYC. The Salt Lake and Iron Springs formations and the Mancos Shale have a moderate PFYC. The Claron and Flagstaff formations have a high PFYC. There is one fossil locality occurring within 1.0 mile of this alternative route.

Environmental Effects

Alternative S6 crosses 2.9 miles of high sensitivity, 1.3 miles of moderate sensitivity, and 23.4 miles of low sensitivity for paleontological resources on BLM-administered lands; 0.9 mile of high, 7.0 miles of moderate, and 12.1 miles of low sensitivity on USFS land; 0.1 mile of high sensitivity and 2.6 miles of low sensitivity on state land; and 0.2 mile of moderate sensitivity and 11.3 miles of low sensitivity on private land. Alternative S6 crosses 3.9 miles of areas with high paleontological sensitivity and 8.5 miles of areas with moderate/undetermined paleontological sensitivity, including portions of the route that cross the Salt Lake, Iron Springs, Claron and Flagstaff formations, and the Mancos Shale, as these areas could contain fossil land mammals or other vertebrates (MV-9). However, as a design feature of the Proposed Action (Table 2-6), all areas with high or moderate/undetermined sensitivity (i.e., PFYC 3, 4, and 5) would be surveyed prior to construction to support development of a PRTP to be implemented before and/or during construction. The implementation of the PRTP would minimize the potential for impacts on paleontological resources associated with this alternative route.

Alternative S7 – Middle Hybrid Route

Affected Environment

Alternative S7 crosses five geological units (Table 3-53). Of these geological units, Quaternary alluvium, Miocene volcanics, and Quaternary basalt have a low PFYC. The Salt Lake Formation has a moderate PFYC. The Claron and Flagstaff formations, which are grouped together, have a high PFYC. There are four fossil localities occurring within 1.0 mile of this alternative route along Link 270.

Environmental Effects

Alternative S7 crosses 13.0 miles of low sensitivity for paleontological resources on BLM-administered lands; 0.5 mile of high, 1.1 miles of moderate, and 11.5 miles of low sensitivity on USFS land; 0.9 mile of low sensitivity on state land; and 22.8 miles of low sensitivity on private land. Alternative S7 crosses 0.5 mile of areas with high paleontological sensitivity and 1.1 miles of areas with moderate/undetermined paleontological sensitivity, including portions of the route that cross the Salt Lake, Iron Springs, Claron and Flagstaff formations and the Mancos Shale, as these areas could contain fossil land mammals or other vertebrates (MV-9). However, as a design feature of the Proposed Action (Table 2-6), all areas with high or moderate/undetermined sensitivity (i.e., PFYC 3, 4, and 5) would be surveyed prior to construction to support development of a PRTP to be implemented before and/or during construction. The implementation of the PRTP would minimize the potential for impacts on paleontological resources associated with this alternative route.

Alternative S7-A (route variation of Alternative S7) – Middle Hybrid Route 300 Feet East of Sigurd to Red Butte No. 1 Transmission Line Adjacent to Atchinson IRA (Agency Preferred Alternative)

Affected Environment

Alternative S7-A crosses five geological units (Table 3-53). Of these geological units, Quaternary alluvium, Miocene volcanics, and Quaternary basalt have a low PFYC. The Salt Lake Formation has a moderate PFYC. The Claron and Flagstaff formations, which are grouped together, have a high PFYC. There are four fossil localities occurring within 1.0 mile of this alternative route along Link 270.

Environmental Effects

Alternative S7-A crosses 13.0 miles of low sensitivity for paleontological resources on BLM-administered lands; 0.9 mile of high, 1.1 miles of moderate, and 10.6 miles of low sensitivity on USFS land; 0.9 mile of low sensitivity on state land; and 23.3 miles of low sensitivity on private land. Alternative S7-A crosses 0.9 mile of areas with high paleontological sensitivity and 1.1 miles of areas with moderate/undetermined paleontological sensitivity, including portions of the route that cross the Salt Lake, Iron Springs, Claron and Flagstaff formations and the Mancos Shale, as these areas could contain fossil land mammals or other vertebrates (MV-9). However, as a design feature of the Proposed Action (Table 2-6), all areas with high or moderate/undetermined sensitivity (i.e., PFYC 3, 4, and 5) would be surveyed prior to construction to support development of a PRTP to be implemented before and/or during construction. The implementation of the PRTP would minimize the potential for impacts on paleontological resources associated with this alternative route.

3.2.7.5 Summary

Alternative routes N1 to N6 have a similar amount of paleontological sensitivity, only varying between 10.4 and 12.3 miles in high sensitivity areas. Alternative routes N1, N2, N2-A, and N4 have the least amount of high sensitivity areas while Alternative N6 has the most. Geological units with high sensitivity for paleontological resources along these alternative routes include the Green River, Crazy Hollow, Flagstaff, and Sevier River formations. Alternative routes S1 to S7 vary in their amount of paleontological sensitivity areas, varying between 0.5 mile and 6.0 miles in high sensitivity areas, and between 1.1 and 8.5 miles in moderate/undetermined sensitivity areas. Alternatives S2 and S7 have the least and Alternative S5 has the most amount of high sensitivity area. Geological units with high-to-moderate/undetermined sensitivity for paleontological resources along these alternative routes include the Iron Springs Formation, Mancos Shale, Claron Formation, and Flagstaff Formation.

Without preparation and implementation of a PRTP, impacts on paleontological resources could be high along these routes, as many areas could contain scientifically significant fossils, such as fossil land mammals, dinosaurs, and other vertebrates. The PRTP will cover areas with high or moderate/ undetermined sensitivity and will be implemented before and during construction (Table 2-6). The PRTP would include a preconstruction survey to describe and collect scientifically significant fossils, monitoring of ground-disturbing activities during construction to collect scientifically significant fossils, curation of any fossils collected during the survey or monitoring, and deposition of the fossils into a federally approved repository for future scientific study and education.

3.2.8 Visual Resources

3.2.8.1 Introduction

The following section describes the visual resource inventory and impact assessment based on the construction, operation, and maintenance of the proposed Project. The inventory and impact assessment were focused within a 6-mile-wide visual resource study corridor centered on the reference centerline for each alternative route under consideration within this EIS. Furthermore, the inventory and impact assessment methodologies were developed in consultation with the BLM and USFS and are consistent with, and adhere to, applicable visual resource policy of the BLM and USFS.

Areas of concern that were identified during the scoping period and through consultation with the BLM, USFS, local agencies, and the public include:

- BLM
  - American Discovery Trail (National Millennium Trail)
  - Old Spanish Trail (NHT)
  - Escalante Trail
  - I-15
  - Landscape aesthetics associated with the Mineral Mountains
- USFS
  - Mountain Meadows Massacre Site NHL
  - Pine Valley Mountain Wilderness
  - Locations where the Project would not be within the utility window designated by the Fishlake National Forest
  - Areas of High and Very High Scenic Integrity within the Dixie National Forest
- Local Agencies
  - Cove Fort Historic Site
  - Fremont Indian State Park

- Public
  - Residential views from the communities of Pine Valley, Central, Minersville, and Milford
  - Recreation areas adjacent to Pine Valley
  - Landscape aesthetics associated with the Antelope Range

3.2.8.2 Regulatory Framework

Visual resources on BLM-administered lands are managed within the context of the VRM system as described in the *BLM Manual 8400 – Visual Resource Management*. The system includes an inventory of scenic values (VRI) based on the following factors: (1) diversity of landscape elements that define and characterize landscapes in a given planning area (scenic quality), (2) public concern for the landscapes that make up a planning area (sensitivity levels), and (3) landscape visibility from public viewing locations (distance zones). Combined, these three factors determine VRI classes, which indicate existing scenic values of BLM-administered lands. Through the resource management planning process, VRM classes are prepared, which provide VRM objectives for planning and project-level activities and are used to demonstrate compliance with the RMP. The VRM system also describes the methodology to assess and demonstrate compliance with VRM objectives (contrast analysis).

The SMS is used to manage visual resources on USFS-administered lands. SIOs are analyzed and prepared during the forest planning process using the SMS (Landscape Aesthetics) Manual. SIOs establish management goals and objectives (including appropriate levels of mitigation) for a given landscape based on future desired conditions. Consistency with SIOs is determined by evaluating modifications to scenic integrity generated by a project. Per guidance provided in both the Dixie and Fishlake National Forests LRMPs, as amended, a project is considered compliant with the forest plan unless the resulting scenic integrity would not meet the management objectives defined for the management area crossed.

The WWEC Programmatic EIS establishes Interagency Operation Procedures for visual resources that apply to both the BLM and USFS. This document states if agency visual management objectives have not been completed, then they should be developed by the proper agency. The BLM field office manager or forest supervisor will determine the role of the Proponent in completing this task (DOE 2008).

BLM WO IM-2009-167 reiterates existing VRM policy regarding VRI in the context of renewable energy projects (including transmission lines). All BLM field offices must have current VRI and VRM classes delineated as part of the land use planning process. If a BLM field office does not have VRI data, then an inventory will need to be completed to process permit applications (BLM 2009b).

County

Beaver and Iron counties do not have goals, policies, or objectives identified in their general plans in regards to visual resources. This section details specific policies regarding visual resources that may affect the construction, operation, and maintenance of the Project.

Sevier County

Unincorporated areas of Sevier County in the Project area are managed under the 1998 General Plan. Goals and policies identified in the plan include the following:

> "The Forest Service has identified utility corridors and designated these lands as such. USFS officials must complete a NEPA analysis before giving permits for any utility additions on Forest Service land. The Forest Service also encourages buried utility lines for distribution. The visual aspect of aboveground lines is also considered."

Millard County

Unincorporated areas of Millard County in the Project area are managed under the 1998 General Plan. Objectives identified in the plan include the following:

- County Objective: Development should be in harmony with the county's character.
- Develop programs to enhance the county's visual quality.

Washington County

Unincorporated areas of Washington County in the Project area are managed under the 2007 Vision Dixie. Goals and policies identified in the plan include the following:

> "Protect unique physical features. The spectacular visual setting of southern Utah is central to our quality of life and helps drive our economic engine drawing residents, businesses, and tourists to Washington County."

City

The incorporated municipalities of Sigurd, Richfield, Elsinore, Joseph, Minersville, and Enterprise do not have specific planning goals, policies, or objectives for visual resources identified in their general plans. This section details specific policies regarding visual resources that may affect the construction, operation, and maintenance of the Project.

City of Milford

Areas in Milford are managed under the 2004 General Plan. Goals identified in the plan include the following:

> "Goal PS1: To achieve a coordinated and efficient infrastructure system which is visually unobtrusive while designed to meet the current and future needs of the planning area."

3.2.8.3 Environmental Setting

The Project is located in the Basin and Range and Colorado Plateau Physiographic provinces, in the Great Basin and High Plateaus of Utah subdivisions, respectively (Fennemen 1931). Major ecosystems in the Project area include sagebrush basins and slopes, semi-arid foothills, woodland- and shrub-covered low mountains, and shadscale-dominated saline basins (Woods et al. 2001). The Great Basin is characterized by steep (often high elevation), north-south oriented mountains bounding broad, gently sloping, arid basins. The High Plateaus of Utah are characterized by large, high-elevation plateaus with steep slopes along their margins.

Regional landscapes range from developed urban and suburban landscapes in the north, to landscapes with intact characteristics to the south. Urban and suburban type landscapes generally parallel I-70 from Sigurd to Joseph to the Fishlake National Forest boundary. The northern portion of the Project consists of foothills and mountains, including the Pahvant, Tushar, and Mineral mountains. The central portion of the Project is primarily made up of sagebrush basins surrounded by foothills. The southern portion of the Project consists of foothills and mountains, including the Bull Valley, Atchinson, and Pine Valley mountains.

Agricultural development such as center-pivot farming, dry-land agriculture, and grazing lands are integral to the character of the areas around the Sevier River, Escalante Desert, Ox Valley, Mountain Meadows, and along Pinto Creek.

3.2.8.4 Study Methodology

To inventory, characterize, and assess visual resources for all alternatives, regardless of jurisdiction, the following visual components were considered (1) landscape scenery, (2) sensitive viewers, and (3) federal agency visual management objectives. These components are common to both the BLM and USFS visual systems. Planning-level data were used to describe these components except where the data were too general for impact level analysis or data was not available. As such, a Project-level inventory was completed to maintain consistency across multiple jurisdictions as described in the following.

Landscape Scenery

In the context of this Project, landscape scenery pertains to the natural settings that compose the study area. Planning-level data provided by the BLM and USFS were used to develop landscape scenery as described in the following. For BLM-administered lands, scenic quality and sensitivity levels were considered during the landscape scenery inventory. Scenic quality rating units (SQRU) relate to an area of interrelated ecosystems (landscapes) that exhibit similar landform, vegetation, water, etc., and exhibit a distinct landscape character. Each SQRU receives a rating that relates to their inherit aesthetics value. Sensitivity level rating units (SLRU) measure public concern for changes within each SQRU (BLM 1986b).

For USFS-administered lands, scenic attractiveness and scenic integrity were considered during the landscape scenery inventory. Scenic attractiveness is a measure of the aesthetic value inherent in a landscape character unit and is based on landform patterns and features, surface-water characteristics, vegetation patterns, and land use and cultural features. Scenic integrity is the level of intactness associated with the visual elements that define a particular landscape character unit (USFS 1995).

Sensitive Viewers

Sensitive viewers represent viewing locations (including key observation points [KOP]) where the public would view the Project. Sensitive viewers typically include residences, travel routes, and recreation areas. A detailed list of each sensitive viewer, including location and use, is included in Appendix H. The BLM VRM system uses distance zones to account for sensitive viewers in the inventory process and KOPs in the analysis process. The USFS SMS system uses concern levels to describe sensitive viewers.

Distance zones are defined by the BLM as foreground-middleground (less than 5 miles away), background (5 to 15 miles away), and seldom seen (further than 15 miles away or not seen because of

vegetation or topographical screening) (BLM 1986b). These distance zones relate to the level of detail in the landscape or objects being viewed based on the location of viewers.

Federal Agency Visual Management Objectives

Bureau of Land Management

The BLM Manual Handbook 8410-1 established VRM classes, which are assigned through the land use planning process and used to determine management decisions. Compliance with VRM management class objectives is based on a project-specific contrast analysis that compares visual impacts of a proposed project to the class objectives. Visual contrast rating worksheets (BLM Form 8400-4) were prepared from four KOPs to confirm compliance with VRM objectives. The BLM VRM system includes four VRM class objectives to describe the amount of change that is acceptable within each management class as described in Table 3-56.

The Project does not cross Class I or II objective lands.

TABLE 3-56
BLM VISUAL RESOURCE MANAGEMENT CLASSES

Objective Class	Description
Class I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
Class III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV	The objective of this class is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

SOURCE: Bureau of Land Management 1986b

U.S. Forest Service

USFS establishes SIOs through the SMS (Landscape Aesthetics) Manual. SIOs are used to describe the acceptable level of aesthetic change that can be made to the valued landscape character as described in Table 3-57. Consistency with the applicable LRMP was evaluated by comparing the definition of the SIO class crossed with the level of project contrast to determine if the scenic integrity would be degraded below the level allowable by LRMP direction. For the Fishlake National Forest, the allowable level varies by management area and was assessed under the older Visual Management System. Table 3-57 states the minimum Visual Quality Objective for each management area, as defined by the Fishlake National Forest LRMP, as amended, with a crosswalk to the corresponding SIO as defined by the USFS SMS Manual. For the Dixie National Forest, the forest-wide guideline is that permitted management activities should

not be permitted to reduce scenic integrity levels below the prescribed objective for a management area; however, the forest-wide standard for the Dixie National Forest LRMP, as amended, prohibits a result of scenic integrity level of unacceptably low(i.e., below very low). As directed by the Dixie National Forest for the purposes of this study and to provide a consistent baseline for comparison of alternatives as required by the WWEC Programmatic EIS, inventory SIOs were developed for all lands within 3 miles of Project alternatives on the Dixie National Forest. The development of those inventory SIOs are described in Appendix H.

TABLE 3-57
USFS SCENIC INTEGRITY OBJECTIVE LEVELS

Scenic Integrity Objective Level	Description
Moderate	This objective refers to landscapes where the valued landscape character "appears slightly altered." Noticeable deviations must remain visually subordinate to the landscape character being viewed.
Low	This objective refers to landscapes where the valued landscape "appears moderately altered." Deviations begin to dominate the valued landscape character being viewed, but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, vegetation type changes, or architectural styles outside the landscape being viewed. Attributes should not only appear as valued character outside the landscape being viewed, but compatible or complimentary to the character within.
Very Low	This objective refers to landscapes where the valued landscape character "appears heavily altered." Deviations may strongly dominate the valued landscape character. They may not borrow from valued attributes such as size, shape, edge effect, and the landscape being viewed. However, deviations must be shaped and blended with the natural terrain (landforms) so elements such as unnatural edges, roads, landings, and structures do not dominate the composition.

SOURCE: U.S. Forest Service 1995

The Project does not cross very high or very low SIO lands.

Inventory

The methodology used to inventory visual resources across all Project alternatives is consistent with the BLM's VRM Manual (VRM 8400 Series) as well as the USFS SMS. Furthermore, the methodology described in the following addresses Interagency Operation Procedures for visual resources as identified in the WWEC Programmatic EIS and BLM WO IM 2009-167.

The following tasks were implemented to inventory visual resources on all lands within the Project area:

- Identification of BLM VRI components, including SQRUs, SLRUs, distance zones, and VRI classes
- In BLM field offices where VRI components have not been established, a Project-level assessment was completed (i.e., distance zones and SLRUs were represented by sensitive viewers to consider landscape sensitivity)
- Identification of scenic quality/scenic attractiveness (including scenic integrity on USFS-administered lands) in the Project area (where not established by agency)
- Visual sensitivity analysis (where not established by agency [i.e., BLM sensitivity levels])
- Visibility and project-specific distance zone mapping
- Identification of pertinent federal agency visual management objectives (BLM VRM classes and USFS SIO levels)

For detailed inventory study methodology, refer to Appendix H.

Impact Assessment and Mitigation Planning

The methodology used to assess the potential impacts on visual resources associated with implementing the Project included (1) identifying the types of potential effects that could result from construction, operation, and maintenance of the proposed Project; (2) comparing visual elements (form, line, color, and texture) found in the existing landscape with the visual elements associated with the proposed Project (project contrast); (3) developing criteria for assessing the intensity of a potential effect; (4) assessing initial impacts; (5) identifying appropriate mitigation measures for minimizing potential adverse effects; and (6) disclosing potential residual impacts. The impact assessment methodology was developed in consultation with BLM and USFS visual resource specialists. A total of 15 visual simulations were prepared from agency-approved KOP locations to further describe impacts on sensitive viewers and conformance with agency visual management objectives. The simulations are located in Appendix I.

Types of Potential Environmental Effects

The construction, operation, and maintenance of the Project would result in direct effects on visual resources where:

- Landscape scenery (and associated integrity) would be degraded by the presence of vertical elements in the landscape (transmission line structures), areas of cleared vegetation (right-of-way clearing), and exposed soil from the construction of new permanent access roads
- Views from sensitive viewpoints would be adversely modified through the introduction of Project components into the landscape
- The Project would not comply with federal agency visual management objectives where Project components would contrast with or modify the characteristic landscape to a level that would not be consistent with the established management objectives or applicable planning documents

Project Contrast

To assess project contrast generated by the proposed Project, the visual elements (form, line, color, and texture) associated with the existing condition of the landscape (landform, vegetation, water, and structures) were compared to the visual elements associated with the proposed Project. In this regard, project contrast was characterized along all alternative routes and primarily ranged from strong to weak. Project contrast was used as the baseline level of landscape change, which, when combined with scenery and sensitive viewer data, resulted in initial and residual impacts.

Criteria for Assessing Intensity of Impacts

Criteria were developed to assess the intensity of a potential effects associated with implementation of the Project. The intensity of impacts was based on the level of project contrast as it relates to the quality of existing landscapes (landscape scenery) and the visibility and distance of modifications in the viewshed from identified viewpoints (sensitive viewers) (Table 3-58).

TABLE 3-58
CRITERIA FOR ASSESSING INTENSITY OF IMPACTS

Intensity of Impacts	Description
High	▪ Substantially modify the scenic quality of (Class A or B) landscapes. ▪ Contrast produced by the Project would demand attention from identified viewpoints located within the immediate foreground (0 to 0.25 mile) distance zone. ▪ This impact level would be limited to portions of the Project that transmission lines or similar features (i.e., major roads, mines, and existing utility corridors) do not exist in rugged terrain and/or landscapes with restrictive agency visual management objectives (VRM Class II).
Moderate/High	▪ Moderately dominant in high quality (Class A or B) landscapes. ▪ Contrast produced by the Project would begin to demand attention from identified viewpoints located within the immediate foreground or foreground (0.25 to 0.5 mile) distance zones. ▪ This impact level would occur where the Project would not parallel transmission lines or similar features.
Moderate	▪ Co-dominant in high quality (Class A or B) landscapes. ▪ Contrast produced by the Project would attract attention from identified viewpoints typically located within the foreground or middleground (0.5 to 1 mile) distance zones. ▪ This impact level would occur where the Project would parallel existing linear features.
Low/Moderate	▪ Moderately subordinate in moderate quality (Class B or C) landscapes. ▪ Contrast produced by the Project would begin to attract attention from identified viewpoint typically located within the middleground or background (1 to 2 miles) distance zones. ▪ This impact level generally would occur where the Project would parallel an existing similar transmission line facility.
Low	▪ Subordinate in lower quality (Class C) landscapes. ▪ Contrast produced by the Project would be noticeable from identified viewpoints typically located within the background or seldom seen (more than 2 miles) distance zones. ▪ This impact level would occur where the Project would parallel a major transmission line corridor.

Effects Analysis

Assessment of Initial Impacts

Initial impacts were developed based on project contrast in context with landscape scenery, sensitive viewers, and compliance with federal agency visual management objectives. To assess impacts on landscape scenery, the analysis was based on project contrast as it relates to the scenic quality rating of a given landscape. The sensitivity of each viewer, project-specific distance zones, and project contrast were the primary components used to determine visual impacts on sensitive viewers. To determine compliance with BLM VRMs, a contrast analysis was conducted from KOPs. On land managed by the USFS, adherence to the guiding LRMP was evaluated by comparing the definition of the SIO class crossed with the level of project contrast to determine if the scenic integrity would be degraded below the level allowable in forest planning documents. As directed by the Dixie National Forest, inventory SIOs were used as a complete baseline for assessing project consistency because they represented the best available data. Existing plan-approved SIOs for the Dixie National Forest also are discussed by alternative to describe plan consistency.

Mitigation Planning

Design features of the Proposed Action would be applied Project-wide and mitigation measures on a case-by-case basis, as described in Chapter 2. For visual resources, a total of seven mitigation measures were

proposed for the Project (Mitigation Measures 1, 2, 3, 4, 8, 9, and 10). Mitigation measures were applied to all areas of potential moderate/high and moderate initial impacts to reduce impact levels where necessary and effective, and where feasible based on the Project description. Potential low/moderate and low initial impact areas also were studied on a case-by-case basis to determine the effectiveness of mitigation to further reduce impacts.

Mitigation Measure 1 was applied where existing access would need to be widened or upgraded for construction and maintenance. Mitigation Measure 1 would reduce line and color landscape contrast generated by the widening and additional clearing of adjacent vegetation for access.

Mitigation Measure 2 was applied where flat terrain and vegetation would allow for cross-country access. The use of Mitigation Measure 2 would reduce landscape contrast by limiting the amount of soil color exposed during the construction process, which limits contrast between the color of the soil and vegetation.

Mitigation Measure 3 was applied in areas of access level 4 and 5. Mitigation Measure 3 would reduce landscape contrast created by new access roads, through the reduction of cut/fill in sloped areas where grading could expose underlying soils.

Mitigation Measure 4 would be applied where the transmission line crosses overstory vegetation (deciduous forest, mixed conifer forest, pinyon-juniper, or oak stand). This mitigation measure would reduce impacts by decreasing landscape contrast created by the removal of overstory vegetation (tree) and the hard visual line created by the cleared right-of-way/forest interface.

Mitigation Measure 8 was applied where an existing line is paralleled to reduce impacts. Use of Mitigation Measure 8 would modify the standard tower spacing, where feasible, to better match that of the existing structures along the adjacent line, thus reducing line and form structure contrast.

Mitigation Measure 9 was applied where the line crosses a sensitive feature at a perpendicular or near perpendicular angle to offset the proposed structure from a trail, road, scenic byway, or other sensitive viewpoint to the greatest extent practicable, thereby reducing dominance of the transmission line structures in sensitive viewer's viewsheds and/or particular landscape setting.

Mitigation Measure 10, helicopter construction, would be applied in limited locations where access is difficult due to steep terrain. Helicopter construction would reduce landscape contrast particularly in form, line, and color by limiting the amount of landform disturbance and vegetation removal created by the construction of new access roads.

Residual Impacts

After the application of mitigation measures and field observation of site-specific variations in viewing conditions (e.g., viewing position, adjacent landscape influence, viewing orientation, etc.), impacts were assigned a residual impact level of moderate/high, moderate, low/moderate, or low. Impacts are anticipated to be reduced one-half level after implementation of mitigation measures: moderate/high to moderate, moderate to low/moderate, etc.

For the detailed impact assessment methodology, refer to Appendix H.

3.2.8.5 Results

The following results are described for each alternative route in terms of the affected environment and environmental effects. The affected environment discussion includes an inventory of landscape scenery, sensitive viewers, BLM VRM classes and USFS SIO levels, and BLM VRI components. The environmental effects section describes impacts on landscape scenery, sensitive viewers, and compliance with BLM VRM classes and USFS SIO levels. Maps displaying inventory data and residual impacts are included in Volume II (MV-10 to MV-13).

No Action Alternative

Under this alternative, the environment would remain as it presently exists.

Northern Area – Sigurd Substation to South of the Black Mountains

The baseline resource inventory and residual impacts for alternative routes considered in the northern area are presented in Tables 3-59 and 3-60.

Alternative N1 – Black Rock Road to IPP North of Milford Wind Farm

Affected Environment

Landscape Scenery

The majority of this alternative (portions of all links except Links 64, 63, and 66) crosses Class C landscapes, including the Sagebrush Valley and Basin, which are characterized by limited topography relief and are primarily occupied by sagebrush, grasses, and other desert scrub vegetation (MV-10a-c).

Links 33, 30, and 45 are in the Pahvant Range (Class B), which is characterized by steep, colorful rock escarpments with predominantly pinyon-juniper vegetation (MV-10a). Links 64, 63, and 66 cross the Tushar Mountains (Class B), which have moderate-to-steep terrain occupied by dense pinyon-juniper vegetation, as well as a small portion of riparian vegetation in Clear Creek Canyon (Class B) (MV-11a-b). Links 68 and 305 cross rolling juniper hills (Class B), which are defined by undulating, low hills that sustain dense to scattered pinyon-juniper vegetation (MV-10b).

This alternative route primarily crosses the Fishlake National Forest adjacent to an existing 138kV transmission line (including a cleared right-of-way [approximately 50 to 80 feet wide]) that has locally modified the setting. Therefore, existing scenic integrity was inventoried as low due to the strong presence of the existing transmission line. When the alternative route deviates from the existing transmission line at two locations, Link 30 (Milepost 13.7 to 16.8) and Link 64 (Milepost 1.1 to 5.3) to Link 63 (Milepost 0.0 to 0.8), scenic integrity was inventoried as moderate based on the network of existing roads, which slightly alter the existing landscape character.

Sensitive Viewers

High sensitivity residential viewers in high concentrations are located in the following municipalities: Sigurd, Richfield, Elsinore, Joseph, and Milford along Links 24, 26, 33, 30, 45, 64, 381, and 155 (MV-13a-b). The Project would be visible from high sensitivity recreation viewers on Links 30, 64, 63, 66, 68, 305, 365, and 381, including Fremont Indian State Park, Cove Fort Historic Site, Jens Larson Lime Kiln Interpretive Site, American Discovery Trail, Escalante Trail, and Fish Creek (Wild and Scenic Suitable) (MV-12a-b). High sensitivity travel routes, including the Kimberly/Big John Road Scenic Backway and Clear Creek Canyon Road, would have views of Links 63 and 66 (MV-12a).

The Project would be visible on Links 24, 26, 33, 30, 45, 64, 63, 66, 68, and 381 from moderate sensitivity recreation areas, including the Annabella Wildlife Management Area (WMA), Richfield Canal Trail, Marysvale Canyon Trail, Paiute All-terrain Vehicle (ATV) Trail System, Snow College-Richfield Campus, Castle Rock Campground, Flying U Campground, Cove Fort Campground, Cove View Golf Course, Milford Golf Course, Milford Fairgrounds, and numerous local parks (MV-11a-b). Moderate sensitivity travel routes, including I-15, I-70, U.S. Highway 89, SR 21, SR 24, SR 118, SR 119, SR 120, SR 161, SR 257, SR 258, Forest Road (FR) 478, and Beryl Milford Road, would have views of the Project on all links except 330, 350, 380, and 160 (MV-11a-c).

Federal Agency Visual Management Objectives

BLM Visual Resource Management Classes

This alternative route crosses 46.3 miles of BLM-administered lands, with 2.2 miles VRM Class III on Link 33 in the BLM Richfield Field Office and 44.1 miles of VRM Class IV (MV-13a-c).

U.S. Forest Service Inventory Scenic Integrity Objective Levels

There would be 30.8 miles of USFS-administered lands crossed by this alternative, with 2.2 miles in high SIO (Links 30, 64, and 63), which are located southwest of Elsinore and northwest of Joseph, and 28.6 miles in moderate SIO (Links 30, 45, 64, 63, 66, and 68).

TABLE 3-59
ALTERNATIVE ROUTE COMPARISON
FOR VISUAL RESOURCES INVENTORY AND RESIDUAL IMPACTS BY NORTHERN ALTERNATIVE ROUTES

Alternative Route	Total Miles	High Sensitivity Viewers (miles crossed)					Moderate Sensitivity Viewers (miles crossed)					Scenic Quality (miles crossed)			Management Classifications (miles crossed)									Residual Impacts (miles [percent])													Consistency (miles [percent])		
															Bureau of Land Management (BLM)				U.S. Forest Service (USFS)					Landscape Scenery					High Sensitivity Viewers				Moderate Sensitivity Viewers				BLM Visual Resources Management/ USFS Scenic Integrity Objectives		
		0 to 0.25 mile	0.25 to 0.5 mile	0.25 to 1.0 mile	1.0 to 2.0 miles	More than 2 miles	0 to 0.25 mile	0.25 to 0.5 mile	0.25 to 1.0 mile	1.0 to 2.0 miles	More than 2 miles	B	C	Developed	Class I	Class II	Class III	Class IV	Very High	High	Moderate	Low	Very Low	Not Identifiable	Low	Low/moderate	Moderate	Moderate/high	Low	Low/moderate	Moderate	Moderate/high	Low	Low/moderate	Moderate	Moderate/high	Consistent	Not Consistent	Not Applicable
Alternative N1	120.6	10.6	16.2	18.7	20.5	54.6	35.4	19.0	14.2	12.3	39.7	32.9	87.4	0.3	–	–	2.2	44.1	–	2.2	28.6	–	–	0.3 [0.2]	0.4 [0.3]	112.4 [93.3]	7.5 [6.2]	–	33.6 [27.9]	67.0 [55.6]	18.8 [15.5]	1.2 [1.0]	60.8 [50.4]	58.0 [48.1]	1.8 [1.5]	–	71.6 [59.4]	5.5 [4.5]	43.5 [36.1]
Alternative N2	120.4	10.6	16.2	18.9	15.0	59.7	35.4	19.0	14.2	12.3	39.5	34.2	85.9	0.3	–	–	2.2	53.9	–	2.2	28.6	–	–	0.3 [0.2]	0.4 [0.3]	112.2 [93.3]	7.5 [6.2]	–	28.5 [23.7]	71.9 [59.]	18.8 [15.6]	1.2 [1.0]	60.5 [50.2]	58.1 [48.3]	1.8 [1.5]	–	81.4 [67.6]	5.5 [4.6]	33.5 [27.8]
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	120.0	11.2	15.3	18.6	15.0	59.9	34.7	19.1	14.2	12.3	39.7	34.6	85.2	0.2	–	–	2.2	53.8		2.2	28.6	–	–	0.2 [0.2]	0.2 [0.2]	111.8 [93.1]	7.8 [6.5]	–	28.5 [23.8]	70.9 [59.1]	19.4 [16.1]	1.2 [1.0]	59.9 [49.9]	58.3 [48.6]	1.8 [1.5]	–	81.2 [67.7]	5.5 [4.6]	33.3 [27.7]
Alternative N3	117.2	11.3	16.7	23.1	21.2	44.9	36.9	9.5	11.6	6.3	52.9	38.2	78.7	0.3	–	–	2.2	62.3	–	2.2	28.6	–	–	0.3 [0.3]	0.4 [0.3]	109.0 [93.0]	7.5 [6.4]	–	1.6 [1.4]	94.9 [81.0]	19.5 [16.6]	1.2 [1.0]	64.0 [54.6]	51.4 [43.9]	1.8 [1.5]	–	89.8 [76.6]	5.5 [4.7]	21.9 [18.7]
Alternative N4	109.4	10.6	16.2	18.9	15.5	48.2	35.8	19.3	13.6	14.7	26.0	39.8	69.3	0.3	–	–	3.3	41.2	–	2.2	28.6	–	–	0.3 [0.3]	0.4 [0.4]	97.1 [88.7]	11.6 [10.6]	–	28.5 [26.1]	60.9 [55.7]	18.8 [17.1]	1.2 [1.1]	43.9 [40.2]	63.7 [58.2]	1.8 [1.6]	–	69.8 [63.8]	5.5 [5.0]	34.1 [31.2]
Alternative N5	106.2	11.3	16.7	23.1	21.7	33.4	37.3	9.8	11.0	8.7	39.4	43.8	62.1	0.3	–	–	3.3	49.6	–	2.2	28.6	–	–	0.3 [0.3]	0.4 [0.4]	93.9 [88.4]	11.6 [10.9]	–	1.6 [1.5]	83.9 [79.1]	19.5 [18.4]	1.2 [1.1]	47.4 [44.6]	57.0 [53.7]	1.8 [1.7]	–	78.2 [77.6]	5.5 [5.2]	22.5 [21.2]
Alternative N6 (Proponent's Preferred Alternative)	105.4	11.4	15.3	25.5	20.0	33.2	32.5	13.4	11.1	9.2	39.2	48.1	57.1	0.2	–	–	3.3	49.2	–	2.2	28.6	–	–	0.2 [0.2]	0.2 [0.2]	90.8 [86.1]	14.2 [13.5]	–	1.6 [1.5]	79.9 [75.9]	22.7 [21.5]	1.2 [1.1]	42.3 [40.1]	61.3 [58.2]	1.8 [1.7]	–	77.8 [73.8]	5.5 [5.2]	22.1 [21.0]

TABLE 3-60
ALTERNATIVE ROUTE COMPARISON
FOR VISUAL RESOURCES BY NORTHERN ALTERNATIVE ROUTES

Alternative Route	Length (miles)	Landscape Scenery (miles crossed)	Sensitive Viewers: High Sensitivity Viewers (miles crossed)	Sensitive Viewers: Moderate Sensitivity Viewers (miles crossed)	Federal Visual Management Objectives	Summary of Residual Impacts
Alternative N1 Black Rock Road to IPP north of Milford Wind Farm	120.6	Class B Scenery – 32.9	**Views within 0.25 mile –** 10.6 **Views between 0.25 and 0.5 mile –** 16.2	**Views within 0.25 mile –** 35.4 **Views between 0.25 and 0.5 mile –** 19.0	▪ In compliance with visual resource management (VRM) Class III and IV objectives ▪ Not consistent with moderate and high scenic integrity objectives (SIO)	**Landscape Scenery** ▪ Moderate impact on the Pahvant Range, Tushar Mountains, and Juniper Hills landscapes **Residential Views** ▪ Moderate impact on residential viewers in Sigurd, Richfield, Elsinore, Joseph, and Milford **Recreation/Travel Corridor Views** ▪ Moderate/high impact on views from the Fremont Indian State Park ▪ Moderate impact on views from the Jens Larson Lime Kiln, Kimberly/Big John Road Scenic Backway, Fish Creek, Paiute All-terrain Vehicle Trail, Interstate 70, Escalante Trail, and American Discovery Trail **Impacts** ▪ 1.2 miles of moderate/high impact
Alternative N2 Black Rock Road to IPP south of Milford Wind Farm	120.4	Class B Scenery – 34.2	**Views within 0.25 mile -** 10.6 **Views between 0.25 and 0.5 mile –** 16.2	**Views within 0.25 mile –** 35.4 **Views between 0.25 and 0.5 mile –** 19.0	▪ In compliance with VRM Class III and IV objectives ▪ Not consistent with moderate and SIOs	**Landscape Scenery** ▪ Impact on scenery identical to N1 **Residential Views** ▪ Impact on residential viewers identical to N1 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to N1 **Impacts** ▪ 1.2 miles of moderate/high impact
Alternative N2-A (route variation of Alternative N2) Black Rock to IPP south of Milford Wind Farm 1,500 feet east of Kern River Pipeline (Agency Preferred Alternative)	120.0	Class B Scenery – 34.6	**View within 0.25 mile –** 11.2 **Views between 0.25 and 0.5 mile –** 15.3	**Views within 0.25 mile –** 34.7 **Views between 0.25 and 0.5 mile –** 19.1	▪ In compliance with VRM Class III and IV objectives ▪ Not consistent with moderate and high SIOs	**Landscape Scenery** ▪ Impact on scenery identical to N1 **Residential Views** ▪ Impact on residential viewers identical to N1 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to N1 **Impacts** ▪ 1.2 miles of moderate/high impact
Alternative N3 Black Rock Road Parallel to Kern River Pipeline	117.2	Class B Scenery – 38.2	**Views within 0.25 mile –** 11.3 **Views between 0.25 and 0.5 mile –** 16.7	**Views within 0.25 mile –** 36.9 **Views between 0.25 and 0.5 mile –** 9.5	▪ In compliance with VRM Class III and IV objectives ▪ Not consistent with moderate and high SIOs	**Landscape Scenery** ▪ Impact on scenery identical to N1 with the addition of moderate impact on the Foothills landscape **Residential Views** ▪ Impact on residential viewers identical to N1 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to N1 **Impacts** ▪ 1.2 miles of moderate/high impact
Alternative N4 Mineral Mountains to IPP south of Milford Wind Farm	109.4	Class B Scenery – 39.8	**Views within 0.25 mile –** 10.6 **Views between 0.25 and 0.5 mile –** 16.2	**Views within 0.25 mile –** 35.8 **Views between 0.25 and 0.5 mile –** 19.3	▪ In compliance with VRM Class III and IV objectives ▪ Not consistent with moderate and high SIOs	**Landscape Scenery** ▪ Impact on scenery identical to N1 with the addition of moderate impact on the Mineral Mountains landscape **Residential Views** ▪ Impact on residential viewers identical to N1 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to N1 **Impacts** ▪ 1.2 miles of moderate/high impact
Alternative N5 Mineral Mountains to Kern River Pipeline	106.2	Class B Scenery – 43.8	**Views within 0.25 mile –** 11.3 **Views between 0.25 and 0.5 mile –** 16.7	**Views within 0.25 mile –** 37.3 **Views between 0.25 and 0.5 mile –** 9.8	▪ In compliance with VRM Class III and IV objectives ▪ Not consistent with moderate and high SIOs	**Landscape Scenery** ▪ Impacts on scenery identical to N1 with the addition of moderate impact on the Mineral Mountains and Foothills landscapes **Residential Views** ▪ Impact on residential viewers identical to N1 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to N1 **Impacts** ▪ 1.2 miles of moderate/high impact
Alternative N6 Mineral Mountains 1,500 feet east of Kern River Pipeline (Proponent's Preferred Alternative)	105.4	Class B Scenery – 48.1	**Views within 0.25 mile –** 11.4 **Views between 0.25 and 0.5 mile –** 15.3	**Views within 0.25 mile –** 32.5 **Views between 0.25 and 0.5 mile –** 13.4	▪ In compliance with VRM Class III and IV objectives ▪ Not consistent with moderate and high SIOs	**Landscape Scenery** ▪ Impacts on scenery identical to N1 with the addition of moderate impact on the Mineral Mountains and Foothills landscapes **Residential Views** ▪ Impact on residential viewers identical to N1 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to N1 **Impacts** ▪ 1.2 miles of moderate/high impact

U.S. Forest Service Land and Resource Management Plan Conformance

As mapped in the Fishlake National Forest LRMP, as amended, the Project would cross management areas 4A, 4B, and 6B as summarized in Table 3-61. The Project would be in a USFS-designated utility window from Link 45 (Milepost 15.0) to Link 66 (Milepost 0.3) (MV-13a-b). The portion of this alternative that leaves the utility window would be within management area 6B. At Link 66 (Milepost 2.8), the Project re-enters the designated utility window and is located within the window until crosses the USFS boundary on Link 68 (Milepost 1.5).

TABLE 3-61
FISHLAKE NATIONAL FOREST LRMP MINIMUM VISUAL QUALITY OBJECTIVE/SCENIC INTEGRITY OBJECTIVE BY MANAGEMENT AREA

Management Area	Minimum Visual Quality Objective	Minimum Scenic Integrity Objective[1]
4A	Partial retention	Moderate
4B	Modification	Low
6B	Modification	Low

NOTE: [1]Minimum scenic integrity objectives were determined by utilizing the visual quality objective/scenic integrity objective crosswalk provided in Appendix H of the U.S. Forest Service Scenery Management System Manual

BLM Visual Resource Inventory Components

Scenic Quality

The Mineral Mountains are crossed by the Project and are classified as a Class A landscape within the planning inventory data. Landscapes with Class B scenic quality crossed by the Project include Sanpete Valley, Wildcat, Horse Flats, Cove Creek, and the Shauntie Hills. Class C landscapes crossed include the Escalante Desert and Beaver River Bottoms.

Sensitivity Level Rating Units

The Project predominantly crosses areas of low landscape sensitivity with limited areas of high and moderate sensitivity.

Distance Zones

The Project would be located within the foreground-middleground distance zone.

Visual Resource Inventory Classes

The Project crosses VRI Class III and Class IV lands.

Environmental Effects

Landscape Scenery

Moderate-to-moderate/strong contrast would result from the construction and operation of permanent new access roads on moderate-to-steep terrain within Class B scenery, including the Pahvant and Tushar mountains and rolling juniper hills along Links 30, 64, and 63. Additionally, the proposed transmission line would introduce vertical structures into a largely natural landscape setting. Contrast would be reduced by implementing mitigation measures that would limit the amount of permanent vegetation clearing and restore disturbed areas not required for maintenance of the Project. Therefore, residual impacts on landscape scenery would be moderate.

Low-to-low/moderate residual impacts would occur in Class C scenery associated with the broad Sagebrush Valley and Basin landscapes traversed by this alternative. Weak/moderate-to-moderate contrast would result from the introduction of vertical elements (associated with the proposed transmission line structures) in a predominantly horizontal landscape. Additional contrast is anticipated based on vegetation disturbance associated with construction access roads. However, because overland construction is anticipated for this portion of the Alternative N1, vegetation is anticipated to regenerate over time and contrast would be reduced. Therefore, impacts on Class C landscape scenery would be reduced.

Within the Fishlake National Forest, contrast resulting from the Project would range from weak/moderate-to-moderate based on the construction of permanent access roads and right-of-way clearing on moderate-to-steep terrain (Links 30, 45, 64, 63, 66, and 68). The proposed transmission line would parallel an existing transmission line that has locally modified the setting and reduced the integrity of the forest landscape. Therefore, impacts on Class B scenery with moderate scenic integrity would be low/moderate after mitigation, which would reduce contrast generated by the construction of access roads and right-of-way clearing.

Sensitive Viewers

Moderate impacts are anticipated for residential viewers located within 0.5 mile of the Project within the municipalities of Sigurd, Richfield, Elsinore, Milford, and Joseph (Links 33, 30, and 155). Contrast generally would range from weak/moderate-to-moderate because the Project would be located immediately adjacent to an existing transmission line, which has similar visual elements as compared to the Project. Mitigation measures would reduce contrast to weak/moderate resulting in low/moderate residual impacts where the Project is located more than 0.25 mile away from the residences.

Moderate/high impacts are anticipated for viewers within the Fremont Indian State Park located within 0.5 mile of the Project on Links 63 and 64. Specifically, views to the south, towards the Tushar Mountains, would be dominated by moderate/strong contrast associated with access road construction and operation in steep terrain occupied by pinyon-juniper vegetation. In addition, the introduction of vertical elements in a largely natural setting would further increase contrast. Mitigation measures would reduce these impacts to moderate levels, except on the steepest terrain, by limiting ground disturbance generated by the construction of access roads.

Moderate impacts would occur on views from high sensitivity recreation viewers, including the Jens Larson Lime Kiln Interpretive Site (Link 30) and Fish Creek (Link 66) located within 0.5 mile of the Project. Low/moderate contrast would occur because the Project would be located directly adjacent to an existing 138kV transmission line, which has similar visual elements as compared to the Project.

Mitigation measures would reduce contrast through the reduction of right-of-way vegetation clearing and ground disturbance generated by the construction of access roads.

Moderate impacts are anticipated for high sensitivity trails, including the American Discovery Trail and Escalante Trail located within 1.0 mile of the Project on Links 365 and 381. Moderate contrast would occur because the Project would not be adjacent to any existing transmission line structures, so the Project would introduce vertical elements in a horizontal, sagebrush-dominated setting. Mitigation measures would not be effective at reducing contrast and therefore impacts at these locations since views toward the Project would be level with the landscape.

Low/moderate impacts would occur on views from Cove Fort Historic Site, a high sensitivity recreation viewer, located more than 1.0 mile from the Project along Links 66 and 68. Contrast would be anticipated to be weak/moderate since the Project is immediately adjacent to an existing transmission line, which has modified the local landscape character.

Moderate impacts would occur along Link 66 on views from high sensitivity travel routes, including the Kimberly/Big John Road Scenic Backway and Clear Creek Canyon, within 0.5 mile of the Project. Contrast generally would range from weak/moderate-to-moderate because the Project would be located adjacent to an existing transmission line. Mitigation measures would reduce contrast to weak/moderate resulting in low/moderate residual impacts by limiting ground disturbance from the construction of access roads and clearing of vegetation in the right-of-way. On Link 66 (Milepost 0.0 to 0.9) where the Project crosses the Kimberly/Big John Road Scenic Backway, residual impacts would remain at a moderate level.

Moderate impacts are anticipated for the Paiute ATV Trail System, a moderate sensitivity recreation viewer, located within 0.5 mile of the Project on Link 64. Moderate-to-moderate/strong contrast would occur because the Project would introduce a strong vertical element in a largely natural setting. Mitigation measures would reduce contrast by limiting ground disturbance generated by the construction of access roads and clearing of vegetation in the right-of-way.

Low-to-low/moderate impacts would occur on views along Links 24, 26, 33, 30, 45, 63, 68, and 381 from other moderate sensitivity recreation viewers. Contrast is anticipated to be weak/moderate because the Project parallels existing transmission lines with similar visual elements as compared to the Project, and limited ground disturbance is expected.

Low-to-low/moderate impacts are anticipated for moderate sensitivity travel routes, including I-15 and I-70 (Links 24, 26, 33, 30, 45, 64, 63, 66, 68, and 305). Contrast would range from weak/moderate-to-moderate because the Project parallels an existing transmission line and the majority of these travel routes are located more than 1.0 mile from the Project in a level, sagebrush-dominated landscape.

<u>Federal Agency Visual Management Objectives</u>

BLM Visual Resource Management Classes

VRM Class III Objective areas are crossed along the edge of the Pahvant Range on Link 33 with a project contrast of weak/moderate. Changes to the characteristic landscape may be moderate in Class III areas, as defined in the BLM VRM Manual 8410. The remainder of the Project crosses Class IV Objective areas, which allow strong changes to the characteristic landscape. KOP No. 12 located along I-70, KOP No. 1 in Richfield, and KOP No. 5 at Cove Fort confirm the Project would be compliant with the VRM objectives along this alternative route.

U.S. Forest Service Inventory Scenic Integrity Objective Levels

Project contrast was assessed to be weak/moderate-to-moderate/strong within areas inventoried as a moderate SIO in the Fishlake National Forest (Links 30, 45, 64, 63, 66, and 68). The changes to the landscape in a moderate SIO may appear slightly altered, but must remain subordinate in the landscape. The Project would not meet the definition of a moderate SIO since the Project would introduce additional vertical structures into the landscape and include clearing of vegetation within the right-of-way. There are also areas of high SIO where project contrast ranges from weak/moderate-to-moderate. A high SIO allows changes to be present, but the landscape must appear intact. The Project does not meet the definition of a high SIO due to the construction of multiple vertical structures and the removal of pinyon-juniper vegetation within the right-of-way.

U.S. Forest Service Land and Resource Management Plan Conformance

The majority of the route across the Fishlake National Forest lies within a designated utility window defined as management area 1D in the Fishlake National Forest LRMP, as amended. The general description and goal for this management area is as follows, "Management activities within these linear corridors strive to be compatible with the management goals of the management areas through which they pass." Additional direction is provided for visual resource management, "Design and construct utilities to harmonize with the landscape." The Project would harmonize with the existing landscape and strive to meet minimum visual management prescriptions in management areas 4A, 4B, and 6B as the Project crosses the Fishlake National Forest parallel to an existing transmission line with similar visual elements of form, line, color, and texture in the designated utility window. A portion of the Project, on Link 66 between Milepost 0.3 and 2.8 within Management Area 6B, exits the utility window but follows the existing transmission line. The visual prescription for this management area allows activities to be evident; and through selective mitigation measures, the Project would blend with the existing character of this modified landscape. A portion of this alternative on Link 30, between Milepost 13.9 and 15.0 within Management Area 4B lies outside of the designated utility window, but the Project would not reduce scenic integrity below a low level, the minimum standard for this management area, through the use of selective mitigation measures, including the reduction of vegetation clearing within the right-of-way and limiting ground disturbance from the construction of access roads.

Alternative N2 – Black Rock Road to IPP South of Milford Wind Farm

Affected Environment

Landscape Scenery

Landscape scenery crossed is similar to Alternative N1.

Sensitive Viewers

Sensitive viewers are similar to Alternative N1.

Federal Agency Visual Management Objectives

This alternative crosses 56.1 miles of BLM-administered lands with 2.2 miles VRM Class III on Link 33 in the BLM Richfield Field Office and 53.9 miles of VRM Class IV (MV-13a-c). USFS-administered lands crossed are similar to Alternative N1.

BLM Visual Resource Inventory Components

SQRUs, SLRUs, distance zones, and VRI classes are similar to Alternative N1.

Environmental Effects

Landscape Scenery

Impacts on landscape scenery are similar to Alternative N1.

Sensitive Viewers

Impacts on sensitive viewers are similar to Alternative N1.

Federal Agency Visual Management Objectives

Compliance with visual management objectives would be similar to Alternative N1.

Alternative N2-A (Route Variation of Alternative N2) – Black Rock Road to IPP South of Milford Wind Farm 1,500 Feet East of Kern River Pipeline (Agency Preferred Alternative)

Affected Environment

Landscape Scenery

Landscape scenery crossed is similar to Alternative N1.

Sensitive Viewers

Sensitive viewers are similar to Alternative N1.

Federal Agency Visual Management Objectives

This alternative crosses 56.0 miles of BLM-administered lands with 2.2 miles VRM Class III on Link 33 in the BLM Richfield Field Office and 53.8 miles of VRM Class IV (MV-13a-c). USFS-administered lands crossed are similar to Alternative N1.

BLM Visual Resource Inventory Components

SQRUs, SLRUs, distance zones, and VRI classes are similar to Alternative N1.

Environmental Effects

Impacts on visual resources resulting from implementation of Alternative N2A would be very similar to Alternative N2 except for a marginally greater level of contrast. This is due to the Project not being located directly adjacent to the existing pipeline corridor and the related linear disturbance from that project.

Landscape Scenery

Impacts on landscape scenery are similar to Alternative N1.

Sensitive Viewers

Impacts on sensitive viewers are similar to Alternative N1.

Federal Agency Visual Management Objectives

Compliance with visual management objectives would be similar to Alternative N1.

Alternative N3 – Black Rock Road Parallel to Kern River Pipeline

Affected Environment

Landscape Scenery

Scenic quality crossed is similar to Alternative N1, except this alternative crosses foothills (Class B) on Link 490, which is defined by moderately steep terrain with scattered pinyon-juniper vegetation (MV-10c).

Existing scenic integrity crossed by this alternative in the Fishlake National Forest is similar to Alternative N1.

Sensitive Viewers

Sensitive viewers are similar to Alternative N1, except the addition of the residential areas around Minersville on Link 475 (MV-12b). SR 257, Milford Golf Course, and Milford Fairgrounds are located more than 4.0 miles from Links 345, 450, 460, and 470 (MV-11b).

Federal Agency Visual Management Objectives

This alternative route crosses 64.5 miles of BLM-administered lands with 2.2 miles VRM Class III on Link 33 in the BLM Richfield Field Office and 62.3 miles of VRM Class IV (MV-13a-c). USFS-administered lands crossed are similar to Alternative N1.

BLM Visual Resource Inventory Components

SQRUs, SLRUs, distance zones, and VRI classes are similar to Alternative N1 with the addition of crossing the Black Mountains SQRU (Class B).

Environmental Effects

Landscape Scenery

Impacts on landscape scenery are similar to Alternative N1, except low/moderate residual impacts would occur in the foothills (Class B) landscape on Link 490. Contrast ranges from moderate-to-moderate/strong because the Project crosses steep, vegetated slopes, and strong vertical elements would be placed in a natural landscape. Mitigation would decrease contrast by limiting vegetation clearing in the right-of-way and ground disturbance from the construction of access roads.

Sensitive Viewers

Impacts on sensitive viewers are similar to Alternative N1, except low/moderate-to-moderate impacts would occur along Link 470 on views from residential viewers in Milford and Minersville where the Project is located approximately 1.0 mile away. Contrast is expected to be moderate since there are no adjacent major transmission lines in a flat, sagebrush-dominated landscape, and new access roads would be constructed. Mitigation would not effectively reduce contrast since these residences have level views toward the Project and the structures would be the primary Project component modifying their viewshed.

Federal Agency Visual Management Objectives

Compliance with visual management objectives would be similar to Alternative N1.

Alternative N4 – Mineral Mountains to IPP South of Milford Wind Farm

Affected Environment

Landscape Scenery

Scenic quality crossed is similar to Alternative N1, except this alternative crosses the Mineral Mountains (Class B) on Link 75, which are characterized by rugged mountains with scattered pinyon-juniper vegetation (MV-11b).

Existing scenic integrity crossed by this alternative in the Fishlake National Forest is similar to Alternative N1.

Sensitive Viewers

Sensitive viewers are similar to Alternative N1, except the Project also would be visible on Link 75 from the Beaver County WMA (MV-11b).

Federal Agency Visual Management Objectives

This alternative route crosses 44.5 miles of BLM-administered lands with 3.3 miles of VRM Class III on Link 33 in the BLM Richfield Field Office and Link 75 over the Mineral Mountains between Milepost 12.0 and 13.1 in the BLM Cedar City Field Office, and 41.2 miles of VRM Class IV (MV-13a-c). Existing scenic integrity crossed by this alternative in the Fishlake National Forest is similar to Alternative N1.

BLM Visual Resource Inventory Components

SQRUs, SLRUs, distance zones, and VRI classes are similar to Alternative N1, except the Beaver River Bottoms and Cove Creek landscapes are not crossed.

Environmental Effects

Landscape Scenery

Impacts on landscape scenery are similar to Alternative N1, except low/moderate-to-moderate impacts also would occur along Link 75 in the Mineral Mountains (Class B) landscape. Moderate-to-moderate/strong contrast is anticipated based on the clearing of vegetation within the right-of-way, construction of access roads on steep slopes, and the introduction of new vertical elements into the landscape. Mitigation would decrease contrast to a weak/moderate-to-moderate level by limiting vegetation clearing in the right-of-way and ground disturbance from constructing new access roads.

The design alternative on Link 75 (mono-pole double-circuit 345/138kV structures) would result in a stronger contrast as compared to the typical design (H-frame) for the Project. Moderate/strong contrast is anticipated based on the introduction of taller structures (as compared to the typical design) and increased number of towers per mile. Mitigation measures would reduce contrast to a moderate level by limiting vegetation clearing and ground disturbance related to the construction of the Project. Therefore, residual impacts on the Mineral Mountains landscape would be moderate.

Sensitive Viewers

Impacts on sensitive viewers are similar to Alternative N1, except low/moderate impacts also are anticipated on views from the Beaver County WMA where the Project would be visible from more than 0.5 mile (Link 75). Moderate-to-moderate/strong landscape contrast would occur based on the occurrence of steep terrain, which would require construction of a new access road. Also, because existing transmission lines or other vertical elements do not exist for this portion of the Project, moderate/strong structure contrast would occur.

Moderate impacts are anticipated on views from the Beaver County WMA along Link 75 for the 345/138kV double-circuit design alternative. Contrast is expected to be stronger than the typical design for the Project due to the increased number of towers per mile and taller structures. Mitigation would

reduce contrast to a moderate level by limiting the amount of vegetation cleared in the right-of-way and ground disturbance associated with the construction of access roads. Residual impacts would remain at a moderate level due to the strong influence of the double-circuit structures in the viewer's viewshed.

Federal Agency Visual Management Objectives

Compliance with visual management objectives would be similar to Alternative N1, with the addition of areas of moderate project contrast in VRM Class III lands on Link 75 over the Mineral Mountains. The Project also would comply with these VRM objectives.

The design alternative would not be initially compliant with VRM Class III lands on Link 75 due to moderate/strong project contrast. Mitigation measures, including the reduction of vegetation clearing in the right-of-way and minimizing the ground disturbance from the construction of access roads, would reduce contrast to a moderate level and bring the design alternative into compliance with the visual management objectives.

Alternative N5 – Mineral Mountains Parallel to Kern River Pipeline

Affected Environment

Landscape Scenery

Scenic quality crossed is similar to Alternative N1, except this alternative route crosses the Mineral Mountains (Class B) on Link 75, which are characterized by rugged mountains with scattered pinyon-juniper vegetation (MV-10b). The alternative also crosses foothills (Class B) on Link 490, which are defined by moderately steep terrain with scattered pinyon-juniper vegetation (MV-10c).

Existing scenic integrity crossed by this alternative in the Fishlake National Forest is similar to Alternative N1.

Sensitive Viewers

Sensitive viewers are similar to Alternative N1, except the addition of the residential areas around Minersville (Link 475) and the Beaver County WMA (Link 75). SR 257, Milford Golf Course, and Milford Fairgrounds are located more than 4.0 miles from Links 460 and 470 (MV-11b).

Federal Agency Visual Management Objectives

This alternative crosses 52.9 miles of BLM-administered lands with 3.3 miles VRM Class III on Link 33 in the BLM Richfield Field Office and Link 75 over the Mineral Mountains between Milepost 12.0 and 13.1 in the BLM Cedar City Field Office and 49.6 miles of VRM Class IV (MV-13a-c). USFS-administered lands crossed are similar to Alternative N1.

BLM Visual Resource Inventory Components

SQRUs, SLRUs, distance zones, and VRI classes are similar to Alternative N1 with the addition of crossing the Black Mountains SQRU (Class B). Also, the Beaver River Bottoms and Cove Creek landscapes are not crossed by this alternative.

Environmental Effects

Landscape Scenery

Impacts on landscape scenery are similar to Alternative N1, except low/moderate-to-moderate impacts also would occur in the Mineral Mountains (Class B) on Link 75 and the foothills (Class B) landscapes on Link 490. Contrast would range from moderate-to-moderate/strong because the Project would require clearing on vegetated, steep slopes and would introduce vertical elements in a rolling pinyon-juniper landscape where none exist. Mitigation would decrease contrast by limiting vegetation clearing in the right-of-way and ground disturbance from the construction of access roads.

Impacts on the Mineral Mountains landscape, associated with the design alternative, are identical to the related discussion for Alternative N4.

Sensitive Viewers

Impacts on sensitive viewers are similar to Alternative N1, except low/moderate-to-moderate impacts would occur along Link 470 on views from residences in Milford and Minersville located approximately 1.0 mile from the Project. Contrast is expected to be moderate because there are no adjacent major transmission lines in a flat, sagebrush-dominated landscape. Mitigation measures would not be effective at reducing contrast from these viewers due to their level views toward the Project.

Low/moderate impacts are anticipated on views from the Beaver County WMA where the Project is viewed from more than 0.5 mile away on Link 75. Contrast is expected to range from moderate-to-moderate/strong since the Project crosses steep terrain, which would require construction of new access roads and clearing of vegetation in the right-of-way. The Project also would introduce new vertical elements into the landscape.

Impacts on the views from the Beaver County WMA, associated with the design alternative, are identical to the related discussion for Alternative N4.

Federal Agency Visual Management Objectives

Compliance with visual management objectives would be similar to Alternative N1, with the addition of areas of moderate Project contrast in VRM Class III lands on Link 75 over the Mineral Mountains. The Project also would comply with these VRM objectives.

Compliance with VRM Class III lands associated with the design alternative is identical to the related discussion for Alternative N4.

Alternative N6 – Mineral Mountains 1,500 Feet East of Kern River Pipeline (Proponent's Preferred Alternative)

Affected Environment

Landscape Scenery

Landscape scenery crossed is similar to Alternative N5.

Sensitive Viewers

Sensitive viewers are similar to Alternative N5.

Federal Agency Visual Management Objectives

This alternative route crosses 52.5 miles of BLM-administered lands with 3.3 miles of VRM Class III on Link 33 in the BLM Richfield Field Office and Link 75 over the Mineral Mountains between Milepost 12.0 and 13.1 in the BLM Cedar City Field Office and 49.2 miles of VRM Class IV (MV-13a-c). USFS-administered lands crossed are similar to Alternative N1.

BLM Visual Resource Inventory Components

SQRUs, SLRUs, distance zones, and VRI classes are similar to Alternative N5.

Environmental Effects

Landscape Scenery

Impacts on landscape scenery are similar to Alternative N5.

Sensitive Viewers

Impacts on sensitive viewers are similar to Alternative N5.

Federal Agency Visual Management Objectives

Compliance with visual management objectives would be similar to Alternative N5.

Southern Area – South of the Black Mountains to Red Butte Substation

The baseline resource inventory and residual impacts for alternatives routes considered in the southern area are presented in Tables 3-62 and 3-63.

Alternative S1 – Pinto Creek

Affected Environment

Landscape Scenery

Every link in this alternative except Link 500 crosses Class C landscapes, including the Sagebrush Basin, which is characterized by limited topography relief and primarily occupied by sagebrush, grasses, and other desert scrub vegetation (MV-10c-d). Link 260 crosses the Atchinson Mountains (Class B), which are characterized by moderate-to-steep terrain with pinyon-juniper vegetation (MV-10d). The remaining portions of this alternative (Links 220, 240, 245, 260, and 500) cross rolling juniper hills (Class B) and foothills (Class B), which are defined by moderately steep terrain with scattered pinyon-juniper vegetation (MV-10d).

This alternative route crosses the Dixie National Forest predominantly in high existing scenic integrity landscapes based on intact natural and agrarian landscape character. Landscapes with moderate existing scenic integrity were inventoried on Link 260 (Milepost 0.0 to 3.0 and 17.0 to 22.5) due to the chaining activities that have altered the existing form, line, color, texture, and pattern of the existing landscape.

Sensitive Viewers

High sensitivity residential viewers in high concentration are located in the municipalities of Newcastle, Pinto, Pine Valley, and Central along Links 240, 245, 260, and 500 (MV-12d). The Project would be visible on Links 220, 240, 260, and 500 from high sensitivity recreation viewers, including the Old Spanish NHT, Goat Spring Trail, Water Canyon Trail, Summit/Rock Spring Trail, Pine Valley Chapel, and Pine Valley Mountain Wilderness Area (MV-12d). FR 035 is a high sensitivity travel route, which would have views of the Project on Link 260 (MV-12d).

The Project would be visible on Links 240, 245, 260, and 500 from moderate sensitivity recreation areas, including Newcastle Reservoir, Cemetery Trail, Indian Hollow Trail, Hardscrabble Trail, and Baker Dam Reservoir and Campground (MV-11d). Moderate sensitivity travel routes include the Lund Highway, SR 18, SR 56, FR 009, FR 011, and FR 255 (Links 165, 220, 240, 245, 260, and 500) (MV-11c and MV-11d).

Federal Agency Visual Management Objectives

BLM Visual Resource Management Classes

This alternative route crosses 12.5 miles of BLM-administered lands with 1.3 miles in VRM Class III, south of Central in the BLM St. George Field Office on Link 260, and 11.2 miles in VRM Class IV (MV-13c and MV-11d).

U.S. Forest Service Inventory Scenic Integrity Objective Levels

There would be 20.7 miles of USFS-administered lands crossed with 20.2 miles within an inventory SIO of high (Link 260) and 0.5 mile within an inventory SIO of moderate (Links 260 and 500) (MV-13d). For a discussion of the development of the inventory SIOs, refer to Appendix H.

TABLE 3-62
ALTERNATIVE ROUTE COMPARISON
FOR VISUAL RESOURCES INVENTORY AND RESIDUAL IMPACTS BY SOUTHERN ALTERNATIVE ROUTES

Alternative Route	Total Miles	High Sensitivity Viewers (miles crossed)					Moderate Sensitivity Viewers (miles crossed)					Scenic Quality (miles crossed)			Management Classifications (miles crossed)									Residual Impacts (miles [percent])												Consistency (miles [percent])		
															Bureau of Land Management (BLM)				U.S. Forest Service (USFS)					Landscape Scenery					High Sensitivity Viewers				Moderate Sensitivity Viewers				BLM Visual Resource Management/ USFS Scenic Integrity Objectives		
		0 to 0.25 mile	0.25 to 0.5 mile	0.25 to 1.0 mile	1.0 to 2.0 miles	More than 2 miles	0 to 0.25 mile	0.25 to 0.5 mile	0.25 to 1.0 mile	1.0 to 2.0 miles	More than 2 miles	B	C	Developed	Class I	Class II	Class III	Class IV	Very High	High	Moderate	Low	Very Low	Not Identifiable	Low	Low/moderate	Moderate	Moderate/high	Low	Low/moderate	Moderate	Moderate/high	Low	Low/moderate	Moderate	Moderate/high	Consistent	Not Consistent	Not Applicable
Alternative S1	55.9	7.8	10.1	13.0	9.2	15.8	11.2	3.6	7.0	8.8	25.3	24.1	31.8	–	–	–	1.3	11.2	–	20.2	0.5	–	–	–	0.8 [1.4]	41.4 [74.1]	13.7 [24.5]	–	12.1 [21.6]	26.6 [47.6]	16.5 [29.5]	0.7 [1.3]	32.6 [58.3]	20.8 [37.2]	2.5 [4.5]	–	12.7 [22.7]	20.5 [36.7]	22.7 [40.6]
Alternative S2	49.6	9.6	11.2	11.8	4.9	12.1	9.0	7.9	5.7	5.3	21.7	13.4	36.1	0.1	–	–	–	13.0	–	1.7	8.2	–	–	0.1 [0.2]	–	45.9 [92.5]	3.6 [7.3]	–	12.1 [24.4]	24.2 [48.8]	12.4 [25.0]	0.9 [1.8]	31.3 [63.1]	17.3 [34.9]	1.0 [2.0]	–	13.8 [27.8]	9.1 [18.4]	26.7 [53.8]
Alternative S3	57.4	8.2	7.8	17.1	10.7	13.6	10.7	6.3	7.2	11.0	22.2	25.9	31.5	–	–	–	–	13.5	–	14.2	5.7	–	–	–	–	42.7 [74.4]	14.7 [25.6]	–	12.1 [21.1]	31.3 [54.5]	13.7 [23.9]	0.3 [0.5]	31.7 [55.2]	22.9 [39.9]	2.8 [4.9]	–	14.1 [24.6]	19.3 [33.6]	24.0 [41.8]
Alternative S4	48.9	4.9	8.2	12.5	11.2	12.1	4.2	5.8	9.5	7.7	21.7	20.1	28.8	–	–	–	–	12.3	–	8.4	6.8	–	–	–	–	36.9 [75.5]	12.0 [24.5]	–	12.1 [24.7]	26.1 [53.4]	10.7 [21.9]	–	33.0 [67.5]	14.3 [29.2]	1.6 [3.3]	–	13.1 [26.8]	14.4 [29.4]	21.4 [43.8]
Alternative S5 (Proponent's Preferred Alternative)	59.0	4.6	8.9	10.4	9.2	25.9	11.3	3.9	6.7	11.5	25.6	29.1	29.9	–	–	–	1.3	24.1	–	20.2	0.5	–	–	–	0.8 [1.4]	44.8 [75.9]	13.4 [22.7]	–	0.2 [0.3]	45.1 [76.5]	13.0 [22.0]	0.7 [1.2]	31.6 [53.6]	24.9 [42.2]	2.5 [4.2]	–	25.6 [43.4]	20.5 [34.7]	12.9 [21.9]
Alternative S6	61.8	4.6	3.7	15.0	14.8	23.7	10.8	5.2	9.2	14.1	22.5	33.3	28.5	–	–	–	–	27.6	–	14.2	5.7	–	–	–	–	47.4 [76.7]	14.4 [23.3]	–	0.2 [0.3]	51.9 [84.0]	9.4 [15.2]	0.3 [0.5]	30.7 [49.7]	28.3 [45.8]	2.8 [4.5]	–	28.2 [45.6]	19.3 [31.2]	14.3 [23.2]
Alternative S7	49.8	7.7	8.1	14.0	7.9	12.1	7.2	6.6	7.0	7.3	21.7	18.0	31.8.	–	–	–	–	13.0	–	2.7	10.4	–	–	–	–	43.3 [86.9]	6.5 [13.1]	–	12.1 [24.3]	26.5 [53.2]	11.2 [22.5]	–	32.6 [65.5]	15.6 [31.3]	1.6 [3.2]	–	13.8 [27.7]	12.3 [24.7]	23.7 [47.6]
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative)	49.8	7.7	9.3	13.9	6.8	12.1	6.8	8.3	6.6	6.4	21.7	16.9	32.9	–	–	–	–	13.0	–	1.4	11.2	–	–	–	–	45.5 [91.4]	4.3 [8.6]	–	12.1 [24.3]	26.5 [53.2]	11.2 [22.5]	–	34.2 [68.7]	14.6 [29.3]	1.0 [2.0]	–	13.8 [27.7]	12.3 [24.7]	23.7 [47.6]

TABLE 3-63
ALTERNATIVE ROUTE COMPARISON
FOR VISUAL RESOURCES BY SOUTHERN ALTERNATIVE ROUTES

Alternative Route	Length (miles)	Landscape Scenery (miles crossed)	Sensitive Viewers: High Sensitivity Viewers (miles crossed)	Sensitive Viewers: Moderate Sensitivity Viewers (miles crossed)	Federal Visual Management Objectives	Summary of Residual Impacts
Alternative S1 Pinto Creek	55.9	Class B Scenery – 24.1	**Views within 0.25 mile –** 7.8 **Views between 0.25 and 0.5 mile –** 10.1	**Views within 0.25 mile –** 11.2 **Views between 0.25 and 0.5 mile –** 3.6	▪ In compliance with visual resource management (VRM) Class III and IV objectives ▪ Consistent with moderate scenic integrity objectives (SIO); not consistent with high SIO ▪ Consistent with standard prohibition of unacceptably low SIO	**Landscape Scenery** ▪ Moderate impact on the Foothill, Juniper Hills, and Atchinson Mountain landscapes **Residential Views** ▪ Moderate/high impact on residential viewers along Pinto Creek and southeast of Central ▪ Moderate impact on residential views east of Newcastle **Recreation/Travel Corridor Views** ▪ Moderate impact on views from Forest Road (FR) 011, FR 035, and the Old Spanish National Historic Trail (NHT) **Impacts** ▪ 0.7 mile of moderate/high impact
Alternative S2 IPP West	49.6	Class B Scenery – 13.4	**Views within 0.25 mile –**9.6 **Views between 0.25 and 0.5 mile –** 11.2	**Views within 0.25 mile –** 9.0 **Views between 0.25 and 0.5 mile –** 7.9	▪ In compliance with VRM Class IV objective ▪ Not consistent with moderate and high SIOs ▪ Consistent with standard prohibition of unacceptably low SIO	**Landscape Scenery** ▪ Moderate impact on the Foothill and Juniper Hills landscapes **Residential Views** ▪ Moderate impact on residential viewers in Newcastle, Mountain Meadows, and Central **Recreation/Travel Corridor Views** ▪ Moderate/high impact on views from the Mountain Meadows Massacre Site National Historic Landmark (NHL) ▪ Moderate impact on views from the Old Spanish NHT ▪ Moderate impact on views from State Route (SR) 18 **Impacts** ▪ 0.9 mile of moderate/high impact

TABLE 3-63
ALTERNATIVE ROUTE COMPARISON
FOR VISUAL RESOURCES BY SOUTHERN ALTERNATIVE ROUTES

Alternative Route	Length (miles)	Landscape Scenery (miles crossed)	Sensitive Viewers: High Sensitivity Viewers (miles crossed)	Sensitive Viewers: Moderate Sensitivity Viewers (miles crossed)	Federal Visual Management Objectives	Summary of Residual Impacts
Alternative S3 Ox Valley	57.4	Class B Scenery – 25.9	**Views within 0.25 mile –** 8.2 **Views between 0.25 and 0.5 mile –** 7.8	**Views within 0.25 mile –** 10.7 **Views between 0.25 and 0.5 mile –** 6.3	▪ In compliance with VRM Class IV objective ▪ Not consistent with moderate and high SIOs ▪ Consistent with standard prohibition of unacceptably low SIO	**Landscape Scenery** ▪ Moderate impact on the Foothill, Juniper Hills, and Bull Valley Mountain landscapes **Residential Views** ▪ Moderate/high impact on residential viewers east of Enterprise ▪ Moderate impact on residential viewers in Newcastle, Enterprise, and Ox Valley **Recreation/Travel Corridor Views** ▪ Moderate impact on views from Old Spanish NHT, SR 18, FR 007, and Hardscrabble Trail **Impacts** ▪ 0.3 mile of moderate/high impact
Alternative S4 IPP East	48.9	Class B Scenery – 20.1	**Views within 0.25 mile –** 4.9 **Views between 0.25 and 0.5 mile –** 8.2	**Views within 0.25 mile –** 4.2 **Views between 0.25 and 0.5 mile –** 5.8	▪ In compliance with VRM Class IV objective ▪ Not consistent with moderate and high SIOs ▪ Consistent with standard prohibition of unacceptably low SIO	**Landscape Scenery** ▪ Impact on scenery identical to S2 with the addition of moderate impact on the Atchinson Mountain landscape **Residential Views** ▪ Impact on residential viewers identical to S2 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to S2 except low/moderate impact expected on views from Mountain Meadows Massacre Site NHL and the Old Spanish NHT **Impacts** ▪ 0.0 mile of moderate/high impact
Alternative S5 Iron Springs and Pinto Creek (Proponent's Preferred Alternative)	59.0	Class B Scenery – 29.1	**Views within 0.25 mile –** 4.6 **Views between 0.25 and 0.5 mile –** 8.9	**Views within 0.25 mile –** 11.3 **Views between 0.25 and 0.5 mile –** 3.9	▪ In compliance with VRM Class III and IV objectives ▪ Consistent with moderate SIO; not consistent with high SIO ▪ Consistent with standard prohibition of unacceptably low SIO	**Landscape Scenery** ▪ Impact on scenery identical to S1 **Residential Views** ▪ Impact on residential viewers identical to S1 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to S1 **Impacts** ▪ 0.7 mile of moderate/high impact
Alternative S6 Iron Springs and Ox Valley	61.8	Class B Scenery – 33.3	**Views within 0.25 mile –** 4.6 **Views between 0.25 and 0.5 mile –** 3.7	**Views within 0.25 mile –** 10.8 **Views between 0.25 and 0.5 mile –** 5.2	▪ In compliance with VRM Class IV objective ▪ Not consistent with moderate and high SIOs ▪ Consistent with standard prohibition of unacceptably low SIO	**Landscape Scenery** ▪ Impact on scenery identical to S3 **Residential Views** ▪ Impact on residential viewers identical to S3 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to S3 **Impacts** ▪ 0.3 mile of moderate/high impact
Alternative S7	49.8	Class B Scenery – 18.0	**Views within 0.25 mile –** 7.7 **Views between 0.25 and 0.5 mile –** 8.1	**Views within 0.25 mile –** 7.2 **Views between 0.25 and 0.5 mile –** 6.6	▪ In compliance with VRM Class IV objective ▪ Not consistent with moderate and high SIOs ▪ Consistent with standard prohibition of unacceptably low SIO	**Landscape Scenery** ▪ Impact on scenery identical to S2 with the addition of moderate impact on the Atchinson Mountain landscape **Residential Views** ▪ Impact on residential viewers identical to S2 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to S2 except low/moderate impact expected on views from Mountain Meadows Massacre Site NHL and the Old Spanish NHT **Impacts** 0.0 mile of moderate/high impact
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative)	49.8	Class B Scenery – 16.9	**Views within 0.25 mile –** 7.7 **Views between 0.25 and 0.5 mile –** 9.3	**Views within 0.25 mile –** 6.8 **Views between 0.25 and 0.5 mile –** 8.3	▪ In compliance with VRM Class IV objective ▪ Not consistent with moderate and high SIOs ▪ Consistent with standard prohibition of unacceptably low SIO	**Landscape Scenery** ▪ Impact on scenery identical to S7 except for low-moderate impact on the Atchinson Mountain landscape **Residential Views** ▪ Impact on residential viewers identical to S7 **Recreation/Travel Corridor Views** ▪ Impact on recreation/travel corridor viewers identical to S7 except low/moderate impact expected on views from Mountain Meadows Massacre Site NHL and the Old Spanish NHT **Impacts** 0.0 mile of moderate/high impact

U.S. Forest Service Land and Resource Management Plan Conformance

As currently managed within the Dixie National Forest LRMP, as amended, the Project crosses 2.3 miles of high SIO, 13.2 miles of moderate SIO, 3.9 miles of low SIO, and 1.1 miles of areas that have not been assigned an SIO level. As defined by forest-wide guideline 5 within the Scenery Management System Amendment to the Dixie National Forest LRMP, General Management Areas (Management Area 1) outside of Concern Level 1 and 2 Use Areas and Travelways should be assigned a minimum SIO level based on the project-level scenic attractiveness analysis since these areas were not assigned an SIO level in the plan amendment. Therefore, the Project would cross 1.1 miles with a minimum SIO of moderate (Class B).

BLM Visual Resource Inventory Components

Scenic Quality

Landscapes with Class B scenic quality crossed by the Project include Antelope Mountain and the Pine Valley Mountains. Class C scenic quality landscapes crossed include the Escalante Desert and Young Basalt Flows.

Sensitivity Level Rating Units

The Project crosses BLM-administered lands with low and moderate landscape sensitivity.

Distance Zones

The Project would be located within the foreground-middleground distance zone.

Visual Resource Inventory Classes

The Project crosses predominantly VRI Class IV lands with isolated areas of Class III.

Environmental Effects

Landscape Scenery

Moderate-to-moderate/strong contrast would be anticipated from the construction and operation of permanent new access roads on moderate-to-steep terrain within Class B scenery, including the Atchinson Mountains, foothills, and rolling juniper hills (Links 220, 240, 245, and 260). The Project would introduce vertical structures into a largely natural landscape setting. Contrast would be reduced by implementing mitigation measures that would limit the amount of permanent clearing of pinyon-juniper vegetation and restore disturbed areas not required for maintenance of the Project. Therefore, impacts on landscape scenery would be moderate.

Low-to-low/moderate impacts would occur in Class C scenery associated with the Sagebrush Basin landscape crossed by this alternative route. Weak/moderate-to-moderate contrast would result from the introduction of vertical elements in a predominantly horizontal landscape. Contrast would be reduced by

limited vegetation clearing due to the scattered arboreal vegetation in these landscapes. Impacts on Class C scenery would be reduced.

In the Dixie National Forest, contrast from the construction and operation of the Project would range from moderate-to-moderate/strong. Due to the construction of new access roads and right-of-way clearing on steep terrain, contrast is increased. Therefore, impacts on Class B scenery with high scenic integrity would be moderate after mitigation. Impacts on Class B scenery with moderate scenic integrity would be low/moderate after mitigation.

Sensitive Viewers

Moderate-to-moderate/high impacts are anticipated for residential viewers within the municipalities of Newcastle, Pinto, and Central located within 0.5 mile of the Project on Link 260. Contrast generally would range from moderate-to-moderate/strong because the Project would not be located adjacent to any existing transmission line facilities and new access roads would be constructed. Mitigation measures would reduce contrast to moderate through reducing ground disturbance associated with the construction of new access roads.

Low/moderate impacts would occur along Link 260 on views from residences in Pine Valley because the Project is located more than 2.0 miles away from these residences. Contrast is moderate since the Project would require construction of new access roads on moderately steep terrain, and there are no adjacent major transmission lines.

Moderate impacts are anticipated on views from the Old Spanish NHT, a high sensitivity recreation area, where the Project is located within 0.5 mile of the trail on Link 220. Contrast would be moderate due to the construction of new access roads on steep terrain. Mitigation measures would reduce contrast by reducing ground disturbance associated with the construction of access roads.

Low/moderate impacts are anticipated along Link 260 on views from high sensitivity recreation areas, including the Pine Valley Mountain Wilderness, Summit/Rock Springs Trail, Goat Spring Trail, Water Canyon Trail, and Pine Valley Chapel. Project contrast is expected to range from moderate-to-moderate/strong because the Project would introduce strong vertical elements in an undulating, pinyon-juniper dominated landscape. Since these viewers are located more than 2.0 miles away from the Project, the dominance of the Project components in the landscape would be reduced; therefore, contrast would be reduced to a weak/moderate-to-moderate level. Mitigation measures would further reduce contrast through the reduction of right-of-way vegetation clearing and ground disturbance generated by the construction of access roads.

Moderate impacts would occur on views from FR 035, a high sensitivity travel route, located within 0.5 mile of the Project on Link 260. Contrast would be expected to range from moderate-to-moderate/strong due to the introduction of strong vertical structures in a natural landscape and the construction of access roads on steep, vegetated slopes.

Moderate impacts would occur along Link 260 on views from FR 011, a moderate sensitivity travel route, located within 0.5 mile of the Project. Contrast would be moderate due to the construction of new access roads on moderately steep terrain with no adjacent major transmission lines. Mitigation would decrease contrast by reducing ground disturbance associated with the construction of the new access roads.

Low-to-low/moderate impacts are anticipated for views from other moderate sensitivity travel routes, including SR 18, SR 56, FR 009, and the Lund Highway (Links 165, 220, 240, 245, and 260). Contrast

associated with the Project ranges from weak-to-weak/moderate due to the adjacency of existing major transmission lines, which have locally modified the existing landscapes.

Low-to-low/moderate impacts are anticipated to occur on views from the Newcastle Reservoir (Links 240 and 245) and Baker Dam Reservoir (Link 260), which are both moderate sensitivity recreation viewers. Contrast associated with the Project ranges from weak-to-weak/moderate due to the adjacency of major existing transmissions and the construction of access roads on level terrain with limited vegetation clearing.

Low/moderate impacts would occur on views from other moderate sensitivity recreation areas located more than 2.0 miles from the Project on Links 260 and 500. Contrast would be anticipated to be moderate because new access roads would be constructed on moderately steep terrain where there are no adjacent existing transmission lines.

Federal Agency Visual Management Objectives

BLM Visual Resource Management Classes

Class III Objective areas are crossed south of Central with a weak-to-moderate project contrast on Link 260. Changes to the characteristic landscape may be moderate in VRM Class III Objective areas. The remainder of the Project crosses Class IV objective areas, which allow strong changes to the characteristic landscape. KOP No. 13, located at the Baker Dam Reservoir Campground, confirms the Project would be compliant with the VRM objectives along this route.

U.S. Forest Service Scenic Integrity Objective Levels

In areas of moderate inventory SIO within the Dixie National Forest, project contrast was assessed to be weak (Link 260 and 500). The changes to the landscape in a moderate SIO may appear altered slightly but remain subordinate in the landscape. The Project would meet the definition of a moderate SIO since it parallels multiple existing transmission lines and is located in proximity to an existing substation. Project contrast was assessed to be moderate-to-moderate/strong in areas with high inventory SIOs in the Dixie National Forest on Link 260. The changes to the landscape in a high SIO may be present, but the landscape must appear intact. The Project would not be consistent with the definition of a high SIO since it would alter the landscape through the introduction of strong vertical elements associated with the transmission line structures and the clearing of vegetation in the right-of-way.

U.S. Forest Service Land and Resource Management Plan Conformance

The majority of this alternative is located outside of the designated utility corridor except in proximity to the Red Butte Substation. Guideline 1 within the Scenery Management System Amendment to the Dixie National Forest LRMP states that resource management activities should not be permitted to reduce scenic integrity below the prescribed objective for a management area. The Project crosses areas of high, moderate, and low existing SIOs. The Project would not meet the definitions of these SIOs due to right-of-way vegetation clearing, construction of access roads on steep terrain, and the addition of vertical structures in the landscape. However, the Project would be compliant with the forest plan because scenic integrity would not be reduced below a very low level (management standard 1 for the Dixie National Forest) through the use of appropriate selective mitigation, including the reduction of disturbance associated with construction access roads and limiting vegetation clearing in the right-of-way.

Alternative S2 – IPP West

Affected Environment

Landscape Scenery

The majority of this alternative route (all links except 275 and 442) crosses Class C landscapes, including the Sagebrush Basin, which is characterized by limited topography relief, and are occupied primarily by sagebrush, grasses, and other desert scrub vegetation (MV-10c and MV-10d). The remaining portions of this alternative route (Links 220, 221, 442, 443, 444, 275, and 500) cross rolling juniper hills (Class B) and foothills (Class B), which are characterized by moderately steep terrain with scattered pinyon-juniper vegetation (MV-10d).

This alternative route crosses the Dixie National Forest adjacent to the major utility corridor for the entire alignment (including a cleared right-of-way that is approximately 150 feet wide) that has locally modified the setting. Therefore, existing scenic integrity was inventoried as low due to the strong presence of the utility corridor.

Sensitive Viewers

High sensitivity residential viewers in high concentration are located in the municipalities of Newcastle, Enterprise, and Central (Links 221, 441, 442, 443, 444, and 275) (MV-12d). The Project would be visible from high sensitivity recreation viewers, including the Mountain Meadows Massacre Site NHL and the Old Spanish NHT along Links 220, 221, 441, 442, 443, and 444 (MV-12d). FR 035 is a high sensitivity travel route, which would have views of the Project on Links 275 and 500 (MV-12d).

The Project would be visible on Links 441, 442, 275, and 500 from moderate sensitivity recreation areas, including the Jefferson Hunt Memorial, Hamblin Town site, Newcastle Reservoir, Shinbone Trail, Hardscrabble Trail, and Baker Dam Reservoir and Campground (MV-11d). Moderate sensitivity travel routes include the Lund Highway, SR 18, SR 56, FR 009, FR 011, and Bench Road and would have views of the Project on all links except Link 163 (MV-12c-d).

Federal Agency Visual Management Objectives

BLM Visual Resource Management Classes

This alternative route crosses 13.0 miles of BLM-administered lands with all 13.0 miles in VRM Class IV (MV-13c and MV-13d).

U.S. Forest Service Inventory Scenic Integrity Objective Levels

There would be 9.9 miles of USFS-administered lands crossed with 1.7 miles within an inventory SIO of high (Link 444) and 8.2 miles within an inventory SIO of moderate (Links 442, 443, 444, 275, and 500) (MV-13d). For a discussion of the development of the inventory SIOs, refer to Appendix H.

U.S. Forest Service Land and Resource Management Plan Conformance

In reference to the current management SIOs, the Project crosses 4.6 miles of high SIO, 4.4 miles of moderate SIO, and 1.0 mile that has not been assigned an SIO level. Areas that have not been assigned an SIO level were given a minimum SIO level as directed by forest-wide guideline 5 within the Scenery Management System Amendment to the Dixie National Forest LRMP based on the project-level scenic attractiveness ratings. Therefore, the Project would cross 1.0 mile with a minimum SIO of moderate (Class B).

BLM Visual Resource Inventory Components

SQRUs, SLRUs, distance zones, and VRI classes are similar to Alternative S1, except the Pine Valley Mountain and Young Basalt Flows landscapes are not crossed.

Environmental Effects

Landscape Scenery

Weak-to-weak/moderate contrast would result from the limited areas of new access roads constructed through moderate steep terrain in Class B scenery, including the foothills and rolling juniper hills along Links 220, 221, 441, 442, 443, 444, 275, and 500. The adjacent existing transmission lines would reduce contrast through their strong presence in the landscape. Contrast would be further reduced by implementing mitigation measures that would limit the amount of permanent vegetation clearing and restore disturbed areas not required for maintenance of the Project. Therefore, impacts on landscape scenery would range from low/moderate-to-moderate.

Low-to-low/moderate impacts would occur in Class C scenery associated with the Sagebrush Basin landscape traversed by this alternative route. Weak/moderate-to-moderate contrast would result from the introduction of vertical elements (associated with the proposed transmission line structures) in a predominantly horizontal landscape. Limited vegetation clearing, due to the shorter vegetation in this landscape, would reduce contrast.

Within the Dixie National Forest, contrast resulting from this alternative would range from weak-to-moderate based on the strong presence of the existing transmission lines. The proposed transmission line would parallel an existing transmission line, which has locally modified the setting and reduced the integrity of the forest landscape. Therefore, impacts on Class B scenery with low scenic integrity would be low after mitigation measures, which would reduce contrast generated by the construction of access roads and right-of-way clearing.

Sensitive Viewers

Moderate impacts are anticipated for residential viewers within the municipalities of Newcastle and Central on Links 221, 441, 443, 444, and 275 located within 1.0 mile of the Project. Contrast generally would range from low/moderate-to-moderate because the Project would be located adjacent to existing major transmission lines. Mitigation measures would reduce contrast to low/moderate by reducing ground disturbance associated with the construction of new access roads.

Moderate-to- moderate/high impacts are anticipated for viewers within the Mountain Meadows Massacre Site NHL. Distances from the Project to viewers within the Mountain Meadows Massacre Site NHL would range from 0.375 mile away in the parking lot to 0.25 mile at the Mountain Meadows Memorial on Dan Sill Hill (Link 444). Views of the Project from the parking lot of the memorial would be unobstructed in very close distance to viewers and therefore structure contrast would be strong. Views of the Project from the two memorial viewing platforms, one located at the end of the trail on Dan Sill Hill and the other located on the valley floor, would be in the context of the existing utility corridor and therefore structure and landscape contrast would be reduced. Although the focus of the Mountain Meadows Massacre Site NHL are these viewing platforms, impacts on viewers from within the memorial parking lot would be moderate/high because the proposed facilities would dominate the view. Furthermore, mitigation would not effectively reduce impacts at this location and therefore moderate/high residual impacts are anticipated. However, moderate impacts are anticipated for views from the memorial viewing platforms because the Project would be in context with the existing utility corridor. Mitigation would further reduce contrast by limiting ground disturbance and vegetation. Therefore, overall residual impacts on the Mountain Meadows Massacre Site NHL would be moderate.

Moderate impacts would occur on views from the Old Spanish NHT, where high sensitivity viewers are located within 0.5 mile of the Project on Links 220, 221, 441, 443, and 444. Contrast would range from low/moderate-to-moderate because the Project would be located adjacent to multiple major transmission lines. Mitigation measures would decrease contrast to low/moderate through a reduction of ground disturbance and vegetation clearing. Due to the proximity of the Project to these viewers, impacts would remain at a moderate level.

Low/moderate impacts would occur on views from FR 035, a high sensitivity travel route located approximately 2.0 miles from the Project on Link 275. Contrast is anticipated to be low because the Project is adjacent to multiple major existing transmission lines, which have strongly altered the existing landscape.

Low/moderate impacts are anticipated on views from moderate sensitivity recreation areas on Links 441, 442, 275, and 500, including the Jefferson Hunt Memorial, Hamblin Town site, Newcastle Reservoir, Shinbone Trail, Hardscrabble Trail, and Baker Dam Reservoir and Campground. Contrast associated with the construction and operation of the Project is expected to range from weak-to-weak/moderate due to strong influence of the multiple existing transmission lines on local landscape.

Moderate impacts on views from SR 18 are anticipated where the Project would be visible in a moderately natural setting. Due to the long duration that the proposed facilities would be in view, the use of selective mitigation measures would not be effective at reducing impacts below a moderate level.

Low/moderate impacts would occur on views from moderate sensitivity travel routes, including SR 56, FR 009, FR 011, Lund Highway, and Bench Road on all links within this alternative except Link 163. Contrast would range from weak-to-weak/moderate because the Project is located adjacent to multiple existing transmission lines.

<u>Federal Agency Visual Management Objectives</u>

BLM Visual Resource Management Classes

All BLM-administered lands crossed by this alternative are VRM Class IV objective and project contrast ranges from weak-to-weak/moderate. Changes to the characteristic landscape may be strong in this objective. The Project would comply with the visual management objectives.

U.S. Forest Service Scenic Integrity Objective Levels

Project contrast was assessed to be weak-to-moderate in areas with moderate inventory and existing SIOs in the Dixie National Forest (Links 442, 443, 444, 275, and 500). The changes to the landscape in a moderate SIO may appear slightly altered but remain subordinate in the landscape; therefore, the Project would not meet the definition of a moderate SIO. There are also areas with high inventory SIOs located adjacent to the Mountain Meadows Massacre Site NHL where project contrast ranges from weak/moderate-to-moderate on Link 444. The changes to the landscape in a high SIO may be present, but the landscape must appear intact. The Project would not be consistent with the definition of a high SIO because it would extend the influence of the transmission line corridor to a level that would degrade the character of the landscape.

U.S. Forest Service Land and Resource Management Plan Conformance

Through the Dixie National Forest, this alternative is located entirely within the designated utility corridor. Guideline 1 within the Scenery Management System Amendment to the Dixie National Forest LRMP states that resource management activities should not be permitted to reduce scenic integrity below the prescribed objective for a management area. The Project would not meet the definition of a high or moderate SIO due to right-of-way vegetation clearing, construction of access roads on steep terrain, and the addition of vertical structures in the landscape. The Project would be compliant with the forest plan because scenic integrity would not be reduced below a very low level (management standard 1 for the Dixie National Forest) through the use of appropriate selective mitigation, including the reduction of disturbance associated with construction access roads and limiting vegetation clearing in the right-of-way.

Alternative S3 – Ox Valley

Affected Environment

Landscape Scenery

All links within this alternative route except Links 442, 280, 290, and 500 cross Class C landscapes, including the Sagebrush Basin, which is characterized by limited topography relief, and are primarily occupied by sagebrush, grasses, and other desert scrub vegetation (MV-10c and MV-10d). Link 285 crosses the Bull Valley Mountains, which are characterized by moderate-to-steep terrain with a variety of vegetation types, including pinyon-juniper, oak, and mountain mahogany (MV-10d). The remaining portions of this alternative route cross foothills (Class B), which are defined by moderately steep terrain with scattered pinyon-juniper vegetation (Links 220, 221, 442, 280, 285, 290, and 500).

This alternative route crosses the Dixie National Forest predominantly in high existing scenic integrity landscapes based on the intact natural appearing landscape character. Landscapes with moderate existing scenic integrity were inventoried on Link 280 (Milepost 0.3 to 4.5) and Link 285 (Milepost 0.0 to 2.4) due to the chaining activities, which have altered the existing form, line, color, texture, and pattern of the existing landscape. In landscapes where the Project would be adjacent to a major existing utility corridor, the existing scenic integrity was inventoried as low due to the strong presence of the existing utility corridor.

Sensitive Viewers

High sensitivity residential viewers in high concentration are located in the municipalities of Newcastle, Enterprise, and Central along Links 221, 280, 285, and 500 (MV-12d). The Project would be visible along Links 220, 221, 441, 442, 280, and 290 from the Old Spanish NHT, a high sensitivity recreation viewer (MV-13d).

The Project would be visible from moderate sensitivity recreation areas along Links 221, 441, 442, 280, 285, 290, and 500, including the Jefferson Hunt Memorial, Newcastle Reservoir, Shinbone Trail, Hardscrabble Trail, Enterprise Rodeo Grounds, Heritage Park, and Baker Dam Reservoir and Campground (MV-12d). Moderate sensitivity travel routes include the Lund Highway, SR 18, SR 56, FR 007, FR 011, and Bench Road and would have views of all links within this alternative except Link 163 (MV-12c and MV–12d).

Federal Agency Visual Management Objectives

BLM Visual Resource Management Classes

This alternative route crosses 13.5 miles of BLM-administered lands with all 13.5 miles in VRM Class IV (MV-13c and MV-13d).

U.S. Forest Service Inventory Scenic Integrity Objective Levels

There would be 19.9 miles of USFS-administered lands crossed with 14.2 miles in an inventory SIO of high (Links 280 and 285) and 5.7 miles in an inventory SIO of moderate (Links 285, 290, 442, and 500) (MV-13d). For a discussion of the development of the inventory SIOs, refer to Appendix H.

U.S. Forest Service Land and Resource Management Plan Conformance

In regard to the current management SIOs, the Project crosses through areas of 0.9 mile of high SIO, 12.0 miles of moderate SIO, 0.4 mile of low SIO, and 6.8 miles that have not been assigned an SIO level. As directed by forest-wide guideline 5 within the Scenery Management System Amendment to the Dixie National Forest LRMP, areas that have not been assigned an SIO level were given a minimum SIO level based on the project-level scenic attractiveness ratings. Therefore, the Project would cross 6.8 miles with a minimum SIO of moderate (Class B).

BLM Visual Resource Inventory Components

SQRUs, SLRUs, distance zones, and VRI classes are similar to Alternative S1, except the Pine Valley Mountain and Young Basalt Flows landscapes are not crossed.

Environmental Effects

Landscape Scenery

Moderate-to-moderate/strong contrast would result from the construction and operation of permanent new access roads on moderate-to-steep terrain within Class B scenery, including the Bull Valley Mountains,

foothills, and rolling juniper hills on Links 220, 221, 280, and 285. Additionally, the proposed transmission line would introduce vertical structures into a largely natural landscape setting. Contrast would be reduced by implementing mitigation measures that would limit the amount of permanent vegetation clearing and restore disturbed areas not required for maintenance of the Project. Therefore, impacts on landscape scenery would be moderate.

Low-to-low/moderate impacts would occur in Class C scenery associated with Sagebrush Basin landscape crossed by this alternative route. Weak/moderate-to-moderate contrast would result from the introduction of vertical elements (associated with the proposed transmission line structures) in a predominantly horizontal landscape. Additional contrast is anticipated based on vegetation disturbance associated with construction access roads. Mitigation measures would reduce vegetation clearing in the right-of-way and limit ground disturbance from the construction of access roads. Therefore, impacts on Class C landscape scenery would be reduced.

In the Dixie National Forest, contrast from the construction and operation of the Project would range from moderate-to-moderate/strong. Due to the construction of new access roads and right-of-way clearing on steep terrain, contrast is increased. Therefore, impacts on Class B scenery with high scenic integrity would be moderate after mitigation. Impacts on Class B scenery with moderate scenic integrity would be low/moderate after mitigation.

Sensitive Viewers

Moderate-to-moderate/high impacts are anticipated along Links 221, 280, and 285 for residential viewers within the municipalities of Enterprise and Newcastle located within 0.5 mile of the Project. Contrast generally would range from moderate-to-moderate/strong because the Project would require the construction of new access roads on steep terrain, and vegetation clearing would occur within the right-of-way. Mitigation measures would reduce contrast to moderate, reducing ground disturbance associated with the construction of new access roads and areas of cleared vegetation.

Low/moderate impacts would occur from residential viewers in Central on Link 500. Contrast would be expected to be low since the Project is located adjacent to multiple major transmission lines, which have strongly modified the existing landscape.

Moderate impacts would be anticipated on views from the Old Spanish NHT, a high sensitivity recreation viewer, located within 0.5 mile of the Project (Links 220, 441, and 280). Contrast would range from low/moderate-to-moderate because the Project would be located adjacent to multiple major transmission lines. Mitigation would decrease contrast to low/moderate by reducing ground disturbance and vegetation clearing. Due to the proximity of the Project to this viewer, impacts would remain at a moderate level.

Moderate impacts would occur on views from SR 18 and FR 007, which are both moderate sensitivity travel routes along Links 280 and 285. Contrast would be moderate/strong because the Project would introduce strong vertical structures into the landscape and access roads would be constructed on steep, vegetated slopes. Mitigation measures would decrease contrast to moderate by reducing ground disturbance associated with the construction of access roads and vegetation clearing within the right-of-way. Therefore, impacts would be reduced to a low/moderate level except where the Project is located less than 0.25 mile from these travel routes.

Low/moderate impacts would occur on views from other moderate sensitivity travel routes, including SR 56, FR 011, the Lund Highway, and the Bench Road along Links 220, 221, 280, 441, and 442. Contrast is

expected to be weak/moderate because the Project would be located adjacent to an existing transmission line, which has modified the existing character of the landscape.

Low/moderate-to-moderate impacts would occur on views from moderate sensitivity recreation viewers, including the Shinbone Trail, Hardscrabble Trail, Enterprise Rodeo Grounds, and Heritage Park (Links 280 and 285). Contrast associated with the construction and operation of the Project varies from moderate-to-moderate/strong. Since there are no adjacent transmission lines, the construction of access roads on steep terrain and the introduction of strong vertical structures would alter the character of the landscape. Mitigation measures would reduce contrast by limiting ground disturbance generated by the construction of new access roads and limiting vegetation clearing in the right-of-way.

Low-to-low/moderate impacts are anticipated on views from other moderate sensitivity recreation viewers, including the Jefferson Hunt Memorial, Newcastle Reservoir, and Baker Dam Reservoir and Campground (Links 221, 441, 290, and 500). Contrast would be low/moderate because the Project is located adjacent to an existing transmission line that has modified the existing character of the landscape.

Federal Agency Visual Management Objectives

BLM Visual Resource Management Classes

All BLM-administered lands crossed by this alternative route are VRM Class IV objective and project contrast ranges from weak-to-weak/moderate. Changes to the characteristic landscape may be strong in this objective. The Project would comply with the visual management objectives.

U.S. Forest Service Scenic Integrity Objective Levels

Project contrast ranged from weak/moderate-to-moderate/strong in areas with moderate inventory SIO in the Dixie National Forest. The changes to the landscape in an area with a moderate SIO could appear slightly altered but would remain subordinate in the landscape. Since the Project would introduce strong vertical elements associated with the transmission line structures and the clearing of vegetation in the right-of-way, it would not meet the definition of a moderate SIO. Project contrast was assessed to be moderate-to-moderate/strong in areas with high inventory and existing SIOs in the Dixie National Forest (Links 280 and 285). The changes to the landscape in a high SIO may be present, but the landscape must appear intact. The Project would not be consistent with a high SIO since it would alter the landscape through the introduction of strong vertical elements associated with the transmission line structures and the clearing of vegetation in the right-of-way.

U.S. Forest Service Land and Resource Management Plan Conformance

This alternative is located partially within the designated utility corridor on Links 280, 285, 290, 442, and 500. Guideline 1 within the Scenery Management System Amendment to the Dixie National Forest LRMP states that resource management activities should not be permitted to reduce scenic integrity below the prescribed objective for a management area. The Project would not meet the definition of a high, moderate, or low SIO due to right-of-way vegetation clearing, construction of access roads on steep terrain, and the addition of vertical structures into the landscape. Since the Project, after applying site-appropriate selective mitigation, would not lower the scenic integrity of these areas below a very low level (management standard 1 for the Dixie National Forest), the Project would be in compliance with the forest plan.

Alternative S4 – IPP East

Affected Environment

Landscape Scenery

Scenic quality crossed is similar to Alternative S2, except this alternative route crosses the Atchinson Mountain landscape with a scenic quality rating of B on Link 270 (MV-10d).

This alternative route crosses the Dixie National Forest adjacent to a major utility corridor (including a cleared right-of-way that is approximately 150 to 200 feet wide) that has locally modified the setting. Therefore, existing scenic integrity was inventoried as low, outside of the IRA, due to the strong presence of the existing transmission lines. In locations where the Project is located within an IRA, existing scenic integrity was inventoried as high due to limited development and landscape character deviations.

Sensitive Viewers

Sensitive viewers are similar to Alternative S2, except Links 222 and 275 are located further than 0.25 mile from the Mountain Meadows Massacre Site NHL, Old Spanish NHT, Jefferson Hunt Memorial, Hamblin Town site, and the Bench Road (MV-11d and 12d).

Federal Agency Visual Management Objectives

BLM Visual Resource Management Classes

This alternative route crosses 12.3 miles of BLM-administered public lands with all 12.3 miles of VRM Class IV (MV-13c and MV-13d).

U.S. Forest Service Land and Resource Management Plan Conformance

There would be 15.2 miles of USFS-administered lands crossed with 8.4 miles in an inventory SIO of high (Links 222 and 270) and 6.8 miles in an inventory SIO of moderate (Links 270 and 275) (MV-13d). For a discussion of the development of the inventory SIOs, refer to Appendix H.

U.S. Forest Service Land and Resource Management Plan Conformance

As currently managed within the Dixie National Forest LRMP, as amended, the Project crosses 2.5 miles of high SIO, 7.5 miles of moderate SIO, 0.2 mile of low SIO, and 4.9 miles through areas that were not assigned an SIO level. Areas that have not been assigned an SIO level were given a minimum SIO level as directed by forest-wide guideline 5 within the Scenery Management System Amendment to the Dixie National Forest LRMP based on the project-level scenic attractiveness ratings. Therefore, the Project would cross 4.9 miles with a minimum SIO of moderate (Class B).

BLM Visual Resource Inventory Components

SQRUs, SLRUs, distance zones, and VRI classes crossed are similar to Alternative S2.

Environmental Effects

Landscape Scenery

Impacts on landscape scenery are similar to Alternative S2, except moderate impacts would occur on Link 270 in the Atchinson Mountains (Class B) landscape. Contrast would range from low/moderate-to-moderate because the Project would require the construction of access roads on steep, vegetated slopes in a modified landscape setting due to the presence of an existing utility corridor. Contrast would be reduced through limiting disturbances generated by the construction of access roads and clearing of vegetation in the right-of-way. Impacts on Class B scenery with a high scenic integrity would be moderate after mitigation.

Sensitive Viewers

Impacts on sensitive viewers are similar to Alternative S2, except impacts on the Mountain Meadows Massacre Site NHL and the Old Spanish NHT would be reduced to low/moderate because the Project would be seen through the context of multiple existing transmission lines, which would reduce contrast (Link 270).

Federal Agency Visual Management Objectives

Compliance with visual management objectives would be similar to Alternative S2, with the addition of areas of high inventory SIO within IRAs on Link 270. The Project would not be consistent with the definition of a high SIO because the Project would alter intact landscapes in the IRA through the construction of access roads and the clearing of vegetation in the right-of-way.

U.S. Forest Service Land and Resource Management Plan Conformance

This alternative is mostly located outside designated utility corridor except for a portion of Link 271, 275, and 500. Guideline 1 within the Scenery Management System Amendment to the Dixie National Forest LRMP states that resource management activities should not be permitted to reduce scenic integrity below the prescribed objective for a management area. The Project would not meet the definition of a high, moderate, or low SIO due to right-of-way vegetation clearing, construction of access roads on steep terrain, and the addition of vertical structures in the landscape. Since the Project, after applying site-appropriate selective mitigation, would not lower the scenic integrity of these areas below a very low level (management standard 1 for the Dixie National Forest), the Project would be in compliance with the forest plan.

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Alternative S5 – Iron Springs and Pinto Creek (Proponent's Preferred Alternative)

Affected Environment

Landscape Scenery

Landscape scenery crossed is similar to Alternative S1.

Sensitive Viewers

Sensitive viewers are similar to Alternative S1, except the Project also would be visible from other moderate sensitivity viewers, including the Three Peaks Special Recreation Management Area (SRMA) and County Road 1740 on Link 435 (MV-11d).

Federal Agency Visual Management Objectives

BLM Visual Resource Management Classes

This alternative route crosses 25.4 miles of BLM-administered lands with 1.3 miles VRM Class III, south of Central in the BLM St. George Field Office on Link 260, and 24.1 miles of VRM Class IV (MV-13c and MV-13d).

U.S. Forest Service Inventory Scenic Integrity Objective Levels

There would be 20.7 miles of USFS-administered lands crossed with 20.2 miles in an inventory SIO of high (Link 260) and 0.5 mile in an inventory SIO of moderate (Links 260 and 500) (MV-13d). For a discussion of the development of the inventory SIOs, refer to Appendix H.

U.S. Forest Service Land and Resource Management Plan

In regard to the existing SIOs, the Project crosses 2.3 miles of high SIO, 13.2 miles of moderate SIO, 3.9 miles of low SIO, and 1.1 miles through areas that have not been assigned an SIO. Areas that have not been assigned an SIO level were given a minimum SIO level as directed by forest-wide guideline 5 within the Scenery Management System Amendment to the Dixie National Forest LRMP based on the project-level scenic attractiveness ratings. Therefore, the Project would cross 1.1 miles with a minimum SIO of moderate (Class B).

BLM Visual Resource Inventory Components

SQRUs, SLRUs, distance zones, and VRI classes crossed are similar to Alternative S1.

Environmental Effects

Landscape Scenery

Impacts on landscape scenery are similar to Alternative S1.

Sensitive Viewers

Impacts on sensitive viewers are similar to Alternative S1, with the addition of anticipated low impacts on views from the Three Peaks SRMA and County Road 1740 located more than 1.0 mile from the Project on Link 435. Contrast would be moderate since new access roads would be constructed on level terrain, but there are no adjacent existing transmission lines so a strong vertical element would be introduced into the landscape.

Federal Agency Visual Management Objectives

Compliance with visual management objectives would be similar to Alternative S1.

Alternative S6 – Iron Springs and Ox Valley

Affected Environment

Landscape Scenery

Landscape scenery crossed is similar to Alternative S3.

Sensitive Viewers

Sensitive viewers are similar to Alternative S3, except the Project also would be visible from other moderate sensitivity viewers, including Three Peaks SRMA and County Road 1740 on Link 435 (MV-11d).

Federal Agency Visual Management Objectives

BLM Visual Resource Management Classes

This alternative route crosses 27.6 miles of BLM-administered lands with 27.6 miles in VRM Class IV (MV-13c-d).

U.S. Forest Service Inventory Scenic Integrity Objective Levels

There would be 19.9 miles of USFS-administered lands crossed with 14.2 miles in an inventory SIO of high (Links 280 and 285) and 5.7 miles in an inventory SIO of moderate (Links 442, 280, 285, 290, and 500) (MV-13d). For a discussion of the development of the inventory SIOs, refer to Appendix H.

U.S. Forest Service Land and Resource Management Plan Conformance

As currently managed within the Dixie National Forest LRMP, as amended, the Project crosses 0.9 mile of high SIO, 12.0 miles of moderate SIO, 0.4 mile of low SIO, and 6.8 miles of lands that have no assigned SIO class. Areas that have not been assigned an SIO level were given a minimum SIO level as directed by forest-wide guideline 5 within the Scenery Management System Amendment to the Dixie National Forest LRMP based on the project-level scenic attractiveness ratings. Therefore, the Project would cross 6.8 miles with a minimum SIO of moderate (Class B).

BLM Visual Resource Inventory Components

SQRUs, SLRUs, distance zones, and VRI classes crossed are similar to Alternative S3.

Environmental Effects

Landscape Scenery

Impacts on landscape scenery are similar to Alternative S3.

Sensitive Viewers

Impacts on sensitive viewers are similar to Alternative S3, except low/moderate residual impacts are anticipated on views from FR 011 where the Project is within 0.5 mile of the road on Link 250. Contrast would be moderate because the Project would not be parallel with any major existing transmission lines and the construction of new access roads on moderately steep terrain would introduce deviations within the existing landscape character. Mitigation measures would reduce the contrast generated by the construction of new access roads and the clearing of vegetation in the right-of-way.

Low impacts would occur on views from the Three Peaks SRMA and County Road 1740 where the Project is located more than 1.0 mile away on Link 435. Contrast would be moderate because the Project would introduce strong vertical elements in a horizontal, sagebrush-dominated landscape. The construction of access roads on level terrain with limited vegetation clearing would reduce contrast.

Federal Agency Visual Management Objectives

Compliance with visual management objectives would be similar to Alternative S3.

Alternative S7 – Middle Hybrid Route

Affected Environment

Landscape Scenery

Landscape scenery crossed is similar to Alternative S2, except the Project crosses the Atchinson Mountain landscape on Link 270, which has a Class B scenic quality rating.

This alternative route crosses the Dixie National Forest in proximity to a major utility corridor that has modified the adjacent landscape character. Due to this existing linear disturbance, scenic integrity was inventoried as low except in locations where the Project crosses through an IRA. These areas were assigned a high level of existing scenic integrity due to the limited existing development and landscape character deviations.

Sensitive Viewers

Sensitive viewers are similar to Alternative S2, except Link 275 is located further than 0.25 mile from the Mountain Meadows Massacre Site NHL and the Hamblin Town site.

Federal Agency Visual Management Objectives

BLM Visual Resource Management Classes

This alternative route crosses 13.0 miles of BLM-administered lands with all 13.0 miles in VRM Class IV (MV-13c and MV-13d).

U.S. Forest Service Inventory Scenic Integrity Objective Levels

There would be 13.1 miles of USFS-administered lands crossed with 2.7 miles in an inventory SIO of high (Link 271) and 10.4 miles in an inventory SIO of moderate (MV-13d). For a discussion of the development of the inventory SIOs, refer to Appendix H.

U.S. Forest Service Land and Resource Management Plan Conformance

As currently managed within the Dixie National Forest LRMP, as amended, the Project crosses 2.5 miles of high SIO, 7.7 miles of moderate SIO, 0.2 mile of low SIO, and 2.8 miles of lands that have no assigned SIO class. As directed by forest-wide guideline 5 within the Scenery Management System Amendment to the Dixie National Forest LRMP, areas that have not been assigned an SIO level were given a minimum SIO level based on the project-level scenic attractiveness ratings. Therefore, the Project would cross 2.8 miles with a minimum SIO of moderate (Class B).

BLM Visual Resource Inventory Components

SQRUs, SLRUs, distance zones, and VRI classes crossed are similar to Alternative S2.

Environmental Effects

Landscape Scenery

Impacts on landscape scenery are similar to Alternative S2, except moderate impacts would occur on Link 270 as the Project crosses the Atchinson Mountains (Class B) landscape. Contrast would range from low/moderate to moderate due to the construction of access roads on steep, vegetated slopes. By limiting ground disturbance associated with the construction of access roads and reducing vegetation clearing in the right-of-way, contrast would be reduced. Impacts on Class B scenery with a high scenic integrity would be moderate after selective mitigation.

Sensitive Viewers

Impacts on sensitive viewers would be similar to Alternative S2, except for impacts on the Mountain Meadows Massacre Site NHL. Low/moderate impacts are anticipated for viewers within this site because the Project would be seen in context with existing, multiple transmission lines, which diminishes the visual contrast generated by the Project.

Federal Agency Visual Management Objectives

Compliance with visual management objectives would be similar to Alternative S2, except for the areas of high inventory SIO within IRAs on Link 270. The Project would not be consistent with the definition of the high SIO because the Project would modify intact landscapes within the IRA through the construction of access roads and clearing vegetation within the right-of-way.

U.S. Forest Service Land and Resource Management Plan Conformance

This alternative is located within the designated utility corridor except for a portion of Link 270, 271 and 445. Guideline 1 within the Scenery Management System Amendment to the Dixie National Forest LRMP states that resource management activities should not be permitted to reduce scenic integrity below the prescribed objective for a management area. The Project would not meet the definition of a high, moderate, or low SIO due to right-of-way vegetation clearing, construction of access roads on steep terrain, and the addition of vertical structures in the landscape. Applying site-appropriate selective mitigation measures, including the reduction of the visible footprint of construction access roads and limiting vegetation clearing in the right-of-way, the Project would not reduce scenic integrity below a very low level. Therefore, the Project would be compliant with the scenery management standard within the Dixie National Forest LRMP, as amended.

Alternative S7-A (Route Variation of Alternative S7) – Middle Hybrid Route 300 Feet East of Sigurd to Red Butte No. 1 Transmission Line Adjacent to Atchinson IRA (Agency Preferred Alternative)

Affected Environment

Landscape Scenery

Landscape scenery crossed is similar to Alternative S2, except the Project crosses the Atchinson Mountain landscape on Link 270, which has a Class B scenic quality rating.

This alternative route crosses the Dixie National Forest in proximity to a major utility corridor that has modified the adjacent landscape character. Due to this existing linear disturbance, scenic integrity was inventoried as low except in locations where the Project crosses through an IRA. These areas were assigned a high level of existing scenic integrity due to the limited existing development and landscape character deviations.

Sensitive Viewers

Sensitive viewers are similar to Alternative S2, except Link 275 is located further than 0.25 mile from the Mountain Meadows Massacre Site NHL and the Hamblin Town site.

Federal Agency Visual Management Objectives

BLM Visual Resource Management Classes

This alternative route crosses 13.0 miles of BLM-administered lands with all 13.0 miles in VRM Class IV (MV-13c-d).

U.S. Forest Service Inventory Scenic Integrity Objective Levels

There would be 12.6 miles of USFS-administered lands crossed with 1.4 miles in an inventory SIO of high (Link 272) and 11.2 miles in an inventory SIO of moderate (MV-13d). For a discussion of the development of the inventory SIOs, refer to Appendix H.

U.S. Forest Service Land and Resource Management Plan Conformance

As currently managed within the Dixie National Forest LRMP, as amended, the Project crosses 3.7 miles of high SIO, 7.6 miles of moderate SIO, and 1.5 miles of lands that have no assigned SIO class. Areas that have not been assigned an SIO level were given a minimum SIO level as directed by forest-wide guideline 5 within the Scenery Management System Amendment to the Dixie National Forest LRMP based on the project-level scenic attractiveness ratings. Therefore, the Project would cross 1.4 miles with a minimum SIO of moderate (Class B) and 0.1 miles with a minimum SIO of low (Class C).

BLM Visual Resource Inventory Components

SQRUs, SLRUs, distance zones, and VRI classes crossed are similar to Alternative S7.

Environmental Effects

Landscape Scenery

Impacts on landscape scenery are similar to Alternative S7, except low-moderate impacts would occur on Link 272 as the Project crosses the Atchinson Mountains (Class B) landscape. Contrast would range from weak-to-weak-moderate where the Project would traverse sagebrush and pinyon-juniper vegetation types, respectively. By closely paralleling the existing designated utility corridor (which includes three transmission lines and two pipelines) and using existing roads for construction access to the extent practicable, contrast generated by the Project would be lower than Alternative S7. By minimizing vegetation clearing in the right-of-way, contrast would be further reduced; therefore, impacts on high scenic integrity Class B scenery would be low-moderate.

Sensitive Viewers

Impacts on sensitive viewers would be similar to Alternative S7, except for impacts on the Mountain Meadows Massacre Site NHL. Low-moderate impacts are anticipated for viewers within this site because the Project would be colocated with multiple existing transmission lines, which diminishes the visual contrast generated by the Project. By siting the Project close to the existing transmission lines, the access roads required for the construction of the Project would also be reduced by using existing roads to the extent practicable.

Federal Agency Visual Management Objectives

Compliance with visual management objectives would be similar to Alternative S7, except for the areas of high inventory SIO within IRAs on Link 272. The Project would not be consistent with the definition of the high SIO because the Project would modify intact landscapes within the IRA through the construction of access roads and clearing vegetation within the right-of-way.

U.S. Forest Service Land and Resource Management Plan Conformance

This alternative is mostly located within a designated utility corridor except for a portion of Link 270, 272, and 445. Guideline 1 within the Scenery Management System Amendment to the Dixie National Forest LRMP states that resource management activities should not be permitted to reduce scenic integrity below the prescribed objective for a management area. The Project would not meet the definition of a high or moderate SIO due to right-of-way vegetation clearing, construction of access roads on steep terrain, and the addition of vertical structures in the landscape. Applying site-appropriate selective mitigation measures, including the reduction of the visible footprint of construction access roads and limiting vegetation clearing in the right-of-way, the Project would not reduce scenic integrity below a very low level. Therefore, the Project would be compliant with the scenery management standard within the Dixie National Forest LRMP, as amended.

3.2.8.6 Summary

Northern Area

Impacts on visual resources would be similar for all seven alternatives evaluated between Sigurd and the Cove Fort area. Generally, the construction and operation of these alignments would result in similar impacts on viewers associated with I-15, Cove Fort Historic Site, and Fremont Indian State Park. Additionally, these alternatives share the same alignment through the utility window designated by the Fishlake National Forest.

Landscape Scenery

The landscape scenery associated with the Mineral Mountains would be affected by Alternatives N4, N5, and N6 since these routes cross this landscape. In contrast, Alternatives N1, N2, N2-A, and N3 would avoid crossing the Mineral Mountains and therefore, impacts on landscape scenery would be minimal.

Sensitive Viewers

Impacts on the Escalante Trail and viewers within the community of Milford would be similar for the northern alternative routes. Alternatives N2, N5, and N6 would have more miles of moderate impacts on the American Discovery Trail than Alternatives N1, N2, N2-A, and N4 because these routes parallel the IPP transmission corridor, which would minimize contrast resulting from the Project. Therefore, impacts on viewers would be reduced for these alternatives. Anticipated impacts on residential viewers in Minersville would be higher for Alternatives N3, N5, and N6 because these routes are located closer to this community than Alternatives N1, N2, N2-A, and N4; therefore, the proposed transmission line facilities would be more apparent in the landscape.

Southern Area

Impacts on visual resources would be similar among all seven alternatives in the southern Project area between Link 163 and Newcastle except for impacts on the landscape character of the Antelope Range.

Landscape Scenery

Alternatives S1, S2, S3, S4, and S7 would affect landscape scenery associated with the Antelope Range. Conversely, Alternatives S5 and S6 do not cross the Antelope Range and therefore effects on landscape scenery would be minimal. Areas of valued landscapes with high scenic integrity within the Dixie National Forest would be modified to a greater level as a result of the construction, operation, and maintenance of Alternatives S1, S3, S5, or S6, as compared to Alternatives S2, S4, S7, and S7-A, based on the occurrence and dominance of existing multiple major transmission lines. Alternative S2 would minimize effects on valued landscapes within the Dixie National Forest for the southern alternative routes.

Sensitive Viewers

Alternative S2 would result in the strongest amount of contrast introduced into the viewshed of the Old Spanish NHT based the proximity of the route to the trail. In comparison, Alternative S5 would minimize perceptible level of change because the route is located more than 2.5 miles away from the trail except where this alternative ties into the Red Butte Substation. All other southern alternative routes would result in a similar level of effects on views to adjacent landscapes from the Old Spanish NHT. Alternative S2 would modify the viewshed from the Mountain Meadows Massacre Site NHL to a greater extent as compared to Alternatives S4, S7, and S7-A. Alternatives S1 and S5 would result in effects on residential viewers in Pine Valley, the Pine Valley Wilderness, and recreation areas adjacent to Pine Valley more than Alternatives S2, S3, S4, S6, S7, and S7-A. Viewers associated with residences within the community of Central would be affected to the greatest extent by Alternatives S2, S4, S7, and S7-A while Alternatives S3 and S6 would minimize the visibility and contrast resulting from the proposed facilities.

3.2.9 Land Use and Recreation Resources

3.2.9.1 Introduction

Issues raised by the public and agencies during Project scoping and preparation of the EIS related to potential impacts on land use and recreation resources include the following:

- Conflicts with current land uses, including airports, residential, commercial, industrial, agriculture, agriculture protection areas, existing rights-of-way, and other authorized land uses
- Impacts on recreation areas, including the Fremont Indian State Park, Paiute ATV Trail network, and other OHV and pedestrian trails
- Impacts on recreational values on the Dixie and Fishlake National Forests based on the recreation opportunity spectrum (ROS)
- Impacts on unroaded/undeveloped areas and IRAs on the Dixie and Fishlake National Forests
- Impacts on BLM-administered lands with wilderness characteristics (LWC) and citizen-proposed wilderness areas such as the Antelope Range
- Impacts on grazing and rangeland infrastructure, such as fences and cattle guards
- Conflicts with low-flying military aircraft (conflicts were not included in the analysis because it was determined the Project would be located outside of military operation areas)

Existing and future land uses and recreation resources were identified and evaluated for all jurisdictions occurring in the study corridors. Existing land use, future land use (based on generalized zoning), and recreation resources are shown in MV-14, MV-15, and MV-16 (Volume II).

3.2.9.2 Regulatory Framework

BLM- and USFS-administered lands occurring in the Project area are managed with direction from land use plans that establish the goals and objectives for the management of resources. The approved management plans (and plan amendments) relevant to the Project area are listed in Section 1.6.3.

The *RACR of 2001* (36 CFR Part 294) was adopted by the USDA to "establish prohibitions on road construction, road reconstruction, and timber harvesting in IRAs on National Forest System lands" (USDA 2001). The rule established criteria for identifying IRAs and prescribed management for road construction and timber harvesting. Pursuant to the *RARE II of 1979*, the USFS identified IRAs in national forests across the nation, which were incorporated into the RACR, to prevent the fragmentation of pristine, sensitive, and roadless areas due to road construction or timber harvesting (USDA 2001).

Private lands are regulated by local zoning ordinances and general plans. The *Utah Land Use Development Management Act* (10 Utah State Code 09a [municipal] and 17 Utah State Code 27a [county]), requires counties and incorporated municipalities to develop a zoning map, zoning ordinance, and general plan. The following incorporated cities and counties within the study corridors have adopted a zoning ordinance and general plan to protect the health, safety, and welfare of the general public:

- Sevier County
- City of Richfield
- Town of Elsinore
- Town of Joseph
- Millard County
- Beaver County
- City of Milford
- Town of Minersville
- City of Beaver
- Iron County
- City of Enterprise
- Washington County

The *Utah Agricultural and Industrial Protection Areas Act* (17 Utah State Code 41) provides protection to owners of agricultural and industrial lands from nuisance lawsuits from encroaching development that might conflict with agricultural and industrial activities. The act also limits the use of eminent domain by government entities, including publically regulated utilities. Under this act, landowners have the option to place their land in an agricultural or industrial protection area through the county or municipality.

Iron County requires proper clearance and compliance with the Habitat Conservation Plan developed in coordination with the UDWR. If the selected route crosses habitat identified in the Habitat Conservation Plan, the Project will be reviewed by Iron County prior to approval of any permits or construction-related activities. (Iron County and UDWR 2006)

3.2.9.3 Regional Setting

The study corridors consist of various types of land uses and recreational opportunities. Given the predominantly rural character of the Project area, agriculture, specifically livestock grazing, is the primary existing land use. Irrigated agriculture is commonly found near populated areas located along interstate and state highways. The City of Richfield and the surrounding Sevier Valley contain the most urbanized

area, with a concentration of residential, industrial, commercial, and quasi-public (e.g., churches, cemeteries, government buildings, etc.) land uses.

Designated recreational areas are located predominantly in the Pahvant, Tushar, and Pine Valley mountain ranges. Unimproved, dispersed recreation opportunities occur throughout the Project area on BLM- and USFS-administered lands. Because of the rural character of the Project area, municipal and county parks are not commonly found.

The majority of land occurring within the study corridor is federal land administered by the BLM or USFS.

3.2.9.4 Study Methodology

Inventory

Existing land uses and designations were inventoried within a 2-mile-wide study corridor (1 mile on each side of the alternative routes) to identify land uses that could be affected both directly and indirectly by Project construction and operation. Existing land uses were inventoried by initially reviewing and interpreting aerial photography and then verifying the data through field reconnaissance.

Future land uses were inventoried by generalizing zoning maps of each county and city within the study corridors (based on interpretation of each zoning ordinance). Information on planned and proposed projects also was collected from the federal, state, county, and local governments.

Recreation areas such as trails, campgrounds, and opportunity areas were identified using USFS map products and in BLM and USFS land use plans.

Inventory data also were obtained from various federal, state, and local agencies, including the following:

- BLM and USFS land use plans and information concerning land use classifications, SRMAs, active mining sites, existing rights-of-way, IRAs, unroaded/undeveloped areas, and other authorized land uses
- Utah State Parks and State Trust Land
- City and county land use plans – existing and future land use
- Private development plans, including energy development projects
- Aerial photographs of the alternative routes using 2009 National Agriculture Imagery Program (NAIP) imagery
- BLM – Legacy Rehost 2000 System

Inventoried Roadless Areas and Unroaded/Undeveloped Areas

The USFS criteria for evaluating the effect of Project activities on IRAs include analysis of impacts on wilderness qualities and attributes and roadless area characteristics within the IRA. The USFS criteria for evaluating the effect of Project activities on unroaded/undeveloped areas include analysis of impacts on wilderness qualities and attributes within the unroaded/undeveloped area.

Inventoried Roadless Areas

Pursuant to RARE II of 1979 and incorporated into the RACR (36 CFR Part 294), both the Fishlake and Dixie National Forests identified areas having pristine, sensitive, and roadless characteristics as IRAs to prevent the fragmentation of these areas by new road construction or improvements. IRAs represent some of the largest and most extensive tracts of undeveloped land on the Dixie National Forest and are valued for their roadless nature, undeveloped values, and associated environmental characteristics and attributes.

IRAs identified or occurring within the Project area are listed in Table 3-64 and shown on Maps 3-7 and 3-8 and MV-14 (Volume II).

TABLE 3-64
INVENTORIED ROADLESS AREAS WITHIN THE PROJECT AREA

Forest	Name of Inventoried Roadless Area	Total Acres	Crossed by Project?
Fishlake National Forest	Beehive Peak	59,102	No
Fishlake National Forest	Bullion - Delano	14,909	No
Fishlake National Forest	Circleville Mountain	24,132	No
Fishlake National Forest	City Creek	13,931	No
Fishlake National Forest	Cove Creek	25,546	No
Fishlake National Forest	Dog Valley	11,805	No
Fishlake National Forest	Flat Canyon	8,658	No
Fishlake National Forest	Joe Lott	19,187	No
Fishlake National Forest	Marysvale Peak	22,766	No
Fishlake National Forest	Pahvant	42,539	No
Fishlake National Forest	Pyramids	13,014	No
Fishlake National Forest	Signal Peak	30,870	No
Fishlake National Forest	Tibadore	9,260	No
Fishlake National Forest	Tushar Mountain	39,974	No
Dixie National Forest	Atchinson	17,662	Yes
Dixie National Forest	Bull Valley	10,919	No
Dixie National Forest	Cave Canyon	1,283	No
Dixie National Forest	Cove Mountain	16,638	Yes
Dixie National Forest	Dixie	108	No
Dixie National Forest	Gum Hill	3,181	No
Dixie National Forest	Kane Mountain	8,016	No
Dixie National Forest	Mogotsu	16,771	Yes
Dixie National Forest	Moody Wash	31,856	No
Dixie National Forest	Pine Valley Mountain	19,472	No
Dixie National Forest	Stoddard Mountain	13,168	No

Unroaded/Undeveloped Areas

Pursuant to prior NFMA implementing regulations at 36 CFR 219.17 (as published in 36 CFR 200 to 299 [July 1, 2000 edition]), the Fishlake and Dixie National Forests each created an inventory of draft unroaded/undeveloped areas as part of LRMP revision efforts, formally initiated with NOIs in 2002 (Federal Register 67[90]:31178 and 67[91]:31761, respectively). The LRMP revisions have not yet been completed for either Forest; however, the information represents the latest inventory data for areas with potential wilderness qualities or attributes. The 2005 draft inventories of unroaded/undeveloped areas were based on direction in the *Intermountain Region Planning Desk Guide: A Protocol for Identifying*

and Evaluating Areas for Potential Wilderness (USFS 2004). There is no policy, law, or directive guiding the management of identified draft unroaded/undeveloped areas that lie outside of IRAs or wilderness areas; therefore, the only guidance for these areas is general forest or management area direction in the LRMPs.

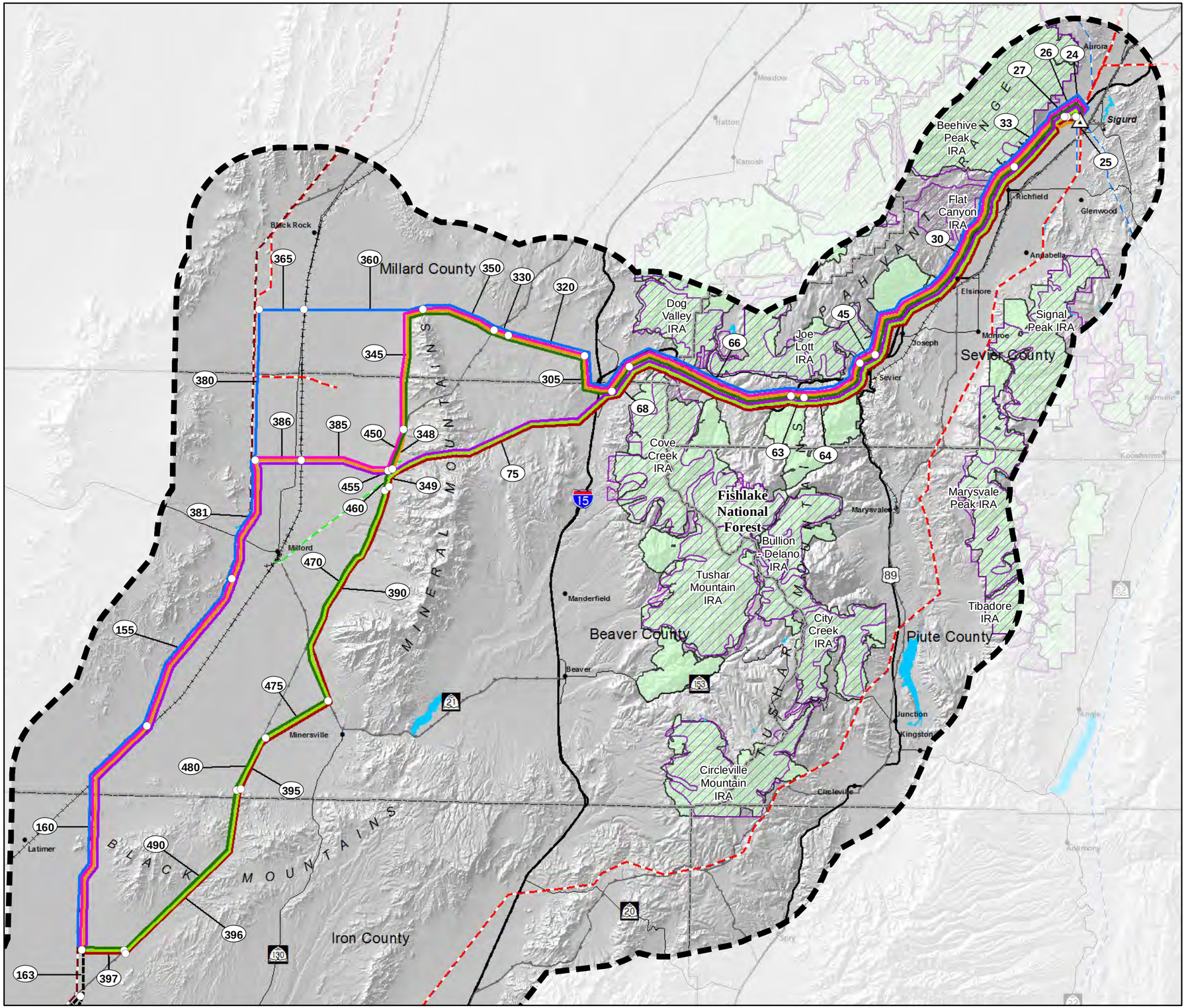
Table 3-65 lists the unroaded/undeveloped areas within the Project area, identifying those areas potentially crossed by the Project. Unroaded/undeveloped areas within the Project area also are shown on Maps 3-7 and 3-8 and MV-14 (Volume II).

TABLE 3-65
UNROADED/UNDEVELOPED AREAS WITHIN THE PROJECT AREA

Forest	Name of Inventoried Roadless Area	Total Acres	Crossed by Project
Fishlake National Forest	Baker Canyon	9,079	No
Fishlake National Forest	Beehive Peak	60,871	No
Fishlake National Forest	Castle Rock	8,269	Yes
Fishlake National Forest	Circleville Mountain	28,629	No
Fishlake National Forest	Delano – Portion 1	38,247	No
Fishlake National Forest	Delano – Portion 2	1,304	No
Fishlake National Forest	Dog Valley	45,385	No
Fishlake National Forest	Joe Lott	24,357	Yes
Fishlake National Forest	Joseph	8,100	Yes
Fishlake National Forest	Marysvale Peak	27,167	No
Fishlake National Forest	Pahvant	55,481	No
Fishlake National Forest	Sargent Mountain	5,524	Yes
Fishlake National Forest	Signal Peak	29,899	No
Fishlake National Forest	Tibadore	8,073	No
Fishlake National Forest	Tushar Mountain – Portion 1	80,375	No
Fishlake National Forest	Tushar Mountain – Portion 2	1,717	No
Dixie National Forest	Atchinson	24,309	Yes
Dixie National Forest	Bull Valley	13,371	No
Dixie National Forest	Cave Canyon	8,135	No
Dixie National Forest	Cedar Bench	10,004	No
Dixie National Forest	Cove Mountain	15,678	Yes
Dixie National Forest	Kane Mountain	9,635	Yes
Dixie National Forest	Moody Wash/Mogotsu	58,993	Yes
Dixie National Forest	Pine Valley Mountain	154,518	Yes
Dixie National Forest	Stoddard Mount	14,214	No

Citizen Proposed Wilderness Areas

Citizen groups have identified citizen-proposed wilderness areas within the study corridors as part of the proposed America's Red Rock Wilderness Act. Section 3.2.10.4 discusses the suitability of these areas for wilderness as determined by the BLM and associated impacts.



MAP 3-7

NORTHERN ALTERNATIVE ROUTES SIGURD SUBSTATION TO SOUTH OF THE BLACK MOUNTAINS IRAS AND UNROADED/UNDEVELOPED AREAS

INVENTORIED ROADLESS AND UNROADED/UNDEVELOPED AREAS

- Inventoried Roadless Area
- Unroaded/Undeveloped Area

ALTERNATIVE ROUTES

- N1
- N2
- N2-A - Agency Preferred Alternative
- N3
- N4
- N5
- N6 - Proponent's Preferred Alternative
- Southern Alternatives

GENERAL REFERENCE FEATURES

- Project Study Area
- Link Number
- Link Node
- Substation
- 500kV +/- DC Transmission Line
- 345kV Transmission Line
- 230 to 287kV Transmission Line
- 138 to 161kV Transmission Line
- Pipeline
- County
- Interstate & U.S. Highway
- State Highway
- Railroad
- Lake or Reservoir

SOURCES:
National Inventoried Roadless Area: USFS, 2000
Transportation: Streetmap 50K to 250K, 2008
Land Jurisdiction: BLM State Office Utah, 2009
POWERmap, powermap.platts.com
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NOTES:
Route colors are representative of the centerline, but multiple options are being considered.
Only IRAs are labeled. Most unroaded/undeveloped area names correspond with the IRA names.

0 2.5 5 10 15 20 Miles

October 2012

Final EIS

SIGURD TO RED BUTTE NO. 2 345kV TRANSMISSION PROJECT

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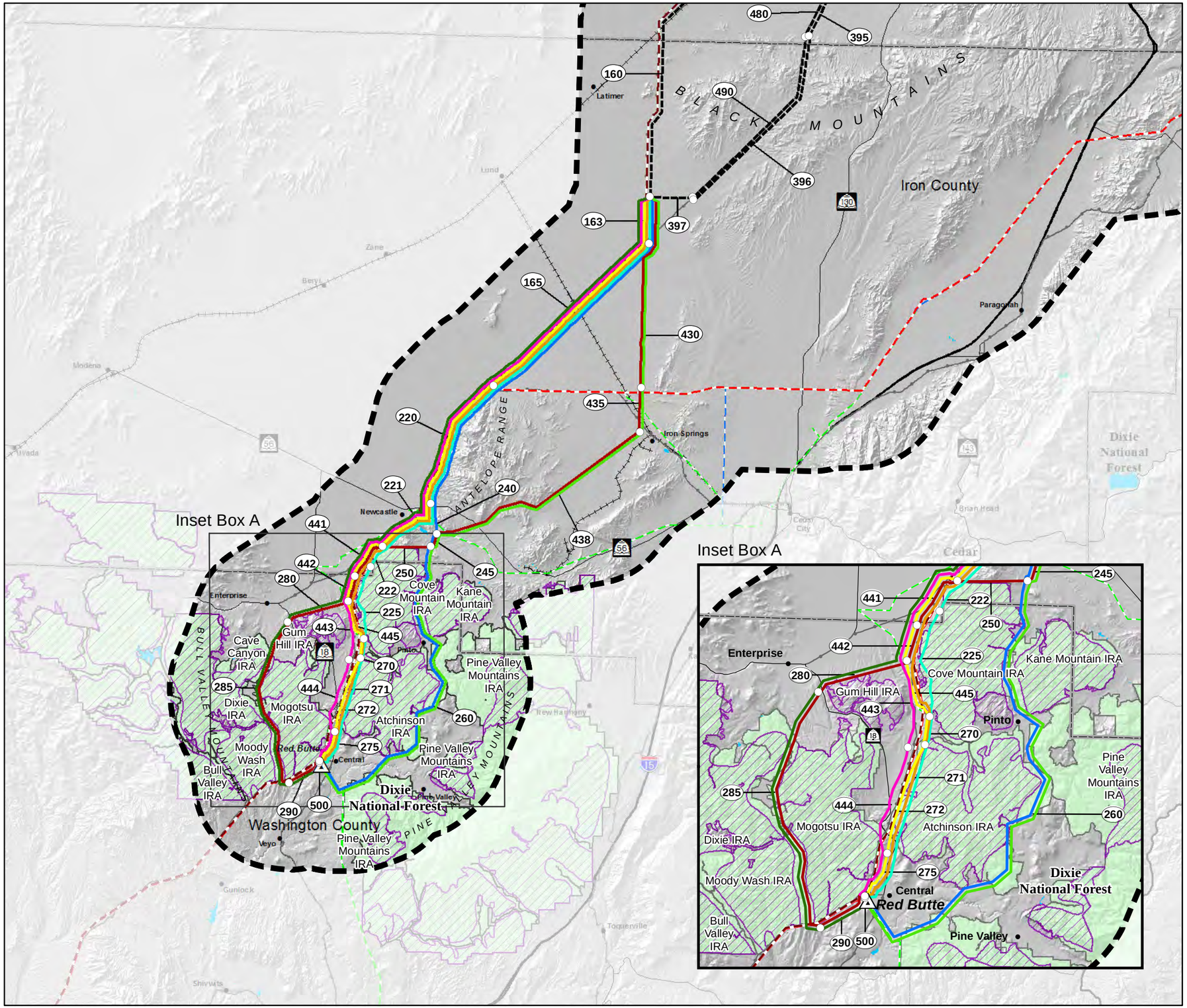

MAP 3-8

SOUTHERN ALTERNATIVE ROUTES SOUTH OF THE BLACK MOUNTAINS TO RED BUTTE SUBSTATION IRAS AND UNROADED/UNDEVELOPED AREAS

INVENTORIED ROADLESS AND UNROADED/UNDEVELOPED AREAS

- Inventoried Roadless Area
- Unroaded/Undeveloped Area

ALTERNATIVE ROUTES

- S1
- S2
- S3
- S4
- S5 - Proponent's Preferred Alternative
- S6
- S7
- S7-A - Agency Preferred Alternative
- Northern Alternatives

GENERAL REFERENCE FEATURES

- Project Study Area
- Link Number
- Link Node
- Substation
- 500kV +/- DC Transmission Line
- 345kV Transmission Line
- 230 to 287kV Transmission Line
- 138 to 161kV Transmission Line
- Pipeline
- County
- Interstate & U.S. Highway
- State Highway
- Railroad
- Lake or Reservoir

SOURCES:
National Inventoried Roadless Area: USFS, 2000
Transportation: Streetmap 50K to 250K, 2008
Land Jurisdiction: BLM State Office Utah, 2009
POWERmap, powermap.platts.com
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NOTES:
Route colors are representative of the centerline, but multiple options are being considered.
Only IRAs are labeled. Most unroaded/undeveloped area names correspond with the IRA names.

0 2.5 5 10 15 20 Miles

October 2012

Final EIS

SIGURD TO RED BUTTE NO. 2
345kV TRANSMISSION PROJECT

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Forestry and Woodland Products

Collection of firewood, Christmas trees, wood for fence posts, and pine nuts is allowed on 18,802 acres of pinyon-juniper stands on land administered by the BLM Fillmore Field Office (BLM 1987). Managed stands on land administered by the BLM Cedar City Field Office are used to supply woodland products (by permit) for fuel-wood, posts, pine nuts, and Christmas trees at fair market value (BLM 1986a). The Fishlake National Forest consists of approximately 770,000 acres of forested land, which constitutes 55 percent of the total area within the Forest. Fifty percent of the forested area is considered suitable for timber production, which includes commercial harvesting, firewood, and Christmas trees (USFS 1986b). Within the Dixie National Forest, 331,200 acres are considered suitable for timber production (USFS 1986a).

Minerals

Leasable Minerals

Within the study corridors, there are authorized oil and gas leases on BLM-administered lands along I-70 in Sevier and Iron counties between SR 130 and the Union Pacific railroad line, southwest of the community of Milford to the Nevada state line.

Locatable Minerals

Commercial mining in Utah began in the mid- to late 1800s and is still prevalent today. Current active mining claims occurring within the study corridors include the following:

- Martin Marietta Materials, Inc. operates a ballast plant, located approximately 4.0 miles north of the community of Milford. Granite is mined from Rocky Range and transported to a ballast plant where it is crushed into small aggregates predominantly used for railroad ballast and paving stones.

- Copper King Mining Corporation merged with Western Utah Copper Company in 2007 and owns mining properties west of Milford, Utah, in Rocky Range, Beaver Lake Mountains, San Francisco Mountains, and Blue Mountain. At full capacity, Copper King can extract 160,000 tons of copper, silver, gold, and magnetite per day.

- Palladon Ventures Ltd. operates the Iron Bull Mining and Milling Facilities, located at the Comstock/Mountain Lion Iron Mine on Iron Mountain. The 6,600-acre property is located approximately 16 miles west of Cedar City. Palladon Ventures aims to mine, process, and export approximately 2 million tons of iron ore to China per year (Palladon Ventures Ltd. 2005).

Other active mining claims in the study corridors are located in the following general locations:

- Sevier County – along I-70
- Beaver County – in the Mineral Mountains, Escalante Desert, Beaver Bottoms, Greenville Bench, and east of I-15
- Iron County – in the Antelope Range and Black Mountains

Salable Minerals

Mineral materials within the study corridors are used for the construction of roads, highways, and commercial and residential development. BLM has active contracts for private extraction of sand, gravel, and building stone and free-use permits, which are agreements between government and nonprofit organizations to extract and use mineral materials for nonindustrial and commercial purposes, with state and local governments. Private individuals also are allowed by permit to remove quantities of landscape rock and building stone in certain areas. In Sevier County, the Federal Highway Administration holds several authorized mineral site rights-of-way along I-70 (Geocommunicator-National Integrated Land System 2009).

Renewable Energy

In the Project area, there are currently three geothermal plants: Enel (formally called Sulphurdale) in Beaver County, south of Cove Fort; Blundell, operated by PacifiCorp located northeast of the community of Milford in Beaver County; and the Orin G. Hatch plant, operated by Cyrq Energy, located south of Milford.

First Wind was issued a site testing right-of-way grant in September 2008, for lands in Millard and Beaver counties. This type of grant affords protection to the Proponent against other wind development applications; however, it does not provide a right-of-way exclusion area for other compatible uses that the BLM may approve (43 CFR 2808.15(b)) (Christensen 2011). BLM considers transmission and wind energy to be compatible uses of public lands that may be colocated provided that operational, safety, and environmental protection requirements for both uses can be implemented appropriately.

First Wind recently completed construction of Phase II of Milford Wind Farm, located north of Milford. A conditional use permit application for Milford Wind Corridor, LLC Phase III, located north of Milford in Beaver and Millard counties, was submitted to Beaver County in June 2011 and approved in July 2011 (Peterson 2011). A similar application was filed in Millard County in September 2011 (Dekker 2011) and approved in November 2011. First Wind submitted a right-of-way application to the BLM on June 1, 2010, for Milford Wind Corridor, LLC Phase IV, located east of Milford Wind Corridor, LLC Phase III and north of Phase II in Beaver County. In response to the right-of-way application for the proposed Milford Wind Corridor, LLC Phase IV project, the BLM is conducting a NEPA analysis as an Environmental Assessment. There is currently no set timeframe for the completion of the NEPA analysis, as First Wind is waiting for the continuation of federal renewable energy production tax credits (Stevens 2011).

EnXco Development Corporation has applied to the BLM for a right-of-way grant for construction of the Mineral Mountains Wind Farm, which is located on BLM, state, and private land in the Mineral Mountains. Mormon Mesa Power Partners, LLC, has applications pending for wind testing in Millard, Beaver, and Iron counties.

The State of Utah has initiated an effort to promote and identify Utah's utility-scale electrical renewable energy resources and to assess transmission needs to bring those resources to load centers in Utah. As part of this effort, the Utah Renewable Energy Zones (UREZ) Task Force, commissioned by former Governor John Huntsman, completed the *Phase I Report–Renewable Energy Zone Resource Identification* report that identified wind, solar, and geothermal zones with the theoretical potential for utility-scale development in Utah (Berry et al. 2009). Additionally, the *Draft Utah Renewable Energy Zones Phase II Task Force Zone Identification and Scenario Analysis* report was released in April 2010, which identified 27 renewable energy zones (seven in the study corridors) capable of generating geothermal, solar, and

wind energy. The report indicated these seven zones within the study corridors are capable of generating enough generation to justify a high-voltage transmission line (Black and Veatch 2010). It is anticipated that future transmission lines will be built in the Project area as the Utah Renewable Energy Zones are developed. Alternative routes considered for the Project cross through seven energy zones: Sevier, Black Rock, Blundell, Antelope, Milford, Escalante Valley, and Red Butte.

Transportation and Access

Highway and Roads

Major interstates and highways occurring in the study corridors are discussed in Appendix H – Visual Resources Supporting Data. Existing access for each alternative route was determined through aerial photography interpretation and existing data available from USFS-motorized travel plans and BLM travel and transportation management plans. Existing access roads, including paved and unpaved roads that parallel or are within 500 feet of the alternative routes were included in the inventory.

Aviation Facilities

FAA registered airports located within the study corridors include:

- Richfield Municipal Airport – located within Richfield city limits, less than 1.0 mile south of the city center
- Milford Municipal Airport (Ben and Judy Briscoe Field) – located less than 1.0 mile north of the community of Milford

Three landing strips are located within the study corridors at the following locations:

- Sulphurdale landing strip – located approximately 0.75 mile southeast of the junction of I-15 and I-70
- Private landing strip – located approximately 1.0 mile southeast of Newcastle Reservoir
- Dixie Deer landing strip – located west of SR 18, near the community of Central in Washington County

One helipad is located within the study corridor at the Western Electrochemical Company facilities, approximately 13 miles northwest of Cedar City. Two military flight paths (Military Flight Path Numbers VR209 and IR126 of the Desert Military Operation Area) are located in the southern portion of the study area on the Dixie National Forest. Nellis Air Force Base was contacted in September 2011 and December 2011 for information about the flight paths and restrictions. No information has been provided to date. (Cadwallader 2011)

Linear Facilities and Utility Corridors

Existing linear facilities within the study corridors include transmission lines, major highways, railroads, and pipelines (MV-14).

The Union Pacific Railroad crosses a study corridor in southern Millard County and follows Highway 257 south to Milford where it continues southwest towards the community of Lund. At Lund, the railroad

splits into two tracks; one track continues southwest towards the Utah-Nevada border and the other travels southeast towards Cedar City.

Designated utility corridors and major rights-of-way within land administered by the BLM Richfield, Fillmore, Cedar City, and St. George Field Offices; Fishlake and Dixie National Forests; and Millard County are identified in their land use plans. The following are designated utility corridors relevant to the study area (MV-14):

- A corridor, containing the Sigurd to Cameron 138kV transmission line, traverses the Fishlake National Forest; corridor width varies between 1 to 3 miles.
- State Highway 257 and Union Pacific Railroad, within land administered by the BLM Fillmore Field Office, is 2,000 feet wide and available to all uses.
- The designated utility corridor containing the IPP 500kV DC transmission line to southern California, within land administered by the BLM Fillmore Field Office, is 1,500 feet wide and available to all uses.
- The designated utility corridor containing the IPP 500kV DC transmission line to Southern California, within land administered by the BLM Cedar City Field Office, is 1 mile wide and available to all uses.
- The corridor containing the IPP 500kV DC transmission line to Southern California (Newcastle to Veyo, Utah, planning window area) is located within the Pine Valley District of the Dixie National Forest. The width of this corridor is not specified in the Dixie National Forest LRMP, as amended.
- A DOE WWEC contains the IPP 500kV DC transmission line to Southern California, and is 3,500 feet wide. Millard County adopted this portion of the WWEC as part of its General Plan.

The following are major rights-of-way relevant to the study corridors (MV-14):

- The IPP 500kV DC transmission line begins north of the community of Delta, Utah, and continues south towards Las Vegas, Nevada.
- The Milford Wind 345kV transmission line parallels the IPP 500kV DC transmission line from Milford Wind Farm to the IPP Substation, located north of Delta City.
- The Sigurd to Red Butte No. 1 – 345kV transmission line begins at the existing Sigurd Substation and heads south until exiting the study corridor near the community of Venice in Sevier County. The transmission line re-enters the study corridor west of Cedar City and parallels the IPP 500kV DC transmission line before terminating at the existing Red Butte Substation.
- A 138kV transmission line begins at the existing Sigurd Substation and is adjacent to the communities of Richfield, Elsinore, Joseph, Beaver, and Newcastle before terminating at the existing Red Butte Substation.
- 46kV and 138kV transmission lines traverse from the Blundell Geothermal Plant to the Milford Substation, located south of Milford City.

- The Harry Allen to Red Butte 345kV transmission line begins at the Harry Allen Substation north of Las Vegas and parallels the IPP 500kV DC transmission line before terminating at the Red Butte Substation.

- The Red Butte to St. George 345kV and 138kV transmission lines share the same corridor and begin at the Red Butte Substation and terminate at the St. George Substation, located north of the city.

- Kern River Gas Transmission Company operates two parallel 36-inch mainline pipelines that traverse in a southwest direction through Pinnacle Pass in the Mineral Mountains and then parallel the IPP 500kV DC transmission line south of the Black Mountains.

- Holly Energy operates the UNEV Pipeline, a 400-mile, 12-inch diameter petroleum products pipeline, from Woods Cross, Utah, to a location north of Las Vegas, Nevada. The pipeline parallels the IPP 500kV DC transmission line and Kern River Pipeline in different locations.

Existing Land Use

Land Jurisdiction and Ownership

The study corridors contain portions of Sevier, Millard, Beaver, Iron, and Washington counties in Utah and include a variety of landscape types, urban and rural development, and a variety of federal, state, and local land-management agencies. There are eight incorporated cities and towns within the Project area, and seven unincorporated communities. Federal, state, and local land-management agencies include the following:

- Federal
  - USDI
    - BLM – Richfield, Fillmore, Cedar City, and St. George Field Offices
    - Bureau of Indian Affairs
  - USDA
    - USFS – Fishlake National Forest (Fillmore and Beaver Ranger Districts) and Dixie National Forest (Pine Valley Ranger District)
- State
  - Utah State Parks
    - Fremont Indian State Park
  - SITLA
  - UDWR
  - UDNR – Division of Forestry, Fire, and State Lands
- County
  - Sevier
  - Millard
  - Beaver
  - Iron
  - Washington
- Municipal/Community
  - Sigurd
  - City of Richfield
  - Town of Elsinore
  - Town of Joseph

- Sevier (unincorporated)
- City of Beaver
- Milford
- Town of Minersville
- Newcastle (unincorporated)
- City of Enterprise
- Pinto (unincorporated)
- Central (unincorporated)

Agriculture and Grazing

Irrigated agricultural lands and farm complexes (e.g., dairy farms, cattle feedlots, etc.) were determined and mapped from 2009 NAIP aerial imagery and field reconnaissance.

Agriculture is a major source of income in Sevier, Millard, Beaver, Iron, and Washington counties and is a predominant land use in the Sevier Valley, near Richfield, the Milford Flat area, between the communities of Milford and Minersville, and in the Escalante Desert near the communities of Newcastle and Enterprise. Types of agriculture found in these counties include irrigated pasture, irrigated croplands, and dry croplands, as well as open-range ranching operations, dairies, and hog and poultry farms.

Under the authority of the *Utah Agricultural and Industrial Protection Areas Act* (17 Utah State Code 41), private landowners within Iron County have placed their land in agriculture protection areas, predominantly southwest of the Black Mountains, east of the Antelope Mountains, and west of Newcastle.

Grazing allotments cover the majority of BLM- and USFS-administered lands in the areas managed by the BLM Richfield, Fillmore, and Cedar City Field Offices and the Dixie and Fishlake National Forests within the study corridors. Grazing allotments are primarily for grazing cattle and sheep. Grazing is also a major land use on private land. Table 3-66 identifies the grazing periods by jurisdiction.

TABLE 3-66
GRAZING PERIODS BY JURISDICTION

Jurisdiction	Grazing Period[1]
BLM Richfield Field Office	May 16 through June 16 March 1 through April 15
BLM Fillmore Field Office	April 1 through September 30 June 1 through October 24 October 1 through April 30 May 1 through June 15
BLM Cedar City Field Office	April 1 through May 15 October 1 through May 31 October 15 through June 15 March 1 through February 28 April 15 through October 15 May 1 through October 31 September 1 through June 30
BLM St. George Field Office	November 1through March 7 March 23 through May 31 June 1 through October 15
Fishlake National Forest	April 26 through December 31[1]
Dixie National Forest	May 21 through October 15

NOTE: [1]Grazing periods are consolidated. For grazing period by allotment, refer to Table J-1 in Appendix J.

Residential

Residences occur throughout the study corridors. Land in the study corridors is predominantly rural (0 to 2 dwelling units per acre) with greater densities (3 to 5 dwelling units per acre) in or near the communities of Richfield, Elsinore, Joseph, Beaver, Milford, Minersville, Newcastle, and Enterprise. The predominant residential types are single- and multi-family homes (mostly in Richfield and surrounding areas).

Commercial and Industrial

Commercial land uses occur primarily in or near town and city centers and include retail businesses, office buildings, hotels, and mixed-use developments. Some commercial areas also are located on the edge of populated areas along I-70, such as service stations, restaurants, and hotels.

Industrial land uses within the study corridors include light and general industrial areas, mining activities, landfills, salvage yards, and sewage and water treatment plants. Major general and light industrial areas exist in the following locations:

- Sevier County – along I-70
- Beaver County – near the community of Milford
- Iron County – Western Electrochemical Company, a producer of jet fuel, is located approximately 13 miles northwest of Cedar City

Special Management Areas

The Chloride Canyon HMA encompasses 44,285 acres in the southern part of the Project area. The HMA is centered on the Antelope Range north of Highway 56. BLM data from 2007 indicated an appropriate management level for the Chloride Canyon herd of 30 horses. Currently, there is an estimated population of 59 horses within the HMA.

Preservation Areas

Washington County has areas zoned as Open Space Transition and Open Space Conservation. Both zones encourage the preservation of open space through low-density development and agricultural activities.

Superfund and Hazardous Waste Sites

<u>EPA National Priorities List</u>

- There are no superfund sites located within the study corridors.

<u>Other Existing or Potential Hazardous Waste Sites</u>

- Blundell Geothermal Plant (owned and operated by PacifiCorp) – The process of creating geothermal energy requires the use of large amounts of water heated within the earth, often along

fault lines. This type of production creates hazardous waste water that could contain arsenic, hydrogen sulfide, or other harmful materials (EPA 2009).

- American Pacific Corporation Utah Operations, Western Electrochemical Company – A chemical manufacturer north of Iron Springs that supplies products to aerospace, national defense, and commercial programs. The site has been used to process the following chemicals: lead compounds, nitric acid, sodium azide, ammonia, and 2,2-Dichloro-1,1,1-Trifuoroethane (EPA 2009).

Future Land Use

Future land uses within the study corridors were based on generalized zoning. Future land uses are predominantly grazing and other agricultural activities, with most urbanized uses (e.g., commercial, residential, etc.) occurring in or near Richfield. In addition, there are numerous proposed developments within the study corridors. The proposed developments are listed in Table 3-67 and include both approved and proposed plans.

TABLE 3-67
PROPOSED DEVELOPMENTS IN PROJECT COUNTIES

Jurisdiction	Type of Development	Project Description/Location	Status
Sevier County	Energy	▪ Proposed Sevier Power Company 540-megawatt gas-fired power plant east of the existing Sigurd Substation. ▪ Zephyr High-Voltage Direct Current (HVDC) Transmission Project	▪ Permitting to be completed in June 2012 (Taylor 2012) ▪ Anticipated Construction in 2017 to 2020; In-service early 2020
	Mining	▪ Green Solutions Pozzolan Mine located east of Fremont Indian State Park	▪ Application submitted to U.S. Forest Service 2010; no specific timeframe
Millard County	Energy	▪ Milford Wind Corridor, LLC Phase III Wind Farm (150 megawatts)	▪ Milford Wind Corridor, LLC Phase III project approved for construction – planned to start fourth quarter 2011 and be completed fourth quarter 2011; no construction started as of March 2012
		▪ Milford Wind Corridor, LLC Phase IV Wind Farm.	▪ Milford Wind Corridor, LLC Phase IV project; Standard Form 299 application submitted to Bureau of Land Management (BLM) June 2010; project postponed by proponent
		▪ Proposed TransWest Express 600-kilovolt (kV) transmission line would cross the county in a north-south direction. An alternative route under consideration would parallel the Intermountain Power Project (IPP) 500kV direct current (DC) transmission line.	▪ Environmental Impact Statement (EIS) scheduled for completion 2014; in-service date 2017
		▪ Zephyr HVDC Transmission Project	▪ Anticipated Construction 2017 to 2020; Planned in-service by early 2020

TABLE 3-67
PROPOSED DEVELOPMENTS IN PROJECT COUNTIES

Jurisdiction	Type of Development	Project Description/Location	Status
Beaver County	Energy	▪ Milford Wind Corridor, LLC Phase III Wind Farm	▪ Approved for construction – planned to start fourth quarter 2011 and be completed fourth quarter 2012; no construction has started as of March 2012
		▪ Proposed enXco Development Corporation Mineral Mountain Development Wind Project.	▪ Plan of Development in progress; in-service date anticipated in 2015 (Johnson 2012)
		▪ Proposed Mormon Mesa Power Partners, LLC wind testing area located between Interstate 15 and the Mineral Mountains, west of the Milford Wind Farm, east of Minersville, and on the Black Mountains southwest of Minersville.	▪ Application submitted to BLM March 2009; decision expected by end of 2012
		▪ Planned PacifiCorp 138kV transmission line between the Cameron Substation, east of the City of Beaver, to the Milford Substation, south of Milford.	▪ In-service date 2014
		▪ Proposed Intermountain Renewable Power 138kV transmission line from Orin G. Hatch Geothermal Plant to Milford Substation, to a proposed substation near the Milford Wind 345kV transmission line.	▪ Project on hold
		▪ Solar Energy Development Programmatic EIS. Identified solar study areas in the BLM Cedar City Field Office.	▪ Final Programmatic EIS anticipated 2012
		▪ Proposed TransWest Express 600kV DC transmission line would cross the county in a north-south direction. An alternative route considered would parallel the existing IPP 500kV DC transmission line	▪ EIS scheduled for completion 2014; planned in-service date 2017
		▪ Zephyr HVDC Transmission Project	▪ Anticipated Construction 2017 to 2020; planned in-service early 2020
Iron County	Industrial	▪ Planned Palladon Ventures aboveground water and slurry pipelines connecting the Iron Mountain open-pit mine with the Granite Mountain mine to the north.	▪ Project cancelled (Cutler 2012)
	Energy	▪ Proposed Mormon Mesa Power Partners, LLC wind testing area on the Black Mountains southwest of Minersville.	▪ Application submitted to BLM March 2009; decision expected by end of 2012
		▪ Proposed TransWest Express 600kV DC transmission line would cross the county in a north-south direction; alternative routes being considered would parallel the existing IPP 500kV DC transmission line and Union Pacific railroad.	▪ EIS scheduled for completion 2014; planned in-service date 2017
		▪ Zephyr HVDC Transmission Project	▪ Anticipated Construction 2017 to 2020; planned in-service early 2020
Washington County	Energy	▪ Proposed TransWest Express 600kV DC transmission line would cross the county in a north-south direction. An alternative route being considered would parallel the IPP 500kV DC transmission line.	▪ EIS scheduled for completion 2014; planned in-service date 2017
		▪ Zephyr HVDC Transmission Project	▪ Anticipated Construction 2017 to 2020; planned in-service early 2020

NOTE: Information presented in this table is current as of June 2012.

Parks and Recreation

There are many opportunities for recreation throughout the study corridors, including hunting, fishing, hiking, rock hounding, touring, camping, picnicking, mountain biking, equestrian use, off-road vehicle use, and sightseeing (BLM 1999; BLM 1986a). In addition to unimproved and dispersed opportunities for recreation, the BLM St. George Field Office manages the Baker Reservoir Recreation Area, located approximately 2.5 miles south of Central, Utah. The Fishlake National Forest manages the Castle Rock Campground, located approximately 2.5 miles south of Fremont Indian State Park. Utah State Parks and Recreation manages Fremont Indian State Park and associated hiking trails, picnic areas, and group areas within the park.

Additional recreation opportunities to those described previously include the following:

- Paiute ATV Trails System
- OHV trails identified by the Utah State Parks and Recreation on the Mineral and Black Mountains
- Hardscrabble and Shinbone trails located on the Dixie National Forest
- Shooting range located approximately 3 miles north of Richfield, west of I-70

Recreation Opportunity Spectrum

Recreation opportunities on the Fishlake and Dixie National Forests were identified based on the ROS. The purpose of the ROS is to provide for a variety of recreation opportunities on federal lands. ROS is a framework for managing recreation settings, opportunities, and activities for the USFS. A forest is divided into the classifications of primitive, semi-primitive nonmotorized, semi-primitive motorized, roaded natural, rural, and urban (USFS 1982):

- **Primitive.** Extremely high probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquility, and self-reliance throughout the application of woodman and outdoor skills in an environment that offers a high degree of challenge and risk. Areas would be characterized by an essentially unmodified natural environment of fairly large size.

- **Semi-primitive nonmotorized.** High, but not extremely high, probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquility, and self-reliance through the application of woodsman and outdoor skills in an environment that offers challenge and risk. Area is characterized by a predominantly natural or natural-appearing environment of moderate-to-large size.

- **Semi-primitive motorized.** Moderate probability of experiencing isolation from the sights and sounds of humans, independence, closeness to nature, tranquility, and self-reliance through the application of woodsman and outdoor skills in an environment that offers challenge and risk. Opportunity to have a high degree of interaction with the natural environment. Opportunity to use motorized equipment while in the area. Area is characterized by a predominantly natural or natural-appearing environment of moderate-to-large size.

- **Roaded natural.** About equal probability to experience affiliation with other use groups and for isolation from the sights and sound of humans. Opportunity to have a high degree of interaction with the natural environment. Challenge and risk opportunities associated with more primitive type of recreation are not very important. Practice and testing of outdoor skills might be

important. Opportunities for both motorized and nonmotorized forms of recreation are possible. Area is characterized by predominantly natural appearing environments with moderate evidences of the sights and sounds of man.

- **Rural.** Probability for experiencing affiliation with individuals and groups is prevalent, as is the convenience of sites and opportunities. These factors are generally more important than the setting of the physical environment. Opportunities for wildland challenges, risk-taking, and testing of outdoor skills are generally unimportant except for specific activities like downhill skiing, for which challenge and risk-taking are important elements. Area is characterized by substantially modified natural environments.

- **Urban.** Probability for experiencing affiliation with individuals and groups is prevalent, as is the convenience of sites and opportunities. Experiencing natural environments, having challenges and risks afforded by the natural environment, and the use of outdoor skills are relatively unimportant. Opportunities for competitive and spectator sports and for passive uses of highly human influence (i.e., parks and open spaces) are common. Areas are characterized by a substantially urbanized environment, although the background may have natural-appearing elements

The number of miles of ROS classes crossed by the alternative routes on USFS-administered lands is shown in Tables 3-73 and 3-74 in Section 3.2.9.5, and the anticipated impacts on the ROS classes occurring within the study corridor are illustrated in MV-16 (Volume II).

Impacts on each classification were assessed based on the suitability of new access roads (refer to Table 3-68 for more information), presence of the transmission line, and vegetation management. The recreation setting associated with each ROS class serves as a baseline for comparing alternatives.

Baseline data for recreational opportunities (e.g., the ROS) were not available for analysis on BLM-administered lands.

Impact Assessment and Mitigation Planning

The methodology for assessing the potential impacts on land use and recreation resources associated with implementing the Project generally include: (1) identifying the types of potential effects on land use and recreation resources that could result from construction, operation, and maintenance of the proposed transmission line and associated facilities; (2) classifying the relative intensity of impacts of a potential effect on land use and recreation resources to potential environmental effects; (3) developing criteria for assessing the intensity of a potential effect on a land use and recreation resource; (4) assessing the initial impacts on the land use and recreation resources; (5) identifying the appropriate selective mitigation measures (Table 3-3) for minimizing potential adverse effects; (6) determining specific areas where selective mitigation should be applied; and (7) disclosing potential residual impacts on land use and recreation resources.

Types of Potential Environmental Effects

The construction, operation, and maintenance of the Project would result in both direct and indirect adverse effects on land use and recreation resources. Direct effects associated with construction, operation, and maintenance activities could include the following:

- Loss of rangeland for livestock grazing associated with clearing pulling and tensioning sites, staging areas, access roads, tower sites, and a batch plant (short- and long-term)
- Trail and scenic backway closures during construction (short-term)
- Increased access into areas not suitable for vehicular travel due to new access roads constructed for the Project (long-term)
- Ground disturbance and impacts on wilderness qualities or attributes in unroaded/undeveloped areas (short- and long-term)
- Ground disturbance and impacts on wilderness qualities or attributes in IRAs (short- and long-term)
- Conflicts with future energy facilities, including the design, construction, and operation of these facilities (long-term)
- Limit future development of agricultural, industrial, and residential areas (long-term)
- Diminishment of open space in areas zoned for open space conservation (long-term)

Indirect effects would include degradation of popular recreation destination points on lands administered by BLM and USFS as the result of increased access. If destination points are made more accessible by new access roads constructed for the Project, these areas could be degraded to the point that the enjoyment of future generations could be diminished.

Criteria for Assessing Intensity of Impacts

Criteria were developed to assess the intensity of a potential effect on a land use and recreation resources associated with implementation of the Project (Table 3-68). The assessment of impacts on each category of existing and future land use or designation and recreation resources was based on the relationship between the intensity of a potential effect of each use to estimated disturbance associated with Project construction, operation, and maintenance.

TABLE 3-68
CRITERIA FOR ASSESSING INTENSITY OF IMPACTS

Intensity of Impacts	Description
High	▪ Areas of very high or high intensity of impact where the Project would create a direct long-term conflict with existing land uses ▪ Areas where the Project would conflict physically with existing residential, commercial, industrial, military, or agricultural uses (i.e., displacement of homes, businesses, or center-pivot irrigation agriculture fields) ▪ Areas where the Project would conflict physically with any designated recreation, preservation use area, inventoried roadless area (IRA), and unroaded/undeveloped areas in a manner that would reduce the size of the area such that it may not be able to be managed as such[1] ▪ Areas where the Project would conflict with any applicable adopted policy or goal of the affected land-management agency ▪ Residential areas where the Project would conflict physically with planned subdivisions at the final plan approval stage ▪ Areas where the Project may require extensive efforts beyond standard construction practices to ensure public or worker safety
Moderate	▪ Areas of moderate intensity of impact where the Project would create an indirect conflict with residential, commercial, or military uses ▪ Areas where the Project would create short-term impacts on agricultural operations ▪ Areas where the transmission lines would require expansion of the existing right-of-way in a designated recreation area or residential areas (existing and proposed conceptual plans) ▪ Areas where the Project would conflict physically with IRAs unroaded/undeveloped areas in a manner that would not affect the ability of the area to be managed as an IRA and/or wilderness[2]

TABLE 3-68
CRITERIA FOR ASSESSING INTENSITY OF IMPACTS

Intensity of Impacts	Description
Low	▪ Areas of low intensity of impact where land use is compatible with a transmission line ▪ Areas where the Project is in a designated (federal or local) utility corridor ▪ Areas of measurable or perceptible change that is small enough that it would not result in a change to ecological condition, a loss of acres eligible to be managed as an IRA or unroaded/undeveloped area or a marked decrease in user experience within the IRA or unroaded/undeveloped area[3]

NOTES:
[1]Impacts on the qualities or attributes for which the areas were designated or identified. For example, impacts on roadless characteristics of IRAs or wilderness attributes of IRAs or unroaded/undeveloped areas. High impacts would include changes such as changes in ecological condition, a loss of acres, or a decrease in user's experience that would preclude management of the area as an IRA and/or wilderness.
[2]Moderate impacts would include changes that are large enough that it may result in changes to ecological conditions, a loss of acres, or a decrease in user's experience, but would not preclude the ability of IRA or unroaded/undeveloped area to be managed as such.
[3]Low impacts, while measurable or perceptible, would be small enough that it would not result in a change to ecological condition, a loss of acres, or a decrease in user's experience that would not preclude management of the area as an IRA and/or wilderness

Inventoried Roadless Areas

This section and the corresponding sections in Chapter 3 to follow, do not present detailed information on the IRAs or analyze their suitability. Rather this section, and following corresponding sections, present the information necessary to understand the potential impacts of the Project on IRAs.

In addition to a general absence of constructed roads, IRAs identified by the Fishlake and Dixie National Forests contain other important environmental values that warrant protection, including the following nine values or features identified in the RACR to characterize IRAs:

- **High quality or undisturbed soil, water, and air resources.** These three resources are the foundation upon which other resource values and outputs depend. Healthy watersheds provide clean water for domestic, agricultural, and industrial uses; maintain fish and wildlife populations; and provide recreational opportunities.

- **Sources of public drinking water.** National Forest System lands contain watersheds that are important sources of public drinking water. Maintaining these areas in a relatively undisturbed condition is crucial to maintain the flow and affordability of clean water to a growing population.

- **Diversity of plant and animal communities.** IRAs are more likely than roaded areas to support greater ecosystem health, including the diversity of native and desired nonnative plant and animal communities. These areas serve as a buffer against the spread of nonnative invasive species.

- **Habitat for special status species dependent on large undisturbed areas of land.** IRAs function as biological strongholds and refuges for many species including 25 and 13 percent of federally listed animal and plant species, respectively. In addition, 65 percent of all USFS sensitive species are directly or indirectly supported by IRAs (36 CFR 294).

- **Primitive, semi-primitive, non-motorized, and semi-primitive motorized classes of dispersed recreation.** IRAs often provide outstanding dispersed recreation opportunities in areas with

wilderness-like attributes. These areas reduce recreation pressure on designated wilderness; and unlike wilderness, the use of mountain bikes and other mechanized means of travel is permitted.

- **Reference landscapes.** Reference landscapes of relatively undisturbed areas serve as a barometer to measure the effect of development on other parts of the landscape.
- **Natural appearing landscapes with high scenic quality.** High quality scenery, especially scenery with natural-appearing landscapes, is a primary reason that people choose to recreate. In addition, quality scenery contributes directly to real estate values in nearby communities and residential areas.
- **Traditional cultural properties and sacred sites.** TCPs are places, sites, structures, art, or objects that have played an important role in the cultural history of a group. Sacred sites are places that have special religious significance to a group. Many of these sites may be eligible for protection under the NHPA; however, many of these areas have not been inventoried.
- **Other locally-identified unique characteristics.** IRAs may offer other locally-identified unique characteristics and values such as uncommon geological formations, unique wetland complexes, or social, cultural, or historical characteristics.

Also, IRAs identified by the Fishlake and Dixie National Forests contain the following attributes that characterize wilderness potential.

- **Natural integrity.** The extent to which long-term ecological processes are intact and operating. It describes the extent to which human influences have altered natural processes.
- **Apparent naturalness.** The environment looks natural to most people using the area (e.g., without permanent improvements or human habitation).
- **Solitude or primitive recreation.** Area provides isolation from sights, sounds, and presence of others. Opportunities for primitive recreation provide experiences to be isolated from the evidence of man, to feel a part of nature, and to have a vastness of scale. Physical factors that can create primitive recreation opportunities include topography, vegetative screening, distance from human impacts such as roads, motorized vehicles, and logging operations, and difficulty of travel.
- **Challenging experience.** A challenging experience is one that requires self-reliance through application of outdoor skills.
- **Special features, places, and values.** These consist of unique geological, biological, ecological, cultural, or scenic features.
- **Wilderness manageability and boundaries.** Consideration of the ability to manage an area as wilderness as required by the Wilderness Act, Section 2, which defines Wilderness as an area that "… has at least 5,000 acres of land or is of sufficient size to make practicable its preservation and use in an unimpaired condition…" Factors such as size, shape, and juxtaposition to external influences should be considered.

Impacts associated with the IRAs are discussed for each alternative in terms of estimated ground disturbance within the IRA and impacts on roadless and wilderness attributes (refer to Section 3.2.9.5, *Results*).

Unroaded/Undeveloped Areas

The USFS identified unroaded/undeveloped areas using inventory procedures found in the Forest Service Handbook 1909.12, Chapter 71. The inventory was conducted with the purpose of identifying potential wilderness areas in the National Forest System. The *National Forest System Land and Resource Management Planning Rule of 1982* (36 CFR §219.17) directed that roadless areas be evaluated and considered for wilderness recommendation during the forest planning process.

It is important to note unroaded/undeveloped areas are not a land designation decision, nor do they imply or impart any particular level of management direction or protection. The boundaries for the unroaded/undeveloped areas (refer to Maps 3-7 and 3-8) provide the most current inventory data for potential wilderness areas on the Dixie and Fishlake National Forests. The analysis used in the inventory is not an evaluation of potential wilderness or a preliminary administrative recommendation for wilderness designation, recommendations of areas suitable for wilderness consideration have not been made by the USFS. The following characteristics are criteria found useful in evaluating effects on wilderness qualities or attributes. These characteristics are described as:

- **Natural.** Area is substantially free from the effects of modern civilization and generally appear affected primarily by forces of nature.
- **Undeveloped.** Area is without permanent improvements or human habitation.
- **Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation.**: Area provides isolation from sights, sounds, and presence of others. Area also provides opportunities such as physical and mental challenge, adventure and self-reliance, as well as feelings of self-awareness and inspiration.
- **Special Features and Values.** Area provides values such as those with ecologic, geologic, scientific, educational, scenic, historical, or cultural significance.
- **Wilderness Manageability.** Consideration of the ability to manage an area as wilderness as required by the Wilderness Act, Section 2, which defines Wilderness as an area that "… has at least 5,000 acres of land or is of sufficient size to make practicable its preservation and use in an unimpaired condition…" Factors such as size, shape, and juxtaposition to external influences should be considered.

Impacts associated with unroaded/undeveloped areas are discussed for each alternative in terms of estimated ground disturbance within an unroaded/undeveloped area and impacts on wilderness attributes (refer to Section 3.2.9.5).

Recreation Opportunity Spectrum

Impacts on the management of dispersed recreation opportunities on the Fishlake and Dixie National Forests were assessed on the basis of the suitability of transmission line access roads within each ROS classification, with the assumption that these roads would provide full access (i.e., driving a vehicle or ATV without difficulty or challenge).

Generally, new transmission line access roads into remote areas would reduce the opportunity for solitude, but enhance the opportunity for socializing and motorized travel. Table 3-69 identifies the suitable access and the initial impacts based on the intensity of a potential effect of each ROS

classification and specifies initial impacts, assuming a permanent access road built to Proponent standards along or within the transmission line right-of-way (per the Project description presented in Chapter 2). Mitigation would be applied to reduce high impacts where feasible, as shown in Table 3-69.

TABLE 3-69
RECREATION OPPORTUNITY SPECTRUM SUITABILITY TO NEW ACCESS ROADS

Classification	Suitable Access	Initial Impact
Primitive	Cross-country (pedestrian)	High
Semi-primitive Nonmotorized	Hiking and equestrian trials	High
Semi-primitive Motorized	All-terrain vehicle trails and two-track roads	Moderate
Roaded Natural	Improved dirt roads	Low
Rural	Improved paved roads	Low
Urban	Improved paved roads	Low

Aesthetic impacts on views from campgrounds, recreation areas, and OHV and pedestrian trails are described in the visual resources section (Section 3.2.8).

Effects Analysis

Assessment of Initial Impacts

With the exception of IRAs and USFS unroaded/undeveloped areas, the intensity of potential effects on land use that could result from implementation of the Project was used as the basis for assessing initial impacts on land use and recreation resources associated with implementation of the Project. The intensity of initial impacts on IRAs and unroaded/undeveloped areas was based on whether the effects would reduce the size of the area and in a manner that would preclude management as an IRA and/or wilderness. The initial impacts were assigned using the criteria presented in Table 3-68.

Mitigation Planning and Effectiveness

Increased access into areas managed for limited access, ground disturbance and access in potential wilderness areas, and trail closures are among the primary adverse environmental effects on land use and recreation resources associated with the construction, operation, and maintenance of the proposed transmission line. In addition to the design features of the Proposed Action described as part of the Project description in Chapter 2 (Table 2-6), mitigation measures were developed to minimize adverse impacts on land use and recreation resources (refer to Table 3-3), including Mitigation Measures 1, 2, 4, 5, 6, 7, 9, 10, 11, and 15 described in this section.

To reduce disturbance to sensitive soils and vegetation in unroaded/undeveloped areas and IRAs, Mitigation Measure 1 was applied. Existing access roads/trails would not be widened or otherwise upgraded for construction and maintenance in areas determined by the land-management agency, where soils and vegetation are particularly sensitive to disturbance.

To reduce ground disturbance and access in LWCs, Mitigation Measure 2 was applied where flat terrain (0 to 8 percent slope) and existing access were present. Mitigation Measure 2 would prohibit blading of new access roads in select areas of sensitive resources during construction or maintenance. Existing or overland access roads are to be used in these areas.

To minimize vegetation removal in IRAs, , LWCs, parks/preservation areas, and semi-primitive nonmotorized and motorized areas, Mitigation Measure 4 (minimizing tree clearing) was applied where vegetation, primarily pinyon-juniper, would be cleared for conductor clearance.

To reduce public access into agricultural areas, preservation areas, LWcs, unroaded/undeveloped areas, IRAs, and semi-primitive motorized and semi-primitive nonmotorized areas, Mitigation Measures 5 and 15 were applied where appropriate. Application of Mitigation Measures 5 and 15 would reduce public access into these areas by either reclaiming the access road (if not required for maintenance) or by placing barriers or gates at the entrances (if required for maintenance).

Modifying tower design (Mitigation Measure 6) would reduce visual contrast or address site-specific constraints in areas where there are sensitive views, an existing corridor, or the Project would be near an airport influence zone.

Spanning sensitive features (Mitigation Measure 7) was applied where the alternative routes cross zoned residential, commercial, energy-related areas, sensitive cultural sites, or agricultural areas (e.g., stockyards), and where unroaded/undeveloped areas and semi-primitive motorized and semi-primitive nonmotorized areas could be feasibly spanned and access roads could be routed around the sensitive features to reduce ground disturbance and access.

Maximizing the span between transmission towers (Mitigation Measure 9) was applied where the Project crosses trails, scenic byways, and backways. Maximizing the span of the transmission line at trail crossings would improve public safety by ensuring the towers are located as far away as possible from the trail or road.

Within the IRAs, the Project would be constructed by helicopter-only construction methods, facilitated by overland travel (Mitigation Measure 10). Helicopters would transport personnel, drilling equipment, towers, and other construction materials to and from the right-of-way and would be used for wire pulling and tensioning (refer to Section 2.3.5.2). Access to the right-of-way also could be accomplished by overland travel using low-impact vehicles (refer to Section 2.3.3). After completion of construction activities, any temporary disturbance, including that associated with overland travel to access the right-of-way within an IRA, would be reclaimed according to the procedures specified in the POD.

Minimizing right-of-way clearing (Mitigation Measure 11) was applied in agricultural areas, LWCs, IRAs, areas zoned as parks/preservation and residential, and semi-primitive motorized and nonmotorized areas. This would reduce the visual contrast and avoid sensitive features.

Residual Impacts

Table 3-70 summarizes the initial impacts based on the intensity of a potential effect on land use and recreation resources, the selective mitigation measures (from Table 3-3) applied to mitigate potentially adverse effects on those resources, and residual impacts. The intensity of initial and residual impacts depends on whether the effects would reduce the size of the area that would preclude management as an IRA and/or wilderness (refer to Table 3-68). In addition, impacts associated with the IRAs are discussed for each alternative in terms of estimated ground disturbance within the IRA and unroaded/undeveloped areas and impacts on roadless or wilderness attributes (refer to Section 3.2.9.5).

TABLE 3-70
SUMMARY OF INITIAL AND RESIDUAL IMPACTS
BY LAND USE AND RECREATION RESOURCE

Resource[1]	Initial Impacts	Selective Mitigation Measures Applied	Residual Impacts
Existing Land Use			
Agriculture Irrigated Dry-land Stockyard	 High Moderate Moderate	 5, 7, 11 5, 7, 11 5, 7, 11	 Moderate/Low Low Low
Airport influence zones (conical and horizontal)	High	6	Low
Lands with Wilderness Characteristics	High/Moderate	2, 4, 5, 11, 15	Moderate
Commercial	Moderate	7	Low
Energy generation (wind farm, geothermal locations, solar)	High/Moderate	7	Moderate/Low
Industrial	Low	–	Low
Inventoried roadless areas[2]	High/Moderate	1, 4, 5, 10, 11, 15	Moderate
National Historic District boundary	Moderate/Low	7	Low
National Historic Landmark	High	7	Moderate
Parks/preservation	High	4, 5, 11, 15	High
Pipelines	Low	–	Low
Rangeland (grazing allotments)	Low	–	Low
Residential	High	7, 11	Moderate
Transmission lines	Low	–	Low
Transportation	Low	–	Low
Unroaded/undeveloped areas	High/Moderate	1, 2, 7, 15	Moderate
Future Land Use			
Agriculture Irrigated Dry-land Stockyard	 Moderate Low Low	 5, 7, 11 – –	 Low Low Low
Commercial	Moderate	7	Low
Energy generation (wind farm, geothermal locations, solar)	Moderate	7	Low
Geothermal energy proposed (leases)[3]	Low	–	Low
Industrial	Low	–	Low
Oil and gas proposed (leases)	Low	–	Low
Parks/preservation	High	4, 5, 11	High/Moderate
Planned pipelines	Low	–	Low
Rangeland (grazing allotments)	Low	–	Low
Residential (platted, conceptual)	High/Moderate	7, 11	Moderate/Low
Solar study areas (Programmatic Environmental Impact Statement)[3]	Moderate	–	Moderate
Transmission lines (planned)	Low	–	Low
Transportation	Low	–	Low
Wind farm testing areas (proposed)[3]	Moderate	–	Moderate
Recreation			
Off-highway vehicle areas	Moderate	–	Moderate
Roaded natural	Low	–	Low

TABLE 3-70
SUMMARY OF INITIAL AND RESIDUAL IMPACTS
BY LAND USE AND RECREATION RESOURCE

Resource[1]	Initial Impacts	Selective Mitigation Measures Applied	Residual Impacts
Scenic byways and backways	Moderate	9	Low
Semi-primitive nonmotorized	High	4, 5, 7, 11, 15	High/Moderate
Semi-primitive motorized	Moderate	4, 5, 7, 11, 15	Moderate/Low
Trails	Moderate	9, 15	Low
Wild and scenic rivers	High/Moderate	9	Moderate/Low

NOTES:
[1]Only resources crossed by the alternative routes are listed in this table.
[2]The intensity of initial and residual impacts depends on whether the effects would reduce the size of the area and preclude management as an IRA and/or wilderness.
[3]None of the mitigation measures were deemed appropriate to reduce the impacts on these future and unknown facilities.

3.2.9.5 Results

A summary of baseline resource inventory and results of the effects analysis is presented in Tables 3-73 and 3-74 and described in this section. Table 2-11 presents a comparison of results of the effects analysis for the alternative routes and Table 2-12 presents a summary of the information presented in Table 2-11.

No Action Alternative

Under this alternative, there would be no construction, operation, or maintenance activities associated with the Project. Current management and use of the area would continue into the reasonably foreseeable future. Impacts on land use and recreation resources associated with the implementation of the Project would not occur.

Impacts Common to All Action Alternatives

Affected Environment

Existing Land Use

All alternative routes cross grazing and rangeland areas. Table 3-71 identifies USFS and BLM grazing allotments by alternative.

Future Land Use

All alternative routes cross areas planned for grazing and rangeland. In addition, all alternatives cross geothermal and oil and gas leases. Tables 3-73 and 3-74 identify how many miles each alternative route crosses geothermal and oil and gas leases.

Environmental Effects

Existing Land Use

Impacts on grazing and rangeland areas crossed by alternative routes (refer to Table 3-71) would be low. Short-term impacts on grazing would result from construction disturbance at tower sites, pulling sites, staging areas, and access roads. Fences and gates could be damaged during construction, but would be repaired or replaced. Long-term impacts on grazing, such as loss of vegetation, would be low due to the minimal extent of disturbance on rangeland from Project construction and operation and could be minimized by soil and vegetation reclamation practices. Table 3-71 identifies the amount of disturbance (acres) anticipated by alternative and the percentage of the grazing allotments disturbed (refer to Appendix J for detailed information by allotment).

TABLE 3-71
BLM AND USFS GRAZING ALLOTMENTS CROSSED

Alternative Route	Managing Agency	Total Allotments Crossed	Total Acres of Allotment	Miles Crossed by Project	Acres of Temporary Disturbance[1, 3]	Acres of Permanent Disturbance[2, 3]	Percent of Allotment Disturbed
Northern - Sigurd Substation to South of the Black Mountains							
N1	BLM Total	14	833,815.3	77.9	708.9	225.9	0.3
	USFS Total	8	166,080.4	31.8	289.4	92.2	0.6
	Grand Total	**22**	**999,895.7**	**109.8**	**998.3**	**318.1**	**0.3**
N2	BLM Total	15	802,493.6	75.4	693.7	218.7	0.3
	USFS Total	8	166,080.4	31.8	292.6	92.2	0.6
	Grand Total	**23**	**968,574.0**	**107.2**	**986.2**	**310.9**	**0.3**
N2-A	BLM Total	15	802,493.6	75.6	695.5	219.2	0.3
	USFS Total	8	166,080.4	31.8	292.6	92.2	0.6
	Grand Total	**23**	**968,574.0**	**107.4**	**988.1**	**311.5**	0.3
N3	BLM Total	16	738,236.5	74.6	686.3	194.0	0.3
	USFS Total	8	166,080.4	31.8	292.6	82.7	0.6
	Grand Total	**24**	**904,316.9**	**106.4**	**1,011.1**	**285.7**	**0.4**
N4	BLM Total	11	502,610.5	64.2	590.6	205.4	0.4
	USFS Total	8	166,080.4	31.8	292.6	101.8	0.6
	Grand Total	**19**	**668,690.9**	**96.0**	**849.2**	**295.4**	**0.4**
N5	BLM Total	12	438,353.4	63.4	589.6	183.9	0.4
	USFS Total	8	166,080.4	31.8	295.7	92.2	0.6
	Grand Total	**20**	**604,433.8**	**95.2**	**886.3**	**276.4**	**0.5**
N6	BLM Total	13	485,133.9	63.2	587.8	221.2	0.4
	USFS Total	8	166,080.4	31.8	295.7	11.3	0.6
	Grand Total	**21**	**651,214.3**	**95.0**	**884.4**	**332.9**	**0.4**
Southern - South of the Black Mountains to Red Butte Substation							
S1	BLM Total	11	250,026.3	32.1	301.7	112.4	0.4
	USFS Total	4	144,283.7	20.9	196.5	73.2	0.4
	Grand Total	**15**	**394,310.0**	**53.0**	**499.1**	**185.9**	**0.4**
S2	BLM Total	11	248,051.1	32.5	328.3	104.0	0.4
	USFS Total	3	105,719.0	13.0	131.3	41.6	0.4
	Grand Total	**14**	**353,770.1**	**45.5**	**460.6**	**145.9**	**0.4**
S3	BLM Total	11	248,051.1	32.5	305.5	133.3	0.4
	USFS Total	3	105,719.0	20.5	192.7	84.1	0.6
	Grand Total	**15**	**353,770.1**	**53.0**	**498.2**	**218.4**	**0.5**
S4	BLM Total	11	248,051.1	31.9	357.3	95.7	0.4
	USFS Total	2	63,683.9	15.1	169.1	45.3	0.7
	Grand Total	**13**	**311,735.0**	**47.0**	**527.5**	**141.3**	**0.5**
S5	BLM Total	14	194,923.5	35.6	334.6	117.5	0.6
	USFS Total	4	144,283.7	20.9	196.5	69.0	0.4
	Grand Total	**18**	**339,207.2**	**56.5**	**531.1**	**186.5**	**0.5**

TABLE 3-71
BLM AND USFS GRAZING ALLOTMENTS CROSSED

Alternative Route	Managing Agency	Total Allotments Crossed	Total Acres of Allotment	Miles Crossed by Project	Acres of Temporary Disturbance[1, 3]	Acres of Permanent Disturbance[2, 3]	Percent of Allotment Disturbed
S6	BLM Total	14	192,948.3	37.7	350.6	139.5	0.6
	USFS Total	3	105,719.0	20.5	190.7	75.9	0.6
	Grand Total	**17**	**298,667.3**	**58.2**	**542.2**	**215.7**	**0.6**
S7	BLM Total	11	248,051.1	32.5	338.0	107.3	0.4
	USFS Total	2	63,683.9	13.2	137.3	43.6	0.6
	Grand Total	**13**	**311,735.0**	**45.7**	**507.5**	**161.0**	**0.4**
S7-A	BLM Total	11	248,051.1	32.5	331.5	104.0	0.4
	USFS Total	2	63,683.9	13.2	134.6	42.2	0.6
	Grand Total	**13**	**311,735.0**	**45.7**	**497.8**	**156.2**	**0.4**

NOTES:
[1]Temporary disturbance: Estimated area of disturbance associated with structure work areas, wire-splicing sites, wire-pulling sites, wire-tensioning sites, multi-use construction yards, staging areas, helicopter refueling sites, guard structures, the shoofly, and temporary access roads. The temporary disturbance numbers, in relation to grazing allotments, were estimated using acres of temporary disturbance per mile and the number of miles crossed by the alternative route.
[2]Permanent disturbance: Estimated area of disturbance associated with H-frame and lattice structure base areas, communication regeneration stations and associated fiber optic and power lines, and permanent access roads. The permanent disturbance number, in relation to grazing allotments, was estimated using acres of permanent disturbance per mile and the number of miles crossed by the alternative route.
[3]For estimating purposes, 5 percent was added to the total acreage of disturbance.

Future Land Use

Impacts on areas planned for grazing and rangeland crossed by alternative routes would be similar to those described for existing land use. Impacts on geothermal leases are anticipated to be low because transmission lines and geothermal plants are compatible facilities. Impacts on oil and gas leases would be similar to impacts on geothermal leases, except transmission lines and oil and gas facilities are generally not as compatible. The Project could impair development of these leases; however, the extent and intensity of these impacts could not be determined since specific projects have not been proposed in the study corridors. It would be anticipated any remaining impacts would be mitigated by engineering design of future facilities.

Recreation

BLM- and USFS-administered lands offer diverse opportunities for dispersed recreation. The Project could provide beneficial effects on motorized recreation opportunities, but also could have adverse effects on nonmotorized recreation activities. Construction, operation, and maintenance of the Project could improve opportunities for dispersed recreation by increasing public access to BLM- and USFS-administered lands via new access roads; however, increased access to popular destination points could increase their popularity, which could more rapidly degrade these areas and diminish their use and enjoyment by future generations. The decision whether to make transmission line maintenance roads available for public use would be left to each agency with lands administered in the Project area.

Impacts Common to Northern Area Action Alternatives

Affected Environment

Existing Land Use

Airports

Link 30 is common to all Northern Area action alternatives (i.e., Alternatives N-1 through N-6) and is located approximately 1 mile west of the Richfield Airport against the mountainside of the Pahvant Range. The FAA will require a Notice of Proposed Construction or Alteration (Form 7460-1); and after review of the notice, the FAA will issue either a Determination of No Hazard to Air Navigation or a Notice of Presumed Hazard.

Unroaded/Undeveloped Areas

Links 30, 45, 63, and 64 are common to all Northern Area action alternatives (i.e., Alternatives N-1 through N-6) and cross 7.8 miles of four unroaded/undeveloped areas, the Castle Rock, Joe Lott, Joseph, and Sargent Mountain unroaded/undeveloped areas (refer to Map 3-7 and MV-14a, MV-14b). Table 3-72 quantifies the USFS unroaded/undeveloped areas crossed by the Project in the Northern Area, including total acreage, miles crossed, temporary and permanent acres of disturbance, and percent of unroaded/undeveloped area disturbed. This section does not present detailed descriptions of the unroaded/undeveloped areas or consider their suitability to be managed as IRAs or wilderness. Rather this section presents information (based on best available data) about the areas necessary to understand the potential impacts of the Project on potential wilderness attributes of the unroaded/undeveloped areas crossed by the Project.

Castle Rock Unroaded/Undeveloped Area

Based on available data for the area, no special features or values are present within the area. One known cultural resource site, which is not eligible for the NRHP, is located within this area. In this area, the alternative routes pass through general raptor habitat and crucial winter habitat for mule deer, and cross Dry Creek, a tributary of the Sevier River, a state-listed impaired water.

While data are not available to document specific outstanding opportunities for solitude or primitive and unconfined recreation, the area is generally known to be natural and undeveloped. The size of the area is 8,269 acres, indicating the area is of sufficient size to make practicable its preservation and use in an unimpaired condition.

Joe Lott Unroaded/Undeveloped Area

Thirty-two known cultural resource sites are located within the Joe Lott unroaded/undeveloped area, indicating potential special features or values (i.e., cultural or historic). The alternative route passes through suitable habitat for pygmy rabbit habitat and USFS sensitive plants, which could be considered special ecological value. The alternative route also crosses three intermittent streams (Dell Lott Hollow, Graveyard Hollow, and Indian Creek), which are tributaries of the Sevier River, a state-listed impaired water, and may also provide special ecological value.

Data are not available to document specific outstanding opportunities for solitude or primitive and unconfined recreation. Portions of the area are generally known to be natural and undeveloped. However, an existing 138kv transmission line and access road are present near Link 30. The size of the area is 24,357 acres, indicating the area is of sufficient size to make practicable its preservation and use in an unimpaired condition.

Joseph Unroaded/Undeveloped Area

Two known cultural resource sites are located within the Joseph unroaded/undeveloped area, indicating potential special features or values (i.e., cultural or historic). The alternative route passes through suitable pygmy rabbit habitat and known or potential habitat for or near known populations of USFS sensitive plants, which could be considered special ecological value. The Project also crosses five intermittent streams in this area (i.e., three unnamed intermittent streams, Mortensen Creek, and Gooseberry Creek), which are tributaries of the Sevier River, a state-listed impaired water, and also may provide special ecological value.

Data are not available to document specific outstanding opportunities for solitude or primitive and unconfined recreation. Portions of the area are generally known to be natural and undeveloped. However, an existing 138kV transmission line and access road are present near Link 30. The size of the area is 8,100 acres, indicating the area is of sufficient size to make practicable its preservation and use in an unimpaired condition.

Sargent Mountain Unroaded/Undeveloped Area

Based on available data for the area, no special cultural or historic features or values are present within the Sargent Mountain unroaded/undeveloped area. In this area, the alternative route passes through general raptor habitat, known USFS sensitive plant populations, and suitable pygmy rabbit habitat, which could be considered special ecological value. In this area, the Project also is located in Dry Hollow and crosses the Dry Hollow intermittent streambed along the route. Dry Hollow is a tributary of the Sevier River, a state-listed impaired water, and may also provide special ecological value.

Data are not available to document specific outstanding opportunities for solitude or primitive and unconfined recreation. Portions of the area are generally known to be natural and undeveloped. However, an existing 138kV transmission line and access road are present near Link 30. The size of the area is 5,524 acres, indicating the area is of sufficient size to make practicable its preservation and use in an unimpaired condition.

Future Land Use

Along Links 25 and 26, the Project would cross an area zoned for agriculture, located west of the Sigurd Substation. The project alternatives also cross an area zoned for residential along Link 30 for approximately 2.0 miles. In Elsinore, along Link 30, the project alternatives cross an area zoned for open space conservation for approximately 0.5 mile. The open space conservation zone currently allows transmission lines.

All of the northern alternatives of the Project (N1 to N6) cross areas used for testing wind facilities. The BLM has approved the use of these lands for wind site testing as right-of-way grants. A wind site testing right-of-way grant affords protection to the Proponent against other wind development applications;

however, it does not provide a right-of-way exclusion area for other compatible uses for which the BLM may approve (43 CFR 2802.15(b)).

Environmental Effects

Existing Land Use

Airports

Short- and long-term impacts on operations at the Richfield Airport would be low because of the location of the alternative route (Link 30) against the mountainside of the Pahvant Range. Furthermore, due to the location of the alternative route (approximately 1 mile west of the airport), the FAA may not require markings for the transmission structures or conductors; however, because the alternative route crosses the airport's horizontal and conical zones (Link 30, Milepost 1.2 to 7.4), it is anticipated the Proponent will file a Notice of Proposed Construction or Alteration (Form 7460-1) with the FAA. The FAA would then determine if the height of the proposed transmission structures conflict with FAA regulations. After review of the notice, the FAA would issue a Determination of No Hazard to Air Navigation if the structures do not compromise the safe operation of the airport. If the structures are determined to compromise the safe operation of the airport, a Notice of Presumed Hazard would be issued and the Proponent would need to undertake mitigation measures, such as modifying tower heights and/or marking conductors and towers in accordance with FAA standards. To further mitigate potential impacts on the safe operation of the airport, tower designs would be modified or an alternative tower type (Mitigation Measure 6) would be used to address height constraints.

Unroaded/Undeveloped Areas

Table 3-72 quantifies the USFS unroaded/undeveloped areas crossed by the Project in the Northern Area, including total acreage, miles crossed, temporary and permanent acres of disturbance, and percent of unroaded/undeveloped area disturbed. Application of mitigation measures during Project siting and construction (refer to Table 3-65) would mitigate impacts on unroaded/undeveloped areas with special ecological or cultural or historic value (e.g., Joe Lott unroaded/undeveloped area). However, moderate residual impacts on wilderness qualities and attributes of unroaded/undeveloped areas on the Fishlake National Forest would be anticipated to result from construction of the Project because direct and permanent loss of acres would occur wherever the Project crosses an unroaded/undeveloped area. Also, the presence of the transmission line within the unroaded/undeveloped area indirectly would affect the naturalness and undeveloped character of the area. While impacts on naturalness and undeveloped character of the unroaded/undeveloped areas would be anticipated, changes in wilderness qualities would not be large enough to preclude management of the areas as an IRA and/or wilderness.

TABLE 3-72
SUMMARY OF EFFECTS ON USFS UNROADED/UNDEVELOPED AREAS CROSSED BY THE PROJECT NORTHERN AREA ACTION ALTERNATIVES

Alternative Route	Unroaded/ Undeveloped Area Name	Total Acres of Unroaded/ Undeveloped Area	Miles Crossed by Project	Acres of Temporary Disturbance[1]	Acres of Permanent Disturbance[2]	Percent of Unroaded/ Undeveloped Area Disturbed
N1–N6	Castle Rock	8,269	0.7	6.5	2.0	Less than 0.1
	Joe Lott	24,357	2.0	18.6	5.8	Less than 0.1
	Joseph	8,100	3.9	36.3	11.3	0.2
	Sargent Mountain	5,524	1.2	11.2	3.5	0.1

NOTES:
[1]Temporary disturbance: Estimated acres of disturbance associated with structure work areas, wire-splicing sites, wire-pulling sites, wire-tensioning sites, multi-use construction yards, staging areas, helicopter refueling sites, guard structures, the shoofly, and temporary access roads. The temporary disturbance numbers, in relation to unroaded/undeveloped areas, were estimated using acres of temporary disturbance per mile and the number of miles crossed by the alternative route.
[2]Permanent disturbance: Estimated acres of disturbance associated with H-frame and lattice structure base areas, communication regeneration stations and associated fiber optic and power lines, and permanent access roads. The permanent disturbance number, in relation to unroaded/undeveloped areas, was estimated using acres of permanent disturbance per mile and the number of miles crossed by the alternative route.

Castle Rock Unroaded/Undeveloped Area

Short- and long-term impacts associated with construction, operation, and maintenance of any of the alternative routes in the Northern Area would diminish the natural appearance and undeveloped character of this area and could decrease opportunities for solitude and primitive recreation, if present. However, changes in wilderness qualities would not be large enough to preclude management of the areas as an IRA and/or wilderness.

Joe Lott Unroaded/Undeveloped Area

Potential impacts on the special cultural or historical values of the area would be avoided or mitigated per direction of the HPTP to be included in the POD (refer to Section 3.2.5). Potential impacts on the special ecological values in the area (i.e., suitable habitat for USFS sensitive plants and pygmy rabbit) would be mitigated by locating tower structures to span sensitive features (Mitigation Measure 7; refer to Table 3-3) and avoiding these areas in designing access routes (Mitigation Measure 2). Potential impacts to intermittent streams also would be mitigated by minimizing vegetation removal (Mitigation Measure 4) when clearing for conductor clearance.

Short- and long-term impacts associated with construction, operation, and maintenance of any of the alternative routes in the Northern Area would diminish the natural appearance and undeveloped character of this area and could decrease opportunities for solitude and primitive recreation, if present. Overall, residual impacts on the wilderness qualities of the area would be moderate but would be lower along Link 30 due to the presence of an existing 138kV transmission line and associated access road.

While impacts on naturalness and undeveloped character of the unroaded/undeveloped areas would be anticipated, changes in wilderness qualities would not be large enough to preclude management of the area as an IRA and/or wilderness.

Joseph Unroaded/Undeveloped Area

Potential impacts on the special cultural or historical values of the area would be avoided or mitigated per direction of the HPTP to be included in the POD (refer to Section 3.2.5). Potential impacts on the special ecological values in the area (i.e., suitable habitat for pygmy rabbit and USFS sensitive plants) would be mitigated by locating tower structures to span sensitive features (Mitigation Measure 7; refer to Table 3-3) and avoiding these areas in designing access routes (Mitigation Measure 2). Potential impacts to intermittent streams also would be mitigated by minimizing vegetation removal (Mitigation Measure 4) when clearing for conductor clearance.

Short- and long-term impacts associated with construction, operation, and maintenance of any of the alternative routes in the Northern Area would diminish the natural appearance and undeveloped character of this area and could decrease opportunities for solitude and primitive recreation, if present. Overall, residual impacts on the wilderness qualities of the area would be moderate but would be lower along Link 30 due to the presence of an existing 138kV transmission line and associated access road.

While impacts on naturalness and undeveloped character of the unroaded/undeveloped areas would be anticipated, changes in wilderness qualities would not be large enough to preclude management of the area as an IRA and/or wilderness.

Sargent Mountain Unroaded/Undeveloped Area

Potential impacts on the special ecological values in the area (i.e., suitable habitat for pygmy rabbit and USFS sensitive plants) would be mitigated by locating tower structures to span sensitive features (Mitigation Measure 7; refer to Table 3-3) and avoiding these areas in designing access routes (Mitigation Measure 2). Potential impacts to intermittent streams also would be mitigated by minimizing vegetation removal (Mitigation Measure 4) when clearing for conductor clearance.

Short- and long-term impacts associated with construction, operation, and maintenance of any of the alternative routes in the Northern Area would diminish the natural appearance and undeveloped character of this area and could decrease opportunities for solitude and primitive recreation, if present. Overall, residual impacts on the wilderness qualities of the area would be moderate but would be lower along Link 30 due to the presence of an existing 138kV transmission line and associated access road.

While impacts on naturalness and undeveloped character of the unroaded/undeveloped areas would be anticipated, changes in wilderness qualities would not be large enough to preclude management of the area as an IRA and/or wilderness.

USFS Tree Removal and Board Feet Calculations

USFS tree removal and board feet calculations were analyzed using the entire forest as inventory. Based on Great Basin pinyon-juniper habitat with an average density of 103 trees per acre with a diameter at root collar greater than 9 inches, 31,462 trees in the Fishlake National Forest are estimated to be removed for this alternative route. Using an average of 837 cubic feet per acre with a diameter at root collar greater

than 9 inches, 3,067,985 board feet of pinyon-juniper are estimated to be cut, sold, or removed and could be used for some minor commercial purposes (e.g., fence posts, poles, fuel wood, etc.) or personal use. This estimate assumes the 150-foot-wide right-of-way would be cleared of vegetation to comply with electrical safety standards. Of 618.2 total acres of right-of-way to be treated in the Fishlake National Forest, approximately 305.5 acres of Great Basin pinyon-juniper habitat would be affected (Moore 2012).

Stockyards

Additional moderate impacts would occur where a stockyard is located west of the Sigurd Substation along Links 25 and 26. Short-term impacts could include displacement of livestock and removal of fences. Long-term impacts could include impeding movement of farm equipment and livestock. These potential impacts would be reduced by maximizing the span between transmission line towers (Mitigation Measure 9), which would reduce the number of towers in this area.

Future Land Use

Low impacts would occur in an area zoned for agriculture located west of the Sigurd Substation along Links 25 and 26. The current agricultural activity is a stockyard, and the location of new transmission line towers could impair future expansion of this facility or future agricultural activities. These potential impacts would be reduced by maximizing the span between transmission line towers (Mitigation Measure 9), which would reduce the number of towers in this area.

Moderate impacts would occur in an area zoned for residential that would be crossed by Link 30 (Milepost 3.1 to 5.1). The Project could impair future development of this area. The alternative routes parallel an existing 138kV transmission line through this area, which minimize permanent ground disturbance and allow for some future development to occur.

Additional moderate impacts would occur in an area zoned for open space conservation in Elsinore along Link 30 (Milepost 8.3 to 8.6 and 8.9 to 9.1). The transmission line is an approved use within this zone. The alternative routes parallel an existing 138kV transmission and, because of slope, it is anticipated the existing access road would be improved and spur roads would be created to access tower locations. New access roads or spur roads not needed for maintenance would be reclaimed (Mitigation Measure 5) to reduce long-term disturbance and motorized access. If the access roads or spur roads are needed for maintenance, placing gates or blocking entrances would limit public access (Mitigation Measure 15).

All of the northern alternatives of the Project (N1 to N6) cross areas used for testing wind facilities. The BLM has approved the use of these lands for wind site testing as right-of-way grants. A wind site testing right-of-way grant affords protection to the Proponent against other wind development applications; however, it does not provide a right-of-way exclusion area for other compatible uses for which the BLM may approve (43 CFR 2802.15(b)).

A possible impact to these future wind projects could include the need to revise preliminary designs of turbine arrays and access roads due to the location of the northern alternative routes of the Project. However, the intensity and extent of impacts cannot be determined at this time for most of the proposed wind farms (except Milford Wind and Mineral Mountains) because a specific project description and turbine array is not available for these facilities.

Parks and Recreation

All northern alternative routes would have low impacts where the routes cross the Paiute ATV Trail System, the American Discovery Trail, and the Kimberly/Big John Scenic Backway (Links 26, 30, 64, 66, 381, 390, and 470). Short-term impacts on the accessibility to the trails and the scenic backway could result from potential trail closures and access restrictions during construction. Long-term impacts, such as permanent trail closures or modifications, would not be anticipated because the Project would span the trails and the scenic backway allowing for the continued use of these facilities (Mitigation Measure 7). In addition, public safety would be enhanced by maximizing the span between transmission line towers (Mitigation Measure 9), which would place the towers a safe distance from the trails and scenic backway.

Moderate impacts on a user-created OHV area along Link 30 west of Richfield would result from the implementation of all northern alternative routes. Short-term impacts would result from potential trail closures and access restrictions during construction. Long-term impacts, such as permanent trail closures or modifications, would be anticipated depending on the location of transmission towers. Public safety could decrease as additional towers are placed adjacent to trails.

Impacts on roaded natural areas would be low because prescribed management of roaded natural areas allows for vehicular travel and frequent social interaction. Over the long-term, vehicular and ATV use in the roaded natural areas likely would increase as a result of a new access road built for the construction, operation, and maintenance of the Project if it remains open to public use. Some new roads built for the construction, operation, and maintenance of the Project would be gated and locked, or otherwise blocked from public access using natural barriers, as determined by the USFS in coordination with the Proponent (Mitigation Measure 15).

Depending on the location and application of mitigation measures, low and moderate impacts on semi-primitive motorized areas could result from increased access provided by a new access road, which could exceed the management threshold for ease of access and social interaction. Low impacts also would occur where the alternative routes parallel the 138kV transmission line, but the terrain does not allow for overland access along Links 30 and 66. In these areas, long-term impacts would be reduced by reclaiming new access roads not needed for maintenance (Mitigation Measure 5) to reduce long-term disturbance and motorized access. If the access roads are needed for maintenance, placing gates or blocking entrances would limit motorized access (Mitigation Measure 15). Moderate impacts would result along Links 30 and 64 where Mitigation Measures 5 and 15 are applied and the alternatives are not parallel to the existing 138kV transmission line. Motorized access could increase during construction, but the application of these mitigation measures would minimize long-term motorized access.

High impacts on semi-primitive nonmotorized areas would result from increased access provided by a new access road that would exceed the management threshold for ease of access and social interaction. The presence of the access road would result in increased motorized use (e.g., ATV and vehicular) and social interaction in areas managed for primitive use (hiking and horseback riding) and limited social interaction (i.e., solitude). High impacts would occur along Links 63 and 64 where new access roads would be constructed due to terrain. Motorized access likely would increase during construction. Long-term motorized access would be minimized by reclaiming new access roads not needed for maintenance (Mitigation Measure 5). If the access roads are needed for maintenance, placing gates or blocking entrances would limit motorized access (Mitigation Measure 15).

Although the Castle Rock Campground is not traversed by the northern alternative routes, short-term impacts would result from potential temporary road closures during construction.

Northern Area – Sigurd Substation to South of the Black Mountains

The baseline resource inventory and residual impacts for all alternative routes considered in the northern area are presented in Table 3-73.

Alternative N1 – Black Rock Road to IPP North of Milford Wind Farm

Affected Environment

Jurisdiction

Alternative N1 is 120.6 miles in length and crosses 46.3 miles of BLM-administered lands (38.4 percent), 30.8 miles of USFS-administered lands (25.5 percent), 5.1 miles of state land (4.2 percent), and 38.4 miles of private land (31.8 percent).

Linear Facilities

This alternative route parallels an existing 138kV transmission line for 36.5 miles, the Kern River pipeline for 2.4 miles, the existing Milford Wind Farm 345kV transmission line for 5.6 miles, and the IPP 500kV DC transmission line for 34.9 miles.

Existing Land Use

Table 3-73 identifies the existing land uses crossed by Alternative N1 and the number of residences within 0.25 mile. Most of the residences are in or near Richfield, which represents the most populated area along the alternative route. The Martin Marietta Materials ballast plant and Circle 4 Farms (hog farms) also are located within the study corridor of this alternative route. The alternative route is located approximately 1 mile from the Richfield Municipal Airport along Link 30 and approximately 1.5 miles from the Milford Municipal Airport along Link 381. The Milford Wind Corridor, LLC Phase III project was approved in November 2011, and is located along links 365 and 380.

Portions of IRAs (i.e., Beehive Peak, Cove Creek, Dog Valley, Flat Canyon, and Joe Lott) are located within the 2-mile-wide study corridor; however, the transmission line would not cross these areas as part of this alternative route.

Future Land Use

Table 3-73 identifies the future land uses crossed by Alternative N1. This alternative route crosses 8.3 miles of the proposed Milford Wind Corridor, LLC Phase IV project along Links 350 and 360, and 1.7 miles of the proposed Mormon Mesa Wind Testing Area along Links 380 and 381.

Parks and Recreation

Alternative N1 crosses the Paiute ATV Trail System, specifically numbered 1, 4, 11, 10, 15, and 76 (paralleling Trail 76 for 1.7 miles). The route crosses the American Discovery trail west of Milford, and the Kimberly/Big John Scenic Backway southwest of Fremont Indian State Park. The Castle Rock Campground, located 0.6 mile southwest of Fremont Indian State Park, is located within the study

corridor but would not be crossed by the transmission line; however, the alternative route crosses the road leading to the campground. Table 3-73 identifies the ROS designations crossed on the Fishlake National Forest by Alternative N1.

Environmental Effects

Existing Land Use

Impacts on existing land use are described under the Impacts Common to All Alternatives and Impacts Common to Northern Area Action Alternatives subheadings. Short- and long-term impacts on operations at the Milford Municipal Airport would be low. It is not anticipated construction and operation of the Project would inhibit the safe operation of the airport, since it would parallel the existing IPP 500kV transmission line and is located approximately 1.6 miles (Link 381) west of the airport; however, because the alternative route crosses the airport's horizontal and conical zones (Link 381, Milepost 0.8 to 5.7), it is anticipated the Proponent would file a Notice of Proposed Construction or Alteration (Form 7460-1) with the FAA. In addition, Mitigation Measure 6 would be applied for the same reasons discussed previously for the Richfield Airport.

Direct impacts on the approved Milford Wind Corridor, LLC Phase III project located along Links 365 and 380 would be high for 4.1 miles as a result of location and operational conflicts between the route and wind turbine locations. The Project could affect directly the location and operation of up to 15 wind turbines and effect the commercial viability of the wind farm (Sullivan 2011a).

This alternative would require an amendment to the Millard County General Plan for utility corridors. Millard County has provided formal comments that they would not support this route alignment and amendment of the General Plan (Dekker 2011).

Future Land Use

In addition to impacts described under the Impacts Common to All Alternatives and Impacts Common to Northern Area Action Alternatives subheadings, moderate impacts could include impairing future development of the proposed Mormon Mesa Wind Testing Area (if approved) located along Links 380 and 381; however, the intensity and extent of impacts could not be determined because a specific project description is not available for the wind farm. It would be anticipated any remaining impacts could be mitigated by engineering design of the wind farm. Impacts on the proposed Milford Wind Corridor, LLC Phase IV project located along Links 350 and 360 would be moderate for 8.3 miles as a result of location and operational conflicts between the route and preliminary wind turbine and array locations. The route or turbine locations could be micro-sited to avoid direct location and operational conflicts between the two projects; this is based on preliminary engineering information provided by First Wind and Rocky Mountain Power (Smith 2011; Sullivan 2011b). Potential impacts related to avian and biological resources in this area are addressed in Section 4.3.4. Other proposed project areas were avoided to the extent possible during the identification of alternative routes for the Project, limiting the extent of the areas that could be affected.

Parks and Recreation

Impacts on recreation resources are common to all northern alternatives and were discussed previously.

TABLE 3-73
ALTERNATIVES ROUTE COMPARISON
FOR LAND USE AND RECREATION INVENTORY DATA AND RESIDUAL IMPACTS BY NORTHERN ALTERNATIVE ROUTES

Alternative Route	Total Miles	Jurisdiction (miles)					Parallel Linear Facilities (within 1500 feet) (miles)				Existing Land Use Crossed (miles)														Residences within 0.25 Mile	Recreation Uses Crossed (miles)								Future Land Use Crossed[5] (miles)													Residual Impacts (miles [percent])								
																																																Existing Land Use			Future Land Use			Recreation		
																													Recreation Opportunity Spectrum																									
		Bureau of Land Management	U.S. Forest Service	State	Tribal	Private	500kV	345kV	138kV	Pipeline	Residential	Commercial	Agriculture	Industrial	Airport Influence Zones[1]	Parks/Preservation	Public/Quasi–public	Schools	Recreation	Transportation Facilities	Rangeland and Vacant/Undeveloped[2]	Utility[3]	Inventoried Roadless Areas[4]	Unroaded/Undeveloped Areas[4]	Designated Utility Corridor		Off-highway Vehicles	Trails	Primitive	Semi–primitive Nonmotorized	Semi–primitive Motorized	Roaded Natural	Rural	Urban	Residential	Commercial	Agriculture	Industrial	Communication Facilities	Parks/Preservation	Public/Quasi–public	Recreation	Schools	Transportation Facilities	Rangeland	Geothermal Leases	Oil and Gas Leases	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
Alternative N1	120.6	46.3	30.8	5.1	–	38.4	34.9	5.6	36.5	2.4	–	0.1	0.2	0.2	6.9	–	–	–	0.8	0.5	114.6	4.2	–	7.8	51.8	74	0.8	1.6	–	1.4	10.1	19.3	–	–	2.1	0.2	0.6	–	–	0.5	–	–	–	0.3	39.5	5.8	14.5	108.7 [90.2]	7.8 [6.4]	4.1 [3.4]	56.6 [46.9]	12.1 [10.0]	4.6 [3.8]	23.3 [19.3]	6.8 [5.6]	1.4 [1.2]
Alternative N2	120.4	56.1	30.8	3.9	–	29.6	29.7	0.7	36.5	6.7	–	0.1	0.2	0.2	6.9	–	–	–	0.8	0.5	116.9	1.7	–	7.8	46.2	74	0.8	1.6	–	1.4	10.1	19.3	–	–	2.1	0.2	0.6	–	–	0.5	–	–	–	0.3	30.7	9.1	14.5	112.1 [93.1]	8.3 [6.9]	–	58.3 [48.4]	9.9 [8.2]	0.5 [0.4]	23.3 [19.4]	6.8 [5.6]	1.4 [1.2]
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	120.0	55.9	30.8	3.9	–	29.3	29.7	0.3	38.1	6.9	–	0.1	0.3	0.1	6.9	–	–	–	0.8	0.6	116.4	1.7	–	7.8	46.2	76	0.8	1.5	–	1.4	10.1	19.3	–	–	2.1	0.2	0.6	–	–	0.5	–	–	–	0.4	30.4	9.0	14.5	111.7 [93.1]	8.3 [6.9]	–	57.3 [47.8]	9.9 [8.3]	0.5 [0.4]	23.2 [19.3]	6.8 [5.7]	1.4 [1.2]
Alternative N3	117.2	64.5	30.8	6.6	–	15.3	0.1	0.7	37.5	41.6	–	0.1	0.2	0.2	4.3	–	–	–	0.8	0.3	114.0	1.6	–	7.8	25.3	75	0.8	1.6	–	1.4	10.1	19.3	–	–	2.1	0.2	0.6	–	–	0.5	–	–	–	0.3	16.4	9.8	17.4	109.4 [93.4]	7.8 [6.6]	–	46.6 [39.8]	9.6 [8.2]	0.5 [0.4]	23.3 [19.9]	6.8 [5.8]	1.4 [1.2]
Alternative N4	109.4	44.5	30.8	5.4	–	28.7	29.7	0.7	37.4	2.4	–	0.1	0.2	0.2	6.9	–	–	–	0.8	0.5	105.7	1.9	–	7.8	46.4	74	0.8	1.6	–	1.4	10.1	19.3	–	–	2.1	0.2	0.6	–	–	0.5	–	–	–	0.3	29.7	9.3	14.5	101.1 [92.4]	8.3 [7.6]	–	57.5 [52.6]	5.7 [5.2]	0.5 [0.5]	23.3 [21.3]	6.8 [6.2]	1.4 [1.3]
Alternative N5	106.2	52.9	30.8	8.1	–	14.4	0.1	0.7	38.4	37.3	–	0.1	0.2	0.2	4.3	–	–	–	0.8	0.3	102.8	1.8	–	7.8	25.5	75	0.8	1.6	–	1.4	10.1	19.3	–	–	2.1	0.2	0.6	–	–	0.5	–	–	–	0.3	15.4	10.0	17.4	98.4 [92.7]	7.8 [7.3]	–	45.8 [43.1]	5.4 [5.1]	0.5 [0.5]	23.3 [21.9]	6.8 [6.4]	1.4 [1.3]
Alternative N6 (Proponent's Preferred Alternative)	105.4	52.5	30.8	7.9	–	14.2	0.1	0.3	38.5	33.5	–	0.1	0.3	0.1	4.3	–	–	–	0.8	0.4	103.3	0.4	–	7.8	25.5	76	0.8	1.5	–	1.4	10.1	19.3	–	–	2.1	0.2	0.6	–	–	0.5	–	–	–	0.4	15.4	10.6	18.2	97.6 [92.7]	7.8 [7.3]	–	46.4 [44.0]	5.2 [4.9]	0.5 [0.5]	23.2 [22.0]	6.8 [6.5]	1.4 [1.3]

NOTES:
[1] Airport influence zones overlap underlying land uses and are not included in the total miles.
[2] Vacant/undeveloped denotes areas delineated as being void of human development and does not refer to Bureau of Land Management or U.S. Forest designations. This classification is not to be confused with unroaded/undeveloped areas or construed as having wilderness qualities or attributes. Vacant/undeveloped lands were identified throughout the study corridors, regardless of jurisdiction.
[3] Utility impacts include all energy projects currently existing or approved as of December 2011.
[4] Inventoried roadless areas, unroaded/undeveloped areas, and areas that overlap underlying land uses and are not included in the total miles.
[5] Future land use is based on municipal and county zoning maps and does not include Bureau of Land Management, U.S. Forest Service, or state lands.

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Alternative N2 – Black Rock Road to IPP South of Milford Wind Farm

Affected Environment

Jurisdiction

Alternative N2 is 120.4 miles in length and crosses 56.1 miles of BLM-administered lands (46.6 percent), 30.8 miles of USFS-administered lands (25.6 percent), 3.9 miles of state land (3.2 percent), and 29.6 miles of private land (24.6 percent).

Linear Facilities

This alternative route parallels an existing 138kV transmission line for 36.5 miles, the Sigurd to Red Butte No. 1 – 345kV transmission line for 0.7 mile, and the Kern River pipeline for 6.7 miles, and the IPP 500kV DC transmission line for 29.7 miles.

Existing Land Use

Table 3-73 identifies the existing land uses crossed by Alternative N2 and the number of residences within 0.25 mile. Most of the residences are in or near Richfield, which represents the most populated area along the alternative route. The alternative route crosses 4.2 miles of the Milford Wind Corridor, LLC Phase III project, which was approved in November 2011, along Links 385 and 386.

Other existing land uses not crossed by the alternative route, but located within the study corridor, would be similar to Alternative N1.

Future Land Use

Table 3-73 identifies the future land uses crossed by Alternative N2. This alternative route crosses 4.2 miles of the proposed Milford Wind Corridor, LLC Phase IV project along Links 350 and 345; and 2.1 miles of the proposed Mormon Mesa Wind Testing Area along Links 386 and 381. This alternative route also crosses the proposed route for the Intermountain Renewable Power Technologies 138kV transmission line on Link 386 (Milepost 2.4 to 2.5).

Parks and Recreation

Alternative N2 crosses the same recreation resources as Alternative N1.

Environmental Effects

Existing Land Use

Impacts on existing land use are described under the Impacts Common to All Alternatives and Impacts Common to Northern Area Action Alternatives subheadings. Impacts on the Milford Municipal Airport would be similar to Alternative N1. Impacts on the approved Milford Wind Corridor, LLC Phase III

project located along Links 385 and 386 would be low as a result of minimizing location and operational conflicts between the route and wind turbine locations. The Project would not directly affect the location and operation of wind turbines in this area (Sullivan 2011a).

This alternative also required an amendment to the Millard County General Plan for utility corridors. Millard County approved this alignment and amended the Millard County General Plan (Dekker 2011).

Future Land Use

In addition to impacts described under the Impacts Common to All Alternatives and Impacts Common to Northern Area Action Alternatives subheadings, moderate impacts on future land uses would be similar to Alternative N1.

Impacts on the proposed Milford Wind Corridor, LLC Phase IV project located along Links 350 and 345 would be moderate as a result of location and operational conflicts between the route and preliminary wind turbine and array locations.

The BLM considers transmission and wind energy development to be compatible uses of public lands that may be colocated provided that operational, safety, and environmental protection requirements for both uses can be implemented to prevent unacceptable impacts on any resource. The route or turbine locations could be micro-sited to avoid direct location and operational conflicts between the two projects; this is based on preliminary engineering information provided by First Wind and Rocky Mountain Power (Sullivan 2011b; Smith 2011).

Parks and Recreation

Impacts on recreation resources are common to all northern alternatives and were discussed previously.

Alternative N2-A (Route Variation of Alternative N2) – Black Rock Road to IPP South of Milford Wind Farm 1,500 Feet East of Kern River Pipeline (Agency Preferred Alternative)

Affected Environment

Jurisdiction

Alternative N2-A crosses the same jurisdictions as Alternative N2.

Linear Facilities

This alternative route parallels an existing 138kV transmission line for 38.1 miles and the Kern River pipeline for 6.9 miles.

Existing Land Use

Alternative N2-A is 120.0 miles in length and crosses the same existing land use resources as Alternative N2.

Future Land Use

Alternative N2-A crosses the same future land use resources as Alternative N2.

Parks and Recreation

Alternative N2-A crosses the same parks and recreation resources as Alternative N2.

Environmental Effects

Existing Land Use

Impacts on existing land use are described under the Impacts Common to All Alternatives, Impacts Common to Northern Area Action Alternatives subheadings, and Alternative N2. Impacts on the Millard County General Plan are similar to Alternative N2.

Future Land Use

In addition to impacts described under the Impacts Common to All Alternatives and Impacts Common to Northern Area Action Alternatives subheadings, moderate impacts on future land uses would be similar to Alternative N2.

Parks and Recreation

Impacts on recreation resources are common to all northern alternatives and were discussed previously.

Alternative N3 – Black Rock Road Parallel to Kern River Pipeline

Affected Environment

Jurisdiction

Alternative N3 is 117.2 miles in length and crosses 64.5 miles of BLM-administered lands (55.0 percent), 30.8 miles of USFS-administered lands (26.3 percent), 6.6 miles of state land (5.6 percent), and 15.3 miles of private land (13.1 percent).

Linear Facilities

This alternative route parallels an existing 138kV transmission line for 37.5 miles, the Sigurd to Red Butte No. 1 – 345kV transmission line for 0.7 mile, and the Kern River pipeline for 41.6 miles.

Existing Land Use

Table 3-73 identifies the existing land uses crossed by Alternative N3 and the number of residences within 0.25 mile. Most of the residences are in or near Richfield, which represents the most populated

area along the alternative route. Other existing land uses not crossed by the alternative route, but located within the study corridor, would be similar to Alternative N2 from Sigurd Substation to Blundell Geothermal Plant. From the geothermal plant southward toward the Black Mountains, the alternative route crosses open range land adjacent to the Kern River Pipeline.

Future Land Use

Table 3-73 identifies the future land uses crossed by Alternative N3. In addition, this alternative route crosses 4.2 miles of the proposed Milford Wind Corridor, LLC Phase III project along Links 350 and 345, 0.7 mile of the study area for the proposed Milford Flats South solar study area along Link 480, and 2.6 miles of the proposed Mormon Mesa Wind Testing Area along Link 490.

Parks and Recreation

Alternative N3 crosses the same recreation resources as Alternative N2 from Sigurd Substation to Blundell Geothermal Plant. From the geothermal plant southward toward the Black Mountains, the American Discovery Trail is crossed and dispersed recreation uses may occur on BLM-administered lands.

Environmental Effects

Existing Land Use

Impacts on existing land use are described under the Impacts Common to All Alternatives and Impacts Common to Northern Area Action Alternatives subheadings, and impacts on the Millard County General Plan are similar to Alternative N2.

Future Land Use

In addition to impacts described under the Impacts Common to All Alternatives and Impacts Common to Northern Area Action Alternatives subheadings, moderate impacts could include impairing future development of the proposed Milford Flats South solar study area located along Link 480; however, the intensity and extent of impacts could not be determined because a specific project description is not available for the solar study area. Impacts would be limited and isolated to the eastern edge of the solar study area and would not impair development of the rest of the area. It would be anticipated that any remaining impacts could be mitigated by engineering design of the solar study area. Impacts on the proposed wind farm testing areas and the proposed Milford Wind Corridor, LLC Phase IV project along Links 350 and 345 would be similar to Alternative N2.

Parks and Recreation

Impacts on recreation resources are common to all northern alternatives and were discussed previously.

Alternative N4 – Mineral Mountains to IPP South of Milford Wind Farm

Affected Environment

Jurisdiction

Alternative N4 is 109.4 miles in length and crosses 44.5 miles of BLM-administered lands (40.7 percent), 30.8 miles of USFS-administered lands (28.2 percent), 5.4 miles of state land (4.9 percent), and 28.7 miles of private land (26.2 percent).

Linear Facilities

This alternative route parallels an existing 138kV transmission line for 37.5 miles, the Kern River pipeline for 2.4 miles, and the existing IPP 500kV DC transmission line for 29.7 miles.

Existing Land Use

Table 3-73 identifies the existing land uses crossed by Alternative N4 and the number of residences within 0.25 mile. Most of the residences are in or near Richfield, which represents the most populated area along the alternative route. Existing land uses within the study corridor from Sigurd to Cove Fort would be similar to Alternative N1. From the Cove Fort to the Blundell Geothermal Plant, existing land uses are open rangelands and an existing 46kV line. Impacts on existing land use from the geothermal plant on to the southern end of the alternative route is similar to Alternative N2.

Future Land Use

Table 3-73 identifies the future land uses crossed by Alternative N4. This alternative route crosses 1.6 miles of enXco Development Corporation's proposed Mineral Mountains Wind Farm along Link 75, and 2.1 miles of the proposed Mormon Mesa Wind Testing Area along Links 386 and 381. This alternative route also crosses the proposed route for the Intermountain Renewable Power Technologies 138kV transmission line on Link 386 (Milepost 2.4 to 2.5).

Parks and Recreation

Alternative N4 crosses the same recreation resources as Alternative N2.

Environmental Effects

Existing Land Use

Impacts on existing land use are described under the Impacts Common to All Alternatives and Impacts Common to Northern Area Action Alternatives subheadings. Impact on the Milford Municipal Airport and Milford Wind Corridor, LLC Phase III project would be similar to Alternative N2.

A design alternative for this route on Link 75 involves locating the new 345kV transmission line on a double circuit mono-pole structure along with the existing 46kV transmission line. When compared to the typical project design, this design alternative would result in less short-term ground disturbance and

impacts on grazing activities because the 46kV transmission line would be decommissioned. The long-term impacts also would be less as one right-of-way would be maintained rather than two.

Future Land Use

In addition to impacts described under the Impacts Common to All Alternatives and Impacts Common to Northern Area Action Alternatives subheadings, impacts on future land uses would be similar to Alternative N2, except additional moderate impacts could include impairing future development of the proposed Mineral Mountains Wind Farm along Link 75 (instead of the Milford Wind Corridor, LLC Phase IV project on Links 350 and 345). It would be anticipated any remaining impacts could be mitigated by engineering design of the wind farm. The design alternative (refer to the Existing Land Use subheading under Environmental Effects for a description) for Link 75 would not reduce long-term impacts on the proposed Mineral Mountain Wind Farm. The design alternative potentially would impair future development of the proposed wind farm similar to other potential wind farms.

Parks and Recreation

Impacts on recreation resources are common to all northern alternatives and are discussed previously. The design alternative (refer to the Existing Land Use subheading under Environmental Effects for a description) for Link 75 would not affect recreation resources on the Fishlake National Forest and would have similar impacts on dispersed recreation on BLM-administered lands as the typical project design.

Alternative N5 – Mineral Mountains Parallel to Kern River Pipeline

Affected Environment

Jurisdiction

Alternative N5 is 106.2 miles in length and crosses 52.9 miles of BLM-administered lands (49.8 percent), 30.8 miles of USFS-administered lands (29.0 percent), 8.1 miles of state land (7.6 percent), and 14.4 miles of private land (13.8 percent).

Linear Facilities

This alternative route parallels an existing 138kV transmission line for 38.4 miles and the Kern River pipeline for 37.3 miles.

Existing Land Use

Table 3-73 identifies the existing land uses crossed by Alternative N5 and the number of residences within 0.25 mile. Most of the residences are in or near Richfield, which represents the most populated area along the alternative route. Other existing land uses located within the study corridor would be similar to Alternative N4 from Sigurd Substation to Blundell Geothermal Plant. From the geothermal plant southward toward the Black Mountains, the alternative route is similar to Alternative N3.

Future Land Use

Table 3-73 identifies the future land uses crossed by Alternative N5. In addition, this alternative route crosses 1.6 miles of the enXco Development Corporation's proposed Mineral Mountains Wind Farm along Link 75, 0.7 mile of the proposed Milford Flats South solar study area along Link 480, and 2.6 miles of the proposed Mormon Mesa Wind Testing Area along Link 490. The alternative also crosses the proposed route for the Cameron to Milford 138kV transmission line on Link 470 (Milepost 7.6 to 7.7).

Parks and Recreation

Alternative N5 crosses the same recreation resources as Alternative N4 from Sigurd Substation to Blundell Geothermal Plant. From the geothermal plant southward toward the Black Mountains, the alternative route is similar to Alternative N3.

Environmental Effects

Existing Land Use

Impacts on existing land use are described under the Impacts Common to All Alternatives and Impacts Common to Northern Area Action Alternatives subheadings, as well as Alternative N4 from Sigurd Substation to Blundell Geothermal Plant. From the geothermal plant southward toward the Black Mountains, the alternative route is similar to Alternative N3.

Future Land Use

In addition to impacts described under the Impacts Common to All Alternatives and Impacts Common to Northern Area Action Alternatives subheadings, impacts on future land uses would be similar to Alternative N4 from Sigurd Substation to Blundell Geothermal Plant. From the geothermal plant southward toward the Black Mountains, the alternative route is similar to Alternative N3.

Parks and Recreation

Impacts on recreation resources are common to all northern alternatives and are described previously.

Alternative N6 – Mineral Mountains 1,500 Feet East of Kern River Pipeline (Proponent's Preferred Alternative)

Affected Environment

Jurisdiction

Alternative N6 is 105.4 miles in length and crosses 52.5 miles of BLM-administered lands (49.8 percent), 30.8 miles of USFS-administered lands (29.2 percent), 7.9 miles of state land (7.6 percent), and 14.2 miles of private land (13.6 percent).

Linear Facilities

This alternative route would parallel an existing 138kV transmission line for 38.5 miles and an existing 345kV transmission line for 0.3 mile. This alternative route also parallels the Kern River pipeline for 33.5 miles at a distance of 1,500 feet (to the east of the pipeline).

Existing Land Use

Table 3-73 identifies the existing land uses crossed by Alternative N6 and the number of residences within 0.25 mile. Most of the residences are in or near Richfield, which represents the most populated area along the alternative route. Other existing land uses located within the study corridor would be similar to Alternative N5.

Future Land Use

Table 3-73 identifies the future land uses crossed by Alternative N6. In addition, this alternative route crosses 1.6 miles of the enXco Development Corporation's proposed Mineral Mountains Wind Farm along Link 75, 0.6 mile of the proposed Milford Flats South solar study area along Link 395, and 2.5 miles of the proposed Mormon Mesa Wind Testing Area along Link 396. The alternative also crosses the proposed route for the Cameron to Milford 138kV transmission line on Link 390 (Milepost 7.9 to 8.0).

Parks and Recreation

Alternative N6 crosses the same recreation resources as Alternative N5.

Environmental Effects

Existing Land Use

Impacts on existing land use are described under the Impacts Common to All Alternatives and Impacts Common to Northern Area Action Alternatives subheadings and are similar to Alternative N5.

Future Land Use

In addition to impacts described under the Impacts Common to All Alternatives and Impacts Common to Northern Area Action Alternatives subheadings, impacts on future land uses would be similar to Alternative N5.

Parks and Recreation

Impacts on recreation resources are common to all northern alternatives and are discussed previously.

Southern Area – South of the Black Mountains to Red Butte Substation

The baseline resource inventory and residual impacts for alternative routes considered in the southern area are presented in Table 3-74.

TABLE 3-74
ALTERNATIVES ROUTE COMPARISON
FOR LAND USE AND RECREATION INVENTORY DATA AND RESIDUAL IMPACTS BY SOUTHERN ALTERNATIVE ROUTES

Alternative Route	Total Miles	Jurisdiction (miles)					Parallel Linear Facilities (within 1500 feet) (miles)				Existing Land Use Crossed (miles)														Residences within 0.25 Mile	Recreation Uses Crossed (miles)								Future Land Use Crossed[5] (miles)													Residual Impacts (miles [percent])								
																												Recreation Opportunity Spectrum																			Existing Land Use			Future Land Use			Recreation		
		Bureau of Land Management	U.S. Forest Service	State	Tribal	Private	500kV	345kV	138kV	Pipeline	Residential	Commercial	Agriculture	Industrial	Airport Influence Zones[1]	Parks/Preservation	Public/Quasi–public	Schools	Recreation	Transportation Facilities	Rangeland and Vacant/Undeveloped[2]	Utility[3]	Inventoried Roadless Areas[4]	Unroaded/Undeveloped Areas[4]	Designated Utility Corridor		Off-highway Vehicles	Trails	Primitive	Semi–primitive Nonmotorized	Semi–primitive Motorized	Roaded Natural	Rural	Urban	Residential	Commercial	Agriculture	Industrial	Communication Facilities	Parks/Preservation	Public/Quasi–public	Recreation	Schools	Transportation Facilities	Rangeland	Geothermal Leases	Oil and Gas leases	Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
Alternative S1	55.9	12.6	20.7	0.4	–	22.2	19.7	10.0	4.2	4.1	–	–	–	–	–	–	–	–	–	0.4	54.8	–	–	11.7	5.0	11	–	0.4	–	2.6	6.7	11.2	–	–	–	–	0.3	–	–	1.6	–	–	–	–	20.2	–	7.7	44.2 [79.1]	11.7 [20.9]	–	26.0 [46.5]	1.6 [2.9]	–	1.6 [0.8]	6.7 [2.0]	2.6 [4.7]
Alternative S2	49.6	13.0	9.9	0.9	–	25.8	25.3	15.3	7.0	17.7	0.1	–	0.1	–	–	–	–	–	–	0.2	46.1	0.1	0.1	0.7	19.3	20	–	1.3	–	–	4.7	5.3	–	–	0.2	–	3.4	–	–	2.5	–	–	–	–	19.7	0.8	7.7	48.7 [98.2]	0.9 [1.8]	–	29.4 [59.3]	2.5 [5.0]	–	6.6 [3.3]	4.7 [9.5]	–
Alternative S3	57.4	13.5	20.0	0.9	–	23.0	24.1	16.0	1.8	10.7	–	–	–	–	–	–	–	–	–	0.3	54.6	0.1	–	9.1	13.1	8	–	2.5	–	4.2	14.7	1.2	–	–	–	–	2.9	–	–	0.2	–	–	–	–	19.7	0.8	7.7	48.3 [84.1]	9.1 [15.9]	–	28.9 [50.3]	0.2 [0.3]	–	2.5 [4.4]	4.7 [5.]	4.2 [7.3]
Alternative S4	48.9	12.3	15.2	0.4	–	21.0	21.9	16.5	2.2	5.8	–	–	–	–	–	–	–	–	–	0.1	45.8	–	8.3	10.4	12.7	9	–	0.4	–	6.3	4.1	4.7	–	–	0.2	–	1.1	–	–	–	–	–	–	–	19.7	0.8	7.7	38.6 [78.9]	10.3 [42.1]	–	27.1 [55.4]	0.2 [0.4]	–	5.1 [0.4]	4.1 [8.4]	6.3 [12.9]
Alternative S5 (Proponent's Preferred Alternative)	59.0	25.5	20.7	2.2	–	10.6	3.7	1.6	5.2	3.1	–	–	–	–	–	–	–	–	–	0.4	57.9	–	–	11.7	4.8	11	–	0.2	–	2.6	6.7	11.2	–	–	–	–	0.3	2.2	–	1.6	–	–	–	–	6.4	–	10.8	47.3 [80.2]	11.7 [19.8]	–	18.2 [30.8]	1.6 [2.7]	–	11.4 [9.3]	6.7 [1.4]	2.6 [4.4]
Alternative S6	61.8	27.6	20.0	2.7	–	11.5	8.1	4.4	2.9	7.9	–	–	–	–	–	–	–	–	–	0.3	59.0	0.1	–	9.1	10.8	7	–	2.3	–	4.2	14.7	1.2	–	–	–	–	2.7	2.2	–	0.2	–	–	–	–	6.2	–	10.8	52.7 [85.3]	9.1 [14.7]	–	20.4 [33.0]	0.2 [0.3]	–	2.3 [3.7]	14.7 [6.2]	4.2 [6.8]
Alternative S7	49.8	13.0	13.1	0.9	–	22.8	25.0	15.7	5.3	12.7	–	–	–	–	–	–	–	–	–	0.2	46.6	–	2.7	5.3	16.4	15	–	1.3	–	2.4	6.2	4.8	–	–	0.2	–	2.9	–	–	–	–	–	–	–	19.7	0.8	7.7	44.6 [89.6]	5.2 [0.4]	–	28.9 [58.0]	0.2 [0.4]	–	6.1 [2.2]	16,2 [2.4]	2.2 [4.4]
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative)	49.8	13.0	12.6	0.9	–	23.3	29.5	20.4	9.7	16.7	–	–	–	–	–	–	–	–	–	0.3	46.5	–	1.4	5.0	17.7	15	–	1.3	–	0.5	6.6	5.7	–	–	0.2	–	2.9	–	–	0.5	–	–	–	–	19.7	0.8	7.7	44.8 [90.0]	5.0 [10.0]	–	28.9 [58.0]	0.7 [1.4]	–	7.0 [14.1]	6.6 [13.3]	0.50 [1.0]

NOTES:
[1] Airport influence zones overlap underlying land uses and are not included in the total miles.
[2] Vacant/undeveloped denotes areas delineated as being void of human development and does not refer to Bureau of Land Management or U.S. Forest Service designations. This classification is not to be confused with unroaded/undeveloped areas or construed as having wilderness characteristics. Vacant/undeveloped lands were identified throughout the study corridors, regardless of jurisdiction.
[3] Utility impacts include all energy projects currently existing or approved as of December 2011.
[4] Inventoried roadless areas, unroaded/undeveloped areas, and areas that overlap underlying land uses and are not included in the total miles.
[5] Future land use is based on municipal and county zoning maps and does not include Bureau of Land Management, U.S. Forest Service, or state lands.

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Inventoried Roadless Areas and Unroaded/Undeveloped Areas for Southern Area Alternatives

As discussed in Section 3.2.9.4, IRAs and unroaded/undeveloped areas are present in the Project area on the Dixie National Forest. The following tables (3-75 and 3-76) quantify the estimated disturbance on USFS IRAs and unroaded/undeveloped areas, respectively, crossed by the Project in the southern portion of the Project area. Impacts associated with these areas are discussed under each alternative.

TABLE 3-75
SUMMARY OF EFFECTS ON USFS INVENTORIED ROADLESS AREAS CROSSED BY THE PROJECT SOUTHERN ACTION ALTERNATIVES

Alternative Route	Inventoried Roadless Area Name	Total Acres Inventoried Roadless Area	Miles Crossed by Project	Acres of Temporary Disturbance[1]	Acres of Permanent Disturbance[2]	Percent of Inventoried Roadless Area Disturbed
S1	None Present	–	–	–	–	–
S2	Mogotsu	16,771	0.1	1.0	0.3	Less than 0.1
S3	None Present	–	–	–	–	–
S4	Atchinson	17,662	2.8	31.6	8.4	Less than 0.1
	Cove Mountain	16,638	5.5	61.6	16.8	Less than 0.1
S5	None present	–	–	–	–	–
S6	None present	–	–	–	–	–
S7	Atchinson	17,662	2.7	28.1	9.2	Less than 0.1
S7-A	Atchinson	17,662	1.4	14.3	4.5	Less than 0.1

NOTES:
[1]Temporary disturbance: Estimated area of disturbance associated with structure work areas and overland travel based on assumptions applied to the entire length of alternative route.
[2]Permanent disturbance: Estimated area of disturbance associated with H-frame and lattice structure base areas based on assumptions applied to the entire length of alternative route.

TABLE 3-76
SUMMARY OF EFFECTS ON USFS UNROADED/UNDEVELOPED AREAS CROSSED BY THE PROJECT SOUTHERN ACTION ALTERNATIVES

Alternative Route	Unroaded/ Undeveloped Area Name	Total Acres Unroaded/ Undeveloped Area	Miles Crossed by Project	Acres of Temporary Disturbance[1]	Acres of Permanent Disturbance[2]	Percent of Unroaded/ Undeveloped Area Disturbed
S1	Atchinson	24,309	5.0	47.0	17.2	0.1
	Cove Mountain	15,678	1.6	15.0	5.6	Less than 0.1
	Kane Mountain	9,635	1.5	14.1	5.3	0.1
	Pine Valley Mountain	154,518	3.6	33.8	12.6	Less than 0.1
S2	Moody Wash/Mogotsu	58,993	0.7	7.1	2.2	Less than 0.1
S3	Moody Wash/Mogotsu	58,993	9.1	85.5	35.5	0.1
S4	Atchinson	24,309	4.7	52.6	14.1	0.1
	Cove Mountain	15,678	5.7	63.8	16.8	0.1
S5	Atchinson	24,309	4.9	46.1	16.2	0.1
	Cove Mountain	15,678	1.6	15.0	5.3	Less than 0.1
	Kane Mountain	9,635	1.5	14.1	5.0	0.1
	Pine Valley Mountain	154,518	3.6	33.8	11.9	Less than 0.1
S6	Moody Wash/ Mogotsu	58,993	9.1	84.6	33.7	0.1

TABLE 3-76
SUMMARY OF EFFECTS ON USFS UNROADED/UNDEVELOPED AREAS CROSSED BY THE PROJECT SOUTHERN ACTION ALTERNATIVES

Alternative Route	Unroaded/ Undeveloped Area Name	Total Acres Unroaded/ Undeveloped Area	Miles Crossed by Project	Acres of Temporary Disturbance[1]	Acres of Permanent Disturbance[2]	Percent of Unroaded/ Undeveloped Area Disturbed
S7	Atchinson	24,309	4.7	48.9	15.5	0.1
	Cove Mountain	15,678	0.4	4.2	1.3	Less than 0.1
S7-A	Atchinson	24,309	4.5	45.9	14.4	0.1
	Cove Mountain	15,678	0.5	5.1	1.6	Less than 0.1

NOTES:
[1]Temporary disturbance: Estimated area of disturbance associated with structure work areas, wire-splicing sites, wire-pulling sites, wire-tensioning sites, multi-use construction yards, staging areas, helicopter refueling sites, guard structures, the shoofly, and temporary access roads. The temporary disturbance numbers, in relation to unroaded/undeveloped areas, were estimated using acres of temporary disturbance per mile and the number of miles crossed by the alternative route.
[2]Permanent disturbance: Estimated area of disturbance associated with H-frame and lattice structure base areas, communications regeneration stations and associated fiber optic and power lines, and permanent access roads. The permanent disturbance number, in relation to unroaded/undeveloped areas, was estimated using acres of permanent disturbance per mile and the number of miles crossed by the alternative route.

Alternative S1 – Pinto Creek

Affected Environment

Jurisdiction

Alternative S1 is 55.9 miles in length and crosses 12.6 miles of BLM-administered lands (22.5 percent), 20.7 miles of USFS-administered lands (37.0 percent), 0.4 mile of state land (0.7 percent), and 22.2 miles of private land (39.7 percent).

Linear Facilities

This alternative route parallels an existing 138kV transmission line for 4.2 miles, the Kern River pipeline for 4.1 miles, the Sigurd to Red Butte No.1 – 345kV transmission line for 10.0 miles, and the IPP 500kV DC transmission line for 19.7 miles.

Existing Land Use

Table 3-74 identifies the existing land uses crossed by Alternative S1 and the number of residences within 0.25 mile. Most of the residences are in the community of Pinto, which represents the most populated area along the alternative route. The alternative route crosses 9.4 miles of the Chloride Canyon HMA and 11.7 miles of unroaded/undeveloped areas (i.e., Atchinson, Cove Mountain, Kane Mountain, and Pine Valley Mountain). Portions of IRAs (i.e., Gum Hill, Kane Mountain, and Moody Wash) are located within the study corridor; however, the alternative route does not cross these areas.

Atchinson Unroaded/Undeveloped Area

Seven known cultural resource sites, including six historic properties (i.e., recommended or determined eligible for the NRHP), and one unevaluated site, are located within the Atchinson unroaded/undeveloped

area, indicating potential special features or values (i.e., cultural or historic). Alternative S1 passes through suitable habitat for pygmy rabbit, which could be considered special ecological value. The alternative route also crosses unidentified intermittent streams that are tributaries to state-listed impaired waters, and also may provide special ecological value. Data are not available to document specific outstanding opportunities for solitude or primitive and unconfined recreation. Portions of the area are generally known to be natural and undeveloped. However, in most instances, the alternative route is either located on the edge or near an existing road. The size of the Atchinson area is 24,309 acres, indicating the area is of sufficient size to make practicable its preservation and use in an unimpaired condition.

Cove Mountain Unroaded/Undeveloped Area

One known cultural resource site, which is recommended/determined eligible for the NRHP, is located within the Cove Mountain unroaded/undeveloped area, indicating potential special features or values (i.e., cultural or historic). The alternative route passes through suitable pygmy rabbit habitat, which could be considered special ecological value. The Project also runs along Pinto Creek, crosses tributaries of Pinto Creek, which runs into Newcastle Reservoir, a state-listed impaired water and crosses tributaries of the Santa Clara River, another state-listed impaired water, and may also provide special ecological value.

Data are not available to document specific outstanding opportunities for solitude or primitive and unconfined recreation. Portions of the area are generally known to be natural and undeveloped. However, in most instances the alternative route is either located on the edge or near an existing road. The size of the Cove Mountain area is 15,678 acres, indicating the area is of sufficient size to make practicable its preservation and use in an unimpaired condition.

Kane Mountain Unroaded/Undeveloped Area

Based on available data for the area, no special cultural or historic features or values are present within the area. The alternative route passes through suitable pygmy rabbit habitat, which could be considered special ecological value. The Project runs up the Pinto Creek drainage and crosses tributaries of Pinto Creek, which drains into Newcastle Reservoir, a state-listed impaired water, and may also provide special ecological value.

Data are not available to document specific outstanding opportunities for solitude or primitive and unconfined recreation. Portions of the area are generally known to be natural and undeveloped. However, in most instances the alternative route is either located on the edge or near an existing road. The size of the Kane Mountain area is 9,635 acres, indicating the area is of sufficient size to make practicable its preservation and use in an unimpaired condition.

Pine Valley Mountain Unroaded/Undeveloped Area

Three known cultural resource sites, including two historic properties (i.e., recommended/determined eligible for the NRHP), and one not eligible site, are located within the Pine Valley Mountain unroaded/undeveloped area, indicating potential special features or values (i.e., cultural or historic). The alternative route passes through suitable pygmy rabbit habitat, which could be considered special ecological value. The Project also would cross tributaries of the Santa Clara River, a state-listed impaired water and tributaries that may recharge groundwater used by residents of Pinto, Pine Valley, and Central, Utah, and may also provide special ecological value.

Data are not available to document specific outstanding opportunities for solitude or primitive and unconfined recreation. Portions of the area are generally known to be natural and undeveloped. However, in most instances the alternative route is either located on the edge or near an existing road. The size of the Pine Valley area is 154,518 acres, indicating the area is of sufficient size to make practicable its preservation and use in an unimpaired condition.

Future Land Use

Table 3-74 identifies the future land uses crossed by Alternative S1.

Parks and Recreation

Alternative S1 crosses areas on the Dixie National Forest designated under the ROS. Table 3-74 identifies which designations are crossed.

Environmental Effects

Existing Land Use

Table 3-76 quantifies the effects on unroaded/undeveloped areas crossed by Alternative S1, which includes miles crossed, temporary and permanent disturbance, and the percentage of area disturbed. Impacts on the wilderness qualities and attributes of the unroaded/undeveloped areas are presented below.

Atchinson Unroaded/Undeveloped Area

Potential impacts to the special cultural or historical values of the area would be avoided or mitigated per direction of the HPTP to be included in the POD (refer to Section 3.2.5). Potential impacts on the special ecological values in the area (i.e., suitable habitat for pygmy rabbit) would be mitigated by locating tower structures to span sensitive features (Mitigation Measure 7; refer to Table 3-3) and avoiding these areas in designing access routes (Mitigation Measure 2). Potential impacts to intermittent streams also would be mitigated by minimizing vegetation removal (Mitigation Measure 4) when clearing for conductor clearance. Short- and long-term impacts associated with construction, operation, and maintenance of the transmission line along this alternative route would diminish the natural appearance and undeveloped character of this area and could decrease opportunities for solitude and primitive recreation,, if present. Overall, residual impacts on the wilderness qualities of the area would be moderate, but would be lower where the line is located on the edge or near an existing road.

While impacts on naturalness and undeveloped character of the unroaded/undeveloped areas would be anticipated, changes in wilderness qualities would not be large enough to preclude management of the areas as an IRA and/or wilderness.

Cove Mountain Unroaded/Undeveloped Area

Potential impacts to the special cultural or historical values of the area would be avoided or mitigated per direction of the HPTP to be included in the POD (refer to Section 3.2.5). Potential impacts on the special ecological values in the area (i.e., suitable habitat for pygmy rabbit) would be mitigated by locating tower structures to span sensitive features (Mitigation Measure 7; refer to Table 3-3) and avoiding these areas in

designing access routes (Mitigation Measure 2). Potential impacts to tributary streams also would be mitigated by minimizing vegetation removal (Mitigation Measure 4) when clearing for conductor clearance.

Short- and long-term impacts associated with construction, operation, and maintenance of the transmission line along this alternative route would diminish the natural appearance and undeveloped character of this area and could decrease opportunities for solitude and primitive recreation, if present. Overall, residual impacts on the wilderness qualities of the area would be moderate, but would be lower where the line is located on the edge or near an existing road.

While impacts on naturalness and undeveloped character of the unroaded/undeveloped areas would be anticipated, changes in wilderness qualities would not be large enough to preclude management of the areas as an IRA and/or wilderness.

Kane Mountain Unroaded/Undeveloped Area

Potential impacts on the special ecological values in the area (i.e., suitable habitat for pygmy rabbit) would be mitigated by locating tower structures to span sensitive features (Mitigation Measure 7; refer to Table 3-3) and avoiding these areas in designing access routes (Mitigation Measure 2). Potential impacts to tributary streams also would be mitigated by minimizing vegetation removal (Mitigation Measure 4) when clearing the right-of-way for conductor clearance.

Short and long-term impacts associated with construction, operation, and maintenance of any of the alternative routes in the Northern Area would diminish the natural appearance and undeveloped character of this area and could decrease opportunities for solitude and primitive recreation, if present. Overall, residual impacts on the wilderness qualities of the area would be moderate, but would be lower where the line is located on the edge or near an existing road.

While impacts on naturalness and undeveloped character of the unroaded/undeveloped areas would be anticipated, changes in wilderness qualities would not be large enough to preclude management of the area as an IRA and/or wilderness.

Pine Valley Mountain Unroaded/Undeveloped Area

Potential impacts to the special cultural or historical values of the area would be avoided or mitigated per direction of the HPTP to be included in the POD (refer to Section 3.2.5). Potential impacts on the special ecological values in the area (i.e., suitable habitat for pygmy rabbit) would be mitigated by locating tower structures to span sensitive features (Mitigation Measure 7; refer to Table 3-3) and avoiding these areas in designing access routes (Mitigation Measure 2). Potential impacts to tributary streams also would be mitigated by minimizing vegetation removal (Mitigation Measure 4) when clearing right-of-way for conductor clearance.

Short- and long-term impacts associated with construction, operation, and maintenance of any of the alternative routes in the Northern Area would diminish the natural appearance and undeveloped character of this area and could decrease opportunities for solitude and primitive recreation, if present. Overall, residual impacts on the wilderness qualities of the area would be moderate, but would be lower where the line is located on the edge or near an existing road.

While impacts on naturalness and undeveloped character of the unroaded/undeveloped areas would be anticipated, changes in wilderness qualities would not be large enough to preclude management of the area as an IRA and/or wilderness.

Herd Management Areas

Low impacts are anticipated along Links 220 and 221, where the alternative crosses 9.4 miles of the Chloride Canyon HMA. Impacts are anticipated to be low because the overall management of this area for wild horses would not be modified; the overall disturbance is minimal (0.4 percent of the total HMA); and would likely occur along the perimeter of the HMA. Per management objectives, wild horses could continue to be managed within the HMA under this alternative.

USFS Tree Removal and Board Feet Calculations

USFS tree removal and board feet calculations were analyzed using the entire forest as inventory. Based on Great Basin pinyon-juniper habitat with an average density of 103 trees per acre with a diameter at root collar greater than 9 inches, 25,282 trees in the Dixie National Forest are estimated to be removed for this alternative route. Using an average of 837 cubic feet per acre with a diameter at root collar greater than 9 inches, 2,465,345 board feet of pinyon-juniper are estimated to be cut, sold, or removed and could be used for some minor commercial purposes (e.g., fence posts, poles, fuel wood, etc.) or personal use. This estimate assumes the 150-foot-wide right-of-way would be cleared of vegetation to comply with electrical safety standards. Approximately 245.5 acres of Great Basin pinyon-juniper habitat (of 389.1 total acres) in the Dixie National Forest would be treated (Moore 2012).

Future Land Use

Additional moderate impacts would occur in areas zoned for open space conservation in Washington County along Link 260. The alternative route may conflict with the purposes of this zone. To reduce the potential impacts on this area, new access roads not needed for maintenance would be reclaimed (Mitigation Measure 5) to reduce long-term disturbance and motorized access. If the access roads are needed for maintenance, placing gates or blocking entrances would limit public access (Mitigation Measure 15). While the affected lands along this alternative route are zoned open space conservation by Washington County, the lands are owned and managed by the USFS.

Parks and Recreation

Impacts on recreation resources would range from low to high. Impacts on roaded natural areas would be low because the prescribed management allows for vehicular travel and frequent social interaction. Over the long term, vehicular and ATV use likely would increase as a result of a new access road. Depending on the location and application of mitigation measures, low and moderate impacts on semi-primitive motorized areas could result from increased access provided by a new access road, which could exceed the management threshold for ease of access and social interaction.

Low impacts would occur along Link 260 (Milepost 25.1 to 25.2) where existing roads provide access into a semi-primitive motorized area near the Red Butte Substation. Long-term impacts would be reduced by reclaiming new access roads not needed for maintenance (Mitigation Measure 5) to reduce long-term

disturbance and motorized access. If the access roads are needed for maintenance, placing gates or blocking entrances would limit motorized access (Mitigation Measure 15).

Moderate impacts would result along Link 260 where Mitigation Measures 5 and 15 would be applied and the alternative is not in proximity to existing roads. Motorized access could increase during construction, but the application of these mitigation measures would minimize long-term motorized access.

Depending on the location and application of mitigation measures, moderate and high impacts on semi-primitive nonmotorized areas could result from increased access provided by a new access road that could exceed the management threshold for ease of access and social interaction. The presence of the access road could result in increased motorized use (e.g., ATV and vehicular) and social interaction in areas managed for primitive use (hiking and horseback riding) and limited social interaction (i.e., solitude). Moderate impacts would occur along Link 260 (Milepost 17.7 to 17.8) where towers would span the semi-primitive nonmotorized area to limit motorized access (Mitigation Measure 7). High impacts would occur along Link 260 where the alternative is not in proximity to existing roads. Long-term motorized access would be minimized by reclaiming new access roads not needed for maintenance (Mitigation Measure 5). If the access roads are needed for maintenance, placing gates or blocking entrances would limit motorized access (Mitigation Measure 15).

Alternative S2 – IPP West

Affected Environment

Jurisdiction

Alternative S2 is 49.6 miles in length and crosses 13.0 miles of BLM-administered lands (26.2 percent), 9.9 miles of USFS-administered lands (20.0 percent), 0.9 mile of state land (1.8 percent), and 25.8 miles of private land (52.0 percent).

Linear Facilities

This alternative route parallels a 138kV transmission line for 7.0 miles, the Kern River pipeline for 17.7 miles, the Sigurd to Red Butte No.1 – 345kV transmission line for 15.3 miles, and the IPP 500kV DC transmission line for 25.3 miles.

Existing Land Use

Table 3-74 identifies the existing land uses crossed by Alternative S2 and the number of residences within 0.25 mile. Alternative S2 crosses 0.1 mile of residential use on Link 444. Mitigation Measures 7 and 11 would be applied to reduce impacts. The alternative route crosses 9.4 miles of the Chloride Canyon HMA and is parallel to the UNEV pipeline through Holt Canyon.

Mogotsu IRA

Alternative S2 crosses 0a corner of Mogotsu IRA for 0.1 miles along Link 444 (refer to Map 3-8 and MV-14c and MV-14d). The size of the entire IRA is 16,771 acres. Portions of other IRAs (i.e., Atchinson,

Cove Mountain, Gum Hill, Kane Mountain, Moody Wash, and Pine Valley Mountains) are located within the study corridor, but are not crossed by Alternative S2.

Three known cultural resource sites, including two historic properties (i.e., recommended/determined eligible for the NRHP), are located along Alternative S2 within the Mogotsu IRA. In addition, a portion of the Mountain Meadows Historic Site (National Register Historic District) and a portion of the Old Spanish NHT are located within the Mogotsu IRA. The alternative route also crosses tributaries of the Santa Clara River, a state-listed impaired and water tributaries that may recharge groundwater used as a drinking water source by residents of Central, Utah, which may also provide special ecological value. These sites and features could represent special or unique features that exemplify wilderness potential. Based on available data for the IRA, no other special features or values characterizing wilderness potential (e.g., suitable habitat for sensitive species or other sensitive resources) are present within the IRA.

There is a general absence of constructed roads within the Mogotsu IRA and the area is known to contain a diversity of plant and animal communities. Data are not available to document specific opportunities for solitude or primitive recreation.

Moody Wash/Mogotsu Unroaded/Undeveloped Area

Alternative S2 also crosses the Moody Wash/Mogotsu unroaded/undeveloped area for 0.7 miles (refer to Map 3-8 and MV-14c and MV-14d). The Moody Wash/Mogotsu unroaded/undeveloped area encompasses 58,993 acres that largely overlap the Mogotsu IRA. The wilderness attributes of the unroaded/undeveloped area within the Project area are assumed to be similar to those of the Mogotsu IRA where the two areas overlap. While the unroaded/undeveloped area is of sufficient size to make practicable its preservation and use in an unimpaired condition, the presence of man-made features such as the Kern River pipeline, SR 18, other existing roads, and existing transmission lines diminish the wilderness qualities and attributes of naturalness and lack of development in some parts of the Moody Wash/Mogotsu unroaded/undeveloped area.

Future Land Use

Table 3-74 identifies the future land uses crossed by Alternative S2.

Parks and Recreation

Alternative S2 crosses areas on the Dixie National Forest designated under the ROS. Table 3-74 identifies which designations are crossed.

Environmental Effects

Existing Land Use

Tables 3-75 and 3-76 present the number of miles crossed, temporary and permanent disturbance (including disturbance associated with overland travel within IRAs), and the percentage of area disturbed within the IRAs and unroaded/undeveloped areas crossed by Alternative S2. In addition, a description of impacts on the roadless characteristics and wilderness qualities and attributes in the Mogotsu IRA and

wilderness qualities and attributes within the Moody Wash/Mogotsu unroaded/undeveloped area discussed in this section.

Mogotsu Inventoried Roadless Area

The alternative route does not cross the designated Mountain Meadows Massacre Site NHL. Alternative S2 does cross the Mountain Meadows Historic Site boundary on Link 444. Alternative S2 is located approximately 250 feet away from Site One of the NHL and approximately 710 feet away from Site Two. Application of mitigation measures during Project siting and construction (refer to Table 3-65) would mitigate impacts on these special features and other attributes used to characterize wilderness potential. Further, impacts on the three known cultural resource sites would be avoided or mitigated per direction of the HPTP to be included in the POD (Section 3.2.5).

In regards to environmental qualities or features used to characterize IRAs, no impacts on groundwater resources used by the residents of Central, Utah, would be anticipated (refer to Section 3.2.3.4). Also, the limited amount of temporary and permanent ground disturbance within the IRA would not impact the diversity of plants and animals within the IRA. However, the existing landscape character of the Mogotsu IRA would be modified minimally by the presence of the transmission line within the IRA. Also, a permanent loss of acres would occur where the Project crosses the IRA. While impacts on the existing landscape character would be anticipated, the changes in the roadless characteristics of the IRA would not be large enough to preclude management of the area as an IRA and/or wilderness.

Moody Wash/Mogotsu Unroaded/Undeveloped Area

The effects of the Project on the wilderness qualities and attributes would be similar to those described for the Mogotsu IRA where the two areas overlap. Overall, short- and long-term impacts associated with construction, operation, and maintenance would diminish the natural appearance and undeveloped character of portions of the unroaded/undeveloped area and could decrease opportunities for solitude and primitive recreation, where present. However, the wilderness characteristics of the area have already been affected by existing man-made features present in the area and changes in the wilderness qualities would not be large enough to preclude management of the areas as an IRA and/or wilderness.

Herd Management Areas

Impacts on the Chloride Canyon HMA would be similar to Alternative S1.

USFS Tree Removal and Board Feet Calculations

USFS tree removal and board feet calculations were analyzed using the entire forest as inventory. Based on Great Basin pinyon-juniper habitat with an average density of 103 trees per acre with a diameter at root collar greater than 9 inches, 5,805 trees in the Dixie National Forest are estimated to be removed for this alternative route. Using an average of 837 cubic feet per acre with a diameter at root collar greater than 9 inches, 566,116 board feet of pinyon-juniper are estimated to be cut, sold, or removed and could be used for some minor commercial purposes (e.g., fence posts, poles, fuel wood, etc.) or personal use. This estimate assumes the 150-foot-wide right-of-way would be cleared of vegetation to comply with electrical safety standards. Of 234.5 total acres of right-of-way to be treated in the Dixie National Forest, approximately 56.4 acres of Great Basin pinyon-juniper would be affected (Moore 2012).

Future Land Use

In addition to impacts described under the Impacts Common to All Alternatives subheading, impacts also would occur along Links 443 and 444 on areas zoned for open space conservation in Washington County. Mitigation Measures 5 and 15 would be applied similarly to minimize long disturbance and motorized access. While the affected lands along this alternative route are zoned as open space conservation, the lands are owned and managed by the USFS.

Low impacts along Links 441 and 442 would occur on areas zoned for agriculture in Washington County. The presence of transmission line towers could impair improvements to future use of the land for various agricultural activities, including irrigated agriculture and grazing. It would be anticipated that any remaining impacts could be mitigated by site design of future facilities.

Moderate impacts along Link 275 (Milepost 1.7 to 1.9) would occur on areas zoned for residential in Washington County. Long-term impacts would include potentially impairing future development of this area. To reduce potential impacts, transmission towers would span this private property to the extent possible based on engineering design (Mitigation Measure 7).

Parks and Recreation

Impacts on recreation resources would range from low to moderate. Impacts on roaded natural areas would be low and similar to Alternative S1.

Depending on the location and application of mitigation measures, low and moderate impacts on semi-primitive motorized areas could result from increased access provided by a new access road, which could exceed the management threshold for ease of access and social interaction. Low impacts would occur along Link 443 (Milepost 4.0 to 4.2) where towers would span the semi-primitive nonmotorized area to limit motorized access (Mitigation Measure 7). Moderate impacts would result on Links 443 and 444 where the alternative route is not in proximity to existing roads. Potential impacts would be reduced by reclaiming new access roads, if not needed for maintenance (Mitigation Measure 5), thereby minimizing long-term disturbance and motorized access. If the access roads are needed for maintenance, placing gates or blocking entrances by other means would limit public access (Mitigation Measure 15).

Alternative S3 – Ox Valley

Affected Environment

Jurisdiction

Alternative S3 is 57.4 miles in length and crosses 13.5 miles of BLM-administered lands (23.4 percent), 20.0 miles of USFS-administered lands (34.9 percent), 0.9 mile of state land (1.6 percent), and 23.0 miles of private land (40.1 percent).

Linear Facilities

This alternative route parallels an existing 138kV transmission line for 1.8 miles, the Kern River pipeline for 10.7 miles, the Sigurd to Red Butte No.1 – 345kV transmission line for 16.0 miles, and the IPP 500kV DC transmission line for 24.1 miles.

Existing Land Use

Table 3-74 identifies the existing land uses crossed by Alternative S3 and the number of residences within 0.25 mile. The alternative route crosses 9.4 miles of the Chloride Canyon HMA. Portions of IRAs (i.e., Atchinson, Cove Mountain, Gum Hill, Kane Mountain, Mogotsu, Moody Wash, and Pine Valley Mountains) are located within the study corridor; however, the transmission line would not cross these areas.

Moody Wash/Mogotsu Unroaded/Undeveloped Area

Alternative S3 also crosses the Moody Wash/Mogotsu unroaded/undeveloped area for 9.1 miles (refer to Map 3-8 and MV-14c and MV-14d). The Moody Wash/Mogotsu unroaded/undeveloped area encompasses 58,993 acres that largely overlap the Mogotsu IRA. The wilderness attributes of the unroaded/undeveloped area within the Project area are assumed to be similar to those of the Mogotsu IRA (refer to Alternative S2) where the two areas overlap. While the unroaded/undeveloped area is of sufficient size to make practicable its preservation and use in an unimpaired condition, the presence of man-made features such as the Kern River pipeline, SR 18, other existing roads, and existing transmission lines diminish the wilderness qualities and attributes of naturalness and lack of development in some parts of the Moody Wash/Mogotsu unroaded/undeveloped area.

Future Land Use

Table 3-74 identifies the future land uses crossed by Alternative S3.

Parks and Recreation

Alternative S3 crosses areas on the Dixie National Forest designated under the ROS. Table 3-74 identifies which designations are crossed. This alternative route also crosses the Hardscrabble Trail along Link 285 south of Ox Valley.

Environmental Effects

Existing Land Use

Tables 3-75 and 3-76 present a summary of effects on IRAs and unroaded/undeveloped areas, respectively, crossed by Alternative S3. Impacts on the wilderness qualities and attributes of these areas are presented below.

Moody Wash/Mogotsu Unroaded/Undeveloped Area

The effects of the Project on the wilderness qualities and attributes would be similar to those described for the Mogotsu IRA (refer to Alternative S2) where the two areas overlap. Overall, short- and long-term impacts associated with construction, operation, and maintenance would diminish the natural appearance and undeveloped character of portions of the unroaded/undeveloped area and could decrease opportunities for solitude and primitive recreation, where present. However, the wilderness characteristics of the area have been affected by existing man-made features present in the area and changes in the wilderness qualities would not be large enough to preclude management of the areas as an IRA and/or wilderness.

Herd Management Areas

Impacts on the Chloride Canyon HMA would be similar to Alternative S1.

USFS Tree Removal and Board Feet Calculations

USFS tree removal and board feet calculations were analyzed using the entire forest as inventory. Based on Great Basin pinyon-juniper habitat with an average density of 103 trees per acre with a diameter at root collar greater than 9 inches, 20,600 trees in the Dixie National Forest are estimated to be removed for this alternative route. Using an average of 837 cubic feet per acre with a diameter at root collar greater than 9 inches, 2,008,800 board feet of pinyon-juniper are estimated to be cut, sold, or removed and could be used for some minor commercial purposes (e.g., fence posts, poles, fuel wood, etc.) or personal use. This estimate assumes the 150-foot-wide right-of-way would be cleared of vegetation to comply with electrical safety standards. Of 370.9 total acres of right-of-way to be treated in the Dixie National Forest, approximately 200.0 acres of Great Basin pinyon-juniper would be affected (Moore 2012).

Future Land Use

Impacts are described under the Impacts Common to All Alternatives subheading.

Parks and Recreation

Low impacts would occur where the alternative crosses the Hardscrabble Trail along Link 285 (Milepost 6.5 to 6.9). Short-term impacts on the accessibility to the trail could result from potential trail closures and access restrictions during construction. Long-term impacts, such as permanent trail closures or modifications, would not be anticipated because the Project would span the trail allowing for its continued use (Mitigation Measure 7). In addition, public safety would be enhanced by maximizing the span between transmission line towers (Mitigation Measure 9), which would place the towers a safe distance from the trail. Additional low impacts on roaded natural areas would be similar to Alternative S1.

Moderate impacts on semi-primitive motorized areas could result from increased access provided by a new access road, which could exceed the management threshold for ease of access and social interaction. Potential impacts would occur along Links 280 and 285 and impacts would be reduced by reclaiming new access roads, if not needed for maintenance (Mitigation Measure 5), thereby minimizing long-term disturbance and motorized access. If the access roads are needed for maintenance, placing gates or blocking entrances by other means would limit public access (Mitigation Measure 15).

High impacts on semi-primitive nonmotorized areas could result from increased access provided by a new access road that could exceed the management threshold for ease of access and social interaction. The presence of the access road could result in increased motorized use (e.g., ATV and vehicular) and social interaction into areas managed for primitive use (hiking and horseback riding) and limited social interaction (i.e., solitude). Potential impacts would occur along Links 280 and 285. Long-term motorized access would be minimized by reclaiming new access roads not needed for maintenance (Mitigation Measure 5). If the access roads are needed for maintenance, placing gates or blocking entrances would limit motorized access (Mitigation Measure 15).

Alternative S4 – IPP East

Affected Environment

Jurisdiction

Alternative S4 is 48.9 miles in length and crosses 12.3 miles of BLM-administered lands (25.2 percent), 15.2 miles of USFS-administered lands (31.1 percent), 0.4 mile of state land (0.8 percent), and 21.0 miles of private land (42.9 percent).

Linear Facilities

This alternative route parallels an existing 138kV transmission line for 2.2 miles, the Kern River pipeline for 5.8 miles, the Sigurd to Red Butte No.1 – 345kV transmission line for 16.5 miles, and the IPP 500kV DC transmission line for 21.9 miles.

Existing Land Use

Table 3-74 identifies the existing land uses crossed by Alternative S4 and the number of residences within 0.25 mile. The alternative route crosses 9.4 miles of the Chloride Canyon HMA.
The Mountain Meadows Massacre Site NHL is located in the study corridor but is not crossed by the alternative.

Atchinson IRA

Alternative S4 crosses the Atchinson IRA for 2.8 miles along Link 444 approximately 0.4 mile from the western boundary of the IRA (refer to Map 3-8 and MV-14c and MV-14d). The size of the entire IRA is 17,662 acres. Portions of other IRAs (i.e., Gum Hill, Kane Mountain, Mogotsu, Moody Wash, and Pine Valley Mountains) are located within the study corridor, but are not crossed by Alternative S4.

Six known cultural resource sites, including four historic properties (i.e., recommended/determined eligible for the NRHP), and two not eligible sites, are located along Alternative S4, within the Atchinson IRA. In addition, a portion of the Mountain Meadows Historic Site (National Register Historic District) is located within the Atchinson IRA.

The alternative route would cross intermittent streams within the Atchinson IRA that are tributaries to the Santa Clara River, a state-listed impaired water, and passes within proximity to Kane Spring (identified during the public comment period of the Draft EIS as a municipal water source). These sites and features could represent special or unique features that exemplify wilderness potential. Based on available data for the IRA, no other special features or values characterizing wilderness potential (e.g., suitable habitat for sensitive species or other sensitive resources) are present within the IRA.

In addition to the general absence of constructed roads within the Atchinson IRA, crosses tributaries that may recharge groundwater used by residents of Pine Valley and Central, Utah. Data are not available to document specific opportunities for solitude or primitive recreation.

Cove Mountain Inventoried Roadless Area

Alternative S4 crosses the Cove Mountain IRA for 5.5 miles along Links 222 and 225 (refer to Map 3-8 and MV-14c and MV 14d). This size of the entire IRA is 16,638 acres.

Six known cultural resource sites, including two historic properties (i.e., recommended/determined eligible for the NRHP), one unevaluated site, and three not eligible sites, are located along Alternative S4, within the Cove Mountain IRA.

The alternative route crosses habitat suitable for pygmy rabbit and known USFS sensitive plant populations, which may provide ecological value. The alternative route would cross five unnamed intermittent streams that lead to the Escalante Desert. These sites and features could represent special or unique features that exemplify wilderness potential. This alternative route crosses through moderate to steep terrain dominated by pinyon-juniper vegetation in the Cove Mountain IRA. This landscape has been classified as Class B scenery since the landscape character is commonly found throughout the Dixie National Forest.

Based on available data for the IRA, no other special features or values characterizing wilderness potential (e.g., suitable habitat for sensitive species or other sensitive resources) are present within the IRA.

Atchinson Unroaded/Undeveloped Area

Alternative S4 also crosses the Atchinson unroaded/undeveloped area for 4.7 miles (refer to Map 3-8 and MV-14c and MV-14d). The Atchinson unroaded/undeveloped area encompasses 24,309 acres that largely overlap the Atchinson IRA. The wilderness attributes of the unroaded/undeveloped area within the Project area are assumed to be similar to those of the Atchinson IRA where the two areas overlap. While the unroaded/undeveloped area is of sufficient size to make practicable its preservation and use in an unimpaired condition, the presence of man-made features such as the Kern River pipeline, other existing roads, and existing transmission lines diminish the wilderness qualities and attributes of naturalness and lack of development in some parts of the Atchinson unroaded/undeveloped area.

Cove Mountain Unroaded/Undeveloped Area

Alternative S4 also crosses the Cove Mountain unroaded/undeveloped area for 5.7 miles (refer to Map 3-8 and MV-14c and MV-14d). The Atchinson unroaded/undeveloped area encompasses 15,678 acres that largely overlap the Cove Mountain IRA. The wilderness attributes of the unroaded/undeveloped area within the Project area are assumed to be similar to those of the Cove Mountain IRA where the two areas overlap. While the unroaded/undeveloped area is of sufficient size to make practicable its preservation and use in an unimpaired condition, the presence of man-made features such as the Kern River pipeline, other existing roads, and existing transmission lines diminish the wilderness qualities and attributes of naturalness and lack of development in some parts of the Cove Mountain unroaded/undeveloped area.

Future Land Use

Table 3-74 identifies the future land uses crossed by Alternative S4.

Parks and Recreation

Alternative S4 crosses areas on the Dixie National Forest designated under the ROS. Table 3-74 identifies which designations are crossed.

Environmental Effects

Existing Land Use

Tables 3-75 and 3-76 quantify the effects on IRAs and unroaded/undeveloped areas crossed by Alternative S4, which includes miles crossed, temporary and permanent disturbance (including disturbance associated with overland travel within IRAs), and the percentage of area disturbed. A description of impacts on roadless area characteristics and wilderness qualities and attributes in the IRAs is disclosed in the following sections. Impacts on the wilderness qualities and attributes on the unroaded/undeveloped areas are also presented.

Atchinson Inventoried Roadless Area

The alternative route does not cross the designated Mountain Meadows Massacre Site NHL. Alternative S4 does cross the Mountain Meadows Historic Site boundary on Link 444. Application of mitigation measures during Project siting and construction (refer to Table 3-64) would mitigate impacts on these special features and other attributes used characterize wilderness potential. Further, impacts on the six known cultural resource sites would be avoided or mitigated per direction of the HPTP to be included in the POD (Section 3.2.5).

In regards to environmental qualities or features used to characterize IRAs, no impacts on groundwater resources used by the residents of Pine Valley and Central, Utah, would be anticipated (refer to Section 3.2.3.4). Also, the limited amount of temporary and permanent ground disturbance within the IRA would not impact the diversity of plants and animals within the IRA. However, the existing landscape character of the Atchinson IRA would be modified minimally by the presence of the transmission line within the IRA. Also, a permanent loss of acres would occur where the Project crosses the IRA. While impacts on the existing landscape character would be anticipated, the changes in the roadless characteristics of the IRA would not be large enough to preclude management of the area as an IRA and/or wilderness.

Cove Mountain Inventoried Roadless Area

Potential impacts on the six known cultural resource sites, which may indicate special cultural or historical values of the area, used to characterize wilderness potential, would be avoided or mitigated per direction of the HPTP to be included in the POD (refer to Section 3.2.5).

In regards to environmental qualities or features used to characterize IRAs, no impacts to the intermittent streams that lead to the Escalante Desert would be anticipated (refer to Section 3.2.3.4). Also, the limited amount of temporary and permanent ground disturbance within the IRA would not impact the diversity of plants and animals within the IRA. However, the existing landscape character of the Cove Mountain IRA would be modified minimally by the presence of the transmission line within the IRA. Also, a permanent loss of acres would occur where the Project crosses the IRA. While impacts on the existing landscape character would be anticipated, the changes in the roadless characteristics of the IRA would not be large enough to preclude management of the area as an IRA and/or wilderness.

Atchinson Unroaded/Undeveloped Area

The effects of the Project on the wilderness qualities and attributes would be similar to those described for the Atchinson IRA where the two areas overlap. Overall, short- and long-term impacts associated with construction, operation, and maintenance would diminish the natural appearance and undeveloped character of portions of the unroaded/undeveloped area and could decrease opportunities for solitude and primitive recreation, where present. However, the wilderness characteristics of the area have been affected by existing man-made features present in the area and changes in the wilderness qualities would not be large enough to preclude management of the areas as an IRA and/or wilderness.

Cove Mountain Unroaded/Undeveloped Area

The effects of the Project on the wilderness qualities and attributes would be similar to those described for the Cove Mountain IRA where the two areas overlap. Overall, short- and long-term impacts associated with construction, operation, and maintenance would diminish the natural appearance and undeveloped character of portions of the unroaded/undeveloped area and could decrease opportunities for solitude and primitive recreation, where present. However, the wilderness characteristics of the area have been affected by existing man-made features present in the area and changes in the wilderness qualities would not be large enough to preclude management of the areas as an IRA and/or wilderness.

Herd Management Areas

Impacts on the Chloride Canyon HMA would be similar to Alternative S1.

USFS Tree Removal and Board Feet Calculations

USFS tree removal and board feet calculations were analyzed using the entire forest as inventory. Based on Great Basin pinyon-juniper habitat with an average density of 103 trees per acre with a diameter at root collar greater than 9 inches, 19,289 trees in the Dixie National Forest are estimated to be removed for this alternative route. Using an average of 837 cubic feet per acre with a diameter at root collar greater than 9 inches, 1,880,967 board feet of pinyon-juniper are estimated to be cut, sold, or removed and could be used for some minor commercial purposes (e.g., fence posts, poles, fuel wood, etc.) or personal use. This estimate assumes the 150-foot-wide right-of-way would be cleared of vegetation to comply with electrical safety standards. Of 276.4 total acres of right-of-way to be treated in the Dixie National Forest, approximately 187.3 acres of Great Basin pinyon-juniper would be affected (Moore 2012).

Future Land Use

Alternative S4 crosses most of the same future land uses as Alternative S2. The only variations would be in the distance each land-use type crossed. Impacts on future land use under Alternative S4 would be similar to those anticipated under Alternative S2, except this alternative route does not cross open space conservation zones within Washington County. The exact mileages are given in Tables 3-74.

Parks and Recreation

Impacts on recreation resources would range from low to high. Impacts on roaded natural areas would be low and similar to Alternative S1.

Depending on the location and application of mitigation measures, low and moderate impacts on semi-primitive motorized areas could result from increased access provided by a new access road, which could exceed the management threshold for ease of access and social interaction. Low impacts would occur along Link 270 and 275 where there are existing roads. In these areas, potential impacts would be reduced by reclaiming new access roads, if not needed for maintenance (Mitigation Measure 5), thereby minimizing long-term disturbance and motorized access. If the access roads are needed for maintenance, placing gates or blocking entrances by other means would limit public access (Mitigation Measure 15). Moderate impacts would result along Links 222 and 270 where Mitigation Measures 5 and 15 are applied, and the alternative is not in proximity to existing roads. Motorized access could increase during construction, but the application of these mitigation measures would minimize long-term motorized access.

Depending on the location and application of mitigation measures, moderate and high impacts on semi-primitive nonmotorized areas could result from increased access provided by a new access road that could exceed the management threshold for ease of access and social interaction. The presence of the access road could result in increased motorized use (e.g., ATV and vehicular) and social interaction into areas managed for primitive use (hiking and horseback riding) and limited social interaction (i.e., solitude). Moderate impacts would occur along Link 270 (Milepost 2.8 to 2.9) where towers would span the semi-primitive nonmotorized area to limit motorized access (Mitigation Measure 7). High impacts would result where the alternative is not in proximity to existing roads. Long-term motorized access would be minimized by reclaiming new access roads not needed for maintenance (Mitigation Measure 5). If the access roads are needed for maintenance, placing gates or blocking entrances would limit motorized access (Mitigation Measure 15).

Alternative S5 – Iron Springs and Pinto Creek (Proponent's Preferred Alternative)

Affected Environment

Jurisdiction

Alternative S5 is 59.0 miles in length and crosses 25.5 miles of BLM-administered lands (43.2 percent), 20.7 miles of USFS-administered lands (35.1 percent), 2.2 miles of state land (3.7 percent), and 10.6 miles of private land (18.0 percent).

Linear Facilities

This alternative route parallels an existing 138kV transmission line for 5.2 miles, the Kern River pipeline for 3.1 miles, the Sigurd to Red Butte No.1 – 345kV transmission line for 1.6 miles, and the IPP 500kV DC transmission line for 3.7 miles.

Existing Land Use

Table 3-74 identifies the existing land uses crossed by Alternative S5 and the number of residences within 0.25 mile. Most of the residences are in the community of Pinto, which represents the most populated area along the alternative route. The alternative route crosses 8.3 miles of the Chloride Canyon HMA.

Atchinson Unroaded/Undeveloped Area

Refer to Alternative S1 for description of the affected environment within the Atchinson unroaded/undeveloped area.

Cove Mountain Unroaded/Undeveloped Area

Refer to Alternative S1 for description of the affected environment within the Cove Mountain unroaded/undeveloped area.

Kane Mountain Unroaded/Undeveloped Area

Refer to Alternative S1 for description of the affected environment within the Kane Mountain unroaded/undeveloped area.

Pine Valley Mountain Unroaded/Undeveloped Area

Refer to Alternative S1 for description of the affected environment within the Pine Valley Mountain unroaded/undeveloped area.

Future Land Use

Table 3-74 identifies the future land uses crossed by Alternative S5.

Parks and Recreation

Alternative S5 crosses areas on the Dixie National Forest designated under the ROS. Table 3-74 identifies which designations are crossed.

Environmental Effects

Existing Land Use

Alternative S5 crosses most of the same existing land uses as Alternative S1. The only variations will be in the distance each land-use type crossed. Impacts associated with Alternative S5 on existing land use would be similar to those anticipated for Alternative S1. The mileages are provided in Table 3-74. Table 3-76 quantifies the potential effects on unroaded/undeveloped areas crossed by Alternative S5, which includes miles crossed, temporary and permanent disturbance and the percentage of area disturbed. Disturbance acreages for Alternative S5 compared to Alternative S1 will be slightly less. Impacts on the wilderness qualities and attributes of the unroaded/undeveloped area are presented below.

Atchinson Unroaded/Undeveloped Area

Impacts of implementation of Alternative S5 on the Atchinson unroaded/undeveloped area would be similar to impacts associated with implementation of Alternative S1.

Cove Mountain Unroaded/Undeveloped Area

Impacts of implementation of Alternative S5 on the Cove Mountain unroaded/undeveloped area would be similar to impacts associated with implementation of Alternative S1.

Kane Mountain Unroaded/Undeveloped Area

Impacts of implementation of Alternative S5 on the Kane Mountain unroaded/undeveloped area would be similar to impacts associated with implementation of Alternative S1.

Pine Valley Mountain Unroaded/Undeveloped Area

Impacts of implementation of Alternative S5 on the Pine Valley Mountain unroaded/undeveloped area would be similar to impacts associated with implementation of Alternative S1.

Herd Management Areas

Low impacts could be anticipated along Link 438 where the alternative crosses 8.3 miles of the Chloride Canyon HMA because the overall management of this area for wild horses would not be infringed, and the overall disturbance is minimal (0.4 percent of the total HMA). The alternative route is located near an existing road, which could limit new ground disturbance within the HMA. Wild horses could continue to be managed within the HMA under this alternative.

USFS Tree Removal and Board Feet Calculations

USFS tree removal and board feet calculations are the same as Alternative S1.

Future Land Use

Alternative S5 crosses most of the same future land uses as Alternative S1. The only variations would be in the distance each land-use type would be crossed. Impacts on future land use under Alternative S5 would be similar to those anticipated under Alternative S1.

This alternative route also would have additional low impacts associated with areas zoned for industrial activities in Iron County. Impacts in this area are anticipated to be low because most industrial uses are compatible with transmission lines; however, segmentation of this area could impair future development. It would be anticipated any remaining impacts could be mitigated by site design of future industrial facilities. The exact mileages are given in Table 3-74.

Parks and Recreation

Impacts would be anticipated to be similar to impacts associated with Alternative S1.

Alternative S6 – Iron Springs and Ox Valley

Affected Environment

Jurisdiction

Alternative S6 is 61.8 miles in length and crosses 27.6 miles of BLM-administered lands (44.7 percent), 20.0 miles of USFS-administered lands (32.3 percent), 2.7 miles of state land (4.4 percent), and 11.5 miles of private land (18.6 percent).

Linear Facilities

The alternative would parallel an existing 138kV transmission line for 2.9 miles, the Kern River pipeline for 7.9 miles, the Sigurd to Red Butte No.1 – 345kV transmission line for 4.4 miles, and the IPP 500kV DC transmission line for 8.1 miles.

Existing Land Use

Table 3-74 identifies the existing land uses crossed by Alternative S6 and the number of residences within 0.25 mile. The alternative route crosses 8.3 miles of the Chloride Canyon HMA. Alternative S6 crosses 9.1 miles of unroaded/undeveloped area (i.e., Moody Wash/Mogotsu). Portions of IRAs (i.e., Atchinson, Cove Mountain, Gum Hill, Kane Mountain, Mogotsu, Moody Wash, and Pine Valley Mountain) are located within the study corridor; however, these areas are not crossed by the alternative.

Moody Wash/Mogotsu Unroaded/Undeveloped Area

Refer to Alternative S3 for description of the affected environment within the Moody Wash/Mogotsu unroaded/undeveloped area associated with Alternative S6.

Future Land Use

Table 3-74 identifies the future land uses crossed by Alternative S6.

Parks and Recreation

The alternative route crosses the same recreation resources as Alternative S3.

Environmental Effects

Existing Land Use

In addition to impacts described under the Impacts Common to All Alternatives subheading, moderate impacts on unroaded/undeveloped areas would be similar to Alternative S3.

Moody Wash/Mogotsu Unroaded/Undeveloped Area

Impacts associated with implementation of Alternative S6 on the Atchinson unroaded/undeveloped area would be similar to impacts associated with implementation of Alternative S3.

Herd Management Areas

Impacts on the Chloride Canyon HMA would be similar to Alternative S5.

USFS Tree Removal and Board Feet Calculations

USFS tree removal and board feet calculations are the same as Alternative S3.

Future Land Use

Alternative S6 crosses most of the same future land uses as Alternative S1. The only variations would be in the distance each land-use type crossed. This alternative route also would have additional low impacts associated with areas zoned for industrial activities and impacts would be similar to Alternative S5. The exact mileages are given in Table 3-74.

Parks and Recreation

Impacts would be similar to Alternative S3.

Alternative S7 – Middle Hybrid Route

Affected Environment

Jurisdiction

Alternative S7 is 49.8 miles in length and crosses 13.0 miles of BLM-administered lands (26.0 percent), 13.1 miles of USFS-administered lands (26.4 percent), 0.9 mile of state land (1.8 percent), and 22.8 miles of private land (45.8 percent).

In response to agency and public comments received on the Draft EIS, the BLM and USFS requested the Proponent consider an alternative (referred to as a hybrid of Alternatives S2 and S4) that could reduce the miles of IRAs affected by the Project and locate the transmission line farther from the Mountain Meadows Massacre Site NHL. The alternative would follow Alternative S2 to just north of the NHL and then diverts to the east-central route (Alternative S4), avoiding the Mountain Meadows Massacre Site NHL to the extent possible.

Linear Facilities

The alternative would parallel an existing 138kV transmission line for 5.3 miles, the Kern River pipeline for 12.7 miles, the Sigurd to Red Butte No.1 – 345kV transmission line for 15.7 miles, and the IPP 500kV DC transmission line for 25.0 miles.

Existing Land Use

Alternative S7 would be similar to Alternatives S2 and S4 with variations only in the distance each land-use type crossed. Table 3-74 identifies the existing land uses crossed by Alternative S7 and the number of residences within 0.25 mile. The alternative route crosses 9.4 miles of the Chloride Canyon HMA.

Atchinson Inventoried Roadless Area

Alternative S7 crosses 2.7 miles of the Atchinson IRA. Other portions of IRAs (i.e., Cove Mountain, Gum Hill, Kane Mountain, Mogotsu, Moody Wash, and Pine Valley Mountain) are located within the study corridor; however, the alternative route does not cross these areas. Refer to Alternative S4 for description of the affected environment within the Atchinson IRA associated with Alternative S7.

Atchinson Unroaded/Undeveloped Area

Alternative S7 crosses 4.7 miles of the Atchinson unroaded/undeveloped area. Refer to Alternative S4 for a description of the affected environment within the Atchinson unroaded/undeveloped area associated Alternative S7.

Cove Mountain Unroaded/Undeveloped Area

Alternative S7 crosses 0.4 mile of the Cove Mountain unroaded/undeveloped area. Refer to Alternative S4 for a description of the affected environment within the Cove Mountain unroaded/undeveloped area associated with Alternative S7. Alternative S7 crosses this unroaded/undeveloped area for 5.3 miles less than Alternative S4.

Future Land Use

Table 3-74 identifies the future land uses crossed by Alternative S7.

Parks and Recreation

The alternative route crosses the same recreation resources as Alternative S2 from Newcastle to Pinto Road, and the same recreation resources as Alternative S4 from Pinto Road to Red Butte Substation. Impacts on the Mountain Meadows Massacre Site NHL are discussed in Sections 3.2.5, 3.2.8, and 3.2.10.6.

Environmental Effects

Existing Land Use

Impacts associated with Alternative S7 would be similar to impacts anticipated for Alternatives S2 and S4.

Table 3-75 and 3-76 quantify the potential effects on IRAs and unroaded/undeveloped areas crossed by Alternative S7, which include miles crossed, temporary and permanent disturbance (including disturbance associated with overland travel within the IRAs), and the percentage of area disturbed.

A description of impacts on roadless area characteristics and wilderness qualities and attributes in the IRA is disclosed below. Impacts on the wilderness qualities and attributes on the unroaded/undeveloped areas wilderness qualities and attributes are also presented.

Atchinson Inventoried Roadless Area

Impacts associated with implementation of Alternative S7 on the Atchinson IRA would be similar to anticipated impacts associated with Alternative S4.

Atchinson Unroaded/Undeveloped Area

Impacts associated with implementation of Alternative S7 on the Atchinson unroaded/undeveloped area would be similar to anticipated impacts associated with Alternative S4.

Cove Mountain Unroaded/Undeveloped Area

Impacts associated with implementation of Alternative S7 on the Cove Mountain unroaded/undeveloped area would be similar to impacts anticipated for Alternative S4.

Herd Management Areas

Impacts associated with impacts of Alternative S7 on the Chloride Canyon HMA would be similar to Alternative S4.

USFS Tree Removal and Board Feet Calculations

USFS tree removal and board feet calculations were analyzed using the entire forest as inventory. Based on Great Basin pinyon-juniper habitat with an average density of 103 trees per acre with a diameter at root collar greater than 9 inches, 11,236 trees in the Dixie National Forest are estimated to be removed for this alternative route. Using an average of 837 cubic feet per acre with a diameter at root collar greater than 9 inches, 1,095,709 board feet of pinyon-juniper are estimated to be cut, sold, or removed and could be used for some minor commercial purposes (e.g., fence posts, poles, fuel wood, etc.) or personal use. This estimate assumes the 150-foot-wide right-of-way would be cleared of vegetation to comply with electrical safety standards. Of 238.2 total acres of right-of-way to be treated in the Dixie National Forest, approximately 109.1 acres of Great Basin pinyon-juniper would be affected (Moore 2012).

Future Land Use

Alternative S7 crosses most of the same future land uses as Alternatives S2 and S4. The only variations would be in the distance each land-use type crossed. The exact mileages are given in Table 3-74.

Parks and Recreation

Impacts would be similar to Alternative S4.

Alternative S7-A (Route Variation of Alternative S7) – Middle Hybrid Route 300 Feet East of Sigurd to Red Butte No. 1 Transmission Line Adjacent to Atchinson IRA (Agency Preferred Alternative)

Affected Environment

Jurisdiction

Alternative S7-A is 49.8 miles in length and crosses 13.0 miles of BLM-administered lands (26.1 percent), 12.6 miles of USFS-administered lands (25.3 percent), 0.9 mile of state land (1.8 percent), and 25.3 miles of private land (46.8 percent).

Alternative S7-A is a route variation of Alternative S7. This alternative route variation follows Alternative S7 to a point north of Atchinson IRA boundary. The alternative route crosses back west across the existing transmission lines and pipeline corridor, and follows the existing Sigurd to Red Butte No. 1 transmission line at a 300-foot offset on the eastern side of the transmission line for approximately 1.8 miles to just south of the Atchinson IRA boundary. From this point, the alternative route returns to the alignment of Alternative S7 to the Red Butte Substation. By paralleling the existing Sigurd to Red Butte No. 1 transmission line 300 feet to the east, impacts on the Atchinson IRA would be reduced while also mitigating cultural, historical, and visual impacts on the Mountain Meadows Massacre Site NHL and the Mountain Meadows Historic Site. This would be accomplished by placing more distance between the proposed transmission line and the NHL and by concentrating the linear utilities. The concerns of the Proponent about effects on reliability of the system associated with Alternative S7 also would be relevant to this route variation.

Linear Facilities

The alternative would parallel an existing 138kV transmission line for 9.7 miles, the Kern River pipeline for 12.7 miles, the Sigurd to Red Butte No.1 – 345kV transmission line for 20.4 miles, and the IPP 500kV DC transmission line for 29.5 miles.

Existing Land Use

Table 3-74 identifies the existing land uses crossed by Alternative S7-A and the number of residences within 0.25 mile. The alternative route crosses 9.4 miles of the Chloride Canyon HMA. Alternative S7-A will also cross the Mountain Meadows Historic Site for 1.6 miles.

Atchinson IRA

The alternative crosses 1.4 miles of the Atchinson IRA and 5.0 miles of unroaded/undeveloped areas (Atchinson and Cove Mountain). Other portions of IRAs (i.e., Atchinson, Cove Mountain, Gum Hill, Kane Mountain, Mogotsu, Moody Wash, and Pine Valley Mountain) are located within the study corridor; however, the alternative route does not cross these areas. Refer to Alternative S4 for a description of the affected environment within the Atchinson IRA associated with Alternative S7-A. Alternative S7-A crosses the Atchinson IRA for 1.3 miles less than Alternative S7 and 1.4 miles less than Alternative S4.

Atchinson Unroaded/Undeveloped Area

Refer to Alternative S4 for a description of the affected environment within the Atchinson unroaded/undeveloped area associated with Alternative S7-A.

Cove Mountain Unroaded/Undeveloped Area

Refer to Alternative S4 for a description of the affected environment within the Cove Mountain unroaded/undeveloped area associated with Alternative S7-A.

Future Land Use

Table 3-74 identifies the future land uses crossed by Alternative S7-A.

Parks and Recreation

The alternative route crosses the same recreation resources as Alternative S7 . Impacts on the Mountain Meadows Massacre NHL and the Mountain Meadows Historic Site are discussed in Sections 3.2.5, 3.2.8, and 3.2.10.6.

Environmental Effects

Existing Land Use

In addition to impacts described under Impacts Common to All Alternatives subheading, impacts associated with implementation of Alternative S7-A would be similar to Alternative S4.

Atchinson Inventoried Roadless Area

Impacts associated with implementation of Alternative S7-A on the Atchinson IRA would be similar to Alternative S4. However, fewer miles of the IRA would be crossed.

Atchinson Unroaded/Undeveloped Area

Impacts associated with implementation of Alternative S7-A on the Atchinson unroaded/undeveloped area would be similar to those associated with implementation of Alternative S4.
Cove Mountain Unroaded/Undeveloped Area

Impacts associated with the implementation of Alternative S7-A on the Cove Mountain unroaded/undeveloped area would be similar to those associated with Alternative S7.

Herd Management Areas

Impacts on the Chloride Canyon HMA would be similar to S4.

USFS Tree Removal and Board Feet Calculations

USFS tree removal and board feet calculations were analyzed using the entire forest as inventory. Based on Great Basin pinyon-juniper habitat with an average density of 103 trees per acre with a diameter at root collar greater than 9 inches, 10,675 trees in the Dixie National Forest are estimated to be removed for this alternative route. Using an average of 837 cubic feet per acre with a diameter at root collar greater than 9 inches, 1,040,924 board feet of pinyon-juniper are estimated to be cut, sold, or removed and could be used for some minor commercial purposes (e.g., fence posts, poles, fuel wood, etc.) or personal use. This estimate assumes the 150-foot-wide right-of-way would be cleared of vegetation to comply with electrical safety standards. Of 238.2 total acres of right-of-way to be treated in the Dixie National Forest, approximately 103.6 acres of Great Basin pinyon-juniper would be affected (Moore 2012).

Future Land Use

Alternative S7-A crosses most of the same future land uses as Alternative S7. The only variations would be in the distance each land-use type crossed. This alternative route would be similar to Alternative S7. The exact mileages are given in Table 3-74.

Parks and Recreation

Impacts would be similar to Alternative S7.

3.2.9.6 Summary

Impacts on existing land uses associated with the implementation of the Project would generally be low to moderate. If Alternative N1 were selected, an area of high impact would be where the portion of Alternative N1 crosses the Milford Wind Corridor, LLC Phase III facility. If Alternative S2 was selected, a high impact on a residential use would occur if a direct crossing of the residential structure could not be mitigated through engineering design.

Portions of Alternatives S2, S4, S7, and S7-A that cross IRAs on the Dixie National Forest could result in moderate impacts. Moderate impacts occur where the Project would conflict physically with IRAs and include changes that are large enough that it may result in changes to ecological conditions, a loss of acres, or a decrease in user experience, but would not preclude the ability of the area to be managed as an IRA and/or wilderness.

Portions of all alternative routes cross unroaded/undeveloped areas on the Fishlake and Dixie National Forests and could result in moderate impacts. Moderate impacts occur where the Project would conflict physically with unroaded/undeveloped areas and includes changes that are large enough that it may result in changes to ecological conditions, a loss of acres, or a decrease in user experience, but would not preclude the ability of the area to be managed as an IRA and/or wilderness. All alternative routes would diminish wilderness qualities and attributes of unroaded/undeveloped areas on USFS-administered lands, varying by alternative and location. The wilderness qualities and attributes of the USFS unroaded/undeveloped areas would be diminished as more human developments and prescribed burns are permitted or implemented within these areas. However, the wilderness qualities and attributes of these areas could increase as burned areas recover over time and other developments, such as oil and gas leases, are not constructed.

Potential impacts on future land use, particularly other proposed energy projects, would include constraints on the development of facilities (e.g., placement of wind turbines, solar facilities, and other proposed transmission lines, etc.). The intensity and extent of impacts on specific future development activities could not be assessed due to the preliminary nature of these projects. However, the study areas for other future projects were avoided to the extent possible during the identification of alternative routes for the Project. Also, in response to agency and public comments received on the Draft EIS and additional information provided since the Draft EIS was published, one additional alternative route variation (Alternative N2-A) was developed for analysis. It is anticipated that any impacts related to colocation of projects could be mitigated through final engineering design.

Impacts on recreation would result from potential conflicts with the prescribed management for certain ROS designations (e.g., high impact to semi-primitive nonmotorized) on both the Fishlake and Dixie National Forests associated with the increased access to these areas, which are common to all alternatives. Additional recreation impacts would result from OHV trail and scenic backway crossings, which would temporarily limit the use of these facilities during construction of the Project.

3.2.10 Special Designations

3.2.10.1 Scenic Byways and Backways

The Beaver Canyon Scenic Byway begins east of Beaver and follows Highway 153 into the Fishlake National Forest and passes several campgrounds and trailheads before culminating at the Eagle Point Ski Area, located approximately 15.0 miles east of Beaver City (Federal Highway Administration 2009). The Kimberly/Big John Road Scenic Backway connects with the Beaver Canyon Scenic Byway approximately 11.5 miles east of Beaver City and travels north before terminating at Fremont Indian State Park. The Kimberly/Big John Road Scenic Backway is crossed aerially by all northern alternatives (N1 through N6) in the same location as an existing 138kV transmission line. Aesthetic impacts on views from the scenic byways and backways are described in the visual resources section (Section 3.2.8).

3.2.10.2 National Trails

Indirect impacts on the trail are discussed in the cultural and visual resources section (Sections 3.2.5 and 3.2.8, respectively).

3.2.10.3 Wild and Scenic Rivers

Fish Creek is located in the Beaver Ranger District of the Fishlake National Forest and was determined in the Wild and Scenic River Suitability Study for National Forest System Lands in Utah (USFS 2008) to be suitable and recommended for inclusion into the National Wild and Scenic River System. The upper portion of the creek is classified as "wild" and the lower portion as "recreation" (USFS 2007). The outstanding remarkable values of the upper portion of Fish Creek are its prehistoric/historic, wildlife/ecological, and fish habitat values. This portion of the creek is not crossed by any alternatives being considered for the Project. The outstanding remarkable value for the lower portion of the creek is its recreational value. This portion of the creek is crossed by all northern alternatives (N1 through N6). Regardless of the alternative routes selected, the Project would cross the creek in the same location and would parallel an existing 138kV transmission line. Location of the Project in an existing corridor with an existing transmission line would not result in degradation of the value for which the portion of the creek is being considered. In visual resource studies completed for the Project, Fish Creek was considered to be a high sensitivity recreation viewer due to the location of the Project. A more detailed discussion of impacts is described in the visual resources section (Section 3.2.8).

Little Pinto Creek, crossed by Alternative S6 (Link 245), was determined eligible as a National Wild and Scenic River for its outstandingly remarkable value as habitat for the southwestern willow flycatcher (BLM 2011a). Although a suitability determination as not yet been made, BLM's Manual 8351 (Wild and Scenic Rivers) requires BLM to prevent harm to significant resource values from degradation until the area is fully evaluated. If Alternative S6 were selected, impacts on southwestern willow flycatcher would be reduced by avoiding construction-related disturbance to the species during sensitive periods. Also, the habitat would be avoided to the extent possible through spanning and micro-siting, which would reduce physical disturbance of the habitat during construction and allow the habitats to remain available for use. The measures would be expected to prevent any degradation of habitat value associated with implementation of the Project.

3.2.10.4 Wilderness

Wilderness Areas

The Pine Valley Mountain Wilderness Area is located in the southern area of the Project area in Washington County and is approximately 50,232 acres. It is located approximately 2.4 miles from Alternatives S1 and S5; therefore, there are no direct impacts on this area. Aesthetic impacts on views from the wilderness area are described in the visual resources section (Section 3.2.8).

Lands with Wilderness Qualities or Attributes on BLM-administered Lands

During the scoping process, commenters expressed concern that implementation of the Proponent's Preferred Alternative and alternatives could result in impacts on LWCs.

BLM reviewed the Proposed Action and alternatives and determined areas affected by the Project that clearly lack wilderness qualities or attributes. Information regarding the review for wilderness qualities or attributes conducted by each BLM field office is presented in Appendix K. Based on the outcome of BLM field office reviews, the potential for impacts on LWCs from implementation of the Project was not carried forward as an issue for analysis in the EIS.

Unroaded/undeveloped areas on USFS-administered lands are another method of providing an inventory of wilderness characteristics and are discussed in Section 3.2.9, Land Use. Table 3-65 lists the unroaded/undeveloped areas within the Project area, identifying those areas potentially crossed by the Project. Unroaded/undeveloped areas within the Project area also are shown on MV-14 (Volume II).

3.2.10.5 Area of Critical Environmental Concern Nominations

The BLM Cedar City Field Office is currently developing an RMP. As part of the resource management planning process, three nominations for ACECs were made in December 2010 for areas occurring within the Project area. BLM's Manual 1613 (Areas of Critical Environmental Concern) requires that BLM managers, as necessary, temporarily manage potential ACECs to prevent harm to significant resource values from degradation until the area is fully evaluated through the planning process. BLM managers also have the discretion to postpone project-level decisions if a Proposed Action has the potential to preclude management options being considered in a planning process.

Mineral Mountains and Mineral Mountains Obsidian Area of Critical Environmental Concern Nominations

Two nominations for the Mineral Mountains ACEC were made in December 2010 as part of the BLM Cedar City Field Office RMP planning process. The Mineral Mountains Obsidian ACEC was nominated by the Utah Professional Archaeological Council. The Mineral Mountains ACEC was nominated by Southern Utah Wilderness Alliance and the boundaries of the area nominated by the Southern Utah Wilderness Alliance (i.e., the area being considered in the resource management planning process) are shown on Map MV-15b. Alternative routes considered for the Project would not cross the boundaries of the nominated area. The Project would not result in degradation of the relevant and important values (i.e., biological and cultural resource values) for which the ACEC is being considered. Furthermore, authorization of the Project would not preclude management options being considered in the BLM Cedar City Field Office resource management planning process (i.e., ACEC designation). Potential impacts on biological and cultural resource values in the Mineral Mountains area are addressed in Sections 3.2.4 and Section 3.2.5, respectively.

Sage-Grouse Area of Critical Environmental Concern Nomination

Per an internal nomination, the BLM Cedar City Field Office is considering designation of sage-grouse habitat as an ACEC in their planning process. Management being considered for the potential ACEC includes management of the habitat as an exclusion area for major rights-of-way; however, existing right-of-way corridors would be exempted from this management prescription. Several alternatives being considered for the transmission line, including the Agency Preferred Alternative, include Links 160,163, and 397 that cross sage-grouse habitat being considered for ACEC designation (refer to Table 2-9). However, in the area being considered for ACEC designation, the Agency Preferred Alternative (Alternatives N2-A and S7-A) would locate the Project within (1) an existing right-of-way corridor (a West-wide Energy [Section 368] Corridor]) and (2) a segment of the existing corridor that includes an existing high-voltage transmission line. Location of the Project in an existing corridor with an existing transmission line would not result in degradation of the relevant and important values for which the ACEC is being considered. Further, authorization of the Project would not preclude management options being considered in the BLM Cedar City Field Office resource management planning process.

Potential impacts on sage-grouse habitat are addressed in Section 3.2.4.

3.2.10.6 Mountain Meadows Massacre Site National Historic Landmark

As detailed in Section 3.2.5 (Cultural Resources), the Mountain Meadows Massacre Site NHL is located along SR 18, approximately 7 miles south of Enterprise, Utah, and about 30 miles north of St. George, Utah, in a high valley in the northern part of the Pine Valley Mountains. The Mountain Meadows Historic Site, NRHP property, sits on land currently owned by the LDS Church or various private parties or administered by the Dixie National Forest. On June 23, 2011, two parcels of land adjacent to and within the larger historic site were designated as an NHL by the Secretary of the Interior. The NHL parcels total 760 acres. The Mountain Meadows Massacre Site NHL is owned by the LDS Church and Dixie National Forest.

Alternatives S2 and S7-A cross the Mountain Meadows Historic Site. Alternative S2 crosses the Mountain Meadows Historic Site for 2.4 miles and Alternative S7-A for 1.6 miles. None of the alternative routes considered cross the Mountain Meadows Massacre Site NHL, and there would be no direct land use impacts. Alternative S2 is located approximately 250 feet from Site One of the Mountain Meadows Massacre Site NHL and approximately 710 feet from Site Two. Alternative S7-A is located approximately 2,360 feet from Site One of the Mountain Meadows Massacre Site NHL and approximately 3,400 feet from Site Two. Impacts associated with the Mountain Meadows Massacre Site NHL are largely visual and cultural in nature and are discussed in detail in Sections 3.2.8 and 3.2.5, respectively. The existing land uses affected by the Project within the Mountain Meadows Historic Site have been addressed in Section 3.2.9.5 – Southern Alternatives S2 and S7-A.

3.2.11 Wildland Fire Ecology and Management

3.2.11.1 Introduction

Issues raised by the public and agencies during Project scoping and preparation of the EIS related to potential effects on wildland fire ecology and management included the risk of potential fires caused by construction activities or presence of transmission lines, the limited ability to manage fire in remote areas, and the safety of firefighters who are fighting fires close to the transmission line. The presence and operation of a transmission line could affect fire risk because wildland fires can be ignited by sparks or heat from construction vehicles or equipment, or from public vehicles using new access roads. Also, a fire can result if a conducting object comes in proximity of the transmission line, resulting in a flashover to ground or if an energized phase conductor were to fall to the ground and remain in contact with combustible material long enough to heat the material to its flashpoint.

Wildland fire also can have effects on the operation of the transmission line. Fires under or near overhead transmission lines create hot ionized gases that can provide a conducting path between conductors and ground and hence initiate flashovers. A fire alongside an overhead transmission line where a light breeze blows the smoke into the conductors may be as likely to affect overhead transmission line operation as a fire directly under an overhead transmission line. Fires can also damage infrastructure such as steel support structures and overhead conductors, as well as destroy wood pole support structures.

More than 1,319 wildland fires were reported in Utah during the period from 2002 through 2011, burning an average of 197,457 acres per year (National Interagency Fire Center 2012). The Utah Division of Forestry, Fire, and State Lands and a number of federal land-management agencies have joined in a cooperative effort to address the issues of fire management (e.g., suppression, public education and outreach, and fuel management) across the state (Utah Division of Forestry, Fire, and State Lands 2009).

Wildfires have grown in size, intensity, and frequency over the last 20 to 30 years. This has caused undesirable changes in the composition and structure (age and size) of forest and rangeland vegetation. One of the primary factors responsible for the increased size, intensity, and severity of wildfires is fire exclusion in all ecosystems, which has led to uncharacteristically high fuel loadings (USFS 2010A) and longer fire-return intervals.

The increasing size, intensity, and severity of wildfires pose greater threats to human life and property. More people are recreating in national forests and parks and other open spaces and building homes in wildland areas, increasing their exposure to naturally ignited wildland fires and increasing the risk of human-caused wildfire ignitions. Also, the threat to cultural resources is increased by uncharacteristically high fire intensities and severities resulting from uncharacteristic changes in vegetation, fuel loadings, and fire behavior. Fire suppression costs have also increased (USFS 2010A).

Most ecosystems have evolved with, and adapted to, specific fire regimes. A range of natural fire regimes exist within the Project area, which are largely determined by vegetation type. These fire regimes have been altered by human activities, such as fire suppression and livestock grazing, resulting in changes to the historical distribution, composition, and structure of rangeland vegetation. The alteration of natural fire regimes has also facilitated the invasion of exotic annuals such as cheatgrass (*Bromus tectorum).* An abundance of cheatgrass invading sagebrush understory can alter the fire regime, resulting in more frequent and more consumptive fires due to accumulation of fine dry fuels in the previously open, unvegetated spaces between shrubs (BLM 2005b; Zouhar 2003). Cheatgrass has a competitive advantage over native summer annual grasses, maturing earlier, dropping seed, then completely drying by early summer, just as the high fire risk season commences. Native annuals have not yet matured, so over time the fire intervals shorten with fires occurring earlier when natives are more fire susceptible (Zouhar 2003).

Many areas have had the fire return interval modified due to fire suppression and livestock grazing. Grazing removes fine fuels and inhibits fire from traveling across the landscape. Longer fire-return intervals have had several effects on the landscape, including (1) conifers expanding into non-forested areas, (2) tree densities increasing in existing stands of juniper, (3) junipers encroaching into upland shrub areas (particularly sagebrush), (4) shrub densities increasing, and (5) herbaceous vegetation decreasing due to shading and competition from increased tree and shrub densities.

In other areas where fire-return intervals are decreasing, the fire frequency increases. For example, vegetation changes are occurring in more arid regions where the introduction of exotic annuals, such as cheatgrass, has increased the fire frequency in areas where fire historically played a minimal role in the natural disturbance regime. The increased fire frequency is advantageous to exotic annuals and while inhibiting native vegetation, it facilitates further invasion of exotics.

Fire Management Plans and Objectives

Federal Wildland Fire Management Policy and *Review* and *Update of the 1995 Federal Wildland Fire Management Policy* directed that Fire Management Plans (FMPs) be developed for all areas of burnable vegetation on federal lands. Utah FMPs relevant to the Project area include the Central Utah Interagency FMP (Central Utah Fire Management Group 2010), covering the BLM Richfield and Fillmore field offices and the Fishlake National Forest); the Dixie National Forest FMP (USFS 2010A); and the Southern Utah Support Area FMP Environmental Assessment (BLM 2005b), covering the BLM Cedar City Field Office). The FMPs (available online at BLM and USFS websites) include fire management and suppression objectives that comply with Federal Wildland Fire Management Policy and current BLM and USFS land use plans. These objectives would be integrated into the implementation of the Project.

Additional coordination of management in Utah is provided by the Multi-Agency Coordination Group (USGS 2009c) and the Statewide Annual Operating Plan (Utah Division of Forestry, Fire, and State Lands 2009).

BLM fire management and suppression objectives that apply to the study area include the following:

- Safely reintroducing fire into ecosystems to meet desired resource management objectives by using the best science
- Using wildland fire control and suppression strategies and tactics that emphasize resource management objectives while minimizing total fire management costs
- Using a fire suppression strategy that balances resource management objectives and goals for protecting values at risk while minimizing fire management costs
- Keeping fire size as small and fire intensity as low as possible in the salt desert shrub ecotype to minimize loss of this sensitive vegetation type
- Stopping or reducing as much as possible the conversion of healthy ecosystems to cheatgrass.
- Maintaining or improving the health of the sagebrush steppe ecotype
- Reducing, as much as possible, the juniper encroachment from its historic habitat into adjacent ecosystems

The USFS objectives for wildland fire management are reflected in the Standards and Guidelines presented in the Dixie National Forest FMP (USFS 2010A) and the Central Utah Interagency FMP (Central Utah Fire Management Group 2010). These objectives would be integrated into the implementation of the Project. The fire management and suppression standards that apply to the study area include prioritization of firefighter and public safety and suppression of unwanted (i.e., accidental human-caused fires or arson) wildland fires. USFS guidelines for fire management include consideration of relative resource values in decisions regarding wildland fire control and suppression strategies, commensurate with fire management costs; authorized use of the full range of suppression tactics is forestwide, consistent with forest and management area emphasis and direction; consideration of a full range of management responses (i.e., from full suppression to monitoring) in areas authorized for wildland fire use; and reduction of hazardous fuels consistent with LRMP direction.

Management direction is further organized within the FMPs through the use of land area subdivisions called Fire Management Units (FMU). The FMUs are delineated fire management objectives and constraints, topographic features, values to be protected, political boundaries, fuel types, and fire regime condition classes. The alternative routes considered for the Project occur within 10 FMUs. Management objectives for these FMUs range from an emphasis on suppression to the use of wildland fire to manage ecosystems (Central Utah Fire Management Group 2010, USFS 2010a, BLM 2005b). FMUs relevant to the study area include:

- Escalante Desert
- Mineral and Black Mountains
- Antelope Range/Parowan Front
- Twin Peaks/Fillmore
- Cricket Mountain
- Pahvant
- Tushar Mountains
- Pinto/Mountain Meadow Interface
- Pine Valley Brushland
- Westside/Grass Valley
- Escalante Desert
- Mineral and Black Mountains

- Antelope Range/Parowan Front
- Twin Peaks/Fillmore
- Cricket Mountain
- Pahvant
- Tushar Mountains
- Pinto/Mountain Meadow Interface
- Pine Valley Brushland
- Westside/Grass Valley

3.2.11.2 Environmental Setting

Wildland Fire History

The entire Project area is frequented by numerous, small, lightning-driven fires. The majority of these fires self-extinguish or are contained at less than 10 acres. However, recent fires within the Project area (Table 3-77) include the largest wildland fire in Utah's history, the 2007 Milford Flat Fire, which burned more than 363,000 acres (National Interagency Fire Center 2010). Portions of alternatives considered for the northern segment of the Project, to varying extents, pass through the Milford Flat burned area. Since 2002, other smaller fires have occurred in the study corridors for alternative routes currently under consideration (refer to Table 3-77).

TABLE 3-77
RECENT FIRES WITHIN THE PROJECT AREA

Year	Name of Fire	Acres Burned	Alternatives	Links
Northern Area				
2010	Twitchell Canyon	44,874	N1, N2, N2-A, N3, N4, N5, N6	63, 64, 66
2007	Milford Flat	363,052	N1, N2, N2-A, N3, N4, N5, N6	75, 80, 305, 320, 330, 345, 348, 349, 350, 360, 385, 390, 450, 455, 460, 465, 470
2006	Baboon	1,318	N3, N5, N6	396, 490
2005	Mound[1]	263	N3, N5	490
2006	Pipeline[1]	190	N3, N5	490
2005	Neck	4,931	N3, N5	490
Southern Area				
2007	Antelope Spring[1]	141	S1, S2, S3, S4	220
2007	Moody	93	S3, S6	280, 285, 290, 500
2006	Moody 2	38	S3, S6	280, 285, 290, 500
2004	Cal Hollow[1]	39	S2, S3, S4, S5, S6, S7, S7-A	275
2002	Mountain Meadow	47	S2	441, 443, 444
1996	Magotsu/Racer	8616	S3, S6	280, 285, 290, 500
1995	Holt Canyon	539	S2, S3, S4, S6	441, 443, 444, 220, 270, 271, 280, 285, 290, 500

SOURCES: National Interagency Fire Center 2010; GeoMAC 2009
NOTE: [1]Fires near, but outside the study corridors

3.2.12 Social and Economic Conditions

Issues raised by the public and agencies during Project scoping and EIS preparation related to potentially significant effects on social and economic conditions included potential effects on personal property values and private businesses, including local tourism.

Alternative routes for the Project are located in five counties in central and southwestern Utah (i.e., Beaver, Iron, Millard, Sevier, and Washington counties). These counties comprise the study area for the socioeconomic analysis and are included in the inventory and impact analysis, unless noted otherwise. The study area is approximately 17,070 square miles. The inventory of social and economic resources includes conditions and trends in each of the study area counties. Data and information has been collected from a variety of sources including the U.S. Census Bureau, the U.S. Bureau of Labor Statistics, and the U.S. Department of Commerce Bureau of Economic Analysis (BEA), in addition to state and county resources.

NEPA or CEQ regulations do not provide specific thresholds of significance for socioeconomic impact assessment. This is due to the observation that significance is contextual in nature and varies with the setting of the Proposed Action (40 CFR 1508.27[a]). As such, a set of criteria were developed specifically for this analysis and if any occurred, the alternatives were evaluated based on the following criteria:

- Displace or require relocation of a substantial number of existing residents
- Generate demand for temporary housing of construction workers that exceeds the supply of local housing or hotel/motel facilities
- Have a substantial impact on property values
- Require public service expenditures substantially greater than available approved revenue
- Disproportionally affect minority and/or low-income populations

3.2.12.1 Regional Setting

Geographic Characteristics

As demonstrated in Table 3-78, the number of square miles in study area counties varies considerably. The smallest in terms of land area is Sevier County, which is approximately 1,918 square miles in size. Millard County is the largest of the study area, totaling approximately 6,828 square miles. Study area counties represent approximately 20.8 percent of the total land area in Utah.

TABLE 3-78
GEOGRAPHIC CHARACTERISTICS OF STUDY AREA COUNTIES

Geographic Area	Land Area (millions of acres)	Land Area (square miles)	Population (2010)	Persons per Square Mile (2010)
County				
Beaver	1.7	2,592.3	6,629	2.6
Iron	2.1	3,301.9	46,163	14.0
Millard	4.4	6,827.9	12,503	1.9
Sevier	1.2	1,918.3	20,802	10.8
Washington	1.6	2,429.6	138,115	56.9
State				
Utah	52.5	82,102.0	2,763,885	33.7
Nation				
	2,262.7	3,535,451.0	308,745,538	87.3

SOURCES: U.S. Census Bureau 2010a; Environmental Systems Research Institute 2009

The number of persons per square mile is derived from the 2008 American Community Survey population estimates provided by the U.S. Census Bureau. While it is known that some areas (i.e., towns, villages, and cities) have a higher density per square mile than more rural areas, the following provides an overview of the numbers of persons per square mile, assuming spatial distribution across each county is equal. Two of the five study area counties (Beaver and Millard) have less than three persons per square mile. Washington County is the most populated of the study area and has the greatest number of persons per square mile, 56.9 persons, a population density greater than that of Utah overall.

Land ownership patterns for each of the study area counties are summarized in Table 3-79. Overall, the majority of land in each county is federally owned. At 35.9 percent, Iron County has 15.0 percentage points more of its land privately or locally owned than other study area counties. Washington County, as compared to other study area counties, has the greatest percentage of land classified as an Indian Reservation. This can be attributed to the Reservation of the Paiute Indian Tribe of Utah located south of Red Butte. For all counties, state-owned land ranges from 4.9 to 9.9 percent.

TABLE 3-79
PERCENT OF LAND OWNERSHIP OF STUDY AREA COUNTIES

County	Federal	Private/Local Government	State	American Indian Reservation
Beaver	78.0	12.4	9.6	0.0
Iron	57.3	35.9	6.7	0.1
Millard	76.5	13.6	9.9	0.0
Sevier	76.0	19.1	4.9	0.1
Washington	74.5	17.0	6.7	1.8

SOURCES: Utah Governor's Office of Planning and Budget 2001; Fischer 2010

Population Centers

Population centers for each of the study area counties are shown in Table 3-80. At the time of the 2000 Census, Cedar City in Iron County and St. George in Washington County had the greatest population of study area population centers. Population data from the 2010 Census indicate these two urban areas are growing at a rate notably faster than other study area counties' most populated areas. Population growth in these areas is likely due to retiree migration, increased economic opportunities as a result of increased tourism, and relocation to the area by those seeking amenities provided by Utah's southern national parks and scenic vistas.

The most populated areas in other study area counties either experienced modest growth or declines between 2000 and 2010.

TABLE 3-80
POPULATION CENTERS IN STUDY AREA COUNTIES

County	Most Populated City	2000 Census	2010 Census	Percent Change (2000 to 2010)
Beaver	Beaver	2,454	3,112	26.8
Iron	Cedar City	20,527	28,857	40.6
Millard	Delta	3,209	3,436	7.0
Sevier	Richfield	6,847	7,551	10.3
Washington	St. George	49,663	72,897	46.8

SOURCE: U.S. Census Bureau 2010

County Summaries

A summary profile for each county is provided in the following. Each profile includes a brief history of the county, as well as major industries and economic conditions. Information included in this discussion has been collected from a variety of sources, including the U.S. Department of Commerce, the National Association of Counties (2009), and the Written County Profiles for the Utah Governor's Office of Planning and Budget's Office of Demographic and Economic Analysis.

Beaver County

Beaver County was created in 1856. In the late 1800s, the mining of lead, silver, gold, copper, and other minerals resulted in an economic boom. Recently, the eastern part of Beaver County has benefited from increased tourism activities associated with Utah's National Parks. In 2001, major employers included Circle 4 Farms (pig farms), Beaver County School District, Beaver Valley Hospital, Milford Valley Healthcare Services, Union Pacific Railroad, Beaver County, Eagle Point Resort, the federal government, and many tourism-related overnight accommodations and eating establishments (Utah Governor's Office of Planning and Budget 2001). In 2010, the largest reported employment sectors were government services, farming, and retail trade (U.S. Department of Commerce, BEA 2010).

Iron County

Iron County was created in 1850 by the territorial legislature and named in recognition of the area's iron deposits, which brought mining and smelting activity to the county in the 19th century. Settlers later turned to farming and ranching (Utah Governor's Office of Planning and Budget 2001). In 2001, educational institutions, Southern Utah University and Iron County School District, were the largest employers in the county. Convergys (a business marketing firm), the State of Utah, the federal government, and Valley View Medical Center also were major employers. In 2001, there were a number of manufacturing firms in Iron County, including Metalcraft Technology, O'Sullivan Industries, and Smead Manufacturing (Utah Governor's Office of Planning and Budget 2001). In 2010, the largest reported employment sectors in the county were government services, retail trade, and construction (U.S. Department of Commerce, BEA 2010a).

Millard County

Millard County was first settled in 1851. The establishment of the Union Pacific Railroad through the western part of the county in the early part of the 20th century led to large-scale production of alfalfa seeds. In the 1970s, the development of the IPP, a coal-burning power plant, marked another major economic transition. In 2001, Millard County was ranked sixth in number of farms among Utah counties. In 2001, major employers in Millard County included Intermountain Power Services (electric/gas/sanitary services), Millard County School District, Millard County, Pictsweet Mushroom Farms, Delta Community Medical Center, Brush Wellman Inc., the State of Utah, the federal government, Sunrise Engineering, and Fillmore Hospital (Utah Governor's Office of Planning and Budget 2001). In 2010, the largest reported employment sectors in the county were government services, farming, and retail trade sectors (U.S. Department of Commerce, BEA 2010a).

Sevier County

Sevier County was established in 1865. Agriculture and more recently gypsum production play an important role in the strength of the county's economy. In 2001, Sevier County was the state's leading producer of gypsum. The city of Richfield, with a population projected to increase to 10,597 by 2030, is a major regional commercial center. Also in 2001, the largest employer in the county was the Sevier School District (Utah Governor's Office of Planning and Budget 2001). Other major employers include Canyon Fuels Company, Moroni Feed (poultry slaughtering and processing), IHC Sevier Valley Hospital, the federal government, the State of Utah, Barney Trucking Inc., Six County Association of Governments, K-Mart stores, Robinson Transport, Richfield Care Center (skilled nursing care facilities), and Sevier County (Utah Governor's Office of Planning and Budget 2001). In 2010, the largest reported employment sectors were government services, retail trade, and transportation and warehousing (U.S. Department of Commerce, BEA 2010a).

Washington County

Washington County was established in 1852 and has been known as Utah's Dixie since the 1860s when the area produced large amounts of cotton (Utah Governor's Office of Planning and Budget 2001). The establishment of Zion National Park in 1909 and the completion of I-15 have helped Washington County become both a tourist destination and a retirement community. In 1999, Dixie College, formerly a 2-year institution with about 2,500 students, was granted 4-year status and now plays an important part in Washington County's economy. In 2001, Washington School District was the largest employer in the county, followed by Dixie Regional Medical Center and Wal-Mart. Dixie College, the City of St. George City, the federal government, and Washington County were the largest government employers in the county. In 2001, other major employers included Andrus Trucking, SkyWest Airlines, Lin's Thriftway, Sunroc Corporation, McDonald's, Albertsons, and Harmons (Utah Governor's Office of Planning and Budget 2001). In 2010, the largest reported employment sectors in the county were in the construction, retail trade, and health care industries (U.S. Department of Commerce, BEA 2010a).

Paiute Indian Reservation

Congress created the Paiute Indian Reservation for the Paiute Indian Tribe of Utah in April 1980. The Paiute Indian Tribe of Utah consists of five constituent bands: Cedar, Indian Peaks, Kanosh, Koosharem, and Shivwits bands. Each band has an independent identity as a community, which dates back hundreds of years. In 2006, the total number of tribal members among the five bands was 840 (Paiute Indian Tribe of Utah 2009). The Southern Paiutes probably entered Utah about 1100 A.D. The Paiute were mainly foragers, hunting rabbits, deer, and mountain sheep and gathering seeds, roots, tubers, berries, and nuts. They also had some irrigated fields along the banks of the Virgin, Santa Clara, and Muddy rivers (Paiute Indian Tribe of Utah 2009).

Their Reservation is checker-boarded across 10 separate land areas located in four southwestern Utah counties. The tribal headquarters of the Southern Paiute is located in Cedar City in Iron County. The Shivwits Band of the Paiutes is situated on 28,229 acres of Reservation land in Washington County, Utah, approximately 14 miles northwest of St. George.

Transportation

There are two interstate highways located in the study area: I-15 and I-70. Generally traveling in a north-south direction, I-15 enters the study area in the southeastern part of Millard County. I-15 continues south through eastern Beaver County into Iron County west of Dixie National Forest and exits the study area in south central Washington County.

The east-west interstate system running from Baltimore, Maryland to Utah, I-70 enters the Project area near Sigurd in Sevier County. This area is located within proximity to the northernmost point of the Project area. In the southeastern corner of Millard County, I-70 connects with I-15. Other roads traversing the Project area include SR 130, SR 20, SR 153, and SR 89. In 2008, average annual daily traffic on SR 130 in the vicinity of Cedar City was between 21,870 and 29,245 vehicles. During the same period, SR 20 had an average annual daily traffic of 1,635 vehicles (Utah State Department of Transportation 2008). Other minor arteries connect more rural parts of the study area to the interstate system.

Railroad tracks run through portions of Iron, Beaver, and Millard counties, connecting study area industries to other parts of the region and nation. There are railroad tracks in and around Cedar City in Iron County and the Milford Wind Farm, which straddles the Beaver and Millard county border.

Demographics

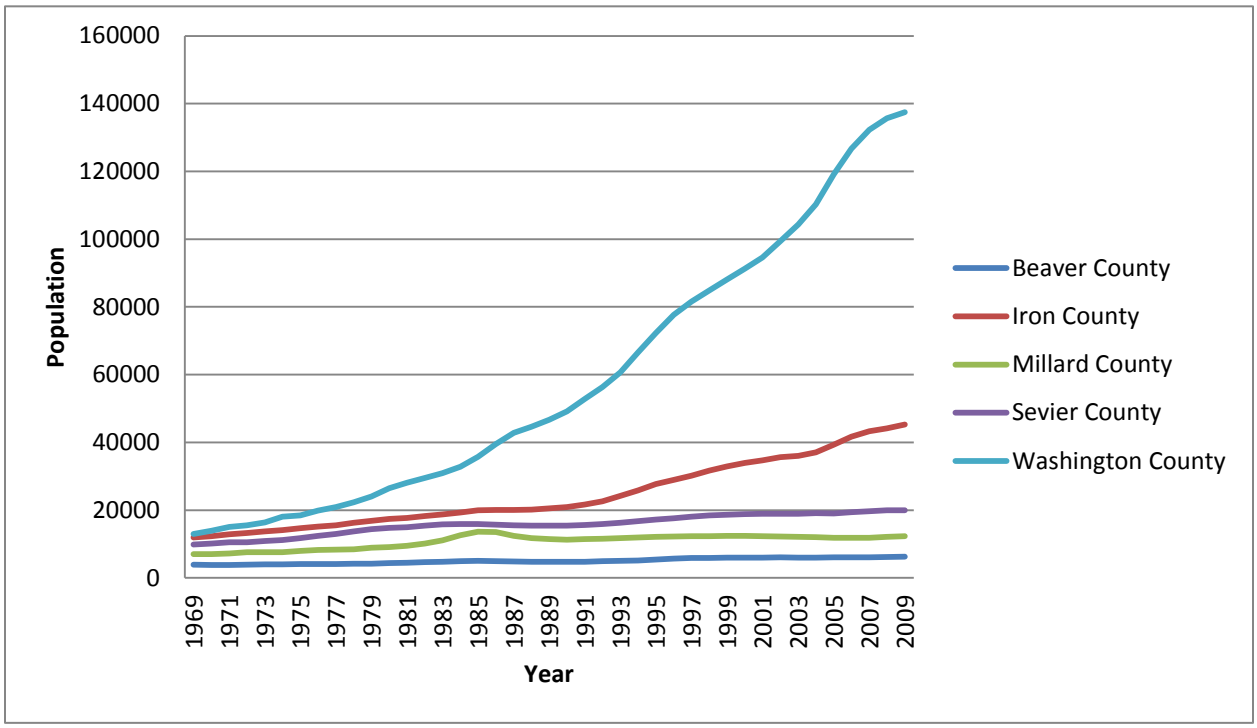
This section describes demographic characteristics for each of the five study area counties. Included in the following is information on population growth since 1969, population projections, age distribution, racial and ethnic characteristics, and per capita income. Information has been retrieved from the U.S. Department of Commerce, the U.S. Census Bureau, and the State of Utah Governor's Office of Planning and Budget.

Population Trends

Population numbers for each county for the years 1969 through 2009 were retrieved from the U.S. Department of Commerce, BEA. The use of population numbers for each year, in the almost four-decade time series, helps more clearly demonstrate where change (positive or negative) has occurred at the fastest rate.

Population change between 1969 and 2009 is demonstrated in Figure 3-1. Each of the study area counties has increased in population since 1969. Millard County reached its largest population to date in the mid-1980s (approximately 13,500) before declining in 1988. The county has grown at a relatively even rate since that period. Overall, the 2009 population of Millard County is 73.0 percent higher than it was in 1969.

Iron and Washington counties have grown in size faster than other study area counties. Between 1969 and 2009, Iron County increased in size by approximately 381.0 percent, from 11,900 to 45,280, with its population increasing by about 1,000 to 2,000 residents per year. The most significant growth was in Washington County, from 13,000 in 1969 to 137,473 residents in 2009, an increase of approximately 1,057.0 percent. Washington County growth began to increase at a notably faster rate than other study area counties in the mid-1980s when the population was increasing between 3,000 and 6,000 residents per year. Almost 9,000 new residents moved to Washington County between 2004 and 2005.



SOURCE: U.S. Department of Commerce, BEA 2010b

Figure 3-1 Historical Population and Current Estimates for Study Area Counties, 1969–2009

Population Projections

The Governor's Office of Planning and Budget for the State of Utah prepares population projections for population centers and counties across the state. Table 3-81 shows population projections for the population centers as well as study area counties. St. George and Washington County are projected to grow at a pace significantly faster than other population centers and counties in the study area. Growth is projected to be slowest in Millard and Sevier counties. Between 2000 and 2020, the population of Richfield is projected to increase by approximately 22.4 percent while Sevier County is projected to increase by 25.2 percent. Both areas are projected to increase less than 7.0 percent between 2020 and 2030. The City of Beaver and Beaver County are both projected to increase more than 50.0 percent between 2000 and 2020, and increase another 44.8 percent between 2020 and 2030.

TABLE 3-81
POPULATION PROJECTIONS FOR POPULATION CENTERS AND STUDY AREA COUNTIES, 2000-2030

Geographic Area	2000	2020	2030	Percent Change (2000-2020)	Percent Change (2020-2030)
City of Beaver	2,454	3,992	5,782	62.7	44.8
Beaver County	6,005	9,178	13,293	52.8	44.8
Cedar City	20,527	40,376	51,799	96.7	28.3
Iron County	33,779	68,315	87,644	102.2	28.3
Delta	3,209	3,984	4,649	24.2	16.7
Millard County	12,405	16,868	19,682	36.0	16.7
City of Richfield	6,847	8,383	8,951	22.4	6.8

TABLE 3-81
POPULATION PROJECTIONS FOR POPULATION CENTERS AND STUDY AREA COUNTIES, 2000-2030

Geographic Area	2000	2020	2030	Percent Change (2000-2020)	Percent Change (2020-2030)
Sevier County	18,842	23,583	25,177	25.2	6.8
City of St. George	49,663	140,268	208,254	182.4	48.5
Washington County	90,354	279,864	415,510	209.7	48.5

SOURCE: Utah Governor's Office of Planning and Budget 2010

Age Distribution

Data related to age composition were obtained from the 2000 and 2010 U.S. Census for each of the five study area counties (Table 3-82). From 2000 to 2010, Millard, Sevier, and Washington counties experienced the most significant growth in the 65 and over age range, with the largest percent change in Washington County (55.3 percent). Both Beaver and Iron counties experienced the most significant growth in the 20 and younger age range, with the largest percent change in Iron County (29.9 percent).

TABLE 3-82
POPULATION CHANGE BY AGE GROUP IN STUDY AREA COUNTIES, 2000 AND 2010

Census Year and 10-Year Change	Total Population	Under 20 Years of Age		Between 40 and 54 Years of Age		65 Years of Age and Over		Median Age
		Number	Percentage	Number	Percentage	Number	Percentage	
Beaver County								
2010	6,629	2,434	36.7	1,153	17.4	832	12.5	31.9
2000	6,005	2,178	36.3	1,090	18.2	835	13.9	30.9
10-Year Change	624	256	0.4	63	-0.8	-3.0	-1.4	1.0
10-Year Percent Change	10.3	11.8	–	6.7	–	-0.03	–	3.2
Iron County								
2010	46,163	16,346	35.4	6,778	14.7	4,533	9.8	26.8
2000	33,779	12,582	37.2	5,207	15.4	2,891	8.6	24.4
10-Year Change	12,384	3,764	-1.8	1,571	-0.7	1,642	1.2	2.4
10-Year Percent Change	36.7	29.9	–	30.2	–	56.8	–	9.8
Millard County								
2010	12,503	4,367	34.9	2,210	17.7	1,770	14.2	33.7
2000	12,405	5,053	40.7	2,180	17.6	1,529	12.3	29.9
10-Year Change	98	-686	-5.8	30	0.1	241	1.9	3.8
10-Year Percent Change	0.7	-15.7	–	1.4	–	15.8	–	12.7
Sevier County								
2010	20,802	7,145	34.3	3,448	16.6	3,016	15.0	32.8
2000	18,842	7,164	38.0	3,337	17.7	2,426	12.9	30.3
10-Year Change	1,960	-19	-3.7	111	-1.1	590	2.1	2.5
10-Year Percent Change	10.4	0.3	–	3.3	–	24.3	–	8.3
Washington County								
2010	138,115	45,948	33.3	19,963	14.5	23,826	17.3	32.5
2000	90,354	31,922	35.3	13,731	15.2	15,343	17.0	31.1
10-Year Change	47,761	14,026	-2.0	6,232	-0.7	8,483	0.3	1.4
10-Year Percent Change	52.9	43.9	–	45.4	–	55.3	–	4.5

SOURCES: U.S. Census Bureau 2000b

During both Census periods, Iron County reported having a lower median age (24.4 and 26.8 years of age) than any of the other Project area counties. Millard County, which had a median age of 29.9 during the 2000 Census, saw the biggest increase in median age, with a jump to 33.7 at the time of the 2010 Census, an increase of 12.7 percent over the 10-year period.

The percentage share of residents under the age of 20 decreased in each county, besides Beaver, between 2000 and 2010, the greatest of which was a decrease of 5.8 percent in Millard County. Four of the five counties experienced an increase in the percentage share of those 65 and over and Beaver County experienced a decrease of 1.4 percent.

Racial and Ethnic Characteristics

The following is based on information from the 2010 Census. A more detailed discussion of those who identify themselves as being of a minority is discussed in Section 3.2.12.1 subheading Environmental Justice.
As demonstrated in Table 3-83, the racial and ethnic composition of study area counties is relatively similar. Between 84.6 and 92.9 percent of residents in each county identify themselves as White Alone. Minority populations are defined as those who identify themselves as being of a race other than Non-Hispanic White Alone. Between 7.1 and 15.4 percent of residents in each of the study area counties identify themselves as being of a minority population. The American Indian and Alaskan Native population in each county ranges from 1.0 to 2.2 percent.

TABLE 3-83
RACIAL AND ETHNIC COMPOSITION PERCENTAGE FOR STUDY AREA COUNTIES, 2010

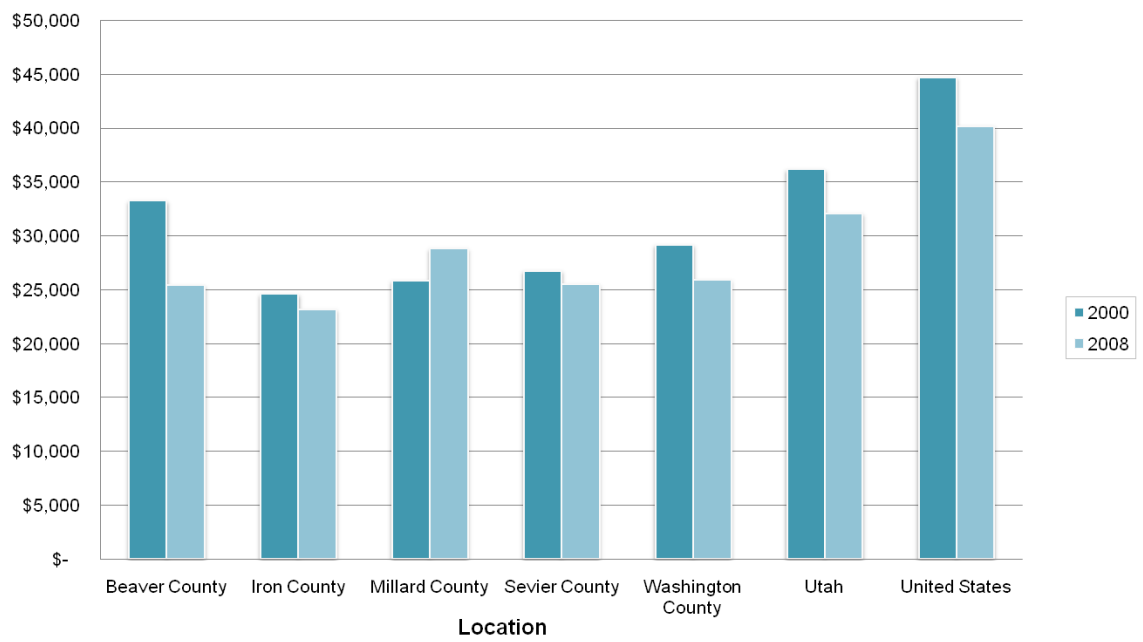
Race	Beaver County	Iron County	Millard County	Sevier County	Washington County
Total	**6,629**	**46,163**	**12,503**	**20,802**	**138,115**
White	89.0	90.7	87.6	94.9	89.7
Non-Hispanic White Alone	85.9	87.1	84.6	92.9	85.6
Hispanic White Alone	3.0	3.5	2.9	2.0	4.1
Black or African-American Alone	0.2	0.5	0.1	0.2	0.6
American Indian and Alaskan Native Alone	1.1	2.2	1.0	1.1	1.4
Asian Alone	1.1	0.8	0.6	0.3	0.7
Native Hawaiian and Other Pacific Islander Alone	0.3	0.3	0.1	0.2	0.8
Two or More Races	1.4	2.3	1.5	1.5	2.3
Other	6.9	3.3	9.1	1.8	4.6
Minority[1]	14.1	12.9	15.4	7.1	14.4
Hispanic Origin	10.8	7.7	12.8	4.5	9.8

SOURCE: U.S. Census Bureau 2010b (Summary File 1 data tables)
NOTES:
[1]The total minority population includes all those who have classified themselves as Black, Hispanic White, American Indian or Alaskan Native, Asian, Other Pacific Islander, Two or More Races, and Others.
Percentages in table are rounded to the nearest tenth of a percent and, therefore, columns may not sum exactly.

Personal Income

Real per capita income in 2000 and 2008 for study area counties, state of Utah, and the United States is shown in Figure 3-2. Per capita income from 2000 was adjusted for inflation and is presented in 2008 dollars. Millard County was the only county to experience an increase in real per capita income between 2000 and 2008. The real per capita income decreased the most significantly in Beaver County. Sevier County experienced a decrease of approximately $1,300. Both the Utah and the United States experienced a decrease in real per capita income between 2000 and 2008.

In both 2000 and 2008, the per capita income for each county was less than that of Utah and the United States. In 2008, Iron County reported the lowest real per capita income at $23,147, approximately 27.8 percent lower than the real per capita income in Utah. In 2008, Millard County reported the highest real per capita income at $28,796. In 2008, the real per capita income in Utah and the United States was $32,050 and $40,166, respectively.



SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis 2010b

Figure 3-2 2000 and 2008 Real Per Capita Income for Study Area Counties, Utah, and the United States (2008 Dollars)

Economic Characteristics

This section discusses the economic characteristics of each county. For certain economic indicators, Project area counties are compared to Utah and/or the United States to demonstrate economic activity in each area. The section includes a discussion of employment by industry, average earnings, unemployment, and economic base analysis.

Employment by Industry

Data were obtained from the BEA on total annual employment for all counties within the study area from 2001 to 2009. This information can be used to understand employment trends as well as current industry employment figures.[1]

The following section describes employment trends in terms of the number and percentage of jobs gained or lost in each industry sector over the 8-year period as well as the percentage of industry jobs in 2009 as a percent of total employment. Employment by industry is not yet available for years after 2009. However, it is anticipated that employment numbers have been affected by the recent economic downturn. Annual unemployment rates for 1997 to 2011 (Figure 3-3 under Unemployment) confirm that employment across the study area has decreased since 2007. Unemployment figures do not reveal which industries have been affected the most by the economic downturn.

Beaver County

In Beaver County, a significant proportion of the increase in employment occurred in the mining (90 jobs), construction (89 jobs), and transportation and warehousing (76 jobs) sectors. In 2009, two of the highest industry employers were government services (20.0 percent) and retail trade (11.2 percent). While the farming industry lost 29 jobs between 2001 and 2009, it was still the second highest industry employer representing 15.0 percent of total county employment. The only other industry to lose jobs was the manufacturing sector, which lost 17 jobs between 2001 and 2009.

Iron County

The considerable increase in Iron County employment can be attributed to the growth of the construction (317 new jobs), retail trade (347 new jobs), real estate and rental and leasing (609 new jobs), finance and insurance (608 new jobs), health care and social assistance (643 new jobs), and government service (389 jobs) sectors. In 2009, administrative and waste services lost 534 jobs, a decrease of approximately 32.0 percent from its 2001 employment base. The notable increase in health care and social assistance and construction industry employment between 2001 and 2009 has resulted in the industries with the third and fourth highest employment in 2009 behind government services (18.8 percent) and retail trade (11.6 percent).

Millard County

There is little employment information available for Millard County. Retail trade added 86 jobs between 2001 and 2009, the most of any industry for which information is available. Construction, manufacturing, and other services except public administration also added between 14 and 44 jobs between 2001 and 2009. Farming lost a total of 159 jobs or 14.1 percent of its 2001 employment base by 2009. Industries

[1] BEA estimates annual employment for counties nationwide. Data can be incomplete in some counties due to disclosure problems associated in areas where few firms are operating. Estimates of total employment, however, do include those numbers unreported or omitted at the specific industry level. Total annual employment includes both part-time and full-time jobs. Therefore, individuals having more than one job are counted twice in the totals. The employment estimates include those individuals who are employed by businesses and public entities, as well as those who are self-employed. Since 2001, BEA has employed the North American Industry Classification System to better capture new industries that did not exist under the old Standard Industrial Classification System.

with the greatest percentage share of total county employment are government services (17.0 percent), farming (14.8 percent), and retail trade (12.4 percent).

Sevier County

Of all industry sectors, the retail trade; transportation and warehousing; and professional, scientific, and technical services sectors gained the most jobs between 2001 and 2009. Between 2001 and 2009, retail trade gained 285 jobs, an increase of 20.5 percent, and the transportation and warehousing sector gained 199 jobs, an increase of 23.4 percent. Professional and technical services also experienced an increase in employment between 2001 and 2009 in the form of 155 new jobs, an increase of 61.0 percent. The considerable growth in the retail trade and transportation and warehousing sectors makes these industries two of the highest employers in the county. At 15.5 percent, government services represent the greatest share of total county employment.

Washington County

There was a considerable amount of job creation in Washington County between 2001 and 2009, with more than 19,000 new jobs gained. The most growth was in government services (2,292 new jobs), health care and social assistance (3,573 new jobs), and real estate and rental and leasing (2,110 new jobs). These industries combined represent approximately 40.0 percent of all new jobs created between 2001 and 2009. Other industries that experienced considerable employment growth include the retail trade; finance and insurance; administrative and waste services; accommodation and food services; and professional, scientific, and technical services sectors. Farming was the only industry that experienced job loss between 2001 and 2009, with a loss of approximately 23 jobs. In 2009, the three industries with the greatest percentage share of total county employment were government services, retail trade, and health care and social assistance.

Average Earnings

Average annual wages by industry are provided by the Utah Department of Workforce Services. As demonstrated in Table 3-84, the average annual earnings for many industries are lower in study area counties than in the state of Utah. In the utilities sector, one of the five counties reports average annual earnings higher than the state average while three report earnings lower than the state average. Information is not available for Sevier County. In Utah, average annual earnings in the transportation and warehousing sector are $41,805. Beaver County reports average annual earnings in this sector to be almost $25,000 higher than the state average. Millard County reports earnings slightly higher than the state average. The remaining three counties report earnings of between $34,284 and $39,892.

TABLE 3-84
2010 AVERAGE ANNUAL EARNINGS BY INDUSTRY IN DOLLARS

Industry	Beaver County	Iron County	Millard County	Sevier County	Washington County	Utah
Mining	40,180	20,671	54,105	51,097	30,475	69,937
Utilities	89,865	74,226	82,735	N/A	65,230	84,430
Construction	41,421	28,630	38,684	26,201	29,822	41,805
Manufacturing	34,799	38,917	38,569	32,890	33,373	49,308
Wholesale trade	20,090	30,013	31,352	29,425	37,929	54,487
Retail trade	16,687	22,371	16,206	21,647	23,389	25,983

TABLE 3-84
2010 AVERAGE ANNUAL EARNINGS BY INDUSTRY IN DOLLARS

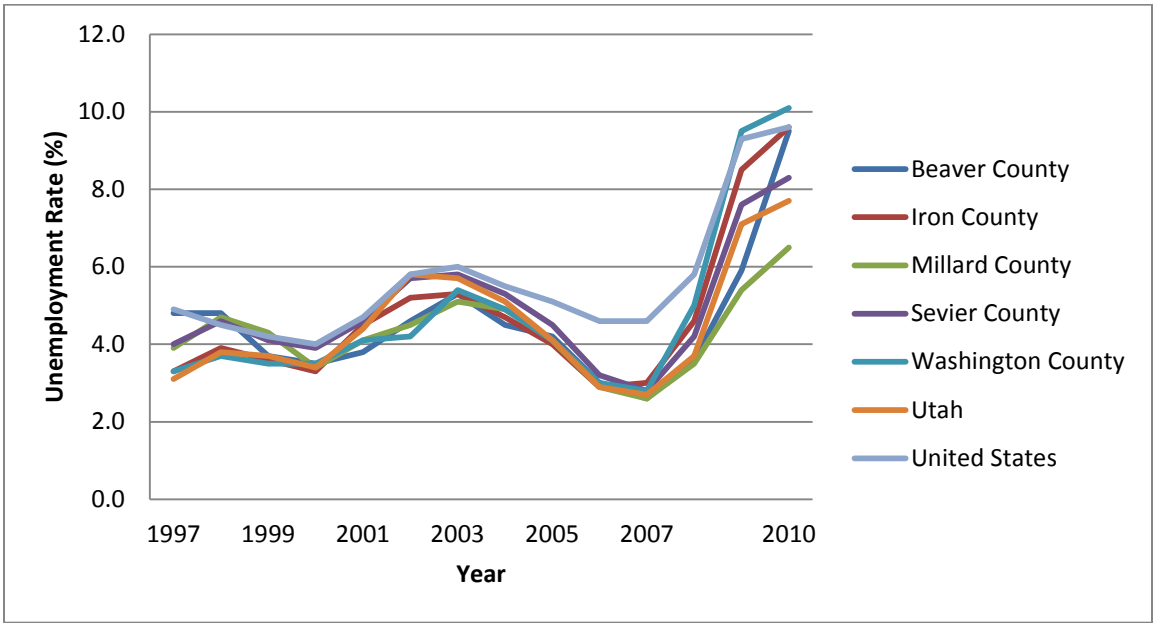
Industry	Beaver County	Iron County	Millard County	Sevier County	Washington County	Utah
Transportation and warehousing	66,053	34,284	42,219	39,892	39,487	41,805
Information	–	21,653	24,863	27,941	27,935	51,200
Finance and insurance	26,910	43,109	25,173	29,142	39,880	54,147
Real Estate and rental and leasing	15,031	19,241	7,974	21,460	26,404	35,649
Professional scientific and technical services	25,640	32,288	47,508	49,030	39,588	59,609
Management of companies and enterprises	–	45,811	–	–	85,956	72,811
Administrative, support, waste management, remediation	10,227	20,957	30,143	16,505	23,829	27,623
Education services	N/A	18,260	N/A	N/A	20,627	27,841
Health care and social assistance	29,212	27,804	33,427	29,325	37,336	37,125
Arts, entertainment, and recreation	N/A	12,291	7,066	6,887	17,177	22,654
Accommodation and food services	11,888	11,400	10,194	10,665	14,544	14,641
Other services (except public administration)	27,971	26,823	29,097	27,701	23,150	28,292
Government	30,432	30,892	31,600	32,299	33,010	39,829

SOURCE: Utah Department of Workforce Services 2010

Unemployment

Annual unemployment rates from 1997 to 2010 for each of the study area counties, Utah, and the United States were retrieved from the Bureau of Labor Statistics. Figure 3-3 shows that while unemployment rates among the geographic areas differ, the similar ebbing and flowing of the rates over time demonstrates the correlation of county unemployment to those of the state and nation. As demonstrated in Figure 3-3, over the past 10 years, counties in the study area have generally had unemployment levels below the national average.

Unemployment in all areas was relatively low in the year or two before the attacks of September 11, 2001. The economic aftermath of the attacks may have contributed to increased unemployment rates in 2002 and 2003. Within a few years, the markets began to stabilize and unemployment rates began to decrease. In 2006 and 2007, unemployment in all counties was lower than it had been in the previous 10 years. However, with the onset of the current economic recession, unemployment rates have increased. As demonstrated in Figure 3-3, unemployment rates went up in each geographic area presented. Unemployment rates increased notably in 2008, 2009, and 2010. The recession has affected severely the cost and availability of credit to both households and businesses, which has in turn affected the housing market and construction industries nationwide (Bernanke 2009). Such an affect can be felt across a variety of industries and markets throughout the country and can contribute to increases in unemployment rates.



SOURCE: U.S. Department of Labor, Bureau of Labor Statistics 2010

Figure 3-3 Study Area Counties, State of Utah, and the U.S. Unemployment Rates, 1997 to 2010

Economic Base Analysis

An area's economic base comprises industries primarily responsible for bringing outside income into the local economy. These industries typically export their goods and services outside the region and, in turn, support ancillary industries such as retail trade, housing construction, and personal services. The location of industries in certain areas has been tied traditionally to such factors as natural resource base, cost factors (transportation and labor), and existing transportation infrastructure. Recently, technology has affected these location factors.

Economic base analysis provides an assessment of which industries an area (i.e., community, county, etc.) may be more heavily dependent on change within these industries or new areas trying to compete for the same consumer base can present a challenge for existing industries. To assess the degree of localized specialization of specific industries, location quotients (LQs) were calculated for 20 industries. LQs are ratios that provide a convenient way to examine the specialization of economic activity in an area. The LQs were calculated for employment by industry, comparing each industry's share of total employment in the county to that of Utah and the United States as a whole. Employment data were obtained from the U.S. Census Bureau for 2000 since more recent employment data have considerable nondisclosed information with missing observations.

The LQ generally yields a value between 0.0 and 2.0, where 1.0 indicates the area of examination has the same percentage of employment in that industry as experienced in the reference region. LQs greater than 2.0 indicate a strong industry concentration in the area of examination, while those having less than 0.5 indicate a weak industry concentration in the area of examination. The LQ for each industry was calculated as shown:

$$LQ = \frac{\text{Local employment in industry } y}{\text{total local employment}} \div \frac{\text{reference area employment in industry } y}{\text{total employment in reference area}}$$

LQ tables for each county as compared to Utah and the United States are found in the Project Socioeconomic Baseline Assessment (Louis Berger Group 2010).

Generally, LQs in the study area in agriculture, forestry, farming, and hunting are considerably higher than LQs for other industries, indicating the study area is heavily dependent on jobs in these industries to support the economic base. In the study area counties, mining employment LQs are higher than 2.0, indicating a dependence on the mining industry in this area as well. In contrast, LQs in the finance and insurance and professional, scientific, and technical services are relatively low in the study area counties, which suggest employment in these industries compared to the state and the nation is relatively very low.

The relatively large size of the economic base in Washington County, as compared to other counties supports a diverse employment base. As a result, the majority of Washington County LQs when compared to the state and the nation are between 0.5 and 2, with a comparable diversity of employing industries in Washington County, the state, and the nation.

Local Resources

Property Valuation and Taxation

Local and state government entities generate a portion of their tax revenues by assessing and taxing certain categories of property. This section describes the property tax information for each county in the study area.

In Utah, property classified as real property includes land and buildings, while personal property refers to property that can be geographically moved (Utah State Tax Commission 2008). Utah counties have the authority to assess and tax real and personal property located within their jurisdiction. The State of Utah assesses and taxes utilities and natural resources located anywhere within the state's borders. The amount of taxes owed to either the county or the state is determined by applying an appropriate tax rate to the taxable value for a particular property category. Taxable value is equal to the fair market value of the property minus tax exemptions.

Electric transmission lines are considered unitary energy properties,[2] which includes units that cross county lines. Such properties are assessed centrally through the state. The state also assesses natural resources, while real and personal property are assessed by county governments.

In 2010, total taxable valuation for both state and locally assessed property was approximately $212.4 billion. With a fluctuating effective statewide tax ranging from 0.66 to 1.5 percent, approximately $2.5 billion in total property tax revenue was collected (Utah State Tax Commission 2011). Table 3-85 summarizes the total tax and utility tax revenues collected for each county in the study area during the 2010 fiscal year ending June 30, 2010. During fiscal year 2010, tax revenues collected in Washington County represented approximately 5.5 percent of all tax revenue in Utah. Tax revenue generated by

[2]Energy properties include the operating property of natural gas pipelines, natural gas distribution companies, liquid petroleum products pipelines, and electric corporations (e.g., electric generation, transmission, and distribution companies and other similar entities) (Utah State Tax Commission 2010a).

counties with little population and economic base have less taxable property. Beaver County represents less than 0.4 percent of all tax revenue collected during fiscal year 2010.

TABLE 3-85
PROPERTY TAX REVENUE FOR STUDY AREA COUNTIES AND UTAH, 2010

County	Total Tax Revenue	Tax Revenue (as a percentage of Utah total)	Utility Tax Revenue	Utility Tax to Total Tax Revenue (in percent)
Beaver	$7,914,169	0.3	$1,707,429	21.6
Iron	$41,523,533	1.7	$2,230,576	5.4
Millard	$20,772,504	0.8	$12,376,304	59.6
Sevier	$14,296,082	0.6	$740,073	5.2
Washington	$137,937,173	5.5	$3,463,552	2.5
Utah	$2,502,414,690	100.0	$117,849,084	4.7

SOURCE: Utah State Tax Commission 2011
NOTE: Information is for fiscal year 2009 to 2010, which ended on June 30, 2010.

Utility tax revenues account for $117.8 million or approximately 4.7 percent of the state's total tax revenue. PacifiCorp, a utility company, was Utah's largest centrally assessed company in 2010. In Millard County, utility tax revenue accounts for approximately 59.6 percent of total county tax revenues. Beaver County received the second highest percentage of its tax revenue from utilities. The three other counties in the study area can attribute less than 10.0 percent of their total tax revenue to utilities.

Housing and Construction

Construction spending and housing characteristics can act as indicators when determining the health of a local and/or regional economy. The construction of the Project would help support the construction industry within the study area. This section includes a discussion of construction spending by county and selected housing characteristics for 2010. Construction spending totals provided in Table 3-86 include both residential and nonresidential construction, including public utility buildings, structures other than buildings, and public projects. Using the Consumer Price Index published by the U.S. Department of Labor, annual construction spending was adjusted for inflation and is presented in Table 3-86 in 2009 dollars. This information is provided by the Bureau of Economic and Business Research at the University of Utah. Housing units, occupancy status, and median gross rent for counties in the study area are provided in Table 3-87.

Beaver County

Construction spending in Beaver County was at its highest in 2006 and 2008. Construction spending decreased approximately 42.9 percent between 2000 and 2009 and was at its lowest in 2009. At the time of the 2010 Census, approximately 75.5 percent of the 2,265 occupied housing units were owner-occupied. In Beaver County, there were 643 vacant housing units or approximately 22 percent of the housing stock. This county had the fewest number of vacant housing units in the study area in 2010. Median gross rent was $677 in 2010.

TABLE 3-86
CONSTRUCTION INDUSTRY SPENDING, 2001 TO 2009 (IN MILLIONS, 2009 DOLLARS)

Area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Percent Change (2000 to 2009)
Beaver County	1,197.8	757.6	971.6	820.9	478.3	983.9	2,356.7	1,708.7	3,352.3	684.2	-42.9
Iron County	11,069.5	7,057.8	6,553.7	7,078.6	12,123.8	17,498.1	17,545.3	15,930.9	5,802.2	3,079.4	-72.2
Millard County	2,693.0	830.9	1,321.3	1,818.7	1,073.0	1,860.4	1,146.8	1,368.1	1,465.0	1,570.6	-41.7
Sevier County	2,252.1	2,427.3	2,892.1	3,411.6	3,223.0	3,314.1	4,479.7	5,677.9	3,099.0	2,328.3	3.4
Washington County	32,768.0	29,149.4	42,108.6	45,624.4	68,340.8	85,093.1	67,920.8	57,211.8	27,764.8	16,774.8	-48.8
Utah	490,579.7	470,953.8	451,236.7	548,220.3	603,405.9	750,005.2	813,926.3	754,335.6	457,169.2	338,701.5	-31.0

SOURCE: University of Utah 2010
NOTE: Values were adjusted for inflation using the Consumer Price Index published by the U.S. Department of Labor, Bureau of Labor Statistics.

TABLE 3-87
HOUSING CHARACTERISTICS FOR STUDY AREA COUNTIES, 2010

Housing Characteristics	Beaver County	Iron County	Millard County	Sevier County	Washington County	Study Area Counties	Relevant Percentage for Study Area Counties	Utah
Total housing units	2,908	19,667	4,939	8,449	57,734	93,697	–	979,763
Occupied	2,265	15,022	4,201	7,094	46,334	74,916	80.0	877,692
Vacant	643	4,645	738	1,355	11,400	18,781	20.0	102,071
Percentage of owner-occupied housing units	75.5	63.7	77.6	77.5	70.5	73.0	74.0	70.4
Percentage of renter-occupied housing units	24.5	36.3	22.4	22.5	29.5	27.0	26.0	29.6
Median Monthly Gross Rent (2010 dollars)	$677	$643	$502	$609	$880	$781	–	–

SOURCES: U.S. Census Bureau 2010b; 2010c

Iron County

As demonstrated in Table 3-86, construction spending in Iron County decreased 72.2 percent between 2000 and 2009. Construction spending increased considerably between 2002 and 2006, and the most significant period of growth was between 2003 and 2005. In 2008, construction spending plummeted and further decreased in 2009. Approximately 64 percent of occupied housing units are owner-occupied, the lowest rate of any county. In Iron County, there were 4,645 vacant housing units or approximately 24 percent of the housing stock. Only Washington County has more vacant housing units, which may be available for rent. Median gross rent was $643 in 2010.

Millard County

In Millard County, construction spending was at its highest in 2000. By 2001, construction spending was less than half of what it had been the previous year. Beginning in 2002, construction spending began to rise again and has increased each year since 2006. Renter-occupied units in Millard County account for approximately 22.4 percent of occupied units. In Millard County, there were 738 vacant housing units or approximately 15 percent of the housing stock. Median gross rent was $502 in 2010, which was the least expensive in comparison to the other study area counties.

Sevier County

Sevier County is the only county that experienced an increase in construction spending between 2000 and 2009. Such spending was at its highest in 2007. Sevier County had the second highest percentage of owner-occupied units. In Sevier County, there were 1,355 vacant housing units or approximately 16 percent of the housing stock. Median gross rent was $609 in 2010.

Washington County

Construction spending in Washington County changed significantly between 2000 and 2009, decreasing 48.8 percent during this period. Spending was at its highest in 2005 when construction spending topped $85.093 million. By 2009, this number was barely 20 percent of what it had been in 2005. Washington County contains the largest number of housing units in the five-county study area; in 2010, there were 11,400 vacant housing units or 20 percent of the housing stock in the county. The median gross rent was the highest in the study area, at $880 monthly in 2010.

Schools

There are 101 schools located in the study area. During the 2010 to 2011 academic year, these schools had a total enrollment of 46,487 students (U.S. Department of Education 2010). The number of schools per capita is calculated by dividing the number of schools in each county by the total county population. Since enrollment figures and the number of schools are based on the 2010 to 2011 academic year, it was appropriate to use the 2010 population provided by the 2010 Census for this calculation. As demonstrated in Table 3-88, the most schools were in Beaver County (0.11 per capita) and the least were in Washington County (0.04 schools per capita).

TABLE 3-88
SCHOOLS IN STUDY AREA COUNTIES

County	School/District	Number of Schools	Enrolled Students (2007 to 2008 academic year)	Population (2008 estimate)	Number of Schools per Capita
Beaver	Beaver District	7	1,634	6,629	0.11
Iron	Iron District	21	8,697	46,163	0.05
	Success Academy	1	345		
	Gateway Preparatory Academy	1	597		
Millard	Millard District	13	2,998	12,503	0.10
Sevier	Sevier District	15	4,794	20,802	0.07
Washington	George Washington Academy	1	487	138,115	0.04
	Washington District	48	25,915		
	Tuacahn High School for the Performing Arts	1	250		
	Vista at Entrada School of Performing Arts and Technology	1	770		

SOURCE: U.S. Department of Education Institute of Education Sciences 2010

Police Protection and Emergency Services

As demonstrated in Table 3-89, a total of 12 police departments and sheriff's offices providing police protection and law enforcement services are located in the study area. Iron County has the greatest number of law enforcement units (four) while Beaver and Millard counties are each served by one sheriff's office (USACE 2010).

TABLE 3-89
POLICE PROTECTION IN STUDY AREA COUNTIES

County	Unit
Beaver	Beaver County Sheriff's Office
Iron	Iron County Sheriff's Office
	Cedar City Police Department
	Enoch Police Department
	Parowan Police Department
Millard	Millard County Sheriff's Office
Sevier	Sevier County Sheriff's Office
	Richfield Police Department
	Salina Police Department
Washington	Washington County Sheriff's Office
	Hurricane Police Department
	St. George Police Department

SOURCE: U.S. Army Corps of Engineers 2010

In addition to county police protection, residents, employees, and visitors also are protected by the Utah Department of Public Safety (the state law enforcement agency with statewide jurisdiction). The department works closely with the Utah Highway Patrol and Office of the State Fire Marshal.

As demonstrated in Table 3-90, there are 74 professional and volunteer-run fire stations located in the study area. There are a total of 1,642 paid and volunteer firefighters at these locations. Washington

County, which has the largest population of the study area counties, also has the greatest number of fire stations and personnel.

TABLE 3-90
FIREFIGHTING SERVICES IN STUDY AREA COUNTIES

Region	Number of Fire Stations	Personnel	2010 Population	Population Per Emergency Service Personnel
Beaver County	2	39	6,692	123
Iron County	13	210	46,163	220
Millard County	12	247	12,503	32
Sevier County	12	393	20,802	53
Washington County	35	753	138,115	183

SOURCE: U.S. Fire Administration 2010
NOTE: Based on National Fire Department Census of 2010

The population per emergency service personnel is calculated by dividing 2010 Census county population by the number of firefighting personnel in each county. Of study area counties, Iron County has the highest number of residents per single emergency service personnel (220 residents for every one emergency service personnel). This exceeds the number of residents per emergency personnel for other study area counties. Millard County has the fewest residents per emergency service personnel (32 residents for every one emergency service personnel).

There are seven hospitals and emergency medical centers located in the study area (Table 3-91). Each county has either one or two facilities.

Since the U.S. Department of Health and Human Services (DHHS) continuously updates its Health Resources and Service Administration Geospatial Data Warehouse – Report Tool, it was appropriate to use 2010 Census population numbers for this calculation. Data currently reported by the Health Resources and Service Administration Geospatial Data Warehouse – Report Tool are from late June 2011.

As demonstrated in Table 3-91 based on 2010 population estimates, Iron County has the greatest number of residents per available bed (1,099 residents per available bed). Beaver County is the only county that has fewer than 100 residents per available bed.

TABLE 3-91
HOSPITALS AND MEDICAL CENTERS IN STUDY AREA COUNTIES

County	Number of Hospitals/ Medical Centers	Number of Patient Beds	2010 Population Estimates	Population per Available Patient Bed
Beaver County	2	80	6,629	83
Iron County	1	42	46,163	1,099
Millard County	2	40	12,503	313
Sevier County	1	42	20,802	495
Washington County	1	245	138,115	564
Total	**7**	**449**	**224,212**	**499**

SOURCE: U.S. Department of Health and Human Services 2010a

Two of the five study area counties have been designated as medically underserved areas[3] (DHHS 2010a). They are Sevier and Washington counties (DHHS 2010b). Residents from these counties may need to travel to neighboring counties to receive medical attention.

Environmental Justice

Executive Order 12898, issued in 1994, directs federal agencies to incorporate environmental justice as part of their mission by identifying and addressing the effects of programs, policies, and activities on minority and low-income populations. The fundamental principles of Executive Order 12898 are as follows:

- Ensure full and fair participation by potentially affected communities in the decision-making process
- Prevent the denial of, reduction, or significant delay in the receipt of benefits by minority or low-income populations
- Avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations
- Encourage meaningful community representation in the NEPA process through the use of effective public participation strategies and special efforts to reach out to minority and low-income populations
- Identify mitigation measures that address the needs of the affected low-income and minority populations.

An environmental justice assessment requires an analysis of whether minority and low-income populations (i.e., populations of concern) would be affected by a proposed federal action and whether they would experience adverse impacts from the Proposed Action. If there are adverse impacts, the severity and proportion of these impacts on populations of concern must be assessed in comparison to the larger majority population or populations not classified as low-income or minority. At issue is whether such adverse impacts fall disproportionately on minority and/or low-income members of the community and, if so, whether they meet the threshold of disproportionately high and adverse. If disproportionately high and adverse effects are evident, the EPA guidance advises that it should trigger consideration of alternatives and mitigation actions in coordination with extensive community outreach efforts (EPA 1998b).

The EPA defines a community with potential populations of concern as one that has a greater percentage of minority and/or low-income populations than does an identified reference area. Areas with high concentrations of minority residents are defined as those populations having (1) 50 percent or more of their population identifying themselves as being of a minority or (2) a significantly greater minority population than the reference area (EPA 1998b). Low-income populations are defined as those individuals that are considered living below the poverty line. The U.S. Census Bureau defines poverty level thresholds for individuals and a family of four as income levels below $11,139 and $22,314, respectively (U.S. Census Bureau 2008).

[3]Medically Underserved Areas/Populations are areas or populations designated by the Health Resources and Services Administration of the DHHS as having too few primary care providers, high infant mortality, high poverty, and/or high elderly population.

The EPA has not provided direct guidance on the significance criteria to identify the presence of minority and/or low-income populations in an area. For purposes of this study, a conservative approach is used to identify areas having high concentrations of minority and/or low-income residents. It is assumed that if the affected area has a minority and/or low-income population more than 10 percentage points higher than the reference area, further analysis is necessary to determine if these populations would receive a disproportionately higher share of adverse Project impacts.

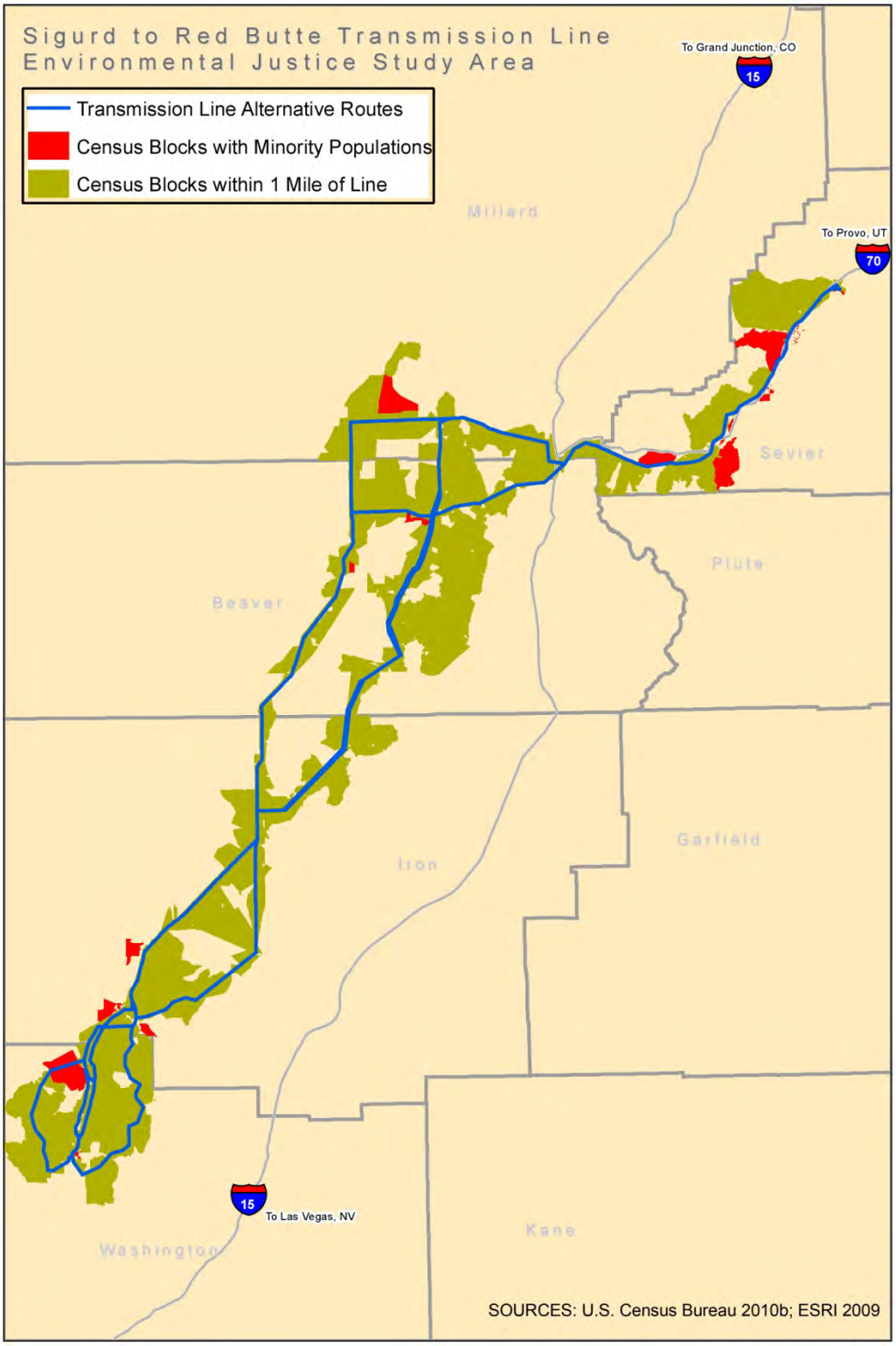
The environmental justice assessment was undertaken at both the Census Block, Census Block Group, and Census Tract levels. The presence of minority populations was evaluated on the Block level, the smallest geographic area for which Census information is available in 2010. For 2010, the smallest geographic area for which the presence of low-income populations is identified is the Census Tract level. However, the Census Block Group low income data is available for 2000. The study area for the environmental justice assessment includes all those Blocks (for minority presence) and Census Block Groups and Tracts (for low-income presence) within 1 mile of the proposed transmission line routes. Map 3-9 shows all Census Blocks in the study area identified as having a high concentration of minority populations. Map 3-10 shows the Census Tracts and Block Groups identified as having a high concentration of low-income populations.

The county and/or state in which each affected Census Block or Tract is located (whichever has the lower threshold level) was used as the reference area to determine the presence of minority and/or low-income populations. In the case of the analysis of environmental justice minorities, the county was used as a reference. For the analysis of low-income communities, Utah was used as a reference. Racial, ethnic, and poverty data have been retrieved from the U.S. Census for 2010.

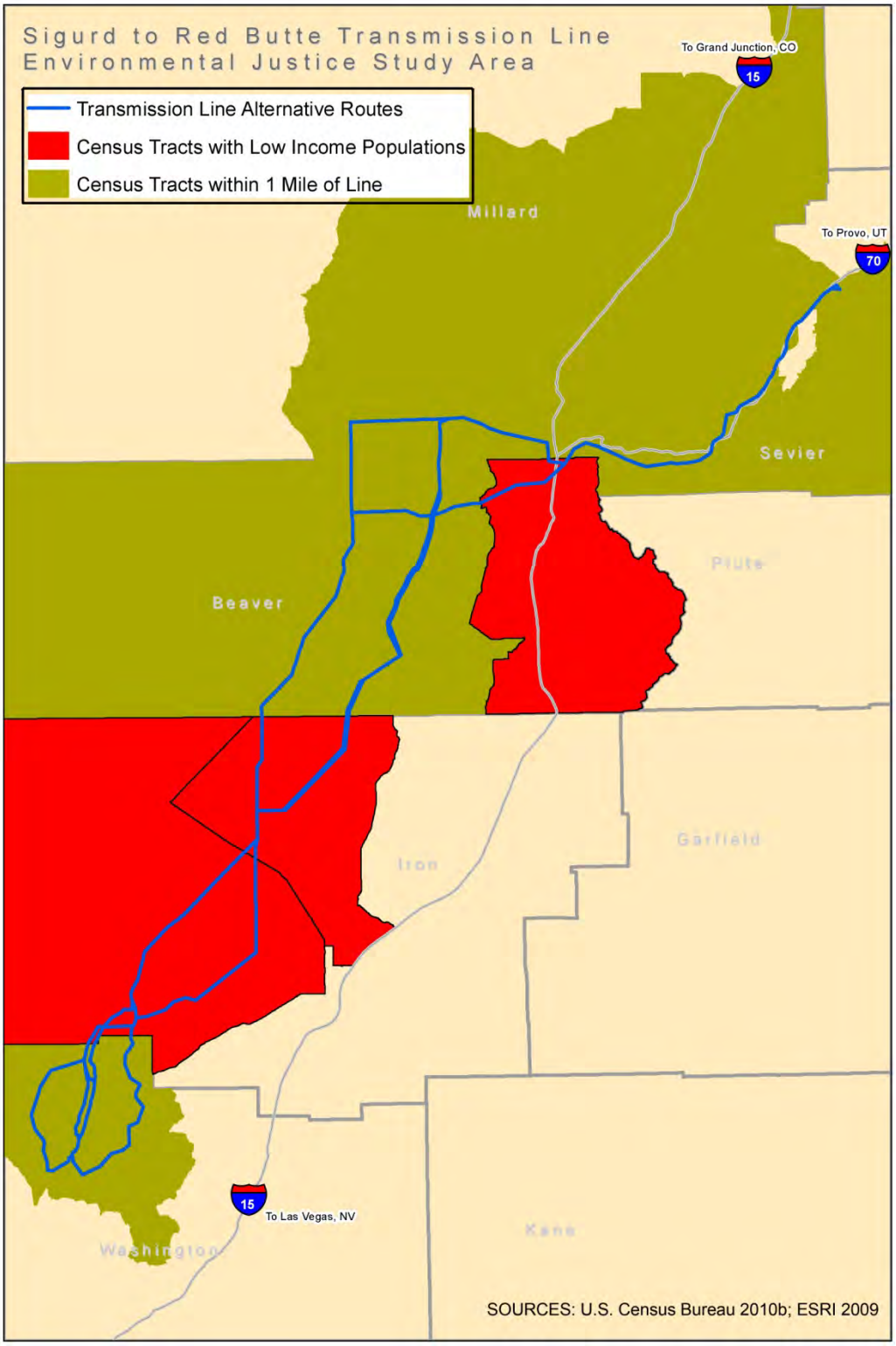
Census Blocks with High Concentrations of Minority Populations

Minority populations are defined as those who identify themselves as being of a race other than Non-Hispanic White Alone. This includes those who identify themselves as Black or African-American, Asian, Hispanic White, American Indian or Alaskan Native, Pacific Islander, Two or More Races, or Other. Map 3-9 shows where those census blocks have been identified as having a high concentration of minority residents within 1 mile of the Project. There are a total of 54 Census Blocks in which potential minority environmental justice populations reside and 1,515 Census Blocks are located within 1 mile of the transmission line routes

In the land use analysis, there were between 7 and 20 residential structures identified as lying within 0.25 mile of the transmission line within the southern portion of the routes. Of those, four structures are located in three Census Blocks with potential minority environmental justice populations in Washington County; the Census Blocks are 2171, 2326, and 2328. In the northern portion of the routes, the land use analysis identified between 76 and 78 structures within 0.25 mile of the lines. Of those, there are two structures in Sevier County residing in two Census Blocks with potential environmental justice populations: 1020 and 1256.



Map 3-9 2010 Census Blocks with Potential Minority Environmental Justice Populations within 1 Mile of the Transmission Line Alternative Routes



Map 3-10 Census Tracts with Potential Low-income Populations within 1 Mile of the Transmission Line Alternative Routes

Beaver County

There are two Census Blocks within 1 mile of the proposed transmission line routes in Beaver County that have a greater percentage of those who identify themselves as being of a minority. Of the four people living in these two Census Blocks, there are two people who identify themselves as Asian.

Iron County

There are six Census Blocks within 1 mile of the Project corridor in Iron County whose minority population exceeds the county average by more than 10 percentage points. Of the 133 people living in these Census Blocks, there is a relatively higher portion of residents identifying themselves as Some Other Race and as White Hispanic.

Millard County

There is one Census Block within 1 mile of the Project corridor in Millard County with higher minority populations than the reference area. In this Census Block, there are two residents, one of whom identifies as American Indian or Alaskan Native.

Sevier County

Of all counties, Sevier County has the greatest number of Census Blocks that have a greater proportion of minority residents. There are 38 Census Blocks within 1 mile of the Project corridor within Sevier County. There are 769 residents of these Census Blocks; minority residents are identified as belonging to various minority groups.

Washington County

There are six Census Blocks within 1 mile of the Project Corridor in Washington County whose percentage of minority residents exceeds the county average by more than 10 percentage points. All minority groups are represented in the 1,458 residents who occupy these six Census Blocks, with residents identifying as Some Other Race constituting the most prevalent minority group.

Census Tracts with Potential Low-Income Environmental Justice Populations

As of the 2010 Census, 3 of the 11 Census Tracts that lie within 1 mile of the transmission line routes in the Project corridor have concentrations of low-income populations that exceed Utah averages by more than 10 percentage points. They are:

- Census Tract 1001, Beaver County, Utah (25.2 percent low-income)
- Census Tract 1102, Iron County, Utah (21.1 percent low-income)
- Census Tract 1103, Iron County, Utah (25.3 percent low-income)

The poverty rate in Utah is 10.8 percent (U.S. Census 2010b). Low-income populations are therefore those Census Tracts with a 20.8 percent or greater proportion of the population identified as living in poverty. The three Census Tracts identified exceed this threshold by more than 5 percent. None of the

Census Tracts within Millard, Sevier, or Washington counties have populations of low-income residents whose share of the total population exceeds that of Utah by more than 10 percentage points.

In the land use analysis, there were between 7 and 20 structures identified as being located with 0.25 mile of the southern transmission line routes. Seven of those structures are located in Census Tract 1103 in Iron County, which has been identified as a potential low income environmental justice population. There are no other structures located in Census Tracts identified as potential low income populations.

3.2.12.2 Results

No Action Alternative

If no action were taken, the Project would not be granted a right-of-way and the transmission lines and substations would not be constructed. The human environment would remain as is and management direction from the current management plans would continue. The advantages of the No Action Alternative would be the avoidance of any of the socioeconomic impacts described (in the following) that would occur with the construction of the transmission lines. However, the projected electricity demands in southwestern Utah would not be met. This could lead to increased cost of energy and continued dependence on a system at capacity. Also, without the Project to strengthen the electrical system, reliability of the electrical system could be jeopardized and could result in power outages, the duration and severity of which cannot be accurately predicted for analysis.

Impacts Common to All Alternatives

Impacts on Employment and Economic Conditions

The construction, operation, and maintenance of the proposed transmission line and related facilities are expected to have a minimal impact on local employment. The largest potential impact from the Project on employment would occur during the construction phase. The construction of facilities for the entire Project is expected to employ at maximum a few hundred laborers (refer to Table 2-8). However, construction is expected to be staggered over 2 years, so average direct employment is not expected to exceed 200 laborers at any one time with dispersal across the study area.

The construction of the proposed line and facilities would require a number of specialized skill sets. An estimate of the number of individuals and specialties are summarized in Table 2-8. Construction of the Project is expected to start in October 2012 and be in service by June 2015. The estimated maximum number of total personnel required during the construction period considering all tasks would not exceed 200 persons. However, at any point in time, the actual personnel would be fewer.

It is anticipated a large percentage of the construction workforce would commute to the Project site from their residences rather than relocate. This is due to the fact that construction employees typically are willing to commute up to two hours from their homes to construction sites (Electric Power Research Institute 1982). Construction expenditures, as shown in Table 3-92, will support construction jobs in the study area, positively impacting this industry in the study area. Additionally, construction workers spending their wages and income also will support induced economic activity in the study area in industry sectors such as accommodations, food and beverage, hospitals and medical services, retail sales, and wholesale trade, among others.

Some more specialized positions likely would have to be filled by others coming from outside the area. The addition of new residents to the area also would have an added effect of increasing economic activity, which would create new jobs in the area. This indirect impact on employment is expected to be small relative to the study area. The change in employment is expected to be short-term and dissipate on completion of construction. Operation of the new facilities would have negligible impacts on local employment.

The estimated construction costs associated with each alternative route (Figures 2-9 and 2-10) are summarized in Table 3-92.

TABLE 3-92
ESTIMATED CONSTRUCTION COSTS

Alternative Route	Total Construction Cost
Alternative N1	$169,630,562
Alternative N2	$171,954,112
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	$170,800,000
Alternative N3	$167,880,881
Alternative N4	$160,090,083
Alternative N5	$156,016,853
Alternative N6 (Proponent's Preferred Alternative)	$153,309,081
Alternative S1	$86,856,718
Alternative S2	$75,401,814
Alternative S3	$93,301,707
Alternative S4	$81,799,056
Alternative S5 (Proponent's Preferred Alternative)	$84,404,448
Alternative S6	$91,178,681
Alternative S7	$79,010,000
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative)	$79,050,000

SOURCE: Pike Engineering/Shaw Engineering 2010

Impacts on Population

The proposed Project and alternatives are expected to cause a slight increase in employment due to construction of the Project. The slight increase in employment is not expected to cause any measurable impacts on population trends. Iron and Washington counties have been experiencing high levels of population growth, which is expected to continue in the future. Any changes in population due to the Project would be small and would not affect these projected trends.

Impacts on Housing

Any small, short-term changes in population due to the Project are not expected to have any measureable impact on available housing in the study area. Available permanent and temporary housing are adequate to supply any new residents to the area.

Impacts on Government-Provided Services

The Project and all of its alternatives are expected to have negligible impacts on government-provided services in the study area. This is due to the fact that changes in employment and population are predicted to be small with the construction, operation, and maintenance of the Project. Therefore, it is not anticipated that there would be a measurable change in supply or demand of relevant government services throughout the study area.

Impacts on Property Values

Whenever land uses change, the concern is often raised about the effect the change may have on property values nearby. The question of whether nearby transmission lines can affect residential property values has been studied extensively in the United States and Canada over the last 20 years or so, with mixed results. In general, the impacts are difficult to measure, vary among individual properties, and are influenced by a number of interplaying factors, including the following:

- Proximity of residential properties to transmission line structures
- Type and size of high-voltage transmission line structures
- Appearance of easement landscaping
- Surrounding topography (Pitts and Jackson 2007)

Pitts and Jackson (2007) summarize the following conclusions on the impacts of high-voltage transmission lines:

- When negative impacts are present, studies report an average decline of prices from 1 to 10 percent
- Value diminution is attributable to the visual unattractiveness of the lines, potential health hazards, disturbing sounds, and safety concerns
- Impacts diminish as the distance between the high-voltage transmission lines and the affected properties increase, and disappear completely at a distance of 200 feet from the lines
- Where views of transmission lines and towers are completely unobstructed, negative impacts can extend up to 0.25 mile
- If high-voltage transmission-line structures are at least partially screened from view by trees, landscaping, or topography, any negative effects are reduced considerably
- Value diminution attributed to high-voltage transmission-line proximity is temporary and usually decreases over time, disappearing completely in 4 to 10 years

In the 1990s, the Bonneville Power Administration (BPA) contributed to the research when it looked at the sale of 296 pairs of residential properties in the Portland, Oregon, metropolitan area (including Vancouver, Washington) and in King County, Washington. Study results showed that the subjects in King County were worth approximately 1 percent less than their matched compensations, while the Portland/Vancouver area subjects were worth almost 1.5 percent more (Cowger et al. 1996). BPA updated this study in 2000 using 1994/1995 sales data. The sales of 260 pairs of residential properties in the King County and Portland/Vancouver metropolitan areas were reviewed. The information confirmed the results of the earlier study (i.e., the presence of high-voltage transmission lines does not significantly affect the sale price of residential properties).

Studies of impacts during periods of physical change, such as new transmission line construction or structural rebuilds, generally have revealed greater short-term impacts than long-term effects. However, most studies have concluded that other factors (e.g., general location, size of property or structure,

improvements, irrigation potential, condition, amenities, and supply and demand factors in a specific market area) are far more important criteria than the presence or absence of transmission lines in determining the value of residential real estate.

Some impacts on property values (and salability) might occur on an individual basis as a result of the new transmission line. There are an estimated 83 to 98 residences within 0.25 mile of the transmission lines, depending on the alternative (refer to Section 3.2.9 – Land Use and Recreation Resources). Additional assessment of these structures indicates only four fall within 0.1 mile (528 feet) and one is located less than 250 feet from the transmission line. Therefore, there are negligible to minimal adverse effects expected to property values associated with the transmission line, and these impacts would be highly variable, individualized, and unpredictable. Additionally, reductions in property values associated with reduced agricultural production would be mitigated with compensation for fair market value losses. Most of these losses would be temporary in nature.

Impacts on Rates and Ratepayers

Capital expenditures for improvements to electric-utility infrastructure are investments made to serve customers. The expenditures are passed on to the customers served in the form of increased rates. However, as a regulated utility, the Proponent can increase rates only on approval by state utility commissions. Such rate-increase requests are subjected to rigorous analysis by regulators and others, and to public process. At this time, not all costs for development of the Project are known; therefore, the Proponent cannot project what the rate increase may be as a result of this Project.

Impacts on Land Uses

Impacts on agriculture anticipated to occur are associated with rangeland disturbance on private lands and BLM and USFS grazing allotments. However, the impacts are expected to be low in the long-term due to the minimal extent of permanent disturbance anticipated on rangelands. A stockyard, located west of the Sigurd Substation, is expected to be adversely affected by the development of the transmission line. Mitigation measures, including the spacing of towers, can be used to alleviate impediments to moving equipment and livestock at a stockyard. Grazing leases on USFS- or BLM-administered lands may be affected by the right-of-way, perhaps requiring slight modifications to the lease stipulations and locations. However, there are negligible economic effects anticipated from these primarily temporary impacts on rangelands.

The impacts on recreational resources have been described in Section 3.2.9 (Land Use and Recreation Resources). Short- and long-term impacts associated with the development and operation of the transmission line would diminish the natural appearance and the undeveloped character of the Areas of Potential Wilderness along all of the northern routes. Additionally, impacts on an OHV area west of Richfield would include trail and access closures and restrictions during construction and possibly modification or realignment may need to occur depending on the specific location of the route. Also, depending on reclamation and implementation of mitigation measures, vehicle and ATV use in the roaded natural and semi-primitive motorized areas is likely to increase over the longer term as a result of new access roads. In total, an influx of new visitors to the study area is not anticipated to occur; therefore, negligible impacts on the study area economies associated with visitor spending would occur due to these changes in recreation resources. However, there may be some adverse impacts on non-market resources associated with the potential wilderness, roadless areas, and roaded natural and semi-primitive motorized areas as more access is likely through the construction of roads to build the transmission line.

Environmental Justice

As described in Section 3.2.12.1 subheading Environmental Justice, there are potential minority and/or low-income populations within the Census Blocks and Tracts adjacent to the transmission line. Since potential environmental justice populations of concern exist, it is necessary to (1) identify which impacts of the Project are high and adverse and (2) examine the spatial distribution of high and adverse impact areas to determine if these impacts are likely to fall disproportionately on the minority and low income populations.

There are an estimated 83 to 98 residences located within 0.25 mile of the transmission line, depending on the alternative route, of which six are located in Census Blocks that have been identified as a potential minority environmental justice population. There are four in Washington County: one structure east of the town of Enterprise and three on the west side of the town of Central. In Sevier County, there are two structures in potential environmental justice Census Blocks: one southwest of Richfield and one at the very northern part of the transmission line. Additionally, there are seven structures located in a Census Tract that has been identified as potentially comprising low income environmental justice populations, six of which are northeast of Enterprise and one in the town of Newcastle.

The Project is expected to contribute positively to potential environmental justice communities through additional job and income opportunities and fiscal receipts to counties. However, these populations also could be affected adversely by the Project's impacts on additional resource areas (e.g., traffic, air quality, visual resources, and ranching land uses). Air-quality and traffic impacts are expected to be short-term with air emission dispersion limited to the vicinity of the construction activity, and impacts would not result in a violation of the NAAQS. Adverse effects associated with visual resources could occur in the communities of Sigurd, Richfield, Elsinore, Joseph, Milford, Minersville, Newcastle, Pinto, Pine Valley, Central, and Enterprise. Thirteen residential structures within 0.25 mile of the transmission line routes have been identified as located in Census Blocks or Census Tracts with relatively higher proportions of minority and poverty populations, respectively. These structures are located primarily in Enterprise, Richfield, Central, and Newcastle. It is possible these residents may experience adverse air quality and visual impacts; however, there are an additional 70 to 85 structures within a 0.25-mile buffer that also would experience some adverse effects. Therefore, these potential environmental justice populations are not expected to be disproportionately affected by these impacts.

The majority of the land uses within 1 mile of the alternative routes comprise rangeland and vacant/undeveloped lands. There may be some small impacts on grazing activities, although these are mostly temporary effects and are not anticipated to fall disproportionately on environmental justice populations. Additionally, there would be negligible to minimal effects on property values as only four residential structures fall within 0.1 mile of the transmission line route. Two of those structures fall in Census Blocks identified as potential minority environmental justice populations.

Additionally, ongoing consultation with Native American Indian Tribes in the study area may be able to mitigate any effects on these minority populations.

Impacts on Property Taxes

The construction, operation, and maintenance of the transmission line would generate additional property taxes to counties where the line would be located. The magnitude of these tax revenues for each alternative was estimated and summarized in Table 3-93. The property taxes for the first year the transmission line would be in service were estimated by applying an average tax rate of 1.27 percent to the construction cost of each segment of the line and are summarized in Table 3-93 under First Year

Property Taxes. (Patterson 2009). The average tax rate for utilities was estimated by dividing total taxes charged against utilities in Utah by the total assessed value of utilities in 2010 (Utah State Tax Commission 2011). It is anticipated that tax revenues would fall after the first year of service as assessed values would consider cost of operation. To estimate an average cash flow for each segment of the line, a capitalization rate of 9.74 percent (Utah State Tax Commission 2010) was applied to cost of construction and is summarized in Table 3-93 under Estimated Annual Cash Flows. The annual tax revenue was then estimated by applying the 1.27 percent average tax rate to the annual cash flow and is summarized in Table 3-93 under Annual Property Taxes for Remaining Years in Service.

TABLE 3-93
PROPERTY TAX ESTIMATES OF ALTERNATIVES

Alternative Route	First Year Property Taxes	Estimated Annual Cash Flows	Annual Property Taxes for Remaining Years in Service
Alternative N1	$2,160,626	$16,522,017	$210,445
Alternative N2	$2,190,221	$16,748,330	$213,328
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	$2,175,521	$16,635,920	$211,896
Alternative N3	$2,138,339	$16,351,598	$208,274
Alternative N4	$2,039,106	$15,592,774	$198,609
Alternative N5	$1,987,224	$15,196,041	$193,556
Alternative N6 (Proponent's Preferred Alternative)	$1,952,735	$14,932,304	$190,196
Alternative S1	$1,106,315	$8,459,844	$107,755
Alternative S2	$960,411	$7,344,137	$93,544
Alternative S3	$1,188,406	$9,087,586	$115,751
Alternative S4	$1,041,894	$7,967,228	$101,481
Alternative S5 (Proponent's Preferred Alternative)	$1,075,080	$8,220,993	$104,713
Alternative S6	$1,161,365	$8,880,804	$113,117
Alternative S7	$1,006,369	$7,695,574	$98,020
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative)	$1,006,879	$7,699,470	$98,070

Tables 3-94 and 3-95 present a rough estimate of tax revenue by county in the Project area. The estimate of tax revenue based on the assumption that the amount of capital applied to each county would correspond with the length of the transmission line (or ancillary facilities) that is constructed in each county.

TABLE 3-94
ESTIMATED FIRST YEAR PROPERTY TAX REVENUES

Alternative Route	Counties				
	Beaver	Iron	Millard	Sevier	Washington
Alternative N1	$640,848	$196,909	$617,577	$705,291	$0
Alternative N2	$833,850	$200,270	$438,772	$717,329	$0
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	$828,253	$198,925	$435,828	$712,515	$0
Alternative N3	$675,073	$304,695	$439,710	$718,862	$0
Alternative N4	$1,006,506	$205,029	$93,195	$734,376	$0
Alternative N5	$844,991	$312,198	$93,472	$736,563	$0
Alternative N6 (Proponent's Preferred Alternative)	$827,367	$314,659	$92,547	$718,162	$0

TABLE 3-94
ESTIMATED FIRST YEAR PROPERTY TAX REVENUES

Alternative Route	Counties				
	Beaver	Iron	Millard	Sevier	Washington
Alternative S1	$0	$630,204	$0	$0	$476,111
Alternative S2	$0	$691,264	$0	$0	$268,915
Alternative S3	$0	$736,564	$0	$0	$451,842
Alternative S4	$0	$741,471	$0	$0	$291,730
Alternative S5 (Proponent's Preferred Alternative)	$0	$635,937	$0	$0	$439,143
Alternative S6	$0	$750,478	$0	$0	$410,887
Alternative S7	$0	$724,586	$0	$0	$281,783
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative)	$0	$724,586	$0	$0	$281,783

TABLE 3-95
ANNUAL PROPERTY TAXES FOR REMAINING YEARS IN SERVICE

Alternative Route	Counties				
	Beaver	Iron	Millard	Sevier	Washington
Alternative N1	$62,419	$19,179	$60,152	$68,695	$0
Alternative N2	$81,217	$19,506	$42,736	$69,868	$0
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	$80,672	$19,375	$42,450	$69,399	$0
Alternative N3	$65,752	$29,677	$42,828	$70,017	$0
Alternative N4	$98,034	$19,970	$9,077	$71,528	$0
Alternative N5	$82,302	$30,408	$9,104	$71,741	$0
Alternative N6 (Proponent's Preferred Alternative)	$80,586	$30,648	$9,014	$69,949	$0
Alternative S1	$0	$61,382	$0	$0	$46,373
Alternative S2	$0	$67,329	$0	$0	$26,215
Alternative S3	$0	$71,741	$0	$0	$44,009
Alternative S4	$0	$72,219	$0	$0	$28,415
Alternative S5 (Proponent's Preferred Alternative)	$0	$61,940	$0	$0	$42,773
Alternative S6	$0	$73,097	$0	$0	$40,020
Alternative S7	$0	$70,575	$0	$0	$27,446
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative)	$0	$70,575	$0	$0	$27,446

3.2.12.3 Summary

The construction, operation, and maintenance of the proposed transmission line and related facilities under all alternatives would be expected to have a minimal impact on local employment. The largest potential impact from the Project on employment would occur during the construction phase. However, construction is expected to be staggered over approximately 2 years, so average direct employment is not expected to exceed 200 people at any one time and would be dispersed across the study area. It is

anticipated that a large percentage of the construction workforce would commute to the Project site from their residences rather than relocate. Construction expenditures are expected to beneficially affect local economies through direct jobs and income, as well as through workers spending their wages in local communities. Impacts on population, housing, and government services from the construction and operations of the transmission line are expected to be minimal.

For all alternative routes, construction and operation of the Project could affect private property values although the impact is expected to be small since only four structures fall within 0.1 mile of the transmission line routes. The impacts are difficult to measure, would vary among individual properties, and would be influenced by a number of interplaying factors (e.g., proximity of residential properties to towers and lines, types and size of lines, and locations of landscaping and surrounding topography). Impacts would tend to decline with distance from a particular line and dissipate over time (i.e., less impact on private property values after the transmission line has been constructed and is in operation).

While potential environmental justice populations are located in the study area near all the alternative route locations, it does not appear that these populations would be disproportionately affected by the development or operation of the Project.

The construction and operation of the transmission line would generate additional property taxes to counties where the line would be located. The magnitude of these tax revenues range by alternative from $1.0 million to $2.2 million in the first year of operation and $98,000 to $213,000 in following years the line is in operation. The counties would each receive their proportional share of such tax revenues.

3.2.13 Public Health and Safety

Issues raised by the public and agencies during Project scoping and preparation of the EIS related to potentially significant effects on public health and safety included potential effects of EMF on humans (e.g., pacemaker use) and animals, as well as concerns with spark-gap transmissions.

3.2.13.1 Electromagnetic Fields and Corona Effects

As proposed, the Project would be a new single-circuit 345kV AC transmission line between the existing Sigurd Substation and the existing Red Butte Substation.

The existing and proposed circuits between the Sigurd and Red Butte substations are sources of 60 Hertz (Hz) EMF, audible noise, and radio noise. To characterize the potential effect of the proposed Project on the existing levels of EMF, audible noise, and radio noise, the levels of these parameters under existing and proposed conditions were modeled at representative locations (identified as cross-sections 1 through 5) accounting for existing and proposed circuits. Conditions where alternative routes parallel existing transmission lines, but are separated by several hundred feet, were not modeled because there would be no perceptible effect on levels of EMF, audible noise, or radio noise. Appendix L includes profiles and tables for cross-sections 1 through 5.

Magnetic Fields

The current flowing in the conductors of a transmission line generates a magnetic field near the transmission line. The strength of Project-related magnetic fields is expressed as magnetic flux density in

units of milligauss (mG), where 1 Gauss = 1,000 mG[4]. It is important to remember that load current, expressed in units of amperes, generates magnetic fields around transmission-line conductors. Measurements of the magnetic field present a snapshot of the load conditions at a point in time. On a given day, throughout a week, or over the course of months and years, the magnetic field can change depending on the patterns of power demand within the surrounding region.

Electric Fields

The voltage on the conductors of transmission lines generates an electric field in the space between the conductors and the ground. The strength of Project-related electric fields is expressed in units of kilovolts per meter (kV/m), which is equal to 1,000 volts per meter[5]. Most objects, including fences, shrubbery, and buildings, block electric fields. Around transmission lines, measurable electric fields at ground level typically are highest in outdoor areas on the right-of-way cleared of vegetation.

Audible Noise

At the surface of high-voltage transmission line conductors, the electric field may become concentrated on surface irregularities to cause an electrical breakdown of the insulating properties of the air, resulting in power loss at the site of breakdown (a phenomenon called corona). Corona can result in audible noise, particularly when the surrounding air contains numerous water droplets or snowflakes. If there is sufficient corona activity, audible noise can be noticeable within a few hundred feet of the transmission line. The intensity is most pronounced directly underneath the line conductors and decreases with distance from the transmission line.

Corona activity depends on a number of factors: altitude, line voltage, conductor size, conductor geometry, and weather conditions. Corona activity is most likely near transmission lines at higher altitudes and is most pronounced during foul weather. The breakdown strength of air is 30 kilovolts per centimeter at sea level and decreases with increasing altitude. A transmission line is designed so that at a particular altitude, conductor size, and line voltage, the electric field at the conductor surface does not exceed the breakdown potential. Nevertheless, any irregularities on the conductor surface (e.g., nicks, water droplets, or debris) will create points where the electric field is intensified sufficiently to produce corona. In foul weather, raindrops or snowflakes accumulating on the conductor surface also will act as points for corona inception.

When corona occurs on 345kV transmission line conductors, it is accompanied by an audible snapping sound. If there is enough corona activity on the line, many small snaps from corona sources along a conductor may be sufficient, in combination, to produce discernible audible noise (sizzling or crackle) at the edge of the right-of-way.

Sound level is measured in decibels referenced to 20 micropascals, which is approximately the pressure threshold of human hearing at 1 kilohertz (kHz). The range of audible frequencies for the human ear is from approximately 20 Hz to 20 kHz, with peak sensitivity near 1 kHz. The change in sensitivity of the human ear with frequency is reflected in measurements by weighting the contribution of sound at

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[4] Scientists more commonly refer to magnetic flux density at these levels in units of microtesla. Magnetic flux density in mG units can be converted to microtesla by dividing by 10 (i.e., 1 mG = 0.1 microtesla).

[5] The strength of an electric field increases with voltage of the source, and decreases with distance from the source. Typical electric field levels in the home and at work are less than 0.1 kV/m. Electric fields within 1 foot of small appliances are in the range of 0.02 to 0.2 kV/m, while the field immediately adjacent to the heating wires of some electric blankets can be considerably higher.

different frequencies. Sound at 20 Hz or 20 kHz, where the ear is less sensitive, is given much less weight than at frequencies near 1 kHz, where the ear is most sensitive. The weighting of sound over the frequency spectrum to account for the sensitivity of the human ear is called the A-weighted sound level.

When the A-weighting scale is applied to a sound-pressure measurement, the level is often reported as decibels at the A-weighted scale (dBA), referenced to the audible pressure threshold. The sound level of typical human speech is approximately 60 dBA, and background levels of noise in rural and urban environments are about 30 to 40 dBA. Specific identifiable noises such as birdcalls, neighborhood activity, and traffic can produce audible noise levels of 50 to 60 dBA. Table 3-96 lists the sound intensities of common acoustic sources.

TABLE 3-96
COMMONLY ENCOUNTERED ACOUSTIC AND AUDIBLE NOISE LEVELS

Source	A-weighted sound level (decibel)
Auto horn	110
Inside subway	95
Traffic	75
Conversation	65
Office	55
Living Room	45
Library	35
Bedroom	24

Corona-generated audible noise varies in time. To account for fluctuating sound levels, statistical descriptors are used to describe environmental noise. Exceedance levels (L levels) refer to the A-weighted sound level that is exceeded for a specified percentage of the time. Thus, the L_5 level refers to the noise level that is exceeded only 5 percent of the time. Median sound level (L_{50}) refers to the sound level exceeded 50 percent of the time. Sound-level measurements are expressed in the L_{50} level in fair and foul (steady rain) conditions.

Radio Noise

Overhead transmission lines can generate radio noise in the bands used for the reception of radio signals. Two potential mechanisms for interference are gap discharges and corona. Corona activity, described previously as a source of audible noise, also induces impulsive currents along a transmission line. These induced currents, in turn, cause wide-band radio frequency noise fields that can affect radio and television reception. Radio noise can produce interference to an amplitude-modulated signal such as a commercial radio audio signal (520 to 1720 kHz) or the video portion of an analog television signal. Frequency-modulated radio stations and the audio portion of an analog television signal are generally not affected by electromagnetic noise from a transmission line.

Gap discharges are an intermittent phenomenon that is more common in distribution lines and low-voltage transmission lines. Electrical discharges on these lines can occur where small gaps develop between metallic line hardware (e.g., insulators, clamps, or brackets). Discharge across these gaps can cause incidental interference to radio-communication services; in this event, the sources of gap-type interference can be located and repaired. Gap discharges occur less frequently on high-voltage transmission lines, and the proposed line will be constructed with modern hardware that eliminates gap-type interference.

Radio noise levels are expressed as decibels above 1 microvolt per meter (dBµV/m) to describe the electric field intensity incident on a reference antenna at 500 kHz, as recommended by the IEEE (1971). Weather has a large influence on corona-generated radio noise, as it does for audible noise. As with audible noise, corona-generated radio noise also varies in time. To account for fluctuating noise levels, statistical descriptors are used to describe radio noise. As with audible noise, radio noise levels in the following are expressed as L_{50} values during fair or foul (steady rain) conditions. Radio noise, like audible noise, is more pronounced at higher altitudes.

3.2.13.2 Regulatory Framework

Electric and Magnetic Fields

Neither the federal government nor the State of Utah has enacted standards for magnetic fields or electric fields from transmission lines or other 60-Hz sources. Several other states have statutes or guidelines that apply to fields produced by new transmission lines, but these guidelines are not health-based. Florida and New York, for example, have enacted standards to limit magnetic fields at the edge of the right-of-way from transmission lines (Florida Department of Environmental Regulation 1989; Florida Department of Environmental Protection 1996; New York Public Service Commission 1978, 1990). For 345kV transmission lines, these limits are 200 mG at the edges of new right-of-ways. The basis for limiting magnetic fields from transmission lines in Florida and New York was to maintain the status quo so fields from new transmission lines would be no higher than those produced by existing transmission lines.

More relevant EMF assessment criteria are the exposure limits recommended by scientific organizations. These exposure limits were developed to protect health and safety and are based on reviews and evaluations of relevant health research. These guidelines include exposure limits for the general public recommended by the International Committee on Electromagnetic Safety (ICES) and the International Commission on Non-Ionizing Radiation Protection (ICNIRP) to address health and safety issues (ICES 2002; ICNIRP 1998). These standards and guidelines are discussed in further detail in the following.

Recommended Exposure Limits

The only confirmed relationship between electric fields or magnetic fields and an adverse biological or health effect are when electric currents, at very high levels of exposure, are experienced in the body as a shock-like effect. The levels at which these short-term effects occur are typically much higher than levels found under transmission lines, and higher than levels found in most homes or commercial establishments. Scientific organizations have recommended exposure limits to protect against the occurrence of these acute adverse effects from short-term exposures. Table 3-97 shows the recommended exposure limits.

TABLE 3-97
REFERENCE LEVELS FOR WHOLE BODY EXPOSURE TO 60 HERTZ FIELDS: GENERAL PUBLIC

Organization Recommending Limit	Magnetic Fields[1]	Electric Fields[1]
International Commission on Non-ionizing Radiation Protection	833 milligauss	4.2 kilovolt per meter
International Committee on Electromagnetic Safety	9,000 milligauss	5 kilovolt per meter 10 kilovolt per square meter

NOTES:
[1]Both organizations judged that evidence for effects from long-term exposure was insufficient for setting exposure standards.
[2]Exception within transmission line right-of-way

Audible Noise

The EPA has established a guideline of 55 dBA for the annual average day-night level (L_{dn}) in outdoor areas (EPA 1974). In computing this value, a 10-decibel correction (penalty) is added to nighttime noise between the hours of 10 p.m. and 7 a.m. Outdoor noise generally does not contribute to indoor levels, which are dominated by activities within a building or residence (EPA 1974).

The predictions of audible noise in Table 3-98 are presented as median levels (L_{50} exceedance levels) during foul weather. To convert these levels to L_{dn} levels requires information or assumptions regarding ambient noise, percentage of foul weather, and the statistical distribution of foul-weather audible noise. The correction factors used to obtain L_{dn} levels from foul-weather L_{50} levels are shown in Table 3-98 for various frequencies of foul weather and ambient noise level.

TABLE 3-98
CORRECTION FACTORS TO OBTAIN EQUIVALENT SOUND LEVELS AND DAY-NIGHT SOUND LEVEL FROM MEDIAN FOUL WEATHER TRANSMISSION LINE SOUND LEVEL

	L_{eq} to L_{50} Foul		L_{dn} to L_{50} Foul	
Frequency	**40 dBA ambient**	**No ambient**	**40 dBA ambient**	**No ambient**
0	-14.0	-24.0	-7.6	-17.6
1	-13.0	-18.4	-6.6	-12.0
5	-10.4	-12.4	-4.0	-6.0
10	-8.4	-9.6	-2.0	-2.9
100	+0.3	+0.3	+6.7	+6.7

SOURCE: Dietrich 1982
NOTES:
L_{50} = Median sound level
L_{dn} = Day-night sound level
L_{eq} = Equivalent sound level

The appropriate correction factor from Table 3-98 can be applied to the calculated L_{50} level to yield an L_{dn} level. A correction factor of -2.9 dBA, corresponding to 10 percent occurrence of foul weather, was used in this report.

Radio Noise

Utah has no limit for radio noise. Likewise, the Federal Communication Commission *Rules and Regulations* (2008) contains no guidelines regarding radio noise levels near high-voltage transmission lines with power transmission lines categorized as an incidental radiator, a device that generates radio frequency energy during the course of its operation although the device is not intentionally designed to generate or emit radio frequency energy. Operation of an incidental radiator is subject to the conditions that no harmful interference is caused and interference must be accepted that may be caused by the operation of an authorized radio station; by another intentional or unintentional radiator; by industrial, scientific, and medical equipment; or by an incidental radiator. Section 15.1(m) of the Federal Communication Commission regulations defines harmful interference as any emission, radiation, or induction that endangers the functioning of a radio navigation service or other safety services, or seriously degrades, obstructs, or repeatedly interrupts an operating radio communications service.

Historically, transmission-line operators have not had difficulty operating under the present FCC rules since most sources of harmful interference are due to gap-type discharges that can be identified and repaired (BPA 1980). Residences very near transmission lines, however, may be affected by corona-type

radio noise in foul weather. For this reason, the *Radio Noise Design Guide* (IEEE 1971) identifies an acceptable limit of average fair-weather radio noise of 40 dBµV/m at 100 feet (30 meters) from the outside conductor.

Pacemakers

Implanted cardiac pacemakers are designed to detect abnormal electrical signals from the beating heart and administer therapy in the form of electrical pulses through implanted electrodes to maintain or restore normal heart function. Many sources of EMFs at a variety of frequencies have been reported to affect pacemaker function, including iPods and other personal MP3 players, cell phones, wireless phones, electric pencil sharpeners, power tools, anti-theft and security devices in stores, libraries and airports, video games, ordinary magnets (i.e., on refrigerators or kitchen cabinets), escalators, electric vehicle ignitions and motors, etc. If pacemaker wearers, however, avoid proximity to these devices, then their pacemakers will not be subject to potential interference from EMFs.

Literature suggests pacemakers also can be affected by EMF from utility power sources and may be somewhat more sensitive to 60-Hz electric fields than 60-Hz magnetic fields. Buildings, walls, shrubbery, and vehicles—among other conductive objects—can effectively shield electric fields under most circumstances, thereby lessening this potential for effect on pacemakers. The manufacturers of pacemakers also have designed their devices in various ways to minimize potential interference from endogenous sources (e.g., muscle potentials) and interference by conducted currents from exogenous sources (e.g., touching electrical appliances). These measures also serve to minimize potential interference by electric fields. To protect the patient, most pacemakers (particularly new ones) are designed to filter out external electrical signals and go into an automatic pacing mode for the period of time interference is detected.

The expected EMF levels at the edge of the proposed right-of-way for the Project are less than 1.8 kV/m, without taking into account any shielding provided by objects in the environment, and 262 mG, respectively (Appendix L, Tables L-2 and L-3). While there is no universal guidance as to acceptable levels of EMF for pacemakers, the American Conference of Governmental Industrial Hygienists has recommended guidelines for occupational exposures, including EMF. These guidelines are designed to identify levels that nearly all workers may be exposed to repeatedly without adverse effect and, for EMF, suggest patients with pacemakers or similar devices limit their exposure to electric fields to 1 kV/m and magnetic fields to 1,000 mG (American Conference of Governmental Industrial Hygienists 2009). Therefore, the expected levels of magnetic fields on the right-of-way and electric fields just outside the edge of the right-of-way would be less than the American Conference of Governmental Industrial Hygienists' guideline levels.

Induction and Field Perception

Short-term effects from transmission-line electric fields are associated with perception of induced currents and voltages or perception of the field. Under certain conditions, the electric field can be perceived through hair movement on an upraised hand or arm of a person standing on the ground under high-voltage transmission lines. This perception is most likely at midspan under a high-voltage line and less likely in locations where the electric field is less than 2 kV/m. Therefore, it is unlikely the field would be perceived beyond the edge of the right-of-way. The presence of vegetation may shield the field and prevent perception. Persons in the cabs of trucks or other vehicles are shielded by the conductive metal of the vehicle from the electric field and induced effects such as shocks.

Induced current or spark discharge shocks can be experienced under certain conditions when a person contacts objects in an electric field. Such effects occur in the fields associated with transmission lines that have voltages of 230kV or higher. Shocks of a magnitude that could be harmful from induced currents would not occur under the existing or proposed lines because clearances aboveground required by the NESC preclude such shocks from large vehicles, and grounding practices eliminate large stationary objects as sources of such shocks.

Minor shocks that produce no harm can be annoying or unexpected and can occur under higher voltage transmission lines when making contact with ungrounded conducting objects (e.g., vehicles or equipment). These shocks would be uncommon and mostly perceived as a nuisance when they occur. Shocks from electric field induction on large metal objects next to the right-of-way, or magnetic induction on fences, irrigation pipes, pipelines, electrical distribution lines, or telephone lines that form a conducting loop for long distances parallel to a transmission line, can be prevented by utility policies for routinely grounding such installations located on or near the right-of-way.

Limiting the possibility of induced currents flowing from farm machinery and large vehicles under transmission lines to persons is accomplished by maintaining sufficient conductor clearance above vehicles in the final design. This is so the induced short-circuit current in the largest anticipated vehicle under the line is limited to 5 milliamperes or less per the NESC.

Vehicles should not be refueled under the proposed line unless specific precautions are taken to ground the vehicle and the fueling source.

3.2.13.3 Environmental Setting

Existing Lines and Structures

Existing transmission lines in the vicinity of the Project alternative routes include:

- IPP 500kV DC transmission line
- Sigurd to Red Butte No. 1 – 345kV transmission line (Sigurd to Three Peaks 345kV and Three Peaks to Red Butte 345kV circuits)
- Sigurd to Cameron 138kV transmission line (Sections 3-5)
- Milford to Cove Fort 46kV sub-transmission line (Section 2)

Existing 500kV Transmission Lines

The Project area includes the existing IPP 500kV transmission line. Unlike the other transmission lines in the Project vicinity, the IPP line is DC rather than AC. The difference between AC and DC systems is how power moves through the transmission-line conductors. In AC systems, current and voltage reverse polarity, oscillating back and forth 60 times per second (60 Hz). The polarity of a DC line does not oscillate, but remains constant or static like the current flowing from a battery. Hence, the magnetic field from the IPP line is static, like the earth's magnetic field that aligns the needle of a compass. For this reason, the IPP line was not modeled in this EMF study.[6]

[6] Electric-field interactions between AC and DC sources will occur in a small area where the proposed 345kV AC line crosses the IPP DC line. Since this configuration does not persist along the preferred route – and only accounts for the fields where AC and DC conductors cross – the IPP crossings were not modeled as part of this EMF study.

Existing 345kV Transmission Lines

The existing 345kV transmission lines include the existing Sigurd to Red Butte No. 1– 345kV transmission line, which consists of the Sigurd to Three Peaks 345kV transmission line and the Three Peaks to Red Butte 345kV transmission line. Operation of the Project would carry a portion of the load between the Sigurd and Red Butte substations that is carried presently by these circuits. For modeling purposes, the conductor, bundling, structure type, and ground clearance of both existing lines is the same as for the H-frame tangent structure described in Section 2.3.1.

The Sigurd to Three Peaks 345kV transmission line is not adjacent to the Project and does not intersect Sections 1-5. The Three Peaks to Red Butte 345kV transmission line, while parallel to the proposed route in Links 275, 444, 441, 221, and 220, is located typically at least 1,500 feet from the Project centerline.[7] At these distances, the interaction between the proposed and existing 345kV transmission lines amounts to less than 0.01 mG change in modeled profiles. For this reason, the existing 345kV circuits were modeled in isolation, rather than as a part of Sections 1-5, to demonstrate how operation of the Project would affect magnetic fields in area transmission corridors.

Existing 138kV Transmission Lines

The existing 138kV transmission lines include the Sigurd to Cameron 138kV transmission line, which consists of the Sigurd to Sevier Tap 138kV circuit and Sevier Tap to Cameron 138kV transmission line. These lines are supported on horizontal H-frame structures (Figure 2-2) and are located between 100 and 150 feet on either side of, and parallel to, the proposed Project. In Sections 3 and 4, all 138kV lines were modeled with 28-foot ground clearance, 13.5-foot horizontal conductor spacing, and single 397.5 circular mils, 26/7 aluminum conductor steel reinforced Ibis conductors. Phasing for the existing 138kV lines was supplied by Pike Energy Solutions and is depicted in the EMF profiles for Sections 3 through 5, Appendix L.

Existing 46kV Sub-transmission Line

The existing 46kV circuits include the Milford to Cove Fort 46kV transmission line, which approaches the proposed route in Link 75. In portions of Link 75, the Milford to Cove Fort 46kV transmission line could be rebuilt on the south side of a double-circuit mono-pole tangent structure (Figure C-8). In Section 2, the rebuilt Milford to Cove Fort 46kV was modeled with single No. 6 phase conductors and 345kV transmission line clearances with 30-foot ground clearance and 25-foot vertical separation between phases. Other 46kV transmission lines in the Project vicinity, such as the Sevier to Sulphurdale 46kV transmission line and the Sigurd to Richfield 46kV transmission line, are located at distances of greater than 1,000 feet from the proposed 345kV transmission line. These 46kV circuits were not modeled since, at these distances, the interaction between the proposed 345kV transmission line and existing 46kV transmission lines amounts to less than 0.01 mG change in modeled profiles.

Modeled Cross Sections

The modeled sections are longitudinally uniform and located between tangent structures on the Project route. Deadend or strain structures at points where the proposed 345kV transmission line terminates or

[7] This excludes crossings, which were not modeled. In the vicinity line crossings, fields from two or more lines alter EMF, audible noise, and radio noise levels in the span of a few hundred feet over the length of the 160-mile route preferred by the Proponent.

changes direction abruptly were not modeled. As with line crossings, regions with abrupt turns alter EMF, audible noise, and radio noise levels in the span of a few hundred feet and are not representative of the EMF and noise levels encountered along the majority of the proposed 160-mile route. Schematic depictions of Sections 1 through 5 are shown in Figure 3-4.

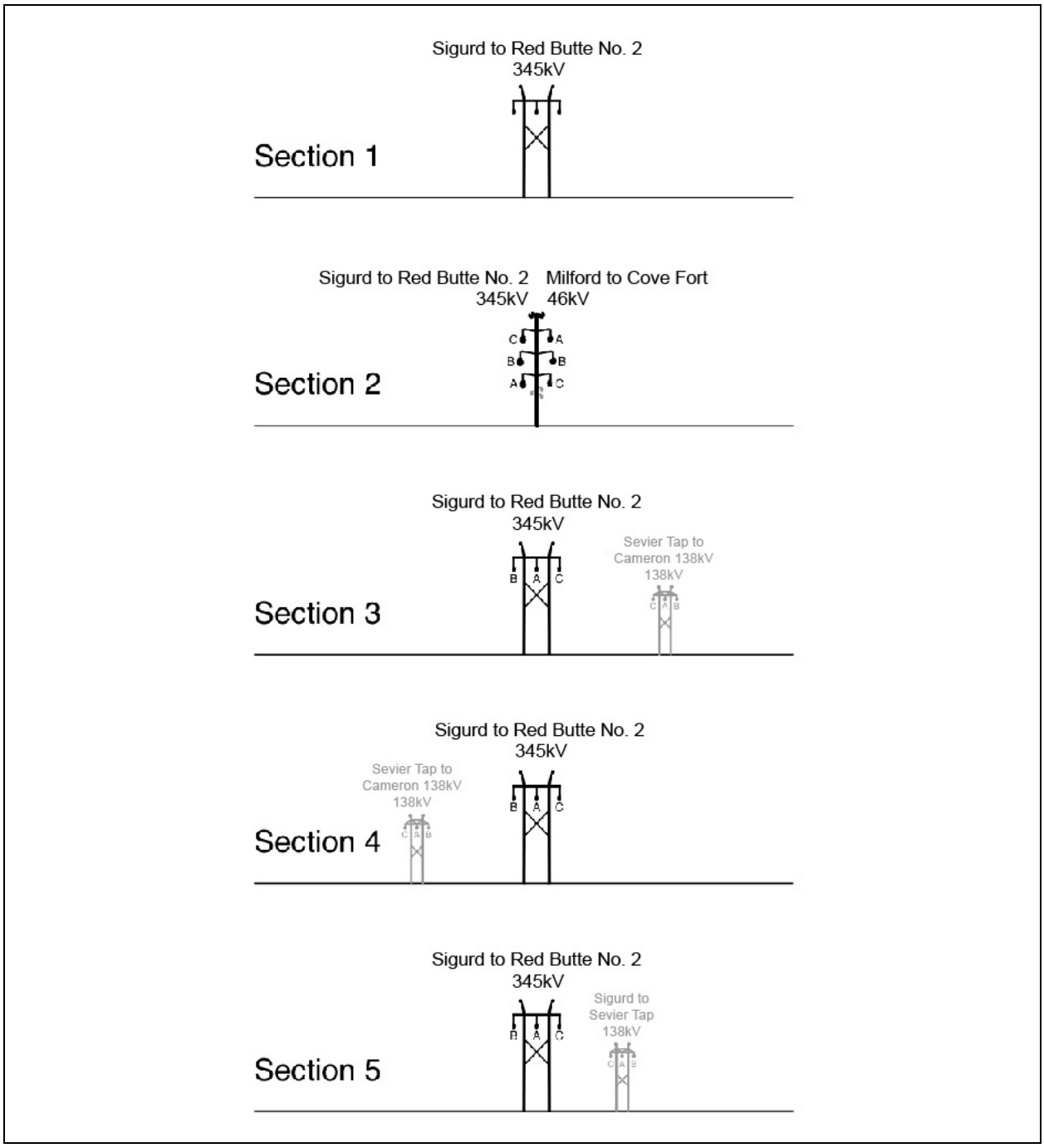

Figure 3-4 Modeled Cross Sections on the Preferred Route of the Project

Section 1

This section depicts the proposed Sigurd to Red Butte No. 2 – 345kV transmission line when adjacent lines are located at distances greater than 1,000 feet from the reference centerline. Section 1 is representative of the majority of the Project, including the majority of Links 25, 45, 64, 63, 349, 390, 475, 395, 396, 397, 163, 444, 441, 221, and 220. Magnetic-field profiles for the existing Sigurd to Red Butte No. 1 – 345kV transmission lines are modeled on this same structure.

Section 2

This section depicts the proposed Sigurd to Red Butte No. 2 – 345kV transmission line on the north side (figure left) of a double-circuit structure, with the Milford to Cove Fort 46kV transmission line rebuilt on davit arms on the south side of the structure. The depicted phasing of the 345kV transmission line was selected to minimize average-load magnetic fields at 75 feet on either side of the double-circuit centerline.

Section 3

This section depicts the proposed Sigurd to Red Butte No. 2 – 345kV transmission line 150 feet north of the existing Sevier Tap to Cameron 138kV transmission line. The depicted 345kV phasing was selected to minimize average-load magnetic fields at 75 feet south (right) of the 138kV centerline and 75 feet north (left) of the 345kV centerline.

Section 4

This section depicts the proposed Sigurd to Red Butte No. 2 – 345kV transmission line 140 feet south of the existing Sevier Tap to Cameron 138kV transmission line, with the same phasing selected to minimize average-load magnetic fields at plus or minus 75 feet.

Section 5

This section depicts the proposed Sigurd to Red Butte No. 2 – 345kV transmission line 100 feet north of the existing Sigurd to Sevier Tap 138kV transmission line. The same 345kV phasing was selected to minimize average-load magnetic fields at 75 feet north (left) of the 345kV centerline.

3.2.13.4 Study Methodology

Calculations

Pre- and post-construction EMF, audible noise, and radio noise levels were calculated using computer algorithms developed by the BPA (BPA 1991). The inputs to the program include data regarding voltage, current flow, circuit phasing, and conductor configurations. The resultant fields and noise levels associated with transmission lines were estimated along transects perpendicular to the transmission centerline at midspan. These midspan profiles model the transmission lines at the point of greatest

conductor sag with a uniform cross-section.[8] Existing and proposed lines were modeled with balanced currents on the phase conductors.

Electric and Magnetic Fields

EMFs were calculated at a height of 1 meter (3.28 feet) aboveground in accordance with the standard method for measuring EMF near transmission lines (IEEE Standard 1308-1994). EMFs are expressed as the resultant (root mean square) of magnetic-field components measured in the x, y, and z axes.[9] The electric-field calculations assumed an overvoltage condition of 5 percent for 345kV transmission lines.

Magnetic fields around the existing and proposed transmission lines depend on current, which increases with increasing load. Loadings on existing and proposed lines were provided by PacifiCorp Transmission Planning and are summarized in Tables 3-99, 3-100, and 3-101 as average and peak A per phase. Since magnetic-field exposures at peak loading would be expected to occur only for a limited number of hours on a limited number of days each year, the calculated field levels at annual average loading provide a better estimate of typical potential exposures. Magnetic fields calculated at annual average loading are depicted in the graphical profiles in Appendix L.

Audible Noise

Audible noise levels across the right-of-way, L_{50} fair and L_{50} rain, are reported for the existing and proposed 345kV transmission lines at a height of 5 feet aboveground at 6,000 feet mean sea level. The 5-foot height estimates the sound-pressure level that would be perceived by a standing listener. When computed according to the BPA methods used in this EIS, the median audible noise levels during average fair weather are 25 dBA lower than foul weather (stable rain values).

Radio Noise

Radio noise levels are expressed as median values for fair or foul weather (steady rain) conditions for a 1-meter high antenna and a signal at 500 kHz. When computed according to the BPA methods used in this EIS, median radio noise levels during average fair weather values are 24 dBμV/m lower than median radio noise levels calculated during foul weather (stable rain values).

Loads

PacifiCorp Transmission Planning provided a list of the transmission and sub-transmission lines that could be on the same corridor as the proposed Sigurd to Red Butte No. 2 – 345 kV transmission line and current estimates for the year 2014, the in-service date of the proposed transmission line. Loads were supplied with and without the proposed 345kV transmission line in service, and power flows and historical data were used to estimate the maximum and average current flows on these lines for normal operating conditions.

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[8] A "uniform cross-section" means the BPA algorithms model the transmission conductors at a uniform height above flat terrain for the entire distance between adjacent structures.

[9] Root-mean-square refers to a common method of reporting the effective magnitude of voltage, current, or EMFs of an AC system. The x, y, and z axes refer to the vertical, transverse, and longitudinal directions relative to the transmission centerline. The BPA algorithms assume a uniform right-of-way cross-section with no longitudinal component of the magnetic field.

The peak line currents are shown in Tables 3-100 and 3-101. These currents assume the imports from (Table 3-99) or exports to (Table 3-100) Nevada Energy's southern system were at their rated limits and assume peak summer loads in southwestern Utah. The maximum current estimates in Tables 3-99 and 3-100 are for normal operating conditions, with all lines in service. For all peak-load magnetic-field modeling, currents for the north to south (export) tie-line-schedule in Table 3-101 were used since export conditions resulted in higher transfer between the Sigurd and Red Butte substations.

TABLE 3-99
CURRENT FLOWS DURING MAXIMUM IMPORT CONDITIONS FROM NEVADA ENERGY'S SOUTHERN SYSTEM (SOUTH-NORTH TIE LINE SCHEDULES)

Transmission Line	Project In-service		Project Not In-service	
	Currents (amperes)	Phase Angle (degrees)	Currents (amperes)	Phase Angle (degrees)
Sigurd[1] to Three Peaks 345kV line	126	51.5	153	45.5
Three Peaks[1] to Red Butte 345kV line	74	27.8	37	30.3
Sigurd[1] to Red Butte No. 2 345kV line	113	71.9	–	–
Sigurd[1] to Sevier Tap 138kV line	135	2.3	139	3.1
Sevier Tap[1]to Cameron 138kV line	61	22.9	65	23.1
Milford[1] to Cove Fort 46kV line	18	77.9	17	77.0
Sigurd[1] to Richfield 46kV line	187	26.1	186	26.1

NOTES: [1] Currents measured from indicated bus.
kV = Kilovolt

TABLE 3-100
CURRENT FLOWS DURING MAXIMUM EXPORT CONDITIONS TO NEVADA ENERGY'S SOUTHERN SYSTEM (NORTH-TO-SOUTH TIE LINE SCHEDULES)

Transmission Line	Project In-service		Project Not In-service	
	Currents (amperes)	Phase Angle (degrees)	Currents (amperes)	Phase Angle (degrees)
Sigurd[1] to Three Peaks 345kV line	955	8.1	1643	0.2
Three Peaks[1] to Red Butte 345kV line	840	6.3	1593	9.1
Sigurd[1] to Red Butte No. 2 345kV line	1053	5.0	–	–
Sigurd[1] to Sevier Tap 138kV line	157	6.7	204	3.5
Sevier Tap[1] to Cameron 138kV line	89	23.7	130	15.5
Milford[1] to Cove Fort 46kV line	15	70.1	19	42.3
Sigurd[1] to Richfield 46kV line	187	26.1	186	26.1

NOTES: [1]Currents measured from indicated bus.
kV = Kilovolt

For the purposes of magnetic-field modeling, the average currents during normal operating conditions are presented in Table 3-101. The average currents for the 345kV transmission lines are derived from peak currents (Table 3-100) and the historical relationship between peak and average flows on the existing Sigurd to Three Peaks to Red Butte 345kV transmission line.[10]

[10]In the historical data considered, there was no load at the Three Peaks Substation.

TABLE 3-101
AVERAGE CURRENT FLOWS DERIVED FROM MAXIMUM EXPORT CONDITIONS TO NEVADA ENERGY'S SOUTHERN SYSTEM (NORTH-TO-SOUTH TIE LINE SCHEDULES)

Transmission Line	Project In-service		Project Not In-service	
	Currents (amperes)	Phase Angle (degrees)	Currents (amperes)	Phase Angle (degrees)
Sigurd[1] to Three Peaks 345kV line	598	26.8	1003	19.7
Three Peaks[1] to Red Butte 345kV line	510	15.5	924	18.2
Sigurd[1] to Red Butte No. 2 345kV line	648	33.8	–	–
Sigurd[1] to Sevier Tap 138kV line	145	4.4	169	3.3
Sevier Tap[1] to Cameron 138kV line	74	23.3	95	19.5
Milford[1] to Cove Fort 46kV line	17	74.2	18	60.7
Sigurd[1] to Richfield 46kV line	187	26.1	186	26.1

NOTES: [1]Currents measured from indicated bus.
kV = Kilovolt

3.2.13.5 Results

Magnetic Fields

Figures L-1 to L-7 in Appendix L depict calculated magnetic-field profiles for average load in Sections 1 to 5, as well as in area transmission corridors off the Project route. Calculated magnetic-field values are tabulated at the end of Appendix L for the average-load case (Table L-1) and peak-load case (Table L-2).

In Section 1 (Figure L-1), the calculated magnetic-field level at the edge of the right-of-way is 34.0 mG under average-load conditions. Under peak-load conditions and corresponding to projected peak summer loads in 2014, the highest calculated magnetic field at the right-of-way edge is 58.8 mG.

Because the proposed 345kV transmission line increases transfer capability between the Sigurd and Red Butte substations, operation of the Project decreases magnetic fields on the route of the existing Sigurd to Three Peaks and Three Peaks to Red Butte 345kV transmission lines. At 75 feet from the centerline of the Sigurd to Three Peaks 345kV circuit, operation of the Project decreases calculated magnetic-field levels (53 mG) by approximately 45 percent under average-load conditions (Figure L-2). Likewise, at 75 feet from the centerline of the Three Peaks to Red Butte 345kV circuit, operation of the Project is anticipated to decrease magnetic fields (49 mG) by approximately 40 percent (Figure L-3).

In Section 2 (Figure L-4), the magnetic-field levels are dominated by current on the 345kV circuit. Under modeled loading conditions, little cancellation of fields is realized by phasing selection. Nevertheless, the depicted 345kV phasing was selected to minimize average-load magnetic fields at 75 feet on either side of the double-circuit centerline.

In Sections 3 to 5 (Figure L-5 to L-7), the phasing of the proposed circuit (BAC) was designed to maximize cancellation of magnetic fields. On the 345kV side of the widened corridor, the calculated magnetic field levels under average-load conditions range between 33.5 and 33.9 mG.[11] On the 138kV side of widened corridor, operation of the Project results in small changes in the calculated magnetic field (less than 0.3 mG) compared to the existing case, assuming average load.

[11] Refer to Appendix L. Because of the cancellation of fields between adjacent 345kV and 138kV circuits, calculated fields on the 345kV side of the corridor are less than magnetic field levels (34.0 mG) calculated for the 345kV transmission line in isolation.

Electric Fields

Figures L-8 to L-12 in Appendix L depict calculated electric-field profiles for average line heights in Sections 1 to 5. Calculated electric-field values are tabulated at the end of Appendix L for average and minimum conductor heights (Table L-3). At peak-load conditions and a minimum ground clearance of 30 feet, the highest calculated electric field beneath the conductors of the proposed 345kV transmission line is 6.6 kV/m. This value of the electric field will be encountered for a few hours each year during periods of peak load, and only at the point of lowest wire sag within some spans. The highest calculated electric-field level at the edge of the right-of-way associated with the operation of the Project is below limits recommended by the ICNIRP and the ICES for the general public.

Audible Noise

Figures L-13 to L-17 in Appendix L depict calculated audible-noise profiles for average line heights in Sections 1 to 5. Calculated audible-noise levels are tabulated at the end of Appendix L for average conductor heights (Table L-4). The levels of audible noise from AC transmission lines are higher in foul weather than in fair weather. In fair and foul weather, the existing lines are not significant sources of audible noise. In fair weather, the audible noise from the additional line would be hard to detect. Assuming 10 percent occurrence of foul weather and no ambient noise, the calculated levels of foul-weather audible noise outside the right-of-way are lower than the EPA's guideline of 55 dBA (EPA 1974).

Radio Noise

Figures L-18 to L-22 in Appendix L depict calculated radio-noise profiles for average line heights in Sections 1 to 5. Calculated radio-noise levels are tabulated at the end of Appendix L for average conductor heights (Table L-5). The existing and proposed transmission lines meet the criterion for fair-weather radio noise recommended in the IEEE Radio Noise Design Guide (IEEE 1971).

3.2.13.6 Summary

The existing and proposed circuits between the Sigurd and Red Butte substations are sources of EMFs, audible noise, and radio noise. This section includes calculated levels of EMF, audible noise, and radio noise at representative locations along the Project route, accounting for existing and proposed circuits.

Magnetic Fields

The calculated magnetic field levels associated with the operation of the Project would be below limits for the general public recommended by ICNIRP and ICES. Along the majority of the Project route, where the Project centerline is more than 500 feet from existing transmission facilities, the calculated magnetic-field level at the edge of the right-of-way[12] is 34 mG under average-load conditions.[13] Under peak-load

[12] The proposed Sigurd to Red Butte No. 2 – 345kV transmission line is modeled in the center of a proposed right-of-way with a 150-foot nominal width.

[13] Refer to the following discussion of loading cases. Average load refers to the projected average currents for a 2014 in-service date, assuming north-to-south tie-line schedules (i.e., export to the Nevada Energy southern system).

conditions, corresponding to projected peak summer loads in 2014, the highest calculated magnetic field at the right-of-way edge is 59 mG.

Because the Project would increase transfer capability between the Sigurd and Red Butte substations, operation of the Project would decrease magnetic fields on the route of the existing Sigurd to Three Peaks and Three Peaks to Red Butte 345kV transmission lines. At 75 feet from the centerline of the Sigurd to Three Peaks 345kV circuit, operation of the Project decreases calculated magnetic-field levels (53 mG for existing lines operating in 2014) by approximately 45 percent under average-load conditions. Likewise, at 75 feet from the centerline of the Three Peaks to Red Butte 345kV circuit, operation of the Project is anticipated to decrease magnetic-field levels at the edge of the right-of-way (49 mG for existing lines operating in 2014) by approximately 40 percent.

In portions of the Project where the transmission line parallels existing 138kV circuits within 300 feet, the phasing of the proposed circuit was designed to maximize the mutual cancellation of magnetic fields from adjacent circuits. In widened corridors containing both existing 138kV transmission lines and the proposed 345kV circuit, the change in magnetic field is confined largely to the side of the corridor nearest the proposed circuit. On the 345kV side of the widened corridor, the calculated magnetic field levels under average-load conditions range between 33.5 and 33.9 mG.[14] On the 138kV side of widened corridor, operation of the Project would result in small changes in the calculated magnetic field (less than 0.3 mG) compared to the existing case, assuming average load.

Electric Fields

The highest calculated electric-field level associated with the operation of the Project is below limits recommended by the ICNIRP and the ICES for the general public outside the right-of-way. At peak-load conditions and a minimum ground clearance of 30 feet, the highest calculated electric field beneath the conductors of the proposed 345kV transmission line is 6.6 kV/m. This value of the electric field would be encountered for a few hours each year during periods of peak load, and only at the point of lowest wire sag within some spans.

Audible Noise

The levels of audible noise from AC transmission lines are higher in inclement/stormy weather than fair weather. In fair weather, the audible noise from the additional line would be hard to detect. Assuming 10 percent occurrence of foul weather and no ambient noise, the calculated levels of audible noise outside the right–of-way are lower than the EPA's guideline of 55 dBA (EPA 1974).

Radio Noise

The existing and proposed transmission lines meet the criterion for fair-weather radio noise recommended in the IEEE Radio Noise Design Guide (IEEE 1971).

[14] Refer to Appendix L. Because of the cancellation of fields between adjacent 345kV and 138kV circuits, calculated fields on the 345kV side of the corridor are less than magnetic field levels (34.0 mG) calculated for the 345kV line in isolation.

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Chapter 4 – Cumulative Effects

CHAPTER 4 – CUMULATIVE EFFECTS

4.1 Introduction

This section presents the cumulative effects associated with the Project, including (1) a general definition of cumulative effects, (2) elements that were considered in the cumulative effect analysis, (3) the assessment approach, and (4) the results of the assessment of cumulative effects for the Project.

4.1.1 Summary of Changes from the Draft EIS

Chapter 4 was updated to reflect additional environmental baseline information suggested or provided in substantive agency and public comments received on the Draft EIS (including information on current and future projects) and additional data collected to address alternative route adjustments made since the publication of the Draft EIS (refer to Section 2.4.2).

Substantive changes made between the Draft EIS and the Final EIS are demarcated in the left margin of this chapter by a vertical black line.

4.1.2 Definition

Cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the impact on the environment that 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 other such actions. Cumulative impacts could result from individually minor, but collectively significant actions taking place over a period of time. These reasonably foreseeable future actions refer to future action projections, or estimates, of what likely is to take place when a Proposed Action is implemented. They are not part of the Proposed Action, but are projections being made so that future impacts, cumulative and otherwise, could be estimated, as required by NEPA. Cumulative impacts are interdisciplinary, multi-jurisdictional, and usually do not conform to political boundaries. The CEQ has defined the resulting effects as direct and indirect. Direct effects are caused by the Project action and occur at the same time and place. Indirect effects also are caused by the Project action, but are later in time or further removed in distance, yet are still reasonably foreseeable (40 CFR 1508.8). Cumulative effects are the total effect on a given resource or ecosystem of all actions taken or proposed.

4.1.3 Cumulative Assessment Process

The cumulative effects assessment process considered (1) scoping and Project issues; (2) cumulative effect timeframes and the resources (or receptors) that could be affected by the Project alternatives; (3) the geographical area in which the impacts would occur; and (4) other past, present, and reasonably foreseeable future actions that have, or could be expected to cause, impacts on these resources when considered with development of the Project.

4.2 Past, Present, and Other Reasonably Foreseeable Actions

Known past and present actions are identified and described in detail in Section 3.2.9.4, which includes mining, renewable energy, transportation, utilities and utility corridors, parks and recreation, agriculture, residential, commercial, and industrial areas, and hazardous sites.

Given the rural setting of the Project area, it is anticipated agriculture, particularly livestock grazing, would continue to be the dominant land use. Urban land uses (e.g., residential, commercial, and industrial) would continue to grow near population centers as population growth continues, particularly in and around the Richfield area. As the Richfield area increases in population, demand for water and recreation resources, particularly ATV access, is expected to increase.

With increased emphasis from the federal, state, and local governments on renewable energy, renewable energy projects are expected to increase within the Project area. Wind is expected to be the major renewable energy resource. As more renewable energy projects (e.g., geothermal and wind) are constructed, it is anticipated additional transmission lines would be required to transmit the energy generated by these facilities to populated areas.

In addition to reasonably foreseeable trends (described previously), Tables 4-1 and 4-2 list known current and future projects and reasonably foreseeable future actions located in or near the Project area. Current and future projects also are shown in Map 4-1. The projects listed in Tables 4-1 and 4-2 were incorporated into the analysis for determining the cumulative effects of the Project.

TABLE 4-1
CURRENT AND FUTURE PROJECTS

Jurisdiction/ Agency	Project Name[1]	Type of Development	Location	Sigurd to Red Butte No. 2 Proposed Route in Relation to Current and Future Projects					Approximate Acreage of Project within the Project Area[2]	Timeframe
				Link Number	From Milepost	To Milepost	Distance from	Relationship		
Beaver City	Culinary Water System Improvements	1-million-gallon water tank and underground pipeline	Beaver City	390	–	–	17.0 miles	–	0.4 (Beaver County Journal 2010)	In-service May 2011
				75	–	–	17.0 miles	–		
Bureau of Land Management (BLM)	Cove Fort (Enel) Geothermal Plant	Construction of new geothermal plant on site of old power plant	Southeast of the Interstate 70 and Interstate 15 junction in Beaver County	68	–	–	0.5 mile	–	4,000.0 (leased)	In-service date 2013
				75	–	–	0.5 mile	–		
	Oski Geothermal Plant	50- to 100-megawatt geothermal plant	On Paiute tribal land west of Cove Fort, Millard County	320	–	–	1.0 mile	–	5.0 (estimated)	No specific timeframe
	Millard Geothermal Leases	Enel long-term plans call for two geothermal plants	North and south of Interstate 70 in Millard County, Utah	460	0.0	1.1	–	–	29,743.6	No specific timeframe; parcels are not currently leased
				75	0.0	0.6	–	–		
					13.2	14.2	–	–		
				349	0.0	1.2	–	–		
				390	0.0	0.6	–	–		
				68	1.5	2.1	–	–		
				305	0.0	0.7	–	–		
				221	1.1	1.9	–	–		
				345	8.6	9.1	–	–		
				385	0.0	0.4	–	–		
				450	0.0	1.6	–	–		
					2.2	3.0	–	–		
				455	0.0	0.3	–	–		
				66	9.6	12.0	–	–		

TABLE 4-1
CURRENT AND FUTURE PROJECTS

Jurisdiction/ Agency	Project Name[1]	Type of Development	Location	Sigurd to Red Butte No. 2 Proposed Route in Relation to Current and Future Projects					Approximate Acreage of Project within the Project Area[2]	Timeframe
				Link Number	From Milepost	To Milepost	Distance from	Relationship		
BLM	Holly Energy UNEV Pipeline	400-mile, 12-inch-diameter petroleum products pipeline	Woods Cross, Utah, to a location north of Las Vegas, Nevada	380	–	–	0.4 mile	–	813.4	Major construction completed in 2011; reclamation to be completed in 2012
				381	–	–	0.4 mile	–		
				155	–	–	0.3 mile	–		
				160	–	–	0.3 mile	–		
				163	–	–	0.3 mile	–		
				165	–	–	0.3 mile	–		
				220	–	–	0.4 mile	–		
				221	–	–	0.4 mile	–		
				441	0.4	0.5	0.3 mile	Crosses		
				222	–	–	0.3 mile	–		
				442	–	–	0.3 mile	–		
				444	4.3	4.4	0.2 mile	Crosses		
				270	–	–	0.5 mile	–		
				275	–	–	0.3 mile	–		
				290	–	–	0.3 mile	–		
				445	1.3	1.4	–	Crosses		
				443	–	–	0.0 to 0.2 mile			
				285	–	–	–	Crosses		
				435	–	–	–	Crosses		
	2011 Oil and Gas Leases	Oil and gas extraction (no developments have been proposed)	Iron County	30	0.0	0.3	–	–	30,451.2	No specific timeframe; parcels are not currently leased
				33	0.2	1.0	–	–		
					1.5	2.4	–	–		
					4.6	4.9	–	–		
				155	2.1	3.8	–	–		
				160	0.4	1.1	–	–		
					2.5	4.6	–	–		
					5.0	5.3	–	–		
					7.4	8.9	–	–		
					9.1	9.6	–	–		
					13.8	14.0	–	–		
					16.8	17.3	–	–		

TABLE 4-1
CURRENT AND FUTURE PROJECTS

Jurisdiction/ Agency	Project Name[1]	Type of Development	Location	Sigurd to Red Butte No. 2 Proposed Route in Relation to Current and Future Projects					Approximate Acreage of Project within the Project Area[2]	Timeframe
				Link Number	From Milepost	To Milepost	Distance from	Relationship		
BLM	2011 Oil and Gas Leases	Oil and gas extraction (no developments have been proposed)	Iron County	163	0.0	1.2	–	–	30,451.2	No specific timeframe; parcels are not currently leased
					2.3	3.2	–	–		
				165	0.0	4.7	–	–		
					5.3	6.0	–	–		
					10.2	10.4	–	–		
				395	0.1	1.3	–	–		
					2.9	3.9	–	–		
				396	0.0	0.6	–	–		
					2.8	10.6	–	–		
				397	1.1	3.0	–	–		
				430	0.0	1.0	–	–		
					5.3	5.8	–	–		
					6.1	6.6	–	–		
					6.7	7.3	–	–		
					8.3	10.1	–	–		
				435	0.0	0.3	–	–		
					1.9	2.0	–	–		
					2.5	3.0	–	–		
				438	0.0	2.2	–	–		
					3.7	4.9	–	–		
				475	1.4	4.9	–	–		
				480	0.2	1.4	–	–		
					3.1	4.2	–	–		
				490	0.0	0.5	–	–		
					2.7	7.3	–	–		
					7.8	10.1	–	–		

TABLE 4-1
CURRENT AND FUTURE PROJECTS

Jurisdiction/ Agency	Project Name[1]	Type of Development	Location	Sigurd to Red Butte No. 2 Proposed Route in Relation to Current and Future Projects					Approximate Acreage of Project within the Project Area[2]	Timeframe
				Link Number	From Milepost	To Milepost	Distance from	Relationship		
BLM	TransWest Express Transmission Project	800-mile-long 600kV direct current transmission line	Wyoming, Colorado, Utah, and Nevada	380	5.8	10.4	275 feet	Coincident	4,073.3	Environmental Impact Statement (EIS) scheduled for completion in 2014; in-service date 2017
				381	0.0	0.4	650 feet	Coincident		
				155	1.6	–	300 feet	Coincident		
				160	–	–	–	Coincident		
				163	–	–	–	Coincident		
				165	–	–	–	Coincident		
				220	–	–	–	Coincident		
				221	–	–	–	Coincident		
				222	–	–	–	Coincident		
				225	–	–	0.3 mile	Coincident		
				270	–	–	0.1 mile	–		
				275	–	–	0.5 mile	–		
				290	–	–	0.6 mile	–		
				440	–	–	–	Crosses		
				285	–	–	–	Crosses		
	Cameron Substation to Milford Substation 138kV Transmission Project	138kV transmission line	Beaver County	470	7.7	7.7	–	Crosses	187.0	Environmental Assessment in Progress; In-service date 2014
				390	7.9	8.0	–	Crosses		
	Thermo North to First Wind Transmission Corridor Project	34-mile-long 138kV transmission line	Beaver County	380	4.5	10.4	–	Parallel	425.1	Project on hold
				386	2.4	2.5	–	Crosses		
				381	0.0	8.6	–	Parallel		
					4.3	4.4	–	Crosses		
					7.0	7.1	–	Crosses		
				155	0.0	11.9	–	Parallel		
					7.0	7.1	–	Crosses		
				160	0.0	5.5	–	Parallel		

TABLE 4-1
CURRENT AND FUTURE PROJECTS

Jurisdiction/ Agency	Project Name[1]	Type of Development	Location	Sigurd to Red Butte No. 2 Proposed Route in Relation to Current and Future Projects					Approximate Acreage of Project within the Project Area[2]	Timeframe
				Link Number	From Milepost	To Milepost	Distance from	Relationship		
BLM	Wasatch Wind: Milford South Wind Testing Area	Wind testing area, with potential to become a wind farm	Beaver County	Not applicable – project cancelled						
	Mormon Mesa Power Partners, LLC: Wind Testing Project Area	Wind testing area, with potential to become a wind farm	Millard and Beaver counties	Area E					108,978.5	Application submitted to BLM March 2009; decision expected by end of 2012
				381	0.0	0.9	–	–		
				386	1.9	3.2	–	–		
				380	9.6	10.4	–	–		
				Area N						
				396	0.1	0.6	–	–		
					1.8	3.8	–	–		
				490	0.0	0.5	–	–		
					1.7	3.8	–	–		
	Milford Wind Phase I	Wind farm	Millard County	345	–	–	1.8 miles	–	17,492.8	Complete
				450	–	–	1.2 miles	–		
				385	–	–	0.3 mile	–		
				380	–	–	3.4 miles	–		
				350	–	–	4.7 miles	–		
				360	–	–	4.7 miles	–		
	Milford Wind Phase II	Wind farm	Millard County	360	–	–	2 miles	–	9,195.0	Complete
				345	–	–	1.7 miles	–		
				385	–	–	5.8 miles	–		
				380	–	–	3.2 miles	–		

TABLE 4-1
CURRENT AND FUTURE PROJECTS

Jurisdiction/ Agency	Project Name[1]	Type of Development	Location	Sigurd to Red Butte No. 2 Proposed Route in Relation to Current and Future Projects					Approximate Acreage of Project within the Project Area[2]	Timeframe
				Link Number	From Milepost	To Milepost	Distance from	Relationship		
BLM	Milford Wind Corridor, LLC Phase III	Wind farm	Millard County/ Beaver County	350	4.6	5.3	–	–	18,635.3	Conditional use permit approved in November 2011; construction planned to begin in fourth quarter 2011; no construction has started as of June 2012
				360	0.0	7.6	–	–		
				345	0.0	3.5	–	–		
	Milford Wind Corridor, LLC Phase IV	Wind farm	Millard County	385	5.5	6.1	–	–	46,481.4	Right-of-way application submitted to BLM in June 2010; project put on hold by proponent
				386	0.0	0.4	–	–		
					1.4	1.9	–	–		
				380	6.6	7.1	–	–		
					7.6	9.6	–	–		
	Mineral Mountain Wind Development	Wind testing area, with potential to become a wind farm	Beaver County	75	11.5	13.1	–	–	6,863.6	Plan of Development in progress; in-service date anticipated in 2015 (Johnson 2012)
BLM/ Department of Energy	Milford Flats South Solar Study Area	Solar study area, with potential to become a solar farm	Beaver County	395	0.1	0.7	–	–	6,440.0 (O'Donoghue 2009)	Final Programmatic EIS released July 2012 (BLM/ DOE 2012)
				380	0.2	0.9	–	–		

TABLE 4-1
CURRENT AND FUTURE PROJECTS

Jurisdiction/ Agency	Project Name[1]	Type of Development	Location	Sigurd to Red Butte No. 2 Proposed Route in Relation to Current and Future Projects					Approximate Acreage of Project within the Project Area[2]	Timeframe
				Link Number	From Milepost	To Milepost	Distance from	Relationship		
BLM/ Department of Energy	Escalante Valley Solar Study Area	Solar study area, with potential to become a solar farm	Iron County	163	–	–	7.5 miles	–	1,333.3	Final Programmatic EIS released July 2012 (BLM/ DOE 2012)
				165	–	–	7.5 miles	–		
				220	–	–	7.5 miles	–		
Federal Energy Regulatory Commission/ BLM	Kern River Apex Expansion	Compressor station	3 miles northwest of Minersville, Utah	470	–	–	2.2 miles	–	5.0 (estimated)	Complete
				475	–	–	2.2 miles	–		
		Pipeline	Beaver, Iron, and Washington counties	165	0.0	14.6	1,650 feet	Parallel	678.8	Complete
				220	0.0	9.6	1,650 to 3,200 feet	Parallel		
				221	0.0	5.2	1,650 to 5,900 feet	Parallel		
				222	0.0	1.6	1,720 feet	Parallel		
				225	0.0	2.6	2,160 feet	Parallel		
				225	2.6	5.4	4,800 feet	Parallel		
				271	0.0	5.4	2,875 feet	Parallel		
				272	0.0	5.4	1,000 feet	Parallel		
				275	0.0	2.4	580 to 2,580 feet	Parallel		
				348	0.0	3.0	1,500 feet	Parallel		
				349	0.0	1.2	1,500 feet	Parallel		
				390	0.0	12.4	1,500 feet	Parallel		
				395	0.0	4.0	1,500 feet	Parallel		
				396	0.0	14.6	1,500 feet	Parallel		
				441	0.0	3.1	Max distance away is 2,000 feet	Crosses at Milepost 0.4		
				442	0.0	1.8	1,500 feet	Parallel		
				443	0.0	4.2	20 to 1,600 feet	Parallel		

TABLE 4-1
CURRENT AND FUTURE PROJECTS

Jurisdiction/ Agency	Project Name[1]	Type of Development	Location	Sigurd to Red Butte No. 2 Proposed Route in Relation to Current and Future Projects					Approximate Acreage of Project within the Project Area[2]	Timeframe
				Link Number	From Milepost	To Milepost	Distance from	Relationship		
Federal Energy Regulatory Commission/ BLM	Kern River Apex Expansion	Pipeline	Millard, Beaver, Iron, and Washington counties	444	0.0	5.4	1,300 to 2,200 feet	Crosses from Milepost 4.6 to 4.7	678.8	Complete
				445	0.0	3.0	Max distance away is 3,690 feet	Crosses from Milepost 1.3 to 1.4		
				450	0.0	3.0	75 feet	Parallel		
				460	0.0	1.4	75 feet	Parallel		
				470	0.0	12.0	75 feet	Parallel		
				480	0.0	4.2	75 feet	Parallel		
				490	0.0	14.2	75 feet	Parallel		
	Zephyr High-voltage Direct Current (HVDC) Transmission Project[3]	Transmission Line	Sevier, Millard, Beaver, Iron, and Washington counties	24	0.0	0.3	–	Parallel	4,014.5 (estimated)	Anticipated construction in 2017 to 2020; In-service early 2020
				25	0.0	0.6	–	Parallel		
				26	0.0	1.4	–	Parallel		
				27	0.0	0.2	–	Parallel		
				30	0.0	17.2	–	Parallel		
				33	0.0	4.9	–	Parallel		
				45	0.0	1.2	–	Parallel		
				63	0.0	0.9	–	Parallel		
				64	0.0	5.2	–	Parallel		
				66	0.0	12.0	–	Parallel		
				68	0.0	2.1	–	Parallel		
				155	0.0	12.0	–	Parallel		
				160	0.0	17.3	–	Parallel		
				163	0.0	3.2	–	Parallel		
				165	0.0	14.6	–	Parallel		
				220	0.0	9.6	–	Parallel		
				221	0.0	5.2	–	Parallel		
				222	0.0	1.6	–	Parallel		

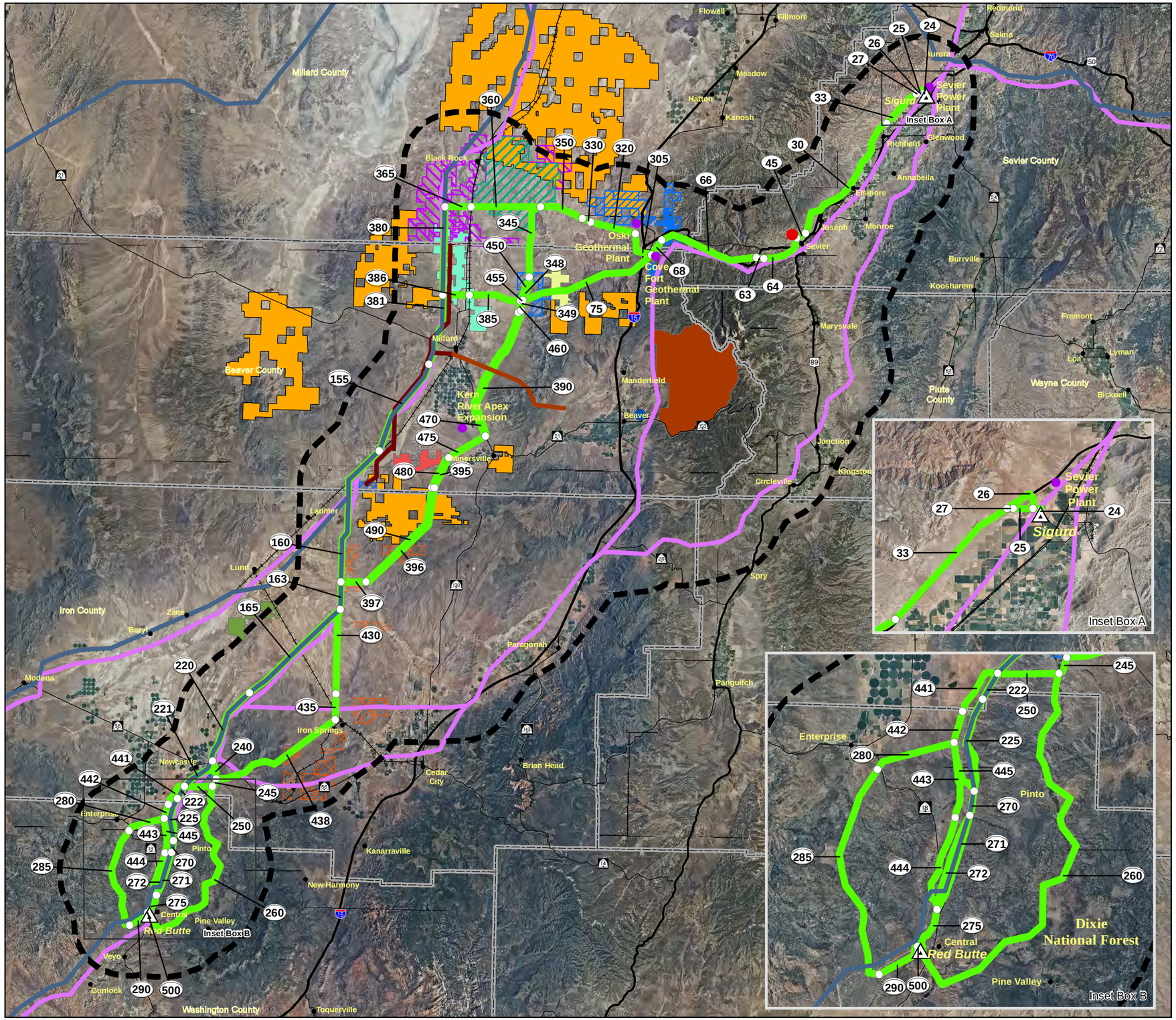
TABLE 4-1
CURRENT AND FUTURE PROJECTS

Jurisdiction/ Agency	Project Name[1]	Type of Development	Location	Sigurd to Red Butte No. 2 Proposed Route in Relation to Current and Future Projects					Approximate Acreage of Project within the Project Area[2]	Timeframe
				Link Number	From Milepost	To Milepost	Distance from	Relationship		
Federal Energy Regulatory Commission/ BLM	Zephyr HVDC Transmission Project[3]	Transmission Line	Sevier, Millard, Beaver, Iron, and Washington counties	240	0.0	2.2	–	Parallel	4,014.5 (estimated)	Anticipated construction in 2017 to 2020; In-service early 2020
				270	0.0	1.4	–	Parallel		
				271	0.0	5.4	–	Parallel		
				272	0.0	5.4	–	Parallel		
				275	0.0	2.4	–	Parallel		
				290	0.0	2.7	–	Parallel		
				380	0.0	10.4	–	Parallel		
				381	0.0	8.6	–	Parallel		
				441	0.0	3.1	–	Parallel		
				442	0.0	1.8	–	Parallel		
				443	0.0	4.2	–	Parallel		
				444	0.0	5.4	–	Parallel		
				445	0.0	3.0	–	Parallel		
				500	0.0	0.1	–	Parallel		
Iron County	Palladon Pipelines	9-mile-long aboveground slurry and water pipelines	Iron County	Not applicable – project cancelled (Cutler 2012)						
Sevier County	Sevier Power Company Power plant	540 megawatt gas-fired power plant	East of Sigurd Substation on SR 118	26	–	–	1.0 mile	–	40.0 (Hanson 2011)	Permitting to be completed in June 2012 (Taylor 2012)
				24	–	–	1.0 mile	–		
U.S. Forest Service (USFS)	North Beaver Fuels Project Environmental Assessment	Prescribed burn	Fishlake National Forest, Beaver District	66	–	–	8.7 miles	–	59,965.7 (USFS 2010b)	Expected implementation, Spring 2012 (Norman 2012)
				75	–	–	8.5 miles	–		
				460	–	–	16.0 miles	–		
				390	–	–	16.0 miles	–		
				470	–	–	16.0 miles	–		

TABLE 4-1
CURRENT AND FUTURE PROJECTS

Jurisdiction/ Agency	Project Name[1]	Type of Development	Location	Sigurd to Red Butte No. 2 Proposed Route in Relation to Current and Future Projects					Approximate Acreage of Project within the Project Area[2]	Timeframe
				Link Number	From Milepost	To Milepost	Distance from	Relationship		
USFS	Watts Mountain Vegetation Management Environmental Assessment	Prescribed burn and mechanical treatment	Fishlake National Forest, Fillmore Ranger District	Not applicable – project cancelled (USFS 2011b)						
	Meteorological Testing Site Categorical Exclusion[4]	Wind testing area, with potential to become a wind farm	Cove Fort Area	Not applicable – project cancelled (Twitchell 2011)						
	Red Butte Substation Expansion	Substation	West of Central, Utah	290	–	–	1 mile	–	17.0 (Klungervik 2010)	Completed in 2011
	Green Solutions Pozzolan Mine	Open-pit mine	East of Fremont Indian State Park	45	–	–	0.7 mile	–	31.0 (Richfield Reaper 2011)	No specific timeframe
				64	–	–	0.7 mile	–		

NOTES:
[1] Current and future projects listed here are current as of June 2012.
[2]Total estimated acreage of all projects in the Project area: 347,788.8 acres
[3] The Zephyr HVDC Transmission Project is preliminary. The links and mileages listed are based on preliminary alternative route options from Zephyr Power Transmission LLC, dated March 2012.
[4] Mapping data was not available.
kV = Kilovolt



MAP 4-1
PROPOSED PROJECTS

PROJECT FEATURES
- Alternative Routes Being Considered
- Project Study Area
- Existing Substation
- Link Node
- Link Number

PROPOSED TRANSMISSION LINES
- Cameron to Milford 138kV
- Thermo North to First Wind
- TransWest Express
- Zephyr

PROPOSED ENERGY PROJECTS
- Proposed Energy Projects
- Escalante Valley Solar Study Area
- Milford Flats South Solar Study Area
- Milford Wind Testing Area
- Milford Wind Phase III
- Milford Wind Phase IV
- Mineral Mountain Wind Farm
- Mormon Mesa Wind Testing Area
- North Beaver Fuels Reduction Project Area
- Oil and Gas Leases
- Geothermal Leases

OTHER PROPOSED PROJECTS
- Beaver City Culinary Water System Improvements
- Green Solutions Pozzolan Mine

OTHER EXISTING LINEAR FACILITIES
- Interstate & U.S. Highway
- State Highway
- Railroad

GENERAL REFERENCE FEATURES
- County Boundary

Data Sources

Energy Gateway South: RMP, 2010; Cameron to Milford: BLM, 2010
Thermo North to First Wind: Comlink Land Services; LLC, 2010 Transwest Express: AECOM, 2010; Zephyr: USFS, 2012
Escalante Valley Solar Study Area: BLM, 2009; Milford Flats South Solar Area: BLM, 2009
Milford Wind: CH2M Hill, 2011; Milford Wind Testing Area: BLM, 2012; Mineral Mountains Wind Farm: enXco, 2009
Mormon Mesa Wind Farm: Champlin Energy Data, 2008; North Beaver Fuels Reduction Project Area: USFS, 2010
Sevier Power Plant: Sevier County, 2010
Parker Knoll: BLM, 2010; Beaver Water: Beaver City, 2010;
Geothermal Leases: EPG, 2009; Kern River Apex: BLM, 2010; Oil and Gas Leases: BLM, 2010
Oski Geothermal Plant: BLM, 2010; Cove Fort Geothermal Plant: BLM, 2010
Green Solutions Pozzolan Mine: BIO-WEST Inc., 2010; Geothermal (Sulpherdale): Fishlake National Forest, 2010
Transportation: NTAD2008, U.S. Department of Transportation; Railroad: FRA, 2008
Roads, County Boundary: ESRI, 2008
Water, River, Stream: USGS, 2008; Hillshade: USGS, 1999; Land Jurisdiction: BLM State Office Utah, 2008
POWERmap, powermap.platts.com © 2007 Platts, A Division of The McGraw-Hill Companies

NOTES:
Data presented on the map are current as of June 2012.

0 6 12 24
Miles

October 2012

Final EIS

SIGURD TO RED BUTTE NO. 2 345kV TRANSMISSION PROJECT

Path: Q:\SRB\FEIS\Apps\FEIS_2_Apps\Volume_1_Proposed_Projects_Inset.mxd

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TABLE 4-2
REASONABLY FORESEEABLE ACTIONS

Jurisdiction/ Agency	Project Name	Type of Development	Location	Timeframe
U.S. Forest Service (USFS)	Oil and Gas Leases Environmental Impact Statement (EIS)	Oil and gas development	Fishlake and Dixie National Forests	EIS targeted for completion in 2011
Bureau of Land Management (BLM)/USFS	Programmatic EIS for Geothermal Leasing in Western United States	Geothermal energy development	BLM Richfield, Cedar City, and St. George Field Offices, and Fishlake and Dixie National Forests	Ongoing through 2025

Table 4-3 identifies the projects in Tables 4-1 and 4-2 that occur within a relevant distance to each alternative route and could result in cumulative impacts on the resources. The geographical scope of analysis for each resource, and the existing, current, or planned projects that cumulatively could impact the resource, are described for each resource in that resource section.

TABLE 4-3
CURRENT AND FUTURE PROJECTS BY ALTERNATIVE

Project Name	N1	N2	N2-A	N3	N4	N5	N6	S1	S2	S3	S4	S5	S6	S7	S7-A
Beaver City Culinary Water System Improvements					✓	✓	✓								
Cove Fort (Enel) Geothermal Plant	✓	✓	✓	✓	✓	✓	✓								
Oski Geothermal Plant	✓	✓	✓	✓											
Millard Geothermal Leases	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓			✓	✓
Holly Energy UNEV Pipeline	✓	✓	✓		✓			✓	✓	✓	✓	✓	✓	✓	✓
2011 Oil and Gas leases, BLM Cedar City Field Office	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TransWest Express Transmission Project	✓	✓	✓		✓			✓	✓	✓	✓	✓	✓	✓	✓
Cameron Substation to Milford Substation 138-kilovolt Transmission Project				✓		✓	✓								
Thermo North to First Wind Transmission Corridor Project	✓	✓	✓		✓										
Wasatch Wind Milford South Wind Testing Area	Not applicable – project cancelled														
Mormon Mesa Power Partners, LLC: Wind Testing Project Area	✓	✓	✓	✓	✓	✓	✓								
Milford Wind Phase I		✓	✓	✓	✓										

TABLE 4-3
CURRENT AND FUTURE PROJECTS BY ALTERNATIVE

Project Name	N1	N2	N2-A	N3	N4	N5	N6	S1	S2	S3	S4	S5	S6	S7	S7-A
Milford Wind Phase II	✓	✓	✓	✓	✓										
Milford Wind Corridor, LLC Phase III	✓	✓	✓	✓											
Milford Wind Corridor, LLC Phase IV	✓	✓	✓		✓										
Mineral Mountain Wind Development					✓	✓	✓								
Milford Flats South Solar Study Area	✓						✓								
Escalante Valley Solar Study Area								✓	✓	✓	✓	✓	✓	✓	✓
Kern River Apex Expansion				✓		✓	✓								
Zephyr High-Voltage4 Direct Current Transmission Project	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Palladon Pipelines	Not applicable – project cancelled														
Sevier Power Company Power Plant	✓	✓	✓	✓	✓	✓	✓								
Red Butte Substation Expansion										✓			✓		
North Beaver Fuels Reduction Project Area	✓	✓	✓	✓	✓	✓	✓								
Meteorological Testing Site Categorical Exclusion	Not applicable – project cancelled														
Watts Mountain Vegetation Management Environmental Assessment	Not applicable - project cancelled														
Oil and Gas Leases Environmental Impact Statement, Fishlake and Dixie National Forests	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Programmatic Environmental Impact Statement for Geothermal Leasing in Western United States	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Green Solutions Pozzolan Mine	✓	✓	✓	✓	✓	✓	✓								

4.3 Cumulative Effects

4.3.1 Climate and Air Quality

Past, present, and reasonably foreseeable future actions were reviewed in evaluating potential cumulative effects on air quality from implementing the Project. Past and present actions with potential for air quality impacts include residential, commercial, and industrial development; highway construction; oil and gas development; pipeline and transmission line construction; and dust from gravel roads and construction. Air quality in the area also would be affected cumulatively by the reasonably foreseeable future construction and operation of projects, such as wind farm development; residential, commercial, and industrial development; and highway, pipeline, and transmission line construction. Impacts related to power generated during transmission line operation also would affect air quality in the region to the extent such power projects could be located in the general Project vicinity.

4.3.1.1 Geographic and Temporal Scope of Analysis

Direct, cumulative impacts on air quality associated with construction of the proposed transmission line would occur, for the most part, within the immediate geographical area of the construction activities. Most impacts would not persist beyond the immediate construction timeframe, although some fugitive dust emissions would be expected until the temporarily disturbed areas are revegetated adequately.

Because GHG emissions from proposed projects contribute to climate change on a global scale, cumulative impacts of GHG emissions on the local environment cannot be quantified. The lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts. Currently, BLM does not have an established mechanism to predict accurately the effect of resource management-level decisions from this Project-specific effort on global climate change. Although the Project would emit GHGs during construction, the emissions would be temporary, only occurring over a period of less than 2 years. GHG emissions from operation of new equipment at the expanded substations would be negligible.

During the operation phase, indirect cumulative impacts would occur primarily in the vicinity of the power plants generating the electricity transmitted through the line and for the duration of power plant operations. Some localized, limited cumulative impacts also would occur in the immediate vicinity of the transmission line during access for maintenance.

Reasonably foreseeable future actions in the analysis include those projects listed in Tables 4-1 and 4-2. Cumulative effects were analyzed over the duration of the life of the Project.

4.3.1.2 Cumulative Effects

Cumulative effects associated with the construction and operation phases of the Project would be common to all alternatives. For emission sources (e.g., construction activities and road dust), cumulative effects would be temporary and limited in geographic extent. Because of the limited geographical extent and the temporary nature of such activities, the potential for cumulative impacts would be minimal and would occur only in the unlikely event construction activities for other projects occur at essentially the same time and place as the construction of the Project.

The emissions occurring from other power projects that might serve the proposed Project would be managed and planned to adhere to air quality rules, regulations, and attainment plans established by the Utah Department of Environmental Quality and EPA. Power plant emissions would be required to meet permitted emission levels required by air management agencies (with oversight by EPA). At such levels, the emissions would be consistent with applicable air quality management plans. Because the Project has the potential to import renewable energy resources, a reduction of emissions from existing thermal power plants in the region actually could occur.

Based on the cumulative character of the phenomena of GHG emissions and global climate change, it is impractical to link the effects of climate change to GHG emissions associated with a particular project or projects. GHG emissions from Project construction would total approximately 96,500 tons of CO_2e, with up to 62,700 tons CO_2e emitted in the year with maximum construction activity. In contrast, U.S. energy-related CO_2 emissions totaled 6,215 million tons in 2010 (EIA 2011a); energy related CO_2 constitutes approximately 80 percent of total U.S. anthropogenic GHG emissions (EIA 2011b). The maximum annual GHG emissions from Project construction would represent approximately 0.001 percent of annual U.S. energy-related emissions, an insignificant additional contribution to cumulative impacts on air quality in the Great Basin.

Regarding potential cumulative impacts of climate change on the Project over time, design features of the Proposed Action (Section 2.3.5.2) and mitigation measures applied for protection of other resources (Section 3.1.3), such as treatment of noxious and invasive weeds during construction, reclamation of disturbed areas, and post-construction reclamation and weed monitoring, would mitigate cumulative impacts of climate change on the Project.

4.3.2 Earth Resources

4.3.2.1 Geologic Hazards

Numerous geologic hazards are present within the broad area covered by the Project. Past, present, and reasonably foreseeable future actions were reviewed for potential cumulative effects on geologic hazards. For the most part, the Project does not have an effect on geologic hazards; instead, geologic hazards could have an effect on the Project. A geologic hazard that could be subject to cumulative effects is landslide susceptibility resulting from the loss of vegetation or ground-disturbing activities related to the construction phase of the Project and multiple other projects. Cumulative effects of past, present, and reasonably foreseeable future actions are not expected to affect Quaternary faults or seismicity in the region.

Geographic and Temporal Scope of Analysis

Geologic hazards are associated with the geology and topography of a certain region. Much of the Project is located in the eastern margin of the Basin and Range Physiographic Province, west of the Colorado Plateau. The geographic scope of the analysis is the eastern margin of the Basin and Range Physiographic Province. This region is known for its high seismicity, high number of Quaternary faults, and steep terrain.

Geologic hazards could impact directly and indirectly the construction, operation, and maintenance of the Project, either through direct equipment loss, injury to personnel as a result of seismic activity, or landslides or indirect loss of transmission service as a result of seismic activity or landslides.

The temporal scope of analysis for potential cumulative effects on geologic hazards includes 2 years of direct effects during construction and 50 years of indirect effects during the life of the Project.

Reasonably foreseeable actions in the analysis include those projects listed in Tables 4-1 and 4-2 (and summarized by alternative in Table 4-3). Cumulative effects were analyzed over the duration of the life of the Project.

Cumulative Effects

Northern Area – Sigurd Substation to South of the Black Mountains

Alternatives N1 through N6 share the same route between the Sigurd Substation and Cove Fort area. For this route segment, there are no current or future projects planned within the geographic scope of analysis for cumulative impacts associated with potential geologic hazards except the Sevier Power Company Power Plant. The Sevier Power Company Power Plant would not be expected to contribute cumulatively to the potential for geologic hazards given its location away from areas susceptible to landslides. This area contains several Quaternary faults, areas of moderate-to-high landslide susceptibility, and moderate-to-high seismicity. Any current or future projects in this area would be affected similarly by geologic hazards as those anticipated for the Project.

The following discussion of Alternatives N1 through N6 focuses mostly on the links west of Cove Fort.

Alternative N1 – Black Rock Road to IPP North of Milford Wind Farm

The current and future projects that occur within the geographic scope of analysis for cumulative impacts associated with geologic hazards for Alternative N1 are shown in Table 4-3. There is an area of high landslide susceptibility along Link 66 where the implementation of the Project and other current and future projects could increase the potential for landslides.

Alternative N2 – Black Rock Road to IPP South of Milford Wind Farm

The cumulative effects anticipated would be the same as Alternative N1.

Alternative N2-A (Route Variation of Alternative N2) – Black Rock Road to IPP South of Milford Wind Farm 1,500 Feet East of Kern River Pipeline (Agency Preferred Alternative)

The cumulative effects anticipated would be the same as Alternative N2.

Alternative N3 – Black Rock Road Parallel to Kern River Pipeline

The current and future projects that occur in proximity to Alternative N3 are shown in Table 4-3. There is an area of high landslide susceptibility crossed by Link 66 and two areas of moderate landslide susceptibility crossed by Link 490 where the implementation of the Project and other current and future projects could increase the potential for landslides.

Alternative N4 – Mineral Mountains to IPP South of Milford Wind Farm

The current and future projects that occur in proximity to Alternative N4 are shown in Table 4-3. There is an area of high landslide susceptibility crossed by Link 66 and a moderate area of high landslide susceptibility crossed by Link 75 where the implementation of the Project and other current and future projects could increase the potential for landslides.

Alternative N5 – Mineral Mountains Parallel to Kern River Pipeline

The current and future projects that occur in proximity to Alternative N5 are shown in Table 4-3. There is an area of high landslide susceptibility crossed by Link 66 and areas of moderate landslide susceptibility crossed by Links 75 and 490 where the implementation of the Project and other current and future projects could increase the potential for landslides.

Alternative N6 – Mineral Mountains 1,500 Feet East of Kern River Pipeline (Proponent's Preferred Alternative)

The current and future projects that occur in proximity to Alternative N6 are shown in Table 4-3. There is an area of high landslide susceptibility crossed by Link 66 and areas of moderate landslide susceptibility crossed by Links 75, 390, 396, and 490 where the implementation of the Project and other current and future projects could increase the potential for landslides.

Southern Area – South of the Black Mountains to Red Butte Substation

Alternative S1 – Pinto Creek

The current and future projects that occur in proximity to Alternative S1 are shown in Table 4-3. The entire portion of Alternative S1 from Link 220 to the Red Butte Substation occurs within an area of moderate landslide susceptibility where the implementation of the Project and other current and future projects could increase the potential for landslides.

Alternative S2 – IPP West

The cumulative effects anticipated would be the same as Alternative S1.

Alternative S3 – Ox Valley

The cumulative effects anticipated would be the same as Alternative S1.

Alternative S4 – IPP East

The cumulative effects anticipated would be the same as Alternative S1.

Alternative S5 – Iron Springs and Pinto Creek (Proponent's Preferred Alternative)

The current and future projects that occur in proximity to Alternative S5 are shown in Table 4-3. The entire portion of Alternative S5 from Link 438 south is within an area of moderate landslide susceptibility where the implementation of the Project and other current and future projects could increase the potential for landslides.

Alternative S6 – Iron Springs and Ox Valley

The current and future projects that occur in proximity to Alternative S6 are shown in Table 4-3. The entire portion of Alternative S6 from Link 438 south is within an area of moderate landslide susceptibility where the implementation of the Project and other current and future projects could increase the potential for landslides.

Alternative S7 – Middle Hybrid Route

The current and future projects that occur in proximity to Alternative S7 are shown in Table 4-3. The entire portion of Alternative S7 from Link 442 south is within an area of moderate landslide susceptibility where the implementation of the Project and other current and future projects could increase the potential for landslides.

Alternative S7-A (Route Variation of Alternative S7) – Middle Hybrid Route 300 Feet East of Sigurd to Red Butte No. 1 Transmission Line Adjacent to Atchinson IRA (Agency Preferred Alternative)

The current and future projects that occur in proximity to Alternative S7-A are shown in Table 4-3. The entire portion of Alternative S7-A from Link 442 south is within an area of moderate landslide susceptibility where the implementation of the Project and other current and future projects could increase the potential for landslides.

4.3.2.2 Mineral Resources

The addition of the Project to past, present, and reasonably foreseeable future actions would result in the greater potential for effect on mineral resources throughout the Project area. Grading and cutting of access roads, auguring for tower footings and anchors, or creating staging areas for the Project and other current and future projects could interfere directly with the mining of mineral resources. Indirect effects could include improved access and increased visibility of mineral resources. However, mineral resources are associated with the geological formations or units they are found within, which typically are localized and do not encompass large areas. Therefore, a particular geological formation and its mineral resources might not be affected by different projects in the same region. Also, not all geological formations contain mineral resources, or mineral resources could be found only in a portion of a certain geological formation.

Geographic and Temporal Scope of Analysis

Since the Project covers a large area, many of the geological formations within the Project area are crossed several times. This increases the cumulative effects that could occur on a mineral resource within a certain geological formation. Other mineral resources (e.g., oil and gas reserves) can cover large areas,

which also could contribute to the cumulative effect for that mineral resource. Mines typically are smaller and more localized, but mining districts can occur that produce various mineral resources over a larger scale.

The temporal scope of analysis for potential cumulative effects on mineral resources includes 2 years of direct effects during construction and 50 years of indirect effects during the life of the Project. As future projects are implemented in an area, cumulative effects could increase in duration.

Cumulative Effects

Northern Area – Sigurd Substation to South of the Black Mountains

Alternatives N1 through N6 share the same route between the Sigurd Substation and the Cove Fort area. For this route segment, other current and future projects include the Sevier Power Company Power Plant and one active oil and gas well identified in proximity to the proposed area for the Sevier Power Company Power Plant. The construction of the Sevier Power Company Power Plant could contribute cumulatively to impacts on mineral resources by limiting the development or extraction of this mineral resource. This segment also has several oil and gas leases, active mines, and mineral resources. Implementation of future projects in this area in addition to the northern segment of the Project would increase the potential for cumulative effects on mineral resources. Direct effects could be the loss of a mineral resource caused by construction activities, or the limiting of development or extraction of the mineral resource. The following discussion focuses on the route segments located west of Cove Fort.

Alternative N1 – Black Rock Road to IPP North of Milford Wind Farm

Other current and future projects that could have effects on mineral resources along Alternative N1 are shown in Table 4-3. These projects could cross mineral resources also found on the Project, as well as other mineral resources outside of the Alternative N2 route. Many of these projects are in proximity to or parallel this alternative route, potentially adding to cumulative effects on mineral resources. Direct effects from construction activities could include the loss of a mineral resource or the limiting of development or extraction of the mineral resource. Numerous active mines or producing wells are scattered throughout the Project area. These tend to be small and localized and would have little potential impact. However, the cumulative effect on these localized mineral resources increases with the number of projects in a certain region. Areas with concentrations of mineral resources occur near the Cove Fort, Blundell, Milford, and Minersville areas. These areas of higher concentrations could have greater cumulative effects on mineral resource as a result of implementation of the Project and other current and future projects.

Alternative N2 – Black Rock Road to IPP South of Milford Wind Farm

The cumulative effects anticipated would be the same as Alternative N1.

Alternative N2-A (Route Variation of Alternative N2) – Black Rock Road to IPP South of Milford Wind Farm 1,500 Feet East of Kern River Pipeline (Agency Preferred Alternative)

The cumulative effects anticipated would be the same as Alternative N1.

Alternative N3 – Black Rock Road Parallel to Kern River Pipeline

The cumulative effects anticipated would be the same as Alternative N1.

Alternative N4 – Mineral Mountains to IPP South of Milford Wind Farm

The cumulative effects anticipated would be the same as Alternative N1.

Alternative N5 – Mineral Mountains Parallel to Kern River Pipeline

The cumulative effects anticipated would be the same as Alternative N1.

Alternative N6 – Mineral Mountains 1,500 Feet East of Kern River Pipeline (Proponent's Preferred Alternative)

The cumulative effects anticipated would be the same as Alternative N1 except that Link 349 crosses an active mining area.

Southern Area – South of the Black Mountains to Red Butte Substation

Alternative S1 – Pinto Creek

The current and future projects that could have effects on mineral resources along Alternative S1 are shown in Table 4-3. These projects are in proximity to or parallel Alternative S1, possibly adding to the cumulative effect on mineral resources. Direct effects from construction activities could be the loss of a mineral resource or the limiting of development or extraction of the mineral resource. Numerous active mines or producing wells are scattered throughout the Project area. These tend to be small and localized and would have little potential impact. However, the cumulative effect of the Project on these localized mineral resources increases with the number of projects in a certain region. Areas with small concentrations of mineral resources occur near Newcastle and the Red Butte Substation. These areas of higher concentrations could have greater cumulative effects on mineral resources as a result of implementation of the Project and other current and future projects.

Alternative S2 – IPP West

The cumulative effects anticipated would be similar to Alternative S1.

Alternative S3 – Ox Valley

The cumulative effects anticipated would be similar to Alternative S1.

Alternative S4 – IPP East

The cumulative effects would be similar to Alternative S1.

Alternative S5 – Iron Springs and Pinto Creek (Proponent's Preferred Alternative)

The cumulative effects would be similar to Alternative S1 except that Links 430 and 438 would cross existing oil and gas leases and small concentrations of mineral resources only occur near the Red Butte Substation.

Alternative S6 – Iron Springs and Ox Valley

The cumulative effects anticipated would be similar to Alternative S1.

Alternative S7 – Middle Hybrid Route

The cumulative effects anticipated would be similar to Alternative S1.

Alternative S7-A (Route Variation of Alternative S7) – Middle Hybrid Route 300 Feet East of Sigurd to Red Butte No. 1 Transmission Line Adjacent to Atchinson IRA (Agency Preferred Alternative)

The cumulative effects anticipated would be similar to Alternative S1.

4.3.2.3 Soil Resources

Project-related impacts on soil resources result either from the permanent conversion of designated farmland soils to nonagricultural uses or from alterations to the natural environment that could increase the rate of soil erosion by water or wind collectively could result in limited loss of productivity of soils within the watershed. The cumulative effect of the Project on soil resources increases with the number and size of projects in a certain region.

Currently, the Project would cross soil units that have been designated Prime and Unique Farmland. The potential for increased erosion resulting from unrestricted public access to previously undisturbed areas could be mitigated by closing and rehabilitating any access roads not necessary for future maintenance of the Project. Furthermore, the cumulative effect the Project could have on increased access would be significantly reduced in previously disturbed areas (e.g., along the Kern River Pipeline) because the Project would use pre-existing access points.

The implementation of appropriate mitigation measures would minimize short-term cumulative impacts (e.g., disturbance of surface soils and other alterations to the natural landscape stemming from construction of the Project and other current projects in an area) such that the local soil resources would be stabilized or returned to a condition close to their preconstruction state. Long-term cumulative impacts on soil resources would be associated with the permanent conversion of designated farmland soils to nonagricultural uses and unrestricted public access via new access roads to previously undisturbed areas associated with construction and maintenance of the Project and other current and future projects.

Geographic and Temporal Scope of Analysis

The geographic scope of analysis for soil resources is considered to be each individual geomorphic feature crossed by the Project. These features include the Sevier River Valley, Tushar Mountains, Mineral Mountains, Escalante Desert, Black Mountains, Antelope Range, Ox Valley, and Bull Valley Mountains.

Cumulative effects unlikely are to spread beyond a given valley, or the mountain range and valleys bounding that range where the effects would occur.

The temporal scope of analysis for potential cumulative effects on soil resources includes 2 years of direct effects during construction and 50 years of indirect effects during the life of the Project. For the purpose of comparison of the alternatives, the approximate acreage of current and future projects within the Project area is presented in Table 4-1 and can provide some indication of the cumulative acreage of projects associated with potential cumulative effects on soil resources.

Cumulative Effects

Northern Area – Sigurd Substation to South of the Black Mountains

The Twitchell Canyon Fire burned more than 44,000 acres of USFS-administered lands along Links 66 and 68 during the summer of 2010. The *Burned Area Emergency Response* report created by the Fishlake National Forest (USFS 2010c) details the short- and long-term plans for the response and rehabilitation projects that would be implemented within the burned area. Ongoing aspects of the response and rehabilitation would include applications of wheat straw mulch to stabilize and protect the unvegetated land surface and seeding efforts to restore vegetation to the land surface. These efforts along with reclamation measures and post-reclamation monitoring cumulatively could result in beneficial effects on soil resources in these areas.

Construction of power plants and pumping systems associated with geothermal leases would affect erodible soils along Links 66 and 68 by increasing potential for erosion and indirectly impacting soil productivity. Impacts would increase with the number of leases developed.

Current and future projects that could affect soil resources along the northern alternatives are shown in Table 4-3. The following discussion consists of route segments located west of Cove Fort (i.e., not common to all alternatives).

Alternative N1 – Black Rock Road to IPP North of Milford Wind Farm

Erodible soil would be affected by the TransWest Express Transmission Project, the Thermo North to First Wind Transmission Corridor Project, Zephyr High-voltage Direct Current (HVDC) Transmission Project, and the UNEV Pipeline along Links 380, 381, 155, and 160; the Milford Flats Solar Study Area and the Milford Wind Corridor, LLC Phase IV project along Link 380; the Mormon Mesa Power Partners Wind Testing Project Area along Link 381; Milford Wind Farm Phase II along Links 360 and 380; the Milford Wind Corridor, LLC Phase III project along Links 350 and 360; oil and gas leases along Link 160; and geothermal leases along Link 320. The construction and development of these types of projects could have direct (i.e., increased soil erosion or loss of farmland soils) and indirect (i.e., degradation of the land surface and loss of soil productivity) effects on soils, as well as effects from ground-disturbing activities.

Alternative N2 – Black Rock Road to IPP South of Milford Wind Farm

Erodible soil would be affected by the TransWest Express Transmission Project, Zephyr HVDC Transmission Project, and the UNEV Pipeline along Links 381, 155, and 160; the Thermo North to First Wind Transmission Corridor Project along Links 381, 386, 155, and 160; the Mormon Mesa Power

Partners Wind Testing Project Area along Links 386 and 381; the Milford Wind Farm Phase I along Links 340, 450, 385, and 350; the Milford Wind Farm Phase II along Links 345 and 385; the Milford Wind Corridor, LLC Phase III project along Links 350 and 345; oil and gas leases along Link 160; and geothermal leases along Links 345 and 450. Erodible and farmland soils would be affected by the Milford Wind Corridor, LLC Phase IV project along Links 385 and 386. The construction and development of these types of projects could have direct (i.e., increased soil erosion or loss of farmland soils) and indirect (i.e., degradation of the land surface and loss of soil productivity) effects on soils, as well as effects from ground-disturbing activities. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative N2-A (Route Variation of Alternative N2) – Black Rock Road to IPP South of Milford Wind Farm 1,500 Feet East of Kern River Pipeline (Agency Preferred Alternative)

Erodible soil would be affected by the TransWest Express Transmission Project and the UNEV Pipeline along Links 381, 155, and 160; the Zephyr HVDC Transmission Project along Links 155 and 160; the Thermo North to First Wind Transmission Corridor Project along Links 381, 386, 155, and 160; the Mormon Mesa Power Partners Wind Testing Project Area along Links 386 and 381; the Milford Wind Farm Phase I along Links 345, 385, and 350; the Milford Wind Farm Phase II along Links 345 and 385; the Milford Wind Corridor, LLC Phase III project along Links 350 and 345; oil and gas leases along Link 160; and geothermal leases along Links 455 and 385. Erodible and farmland soils would be affected by the Milford Wind Corridor, LLC Phase IV project along Links 385 and 386. The construction and development of these types of projects could have direct (i.e., increased soil erosion or loss of farmland soils) and indirect (i.e., degradation of the land surface and loss of soil productivity) effects on soils, as well as effects from ground-disturbing activities. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative N3 – Black Rock Road Parallel to Kern River Pipeline

Erodible soil would be affected by the Cameron to Milford 138kV Wind Transmission Corridor Project along Link 470; the Milford Wind Farm Phase I along Links 345, 350 and 450; the Milford Wind Farm Phase II along Link 345; the Milford Wind Corridor, LLC Phase III project along Links 350 and 345; and geothermal leases along Links 345, 450, and 460. Erodible and farmland soils would be affected by the Mormon Mesa Power Partners Wind Testing Project Area and oil and gas leases along Link 490. The construction and development of these types of projects could have direct (i.e., increased soil erosion or loss of farmland soils) and indirect (i.e., degradation of the land surface and loss of soil productivity) effects on soils, as well as effects from ground-disturbing activities.

Alternative N4 – Mineral Mountains to IPP South of Milford Wind Farm

Erodible soil would be affected by the TransWest Express Transmission Project, Zephyr HVDC Transmission Project, and the UNEV Pipeline along Links 381, 155, and 160; the Cove Fort Geothermal Plant and the Mineral Mountain Wind Development along Link 75; the Milford Wind Farm Phases I and II along Link 385; the Thermo North to First Wind Transmission Corridor along Links 386, 381, 155, and 160; the Milford Wind Corridor, LLC Phase IV project along Links 385 and 386; oil and gas leases along Link 160; and geothermal leases along Links 75, 455, and 385. The construction and development of these types of projects could have direct (i.e., increased soil erosion or loss of farmland soils) and indirect (i.e., degradation of the land surface and loss of soil productivity) effects on soils, as well as effects from

ground-disturbing activities. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative N5 – Mineral Mountains Parallel to Kern River Pipeline

Erodible soil would be affected by the Cove Fort Geothermal Plant and the Mineral Mountain Wind Development along Link 75; the Cameron to Milford 138kV Wind Transmission Corridor Project along Link 470; oil and gas leases along Link 397; and geothermal leases along Links 75 and 455. Erodible and farmland soils would be affected by the Mormon Mesa Power Partners Wind Testing Project Area and oil and gas leases along Link 490. The construction and development of these types of projects could have direct (i.e., increased soil erosion or loss of farmland soils) and indirect (i.e., degradation of the land surface and loss of soil productivity) effects on soils, as well as effects from ground-disturbing activities.

Alternative N6 – Mineral Mountains 1,500 Feet East of Kern River Pipeline (Proponent's Preferred Alternative)

Erodible soil would be affected by the Cove Fort Geothermal Plant and the Mineral Mountain Wind Development along Link 75; the Cameron to Milford 138kV Wind Transmission Corridor Project along Link 390; Mormon Mesa Power Partners Wind Testing Project Area along Link 396; the Milford Flats South Solar Study Area along Link 395, oil and gas leases along Links 396 and 397; and geothermal leases along Links 75 and 349. The construction and development of these types of projects could have direct (i.e., increased soil erosion or loss of farmland soils) and indirect (i.e., degradation of the land surface and loss of soil productivity) effects on soils, as well as effects from ground-disturbing activities.

Southern Area – South of the Black Mountains to Red Butte Substation

Current and future projects that could affect soil resources along the southern alternatives are shown in Table 4-3.

Alternative S1 – Pinto Creek

Cumulative effects on soil resources crossed by designated farmland soils for Alternative S1 could occur along Links 163, 165, 220, 245, and 260.

Erodible soil would be affected by the TransWest Express Transmission Project, the Zephyr HVDC Transmission Project, the UNEV Pipeline, and the Escalante Valley Solar Study Area along Links 163, 165, and 220 and oil and gas leases along Links 163 and 165. The construction and development of these types of projects could have direct (i.e., increased soil erosion or loss of farmland soils) and indirect (i.e., degradation of the land surface and loss of soil productivity) effects on soils, as well as effects from ground-disturbing activities. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative S2 – IPP West

Cumulative effects on soil resources crossed by designated farmland soils would be the same as Alternative S1, except it also would cross Links 221, 441, and 442.

Erodible soil would be affected by the TransWest Express Transmission Project along Links 163, 165, 220, 221, and 275; the Zephyr HVDC Transmission Project and UNEV Pipeline along Links 163, 165, 220, 221, 441, and 275; the Escalante Valley Solar Study Area along Links 163, 165, and 220; oil and gas leases along Links 163 and 165; and geothermal leases along Link 221. The construction and development of these types of projects could have direct (i.e., increased soil erosion or loss of farmland soils) and indirect (i.e., degradation of the land surface and loss of soil productivity) effects on soils, as well as effects from ground-disturbing activities. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative S3 – Ox Valley

Cumulative effects on soil resources crossed by designated farmland soils would be the same as Alternative S2.

Erodible soil would be affected by the TransWest Express Transmission Project along Links 163, 165, 220, 221, 285, and 290; the Zephyr HVDC Transmission Project along Links 163, 165, 220, 221, 441, and 442; the UNEV Pipeline along Links 163, 165, 220, 221, 441, 442, 290, and 285; the Escalante Valley Solar Study Area along Links 163, 165, and 220; oil and gas leases along Links 163 and 165; and geothermal leases along Link 221. The construction and development of these types of projects could have direct (i.e., increased soil erosion or loss of farmland soils) and indirect (i.e., degradation of the land surface and loss of soil productivity) effects on soils, as well as effects from ground-disturbing activities. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative S4 – IPP East

Cumulative effects on soil resources crossed by designated farmland soils would be the same as Alternatives S2 and S3, except it would not cross Links 441 and 442.

Erodible soil would be affected by the TransWest Express Transmission Project, the Zephyr HVDC Transmission Project, and the UNEV Pipeline along Links 163, 165, 220, 221, and 275; the Escalante Valley Solar Study Area along Links 163, 165, and 220; and geothermal leases along Link 221. Erodible and farmland soils would be affected by oil and gas leases along Links 163 and 165. The construction and development of these types of projects could have direct (i.e., increased soil erosion or loss of farmland soils) and indirect (i.e., degradation of the land surface and loss of soil productivity) effects on soils, as well as effects from ground-disturbing activities. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative S5 – Iron Springs and Pinto Creek (Proponent's Preferred Alternative)

Cumulative effects on soil resources crossed by designated farmland soils would be the same as Alternatives S1, except it would cross Links 430, 435, and 438 and not cross Links 165, 220, and 221.

Erodible soil would be affected by the TransWest Express Transmission Project, the UNEV Pipeline, and the Escalante Valley Solar Study Area along Link 163, 165, and 220; the Zephyr HVDC Transmission Project along Link 163; and oil and gas leases along Links 163 and 438. Erodible and farmland soils would be affected by geothermal leases along Link 245. The construction and development of these types of projects could have direct (i.e., increased soil erosion or loss of farmland soils) and indirect (i.e.,

degradation of the land surface and loss of soil productivity) effects on soils, as well as effects from ground-disturbing activities. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative S6 – Iron Springs and Ox Valley

Cumulative effects on soil resources crossed by designated farmland soils would be the same as Alternatives S5, except it would cross Links 441 and 442 and not Link 260.

Erodible soil would be affected by the TransWest Express Transmission Project along Links 163, 430, 435, and 438; the Zephyr HVDC Transmission Project along Links 163, 441, and 442; the UNEV Pipeline along Links 163, 441, 442, 285, and 290; the Escalante Valley Solar Study Area along Link 163; and oil and gas leases along Links 163 and 165. The construction and development of these types of projects could have direct (i.e., increased soil erosion or loss of farmland soils) and indirect (i.e., degradation of the land surface and loss of soil productivity) effects on soils, as well as effects from ground-disturbing activities. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative S7 – Middle Hybrid Route

Cumulative effects on soil resources crossed by designated farmland soils would be the same as Alternatives S2 and S3.

Erodible soil would be affected by the TransWest Express Transmission Project along Links 163, 165, 220, 221, 270, and 275; the Zephyr HVDC Transmission Project along Links 163, 165, 220, 221, 441, 442, 445, and 275; and the UNEV Pipeline along Links 163, 165, 220, 221, 441, 442, 275, and 445; the Escalante Valley Solar Study Area along Links 163, 165, and 220; and geothermal leases along Link 221. Erodible and farmland soils would be affected by oil and gas leases along Links 163 and 165. The construction and development of these types of projects could have direct (i.e., increased soil erosion or loss of farmland soils) and indirect (i.e., degradation of the land surface and loss of soil productivity) effects on soils, as well as effects from ground-disturbing activities. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative S7-A (Route Variation of Alternative S7) – Middle Hybrid Route 300 Feet East of Sigurd to Red Butte No. 1 Transmission Line Adjacent to Atchinson IRA (Agency Preferred Alternative)

Cumulative effects on soil resources crossed by designated farmland soils would be the same as Alternatives S2 and S3.

Erodible soil would be affected by the TransWest Express Transmission Project along Links 163, 165, 220, 221, 270, and 275; the Zephyr HVDC Transmission Project and the UNEV Pipeline along Links 163, 165, 220, 221, 441, 442, 275, and 445; the Escalante Valley Solar Study Area along Links 163, 165, and 220; and geothermal leases along Link 221. Erodible and farmland soils would be affected by oil and gas leases along Links 163 and 165. The construction and development of these types of projects could have direct (i.e., increased soil erosion or loss of farmland soils) and indirect (i.e., degradation of the land surface and loss of soil productivity) effects on soils, as well as effects from ground-disturbing activities.

If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

4.3.3 Water Resources

Cumulative effects on water resources could result from the Project's incremental modification of surface-water features, wetlands, riparian habitats, shallow groundwater, springs, and wells when added to the impacts on water resources associated with the implementation of other current and future projects. That is, the effects from implementing the Project and other projects could result in individually minor, but collectively significant impacts as development around and within the Project area takes place over time. Cumulative effects include, but are not limited to, the removal of riparian and wetland vegetation; the grading and construction of access roads and stream crossings; an increase in traffic due to construction, operation and maintenance and consequently an increase in airborne dust; and the creation of additional roads available for public use, possibly resulting in increased sediment deposition into water resources and a subsequent decrease in water quality. Additionally, effects on water resources from the introduction of deleterious materials into water resources (e.g., run-off from mine tailings, fracking fluid, or accidental spills of fuel or oil) could add to the cumulative effects from the proposed Project and other current and planned projects in the vicinity. Cumulative effects could have the potential for impacting surface water, groundwater, sensitive plant communities, fish, terrestrial vertebrates, aquatic invertebrates, and state-listed impaired waters, as well as municipal and agricultural water quality and quantity. Past and present actions with potential to cause these types of impacts include urban development, roadway and bridge construction, oil and gas development, livestock grazing, wind energy development, prescribed burning, geothermal exploration and plant development, pipeline and transmission line construction, and natural events such as wildfire (Table 4-3).

4.3.3.1 Geographic and Temporal Scope of Analysis

The geographic scope of analysis for water resources is considered to be the four watersheds in the Project area: Beaver Bottoms-Upper Beaver (HUC 16030007), Escalante Desert (HUC 16030006), Middle Sevier (HUC 16030003), and Upper Virgin watersheds (HUC 15010008). The temporal scope of analysis for cumulative effects on water resources includes 2 years of direct effects during construction and 50 years of indirect effects during the life of the Project.

Reasonably foreseeable actions in the analysis include those projects listed in Tables 4-1 and 4-2 that occur or are planned for development within a reasonable proximity to the proposed Project. Cumulative effects were analyzed over the life of the Project.

Project-specific impacts and the effects these impacts have on water resources within the Project area only can be analyzed qualitatively at this point. The area of disturbance, including temporary and permanent disturbance, can be quantified once operational facilities (e.g., access roads, work areas, and specific tower sites) have been designated on approved plans. Though it may seem applicable to estimate the amount of ground disturbance for the cumulative effects analysis, the outcome of an estimate based on previously constructed transmission line projects has the potential of greatly overestimating or underestimating the actual area of impact for this specific project. This analysis would focus on the resource quality and the anticipation that the Project would have some form of detrimental effect on the resources associated with each alternative, but those effects would not be quantified specifically due to the lack of specific construction information available at this time.

4.3.3.2 Cumulative Effects

Current and future projects considered in the cumulative impacts analysis for all alternatives are shown in Table 4-3.

Northern Area – Sigurd Substation to South of the Black Mountains

Alternatives N1 through N6 share the same route between the Sigurd Substation and the boundary between the Middle Sevier Watershed and the Beaver Bottoms – Upper Beaver Watershed just east of Cove Fort. For this route segment, cumulative effects from the Project and current or future projects would have the same effects on water resources for all alternatives. Potential cumulative effects would result mainly from the construction of access roads and the current and future utilization of existing roads by construction and mining equipment.

Project-related access roads and stream crossings could result in increased sedimentation to intermittent and ephemeral streams. Potentially, this sedimentation could be transferred downstream into the Sevier River (a state-listed impaired water) where the culmination of construction related dust and stormwater runoff from the Sevier Power Plant and the Zephyr HVDC Transmission Project could impact the river. There are potentially seven intermittent or ephemeral streams that could transfer sediment to the Sevier River.

The operation of a mine between Sid Carter Hollow and Joe Lott Creek potentially could add to and culminate with the proposed Project to increase construction-related sedimentation in the two creeks, both tributaries to Clear Creek and the Sevier River.

If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative N1 – Black Rock Road to IPP North of Milford Wind Farm

East of the Sevier/Beaver Bottoms watershed boundary, Alternative N1 along with geothermal exploration near the Cove Fort area potentially could culminate to increase sedimentation to streams from the construction and utilization of access roads. Water resources with the potential for receiving increased sedimentation from the projects are Cove Creek, Utah State Well 31-33, Sulphur Creek, and two unnamed intermittent streams.

Cumulative impacts from the Project and the Milford Wind Farm future phases, wind testing areas, Mormon Mesa Wind Testing Area, TransWest Express Transmission Line, and the Zephyr HVDC Transmission Project could increase sedimentation and reduce water quality of water resources located north of the town of Milford. Water resources in this area include Antelope Spring, Cove Creek, the Beaver River, and two unnamed wells. These resources likely would be affected by the use of existing roads and construction of new access roads with stream crossings that could increase sediment loads in the aforementioned waters.

South of the town of Milford, the Project would cross through the southern end of the Beaver Bottoms-Upper Beaver watershed into the Escalante Desert Watershed. Cumulative effects from the Project and TransWest Express, Milford Flats South Solar Energy Study Area, geothermal leases, Mormon Mesa Wind Testing Area, the Zephyr HVDC Transmission Project, and oil and gas leases could affect intermittent streams in the Mud Springs Bench area that discharge into Mud Springs Wash and Iron

Springs Creek. Impacts from these projects potentially could reduce water quality through the use of existing access roads and the construction of new access roads on stream crossings. It is likely that these cumulative impacts generally would be low since the Escalante Desert watershed is a closed-basin system where intermittent and ephemeral streams generally flow into the desert and either infiltrate the soil or evaporate.

Alternative N2 – Black Rock Road to IPP South of Milford Wind Farm

Cumulative effects anticipated for Alternative N2 would generally be the same as Alternative N1, with the only variation in route design being that Alternative N2 crosses the opposite side of the Beaver Bottoms Valley and runs along the eastern flank of the Mineral Mountains. This portion of Alternative N2 crosses many intermittent or ephemeral tributaries to the Beaver River with the major named intermittent stream being Negro Mag Wash. If combined with current and future effects from geothermal leases along the eastern flank of the Mineral Mountains, sedimentation carried down tributaries of the Beaver River could affect water used for livestock grazing in the area and potentially could reduce the quantity of water recharged to the aquifer from construction and travel related sedimentation.

Alternative N2-A (Route Variation of Alternative N2) – Black Rock Road to IPP South of Milford Wind Farm 1,500 Feet East of Kern River Pipeline (Agency Preferred Alternative)

It is anticipated that the cumulative effects for Alternative N2-A would be the same as Alternative N2 due to route collocation with one minor route deviation near the Blundell Geothermal Plant that would result in similar cumulative effects.

Alternative N3 – Black Rock Road Parallel to Kern River Pipeline

Impacts associated with implementation of the Project along Alternative N3 and other current and future projects identified in Table 4-1 could increase sedimentation to numerous ephemeral and intermittent streams starting from the east flank of the Mineral Mountains south through the South Black Mountains to the Mud Springs Bench.

While it is anticipated that the projects would all require a degree of ground disturbance and likely would require the construction and utilization of access roads with stream crossings, it is unlikely that the cumulative effects would have any permanent or detrimental effects on any downstream tributaries since the area drains into the Escalante Desert, a closed basin watershed.

Alternative N4 – Mineral Mountains to IPP South of Milford Wind Farm

Potential impacts of activities associated with the current and future projects listed in Table 4-1 and the Project if Alternative N4 were selected would be anticipated to affect intermittent and ephemeral streams. Notable intermittent streams with the potential for being impacted are Water Creek, Negro Mag Wash, and Mud Springs Wash. Impacts anticipated from construction, operation, and maintenance activities from all potential projects include decreased soil stability resulting in the potential for increased erosion of disturbed soils and the subsequent deposition of sediments to intermittent and ephemeral streams.

While it is anticipated that the projects would all require a degree of ground disturbance and likely the construction and utilization of access roads with stream crossings, it is unlikely that the cumulative effects

would have any long-lasting or highly detrimental effects on any downstream tributaries since the area drains into the Escalante Desert, a closed basin watershed.

Alternative N5 – Mineral Mountains Parallel to Kern River Pipeline

Cumulative effects from impacts associated with implementation of the Project along Alternative N5 and current and future projects listed in Table 4-1 could increase normal sediment loads to temporary and ephemeral streams such as Sulphur Creek, Negro Mag Wash, the Beaver River, and Mud Springs Wash. Alternative N5 along with the Mormon Mesa Wind Testing Area and the Milford Wind Farm south could have impacts on the Marshal Well and two unnamed wells in the Horse Valley if those structures are impacted physically or if deleterious liquids from construction equipment are allowed to infiltrate the soil in those areas.

Alternative N6 – Mineral Mountains 1,500 Feet East of Kern River Pipeline (Proponent's Preferred Alternative)

Due to the proximate colocation of Alternatives N5 and N6, it is anticipated that the cumulative effects described for Alternative N5 would be the same for Alternative N6.

Southern Area – South of the Black Mountains to Red Butte Substation

Alternative S1 – Pinto Creek

Project-related impacts from Alternative S1 and impacts associated with current and future projects, including the Kern River Pipeline, UNEV Pipeline, Trans West Express Transmission Line, and the Zephyr HVDC Transmission Project potentially could affect sensitive perennial and intermittent streams as well as state-listed impaired waters in the Pinto Creek drainage. Streams with the potential of being cumulatively impacted from Alternative S1 and current and future projects include Little Pinto, Pinto, West Fork Pinto, and Iron Springs creeks, as well as the tributaries of Mahogany Creek. Project-related impacts (e.g., the construction of access roads and stream crossings) could lead to unstable soil conditions and increased sediment load to the streams. Additionally, removal of riparian vegetation during construction of the Project may be necessary, which subsequently would reduce available habitat for wildlife, reduce nutrient exchange among vegetation, water, and soil; reduce soil stability, and could reduce shade provided by trees and shrubs that would in turn increase water temperature. These effects could reduce habitat quality for fish and wildlife using the riparian corridors, further degrading state-listed impaired waters. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative S2 – IPP West

Project-related impacts from Alternative S2 and impacts associated with current and future projects, including the Kern River Pipeline, UNEV Pipeline, Trans West Express Transmission Project, and the Zephyr HVDC Transmission Project potentially could affect Iron Springs Creek, Pinto Creek downstream of Newcastle Reservoir, Dan Sill Creek, Spring Creek, tributaries of Mogotsu Creek, numerous unnamed intermittent and ephemeral streams, as well as Abe Spring and an unnamed spring in the Mountain Meadows area occurring along the alternative. Project-related impacts (e.g., the construction of access roads and stream crossings) could lead to unstable soil conditions and increased sediment load to the

streams and springs. Removal of riparian vegetation may be necessary and subsequently would reduce available habitat for wildlife; nutrient exchange among vegetation, water, and soil; soil stability; and shade provided by trees and shrubs, which would increase water temperature. These effects could reduce habitat quality for fish and wildlife which utilize the riparian corridors and also would degrade further state-listed impaired waters. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative S3 – Ox Valley

The cumulative effects anticipated for Alternative S3, the TransWest Express project, UNEV Pipeline, Kern River Pipeline, and the Zephyr HVDC Transmission Project north of Newcastle, as well as geothermal leases southeast of Newcastle, could affect intermittent streams such as Dick Palmer Wash, a tributary to Iron Springs Creek; Pinto Creek downstream of Newcastle Reservoir; and numerous small ephemeral and intermittent streams flowing into the Escalante Desert.

While it is anticipated that the projects would all require a degree of ground disturbance and likely the construction and utilization of access roads with stream crossings, it is unlikely that the cumulative effects would have any long-lasting or highly detrimental effects on any downstream tributaries since the area drains into the Escalante Desert, a closed basin watershed.

Alternative S3 and the TransWest Express line also could cumulatively affect tributaries of the Santa Clara River (a state-listed impaired water). The impacts could result from the construction of access roads and the subsequent destabilization of soils in the upper tributaries of the river including Mogotsu Creek. This could lead to increased sedimentation to tributaries of an impaired water, thus further degrading the quality of the Santa Clara River.

If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative S4 – IPP East

Due to the proximate collocation of Alternatives S2 and S4 and because the two alternative routes cross the same water resources except for Abe Spring and the Mountain Meadow Spring; it is anticipated that the cumulative effects for S4 would be similar to Alternative S2 with the exception that Alternative S4 avoids the two springs. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative S5 – Iron Springs and Pinto Creek (Proponent's Preferred Alternative)

Alternative S5 and S1 are colocated in the north until the Lund Road Area, from there, Alternative S5 along with future oil and gas development and the Zephyr HVDC Transmission Project cumulatively could impact tributaries to Iron Springs Creek. At Newcastle Reservoir, Alternative S5 is again colocated with Alternative S1. From there impacts associated with current and future projects listed in Table 4-1 and construction and maintenance of Alternative S5 potentially could affect state-listed impaired waters and sensitive perennial and *intermittent streams, including Little Pinto, Pinto, West Fork Pinto, Iron Springs creeks, as well as the tributaries of Mahogany Creek. Project-related impacts (e.g., the construction of access roads and stream crossings) could lead to unstable soil conditions and increased sediment load to the streams. Additionally, removal of riparian vegetation may be necessary. It could

subsequently reduce available habitat for wildlife; reduce nutrient exchange among vegetation, water, and soil; reduce soil stability, and would reduce shade provided by trees and shrubs that would in turn increase water temperature. These effects could reduce habitat quality for fish and wildlife that use the riparian corridors and also could further degrade state-listed impaired waters. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative S6 – Iron Springs and Ox Valley

Alternative S6 along with the Zephyr HVDC Transmission Project and future oil and gas development cumulatively could impact tributaries to Iron Springs Creek. At Newcastle Reservoir, Alternative S6 is colocated with Alternative S3. From there, Alternative S6 and the TransWest Express line cumulatively could affect tributaries of the Santa Clara River (a state-listed impaired water). The impacts could result from the construction of access roads and the subsequent destabilization of soils in the upper tributaries of the river including Mogotsu Creek. This could lead to increased sedimentation to tributaries resulting in the further degradation of the Santa Clara River. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative S7 – Middle Hybrid Route

The cumulative effects anticipated for the Project along the alternative route and the TransWest Express project as well as geothermal leases could affect intermittent streams such as Dick Palmer Wash, a tributary to Iron Springs Creek; Pinto Creek downstream of Newcastle Reservoir, and numerous small ephemeral and intermittent streams flowing into the Escalante Desert.

While it is anticipated that these projects would all require a degree of ground disturbance and likely the construction and utilization of access roads with stream crossings, it is unlikely that the cumulative effects would have any permanent or detrimental effects on any downstream tributaries since the area drains into the Escalante Desert, a closed basin watershed.

Moving south, Alternative S7 is colocated with the TransWest Express project. These projects could both cause effects to perennial streams including Spring Creek and Mogotsu Creek. Mogotsu Creek, being a tributary to the Santa Clara River, is sensitive in that the transfer of sediment from its tributaries to the Santa Clara River (a state-listed impaired water) would result in further degradation of water quality in the Santa Clara. Increased sediment load from the construction of access roads and stream crossings, as well as the utilization of existing roads, could lead to a decrease in soil stability and the subsequent increase of sediment loads entering the upper reaches of the Santa Clara River. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative S7-A (Route Variation of Alternative S7) – Middle Hybrid Route 300 Feet East of Sigurd to Red Butte No. 1 Transmission Line Adjacent to Atchinson IRA (Agency Preferred Alternative)

It is anticipated that the cumulative effects for Alternative S7-A would be the same as Alternative S7.

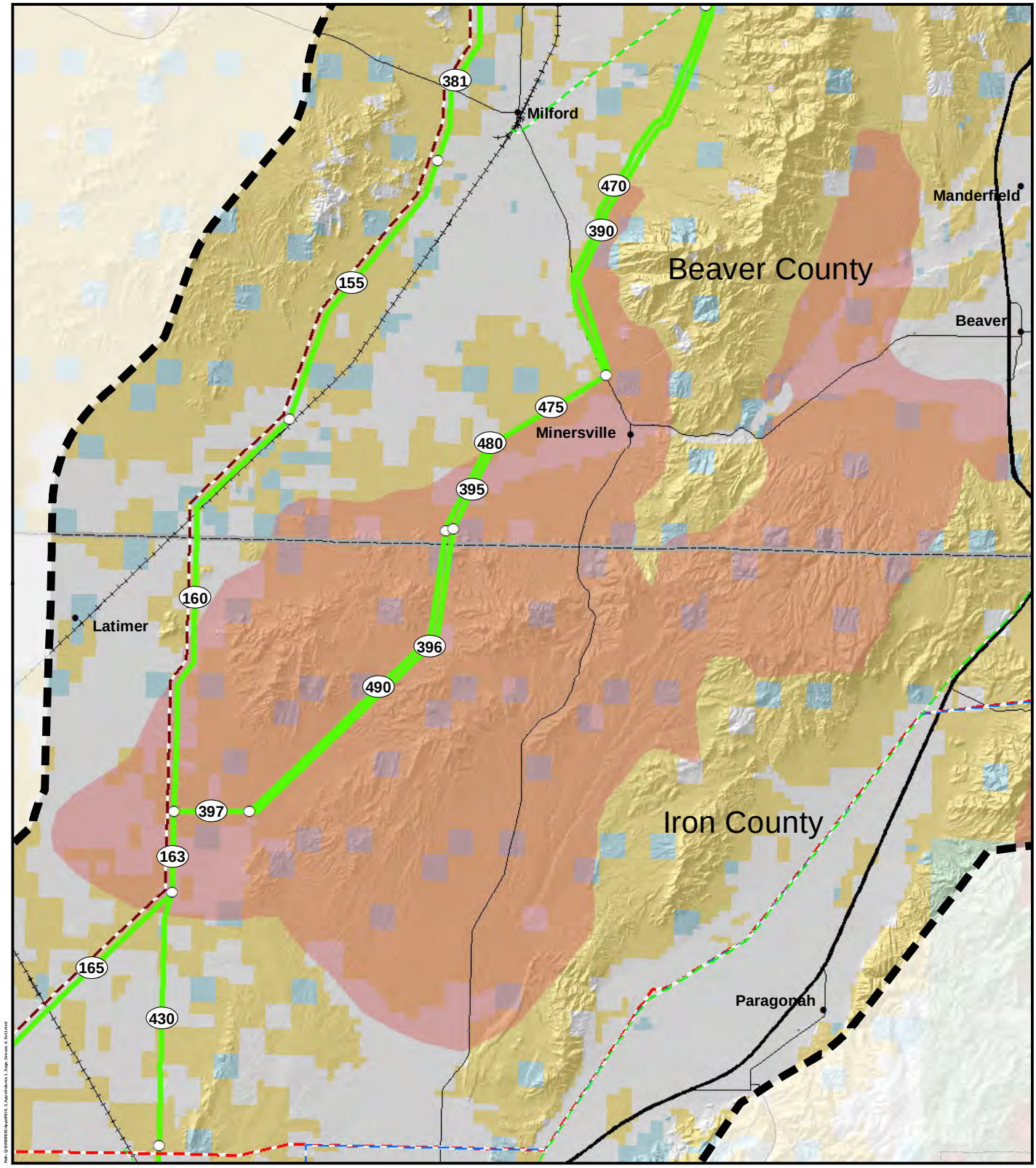
4.3.4 Biological Resources

4.3.4.1 Geographic and Temporal Scope of Analysis

The geographic scope of the cumulative effects analyses for biological resources are identified by resource in Table 4-4. The temporal scope of the analysis includes 2 years for impacts associated with Project construction. The Proponent's proposed action does not include plans to decommission the Project; therefore, the temporal scope of analysis for impacts associated with operation and maintenance of the Project is based on the assumption that the effects of operating and maintaining the transmission line after construction will be permanent.

TABLE 4-4
CUMULATIVE EFFECTS ANALYSIS AREAS FOR BIOLOGICAL RESOURCES

Resource	Cumulative Effects Analysis Areas	Rationale for Area
Vegetation	6th level Hydrological Unit Code (HUC) watersheds crossed by the alternative routes	Area beyond which effects of Project on vegetation communities are no longer discernible
General fish and wildlife	6th level HUC watersheds crossed by the alternative routes	Area beyond which effects of Project on fish and wildlife are no longer discernible
Migratory bird species including raptors	6th level HUC watersheds crossed by the alternative routes	Area beyond which effects of Project on migratory birds are no longer discernible
Mule deer, elk, and pronghorn habitats	UDWR mapped habitats within 6th level HUC watersheds and potentially suitable habitat cover types on the Dixie National Forest crossed by alternative routes	Areas essential to the survival of local big game populations that may be affected by the Project
Utah prairie dog colonies	Extent of colonies within 6th level HUC watersheds crossed by the alternative routes	Habitats crucial to the survival and connectivity of populations affected by the Project
Southwestern willow flycatcher habitat	Extent of breeding habitat crossed by the alternative routes	Breeding habitats used by individuals that may be affected by Project
Greater sage-grouse habitat	Mapped extent of occupied habitat crossed by the alternative routes (Map 4-2)	All habitats utilized by the affected population
Pygmy rabbit habitat	Extent of potentially suitable habitat within 1.8-mile buffer of alternative routes	Median natal dispersal distance for male pygmy rabbits (Estes-Zumpf and Rachow 2009)
Sensitive plant habitat	Extent of known plant populations or suitable habitat within 6th level HUC watersheds crossed by the alternative routes	All suitable habitat for affected populations
Wild horses	Mapped extent of Herd Management Areas crossed by the alternative routes	Areas used by wild horses that may be affected by the Project
Additional USFS-sensitive and MIS	Varies by species, disclosed in Appendix E	Disclosed in Appendix E



Legend

SAGE-GROUSE

- Sage-grouse Cumulative Effects Analysis Area

GENERAL REFERENCE FEATURES

- Project Study Area
- Route Centerline
- # Link Number
- Link Node
- 500kV +/- DC Transmission Line
- 345kV Transmission Line
- 230 to 287kV Transmission Line
- 138 to 161kV Transmission Line
- Interstate & U.S. Highway
- State Highway
- Railroad
- Bureau of Land Management
- State of Utah Trust Lands
- State Park
- Private
- U.S. Forest Service

MAP 4-2
SAGE-GROUSE CUMULATIVE EFFECTS ANALYSIS AREA

SIGURD TO RED BUTTE NO. 2
345kV TRANSMISSION PROJECT

October 2012
Final EIS

0 1 2 4 Miles

4.3.4.2 Cumulative Effects

Impacts of Past and Present Actions on Resources Analyzed

Conversion of native vegetation to agricultural use since 1860 has significantly affected the character of landscapes and the quantity and quality of habitats for biological resources within the cumulative effects analysis area. Construction of settlements, transportation systems, and human population growth also have resulted in further conversion of habitats for biological resources and significant shifts in the abundance, distribution, and species composition of the fauna and flora of the area. Drought, wildfire, and climate change have likewise resulted in changes in the carrying capacity of remaining habitats in more recent times. These historic modifications to the landscape have resulted in baseline conditions and trends to which the Project, and other current, future and reasonably foreseeable future actions (refer to Table 4-1) analyzed in this section contribute continuing and additive cumulative effects. The direct and indirect effects of the Project by alternative are discussed in Section 3.2.4.5. This section provides an analysis of the cumulative effects of implementing the Project in addition to past, present, and reasonably foreseeable future actions.

Additional analysis of the potential impacts associated with implementing the Project on USFS sensitive species and MIS on the Dixie and Fishlake National Forests, as required by USFS to ensure compliance with USFS policy and to facilitate a decision to issue a special-use authorization on lands administered by the USFS, is included in Appendix E.

Vegetation Communities

The temporary and permanent effects of the Project on vegetation would contribute cumulatively to the effects of past and future loss, fragmentation, and modification of native vegetation communities, in the cumulative effects analysis area. Other current and future actions that include wildfire management, agricultural and residential development, wildlife habitat management, and projects identified in Table 4-1 also would affect vegetation in the cumulative effects analysis area.

The magnitude of the modification or loss of native vegetation associated with each Project alternative in combination with other current and reasonably foreseeable future actions within the cumulative effects analysis area for vegetation resources is presented in Table 4-5. The vegetation communities that would be affected cumulatively to the greatest extent by implementation of all northern and southern alternative routes are pinyon-juniper, shrub steppe, desert shrub, and big sagebrush. Based upon consideration of the extent of vegetation communities that would be modified or lost, relative to that available (refer to Table 4-5) none of the Project alternatives, in combination with present and reasonably foreseeable future actions, would be anticipated to contribute to cumulative impacts on vegetation resources that would result in a significant loss of vegetation resource functions or values within the cumulative effects analysis area.

Wildlife

Under all alternatives, implementation of the Project would result in cumulative impacts on fish and wildlife and habitats that support them within the cumulative effects analysis areas. The magnitude of cumulative impacts of all Project alternatives on land cover types providing wildlife habitat is provided in Table 4-5. Terrestrial habitat values for some species would be restored in many areas scheduled for temporary disturbance during Project construction and following successful reclamation, thereby reducing the overall magnitude of cumulative impacts on fish and wildlife. Future actions that include, agricultural

TABLE 4-5
VEGETATION COMMUNITIES CUMULATIVE EFFECTS SUMMARY

Alternative	Community/ Impacts	Vegetation Community Type																				
		Grassland (Acres/ [Percent])	Barren (Acres/ [Percent])	Disturbed (Acres/ [Percent])	Mountain Shrub (Acres/ [Percent])	Pinyon-juniper (Acres/ [Percent])	Riparian (Acres/ [Percent])	Shrub Steppe (Acres/ [Percent])	Aspen (Acres/ [Percent])	Desert Shrub (Acres/ [Percent])	Noxious Weed (Acres/ [Percent])	Wildfire Affected (Acres/ [Percent])	Big Sage (Acres/ [Percent])	Agriculture (Acres/ [Percent])	Alpine (Acres/ [Percent])	Wetlands (Acres/ [Percent])	Water (Acres/ [Percent])	Bigtooth Maple (Acres/ [Percent])	Invasive (Acres/ [Percent])	Mixed Conifer (Acres/ [Percent])	Ponderosa Pine (Acres/ [Percent])	Post-burn Reseed (Acres/ [Percent])
Alternative N1	Total available vegetation community[1]	3,789 (100.0)	11,316 (100.0)	13,186 (100.0)	30,732 (100.0)	191,219 (100.0)	3,086 (100.0)	99,886 (100.0)	4,848 (100.0)	95,286 (100.0)	1,659 (100.0)	70,570 (100.0)	153,346 (100.0)	47,873 (100.0)	1,328 (100.0)	122 (100.0)	697 (100.0)	4 (100.0)	9,268 (100.0)	27,909 (100.0)	1,123 (100.0)	11,921 (100.0)
	Existing disturbance[2]	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Proposed/future disturbance[3]	1,317 (34.8)	311 (2.7)	0 (0.0)	501 (1.6)	23,181 (12.1)	159 (5.2)	23,949 (24.0)	1 (0.0)	24,087 (25.3)	334 (20.1)	31,606 (44.8)	21,777 (14.2)	0 (0.0)	51 (3.8)	0 (0.0)	7 (1.0)	0 (0.0)	2,298 (24.8)	29 (0.1)	0 (0.0)	1,904 (16.0)
	Project disturbance[4]	27 (0.7)	12 (0.1)	52 (0.4)	4 (0.0)	224 (0.1)	0 (0.0)	246 (0.2)	0 (0.0)	377 (0.4)	1 (0.0)	179 (0.3)	248 (0.2)	0 (0.0)	0 (0.0)	1 (0.4)	2 (0.3)	0 (0.0)	66 (0.7)	0 (0.0)	0 (0.0)	15 (0.1)
	Remaining available community	2,445 (64.5)	10,993 (97.1)	13,186 (100.0)	30,227 (98.4)	167,814 (87.8)	2,927 (94.8)	75,691 (75.8)	4,847 (100.0)	70,822 (74.3)	1,325 (79.8)	38,785 (55.0)	131,321 (85.6)	47,873 (100.0)	1,277 (96.2)	122 (99.6)	688 (98.7)	4 (100.0)	6,904 (74.5)	27,880 (99.9)	1,123 (100.0)	10,002 (83.9)
Alternative N2	Total available vegetation community[1]	4,012 (100.0)	11,325 (100.0)	13,048 (100.0)	27,424 (100.0)	167,867 (100.0)	3,085 (100.0)	89,582 (100.0)	4,696 (100.0)	88,743 (100.0)	1,665 (100.0)	96,307 (100.0)	148,677 (100.0)	47,532 (100.0)	1,328 (100.0)	121 (100.0)	694 (100.0)	4 (100.0)	8,655 (100.0)	25,507 (100.0)	1,123 (100.0)	43,264 (100.0)
	Existing disturbance[2]	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Proposed/future disturbance[3]	1,199	382 (3.4)	0 (0.0)	494	16,623 (9.9)	159 (5.2)	16,272 (18.2)	1 (0.0)	20,731 (23.4)	334 (20.1)	37,970 (39.4)	17,772 (12.0)	0 (0.0)	51 (3.8)	0 (0.0)	7 (1.0)	0 (0.0)	1,902 (22.0)	29 (0.1)	0 (0.0)	10,252 (23.7)
	Project disturbance[4]	11	12 (0.1)	52 (0.4)	4 (1.8)	223 (0.1)	0 (0.0)	206 (0.2)	0 (0.0)	233 (0.3)	1 (0.0)	285 (0.3)	246 (0.2)	0 (0.0)	0 (0.0)	1 (0.4)	2 (0.3)	0 (0.0)	58 (0.7)	0 (0.0)	0 (0.0)	113 (0.3)
	Remaining available community	2,802	10,931 (96.5)	13,048 (100.0)	26,926 (98.2)	151,021 (90.0)	2,926 (94.8)	73,064 (81.6)	4,695 (100.0)	67,779 (76.4)	1,331 (79.9)	58,052 (60.3)	130,659 (87.9)	47,532 (100.0)	1,277 (96.2)	121 (99.6)	685 (98.7)	4 (100.0)	6,695 (77.4)	25,478 (99.9)	1,123 (100.0)	32,899 (76.0)
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	Total available vegetation community[1]	4,012 (100.0)	11,325 (100.0)	13,048 (100.0)	27,424 (100.0)	167,867 (100.0)	3,085 (100.0)	89,582 (100.0)	4,696 (100.0)	88,743 (100.0)	1,665 (100.0)	96,307 (100.0)	148,677 (100.0)	47,532 (100.0)	1,328 (100.0)	121 (100.0)	694 (100.0)	4 (100.0)	8,655 (100.0)	25,507 (100.0)	1,123 (100.0)	43,264 (100.0)
	Existing disturbance[2]	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	N/A	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Proposed/future disturbance[3]	1,199 (29.9)	382 (3.4)	0 (0.0)	494(1.8)	16,623 (9.9)	159(5.2)	16,272 (18.2)	1 (0.0)	20,731 (23.4)	334 (20.1)	37,970 (39.4)	17,772 (12.0)	0 (0.0)	51 (3.8)	0 (0.0)	7 (1.0)	0 (0.0)	1,902 (22.0)	29 (0.1)	0 (0.0)	10,252
	Project disturbance[4]	11 (0.3)	12 (0.1)	52 (0.4)	4 (0.0)	223 (0.1)	0 (0.0)	206 (0.2)	0 (0.0)	234 (0.3)	1 (0.0)	290 (0.3)	239 (0.2)	0 (0.0)	0 (0.0)	1 (0.4)	2 (0.3)	0 (0.0)	58 (0.7)	0 (0.0)	0 (0.0)	111 (0.3)
	Remaining available community	2,802 (698.8)	10,931 (96.5)	13,048 (100.0)	26,926 (98.2)	151,021 (90.0)	2,926 (94.8)	73,064 (81.6)	4,695 (100.0)	67,778 (76.4)	1,331 (79.9)	58,047 (60.3)	130,666 (87.9)	47,532 (100.0)	1,277 (96.2)	121 (99.6)	685 (98.7)	4 (100.0)	6,695 (77.4)	25,478 (99.9)	1,123	32,901 (76.0)
Alternative N3	Total available vegetation community[1]	4,860 (100.0)	13,864 (100.0)	14,850 (100.0)	32,896 (100.0)	192,792 (100.0)	3,240 (100.0)	47,395 (100.0)	4,848 (100.0)	65,264 (100.0)	2,987 (100.0)	99,792 (100.0)	150,451 (100.0)	56,957 (100.0)	1,328 (100.0)	126 (100.0)	712 (100.0)	17 (100.0)	8,266 (100.0)	28,247 (100.0)	1,212 (100.0)	43,143 (100.0)
	Existing disturbance[2]	0 (0.0)	0 (0.0)	N/A	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Proposed/future disturbance[3]	1,013 (20.8)	397 (2.9)	0 (0.0)	732 (2.2)	16,614 (8.6)	162 (5.0)	6,844 (14.4)	3 (0.1)	13,462 (20.6)	778 (26.0)	36,225 (36.3)	13,052 (8.7)	0 (0.0)	51 (3.8)	0 (0.0)	7 (1.0)	0 (0.0)	1,326 (16.0)	45 (0.2)	11 (0.9)	10,264 (23.8)
	Project disturbance[4]	9 (0.2)	12 (0.1)	51 (0.3)	5 (0.0)	255 (0.1)	0 (0.0)	91 (0.2)	0 (0.0)	108 (0.2)	1 (0.0)	266 (0.3)	406 (0.3)	0 (0.0)	0 (0.0)	1 (0.4)	0 (0.0)	0 (0.0)	66 (0.8)	0 (0.0)	0 (0.0)	112 (0.3)
	Remaining available community	3,838 (79.0)	13,455 (97.0)	14,850 (100.0)	32,159 (97.8)	175,923 (91.3)	3,078 (95.0)	40,305 (85.0)	4,845 (99.9)	51,694 (79.2)	2,208 (73.9)	63,301 (63.4)	136,993 (91.1)	56,957 (100.0)	1,277 (96.2)	126 (99.6)	705 (99.0)	17 (100.00	6,874 (83.2)	28,202 (99.8)	1,212 (100.0)	32,767 (75.9)

TABLE 4-5
VEGETATION COMMUNITIES CUMULATIVE EFFECTS SUMMARY

Alternative	Community/ Impacts	Vegetation Community Type																				
		Grassland (Acres/ [Percent])	Barren (Acres/ [Percent])	Disturbed (Acres/ [Percent])	Mountain Shrub (Acres/ [Percent])	Pinyon-juniper (Acres/ [Percent])	Riparian (Acres/ [Percent])	Shrub Steppe (Acres/ [Percent])	Aspen (Acres/ [Percent])	Desert Shrub (Acres/ [Percent])	Noxious Weed (Acres/ [Percent])	Wildfire Affected (Acres/ [Percent])	Big Sage (Acres/ [Percent])	Agriculture (Acres/ [Percent])	Alpine (Acres/ [Percent])	Wetlands (Acres/ [Percent])	Water (Acres/ [Percent])	Bigtooth Maple (Acres/ [Percent])	Invasive (Acres/ [Percent])	Mixed Conifer (Acres/ [Percent])	Ponderosa Pine (Acres/ [Percent])	Post-burn Reseed (Acres/ [Percent])
Alternative N4	Total available vegetation community[1]	2,852 (100.0)	11,179 (100.0)	13,200 (100.0)	30,739 (100.0)	176,210 (100.0)	3,083 (100.0)	86,108 (100.0)	4,843 (100.0)	78,888 (100.0)	3,042 (100.0)	47,072 (100.0)	147,447 (100.0)	47,853 (100.0)	1,328 (100.0)	122 (100.0)	697 (100.0)	4 (100.0)	7,972 (100.0)	27,452 (100.0)	1,123 (100.0)	49,754 (100.0)
	Existing disturbance[2]	0 (0.0)	0 (0.0)	N/A	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Proposed/future disturbance[3]	318 (11.2)	230 (2.1)	0 (0.0)	493 (1.6)	15,508 (8.8)	158 (5.1)	14,232 (16.5)	1 (0.0)	16,010 (20.3)	334 (11.0)	14,009 (29.8)	15,664 (10.6)	0 (0.0)	51 (3.8)	0 (0.0)	7 (1.0)	0 (0.0)	1,310 (16.4)	29 (0.1)	0 (0.0)	12,636 (25.4)
	Project disturbance[4]	12 (0.4)	13 (0.1)	53 (0.4)	5 (0.0)	235 (0.1)	0 (0.0)	213 (0.2)	0 (0.0)	241 (0.3)	23 (0.8)	73 (0.2)	256 (0.2)	2 (0.0)	0 (0.0)	1 (0.4)	2 (0.3)	0 (0.0)	60 (0.8)	0 (0.0)	0 (0.0)	174 (0.3)
	Remaining available community	2,522 (88.4)	10,936 (97.8)	13,200 (100.0)	30,241 (98.4)	160,467 (91.1)	2,925 (94.9)	71,630 (83.2)	4,842 (100.0)	62,637 (79.4)	2,685 (88.3)	32,990 (70.1)	131,527 (89.2)	47,853 (100.0)	1,277 (96.2)	122 (99.6)	688 (98.7)	4 (100.0)	6,602 (82.8)	27,423 (99.9)	1,123 (100.0)	36,944 (74.3)
Alternative N5	Total available vegetation community[1]	3,602 (100.0)	13,666 (100.0)	14,641 (100.0)	32,976 (100.0)	191,090 (100.0)	3,237 (100.0)	40,975 (100.0)	4,848 (100.0)	48,280 (100.0)	4,364 (100.0)	45,909 (100.0)	146,552 (100.0)	56,926 (100.0)	1,328 (100.0)	126 (100.0)	712 (100.0)	17 (100.0)	7,312 (100.0)	28,247 (100.0)	1,212 (100.0)	48,023 (100.0)
	Existing disturbance[2]	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Proposed/future disturbance[3]	104 (2.9)	245 (1.8)	0 (0.0)	731 (2.2)	15,495 (8.1)	160 (4.9)	3,822 (9.3)	3 (0.1)	6,230 (12.9)	778 (17.8)	11,902 (25.9)	10,727 (7.3)	0 (0.0)	51 (3.8)	0 (0.0)	7 (1.0)	0 (0.0)	510 (7.0)	45 (0.2)	11 (0.9)	12,369 (25.8)
	Project disturbance[4]	9 (0.2)	12 (0.1)	52 (0.4)	6 (0.0)	268 (0.1)	0 (0.0)	94 (0.2)	0 (0.0)	111 (0.2)	23 (0.5)	58 (0.1)	420 (0.3)	2 (0.0)	0 (0.0)	1 (0.4)	0 (0.0)	0 (0.0)	68 (0.9)	0 (0.0)	0 (0.0)	171 (0.4)
	Remaining available community	3,489 (96.9)	13,409 (98.1)	14,641 (100.0)	32,239 (97.8)	175,327 (1.1)	3,077 (95.0)	36,907 (90.1)	4,845 (99.9)	41,939 (96.9)	3,563 (81.6)	33,949 (73.9)	135,405 (92.4)	56,926 (100.0)	1,277 (96.2)	126 (99.6)	705 (99.0)	17	6,734 (92.1)	28,202 (99.8)	1,212 (99.8)	35,483 (73.9)
Alternative N6 (Proponent's Preferred Alternative)	Total available vegetation community[1]	3,602 (100.0)	13,666 (100.0)	14,641 (100.0)	32,976 (100.0)	191,090 (100.0)	3,237 (100.0)	40,975 (100.0)	4,848 (100.0)	48,280 (100.0)	4,364 (100.0)	45,909 (100.0)	146,552 (100.0)	56,926 (100.0)	1,328 (100.0)	126 (100.0)	712 (100.0)	17 (100.0)	7,312 (100.0)	28,247 (100.0)	1,212 (100.0)	48,023 (100.0)
	Existing disturbance[2]	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Proposed/future disturbance[3]	104 (2.9)	245 (1.8)	0 (0.0)	731 (2.2)	15,495 (8.1)	160 (4.9)	3,822 (9.3)	3 (0.1)	6,230 (12.9)	778 (17.8)	11,902 (25.9)	10,727 (7.3)	0 (0.0)	51 (3.8)	0 (0.0)	7 (1.0)	0 (0.0)	510 (7.0)	45 (0.2)	11 (0.9)	12,369 (25.8)
	Project disturbance[4]	11 (0.3)	12 (0.1)	55 (0.4)	5 (0.0)	311 (0.2)	0 (0.0)	84 (0.2)	0 (0.0)	106 (0.2)	24 (0.5)	62 (0.1)	440 (0.3)	2 (0.0)	0 (0.0)	1 (0.4)	0 (0.0)	0 (0.0)	57 (0.8)	0 (0.0)	0 (0.0)	179 (0.4)
	Remaining available community	3,487 (96.8)	13,409 98.1)	14,641 (100.0)	32,240 (97.8)	175,284 (91.7)	3,077 (95.1)	36,907 (90.1)	4,845 (99.1)	41,944 (86.9)	3,562 (81.6)	33,945 (73.9)	135,385 (92.4)	56,926 (100.0)	1,277 (96.2)	126 (99.6)	705 (99.0)	17 (100.0)	6,745 (92.2)	28,202 (99.8)	1,212 (100.0)	35,475 (73.9)
Alternative S1	Total available vegetation community[1]	5,928 (100.0)	7,075 (100.0)	568 (100.0)	12,333 (100.0)	108,002 (100.0)	2,258 (100.0)	16,572 (100.0)	473 (100.0)	79,243 (100.0)	50 (100.0)	1,739 (100.0)	100,395 (100.0)	3,216 (100.0)	–	465 (100.0)	193 (100.0)	9 (100.0)	17,022 (100.0)	787 (100.0)	633 (100.0)	–
	Existing disturbance[2]	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–
	Proposed/future disturbance[3]	73 (1.2)	487 (6.9)	0 (0.0)	90 (0.7)	1,105 (1.0)	11 (0.5)	408 (2.5)	0 (0.0)	3,937 (5.0)	0 (0.0)	23	2,237	0 (0.0)	–	0 (0.0)	21 (11.7)	0 (0.0)	396	0 (0.0)	0 (0.0)	–
	Project disturbance[4]	3 (0.1)	8 (0.1)	0 (0.0)	11 (0.1)	204 (0.2)	3 (0.1)	29 (0.2)	0 (0.1)	133 (0.2)	0 (0.0)	0 (0.0)	288	0 (0.0)	–	1 (0.1)	0 (0.0)	0 (0.0)	42	0 (0.0)	0 (0.0)	–
	Remaining available community	5,852 (98.7)	6,580 (93.0)	568 (100.0)	12,232 (99.2)	106,693 (98.8)	2,244 (99.4)	15,918 (96.1)	473 (99.9)	75,173 (94.9)	50 (100.0)	1,716	97,870	3,216 (100.0)	–	464 (99.9)	172 (89.1)	9 (100.0)	16,584	787	633	–

TABLE 4-5
VEGETATION COMMUNITIES CUMULATIVE EFFECTS SUMMARY

Alternative	Community/ Impacts	Vegetation Community Type																				
		Grassland (Acres/ [Percent])	Barren (Acres/ [Percent])	Disturbed (Acres/ [Percent])	Mountain Shrub (Acres/ [Percent])	Pinyon-juniper (Acres/ [Percent])	Riparian (Acres/ [Percent])	Shrub Steppe (Acres/ [Percent])	Aspen (Acres/ [Percent])	Desert Shrub (Acres/ [Percent])	Noxious Weed (Acres/ [Percent])	Wildfire Affected (Acres/ [Percent])	Big Sage (Acres/ [Percent])	Agriculture (Acres/ [Percent])	Alpine (Acres/ [Percent])	Wetlands (Acres/ [Percent])	Water (Acres/ [Percent])	Bigtooth Maple (Acres/ [Percent])	Invasive (Acres/ [Percent])	Mixed Conifer (Acres/ [Percent])	Ponderosa Pine (Acres/ [Percent])	Post-burn Reseed (Acres/ [Percent])
Alternative S2	Total available vegetation community[1]	5,500 (100.0)	6,691 (100.0)	1,644 (100.0)	8,419 (100.0)	71,302 (100.0)	1,686 (100.0)	14,445 (100.0)	431 (100.0)	81,706 (100.0)	57 (100.0)	233 (100.0)	110,214 (100.0)	15,742 (100.0)	–	344 (100.0)	179 (100.0)	19 (100.0)	17,604 (100.0)	554 (100.0)	355 (100.0)	0 (100.0)
	Existing disturbance[2]	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	N/A	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Proposed/future disturbance[3]	73 (1.3)	487 (7.3)	0 (0.0)	88 (1.0)	1,530	11	386	0 (0.0)	3,933	0 (0.0)	23	2,444	0 (0.0)	–	0 (0.0)	21 (11.7)	0 (0.0)	396 (2.2)	0 (0.0)	0 (0.0)	0 (0.0)
	Project disturbance[4]	5 (0.0)	9 (0.1)	3 (0.2)	8 (0.1)	97	4	16	0 (0.0)	128	1	0 (0.0)	343	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	44 (0.2)	0 (0.0)	0 (0.0)	0 (0.0)
	Remaining available community	5,422 (98.6)	6,195 (92.6)	1,644 (100.0)	8,323 (98.9)	69,675	1,671	13,813	431	77,645	57	210	107,427	15,742	–	344	158 (88.3)	19 (100.0)	17,164 (97.5)	554 (100.0)	355 (100.0)	0 (0.0)
Alternative S3	Total available vegetation community[1]	5,549 (100.0)	6,899 (100.0)	2,377 (100.0)	15,029 (100.0)	84,160 (100.0)	4,165 (100.0)	16,060 (100.0)	670 (100.0)	83,239 (100.0)	1,418 (100.0)	18,050 (100.0)	124,265 (100.0)	20,474 (100.0)	–	37 (100.0)	219 (100.0)	20 (100.0)	18,049 (100.0)	7 (100.0)	–	–
	Existing disturbance[2]	0 (0.0)	0 (0.0)	2,377 –	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–	–
	Proposed/future disturbance[3]	73 (1.3)	487 (7.3)	0 (0.0)	44 (0.3)	1,490 (1.8)	11 (0.3)	375 (2.3)	0 (0.0)	3,967 (4.8)	0 (0.0)	30 (0.2)	2,379 (1.9)	0 (0.0)	–	0 (0.0)	21 (9.6)	0 (0.0)	395 (2.2)	0 (0.0)	–	–
	Project disturbance[4]	2 (0.2)	12 (0.2)	3 (0.1)	28 (0.2)	206 (0.2)	2 (0.0)	17 (0.1)	2 (0.3)	130 (0.2)	1 (0.0)	0 (0.0)	314 (0.3)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	44 (0.2)	0 (0.0)	–	–
	Remaining available community	5,474 (986.6)	6,400 (92.8)	2,377 (100.0)	14,957 (99.5)	82,464 (98.0)	4,152 (99.7)	15,439 (96.1)	668 (99.7)	79,142 (95.1)	1,418 (100.0)	18,020 (99.8)	121,572 (97.8)	20,474 (100.0)	–	37 (100.0)	198 (90.4)	20 (100.0)	17,610 (97.6)	7 (0.0)	–	–
Alternative S4	Total available vegetation community[1]	5,500 (100.0)	6,691 (100.0)	1,644 (100.0)	8,419 (100.0)	71,302 (100.0)	1,686 (100.0)	14,445 (100.0)	431 (100.0)	81,706 (100.0)	57 (100.0)	233 (100.0)	110,214 (100.0)	15,742 (100.0)	–	344 (100.0)	179 (100.0)	19 (100.0)	17,604 (100.0)	554 (100.0)	355 (100.0)	–
	Existing disturbance[2]	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–
	Proposed/future disturbance[3]	73 (1.3)	487 (7.3)	0 (0.0)	88 (1.0)	1,530 (2.1)	11 (0.7)	386 (2.7)	0 (0.0)	3,933 (4.8)	0 (0.0)	23 (9.9)	2,444 (2.2)	0	–	0 (0.0)	21 (11.7)	0 (0.0)	396 (2.2)	0 (0.0)	0 (0.0)	–
	Project disturbance[4]	2 (0.0)	9 (0.1)	0 (0.0)	6 (0.1)	210 (0.3)	1 (0.1)	17 (0.1)	0 (0.0)	138 (0.2)	1 (1.1)	0 (0.0)	265 (0.2)	0	–	0 (0.0)	0 (0.0)	0 (0.0)	47 (0.3)	0 (0.0)	0 (0.0)	–
	Remaining available community	5,425 (98.6)	6,195 (92.6)	1,644 (100.0)	8,325 (98.9)	69,562	1,674 (99.3)	13,813 (95.6)	431 (100.0)	77,635 (95.0)	56 (98.9)	210 (90.1)	107,505 (97.5)	15,742 (100.0)	–	344 (100.0)	158 (88.3)	19 (100.0)	17,161 (97.5)	554 (100.0)	355 (100.0)	–
Alternative S5 (Proponent's Preferred Alternative)	Total available vegetation community[1]	9,585 (100.0)	3,568 (100.0)	3,264 (100.0)	13,256 (100.0)	116,757 (100.0)	2,286 (100.0)	14,132 (100.0)	485 (100.0)	36,836 (100.0)	88 (100.0)	1,598 (100.0)	69,360 (100.0)	3,447 (100.0)	1 (100.0)	479 (100.0)	65 (100.0)	–	12,262 (100.0)	866 (100.0)	660 (100.0)	–
	Existing disturbance[2]	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	–
	Proposed/future disturbance[3]	80 (0.8)	74 (2.1)	0 (0.0)	90 (0.7)	8,425 (7.2)	11 (0.5)	879 (6.2)	0 (0.0)	2,228 (6.0)	2 (2.3)	0 (0.0)	3,337 (4.8)	0 (0.0)	0 (0.0)	9 (1.9)	15 (23.1)	–	560 (4.6)	0 (0.0)	0 (0.0)	–
	Project disturbance[4]	15 (0.2)	4 (0.1)	0 (0.0)	11 (0.1)	264 (0.2)	3 (0.1)	30 (0.2)	0 (0.1)	84 (0.2)	0 (0.0)	0 (0.0)	299 (0.4)	0 (0.0)	0 (0.0)	1 (0.1)	0 (0.0)	–	40 (0.3)	0 (0.0)	0 (0.0)	–
	Remaining available community	9,490 (99.0)	3,490 (97.8)	3,264 (100.0)	13,155 (99.2)	108,068 (92.6)	2,272 (99.4)	13,007 (92.0)	485 (99.9)	34,524 (93.7)	86 (97.7)	1,598 (100.0)	65,724 (94.8)	3,447 (100.0)	1 (100.0)	478 (99.9)	50 (76.9)	–	11,662 (95.1)	866 (100.0)	660 (100.0)	–

TABLE 4-5
VEGETATION COMMUNITIES CUMULATIVE EFFECTS SUMMARY

Alternative	Community/ Impacts	Vegetation Community Type																				
		Grassland (Acres/ [Percent])	Barren (Acres/ [Percent])	Disturbed (Acres/ [Percent])	Mountain Shrub (Acres/ [Percent])	Pinyon-juniper (Acres/ [Percent])	Riparian (Acres/ [Percent])	Shrub Steppe (Acres/ [Percent])	Aspen (Acres/ [Percent])	Desert Shrub (Acres/ [Percent])	Noxious Weed (Acres/ [Percent])	Wildfire Affected (Acres/ [Percent])	Big Sage (Acres/ [Percent])	Agriculture (Acres/ [Percent])	Alpine (Acres/ [Percent])	Wetlands (Acres/ [Percent])	Water (Acres/ [Percent])	Bigtooth Maple (Acres/ [Percent])	Invasive (Acres/ [Percent])	Mixed Conifer (Acres/ [Percent])	Ponderosa Pine (Acres/ [Percent])	Post-burn Reseed (Acres/ [Percent])
Alternative S6	Total available vegetation community[1]	9,745 (100.0)	4,342 (100.0)	5,153 (100.0)	18,870 (100.0)	149,739 (100.0)	4,480 (100.0)	15,344 (100.0)	778 (100.0)	45,417 (100.0)	1,464 (100.0)	17,910 (100.0)	112,429 (100.0)	22,983 (100.0)	1 (100.0)	67 (100.0)	232 (100.0)	13 (100.0)	13,832 (100.0)	293 (100.0)	247 (100.0)	–
	Existing disturbance[2]	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–
	Proposed/future disturbance[3]	83 (0.9)	74 (1.7)	0 (0.0)	44 (0.2)	9,258 (6.2)	12 (0.3)	882 (5.7)	0 (0.0)	2,259 (5.0)	2 (2.3)	8 (0.0)	4,021 (3.6)	0 (0.0)	0 (0.0)	9 (13.4)	27 (11.6)	0 (0.0)	566 (4.1)	0 (0.0)	0 (0.0)	–
	Project disturbance[4]	14 (0.1)	7 (0.2)	3 (0.1)	28 (0.1)	282 (0.2)	3 (0.1)	27 (0.2)	2 (0.3)	80 (0.2)	0 (0.0)	0 (0.0)	215 (0.2)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	41 (0.3)	0 (0.0)	0 (0.0)	–
	Remaining available community	9,648 (99.0)	4,261 (98.1)	5,153 (100.0)	18,798 (99.6)	140,199 (93.6)	4,465 (99.7)	14,216 (92.6)	776 (99.7)	43,078 (94.8)	1,462 (97.7)	17,902 (100.0)	108,193 (96.2)	22,983 (100.0)	1 (100.0)	67 (100.0)	205 (88.4)	13 (100.0)	13,225 (95.6)	293 (100.0)	247 (100.0)	–
Alternative S7	Total available vegetation community[1]	5,500 (100.0)	6,691 (100.0)	1,644 (100.0)	8,419 (100.0)	71,302 (100.0)	1,686 (100.0)	14,445 (100.0)	431 (100.0)	81,706 (100.0)	57 (100.0)	233 (100.0)	110,214 (100.0)	15,742 (100.0)	–	344 (100.0)	179 (100.0)	19 (100.0)	17,604 (100.0)	554 (100.0)	355 (100.0)	–
	Existing disturbance[2]	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–
	Proposed/future disturbance[3]	73 (1.3)	487 (7.3)	0 (0.0)	88 (1.0)	1,530 (2.1)	11 (0.7)	386 (2.7)	0 (0.0)	3,933 (4.8)	0 (0.0)	23 (9.9)	2,444 (2.2)	0 (0.0)	–	0 (0.0)	21 (11.7)	0 (0.0)	396 (2.2)	0 (0.0)	0 (0.0)	–
	Project disturbance[4]	2 (0.0)	9 (0.1)	4 (0.2)	6 (0.1)	140 (0.2)	1 (0.1)	17 (0.1)	0 (0.0)	132 (0.2)	1 (1.1)	0 (0.0)	325 (0.3)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	45 (0.3)	0 (0.0)	0 (0.0)	–
	Remaining available community	5,425 (98.6)	6,195 (92.6)	1,644 (100.0)	8,325 (98.9)	69,632 (97.7)	1,674 (99.3)	13,813 (95.6)	431 (100.0)	77,641 (95.0)	56 (98.9)	210 (90.1)	107,445 (97.5)	15,742 (100.0)	–	344 (100.0)	158 (88.3)	19 (100.0)	17,163 (97.5)	554 (100.0)	355 (100.0)	–
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative	Total available vegetation community[1]	5,500 (100.0)	6,691 (100.0)	1,644 (100.0)	8,419 (100.0)	71,302 (100.0)	1,686 (100.0)	14,445 (100.0)	431 (100.0)	81,706 (100.0)	57 (100.0)	233 (100.0)	110,214 (100.0)	15,742 (100.0)	–	344 (100.0)	179 (100.0)	19 (100.0)	17,604 (100.0)	554 (100.0)	355 (100.0)	–
	Existing disturbance[2]	0 (0.0)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–	–	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	–
	Proposed/future disturbance[3]	73 (1.3)	487 (7.3)	0 (0.0)	88 (1.0)	1,530 (2.1)	11 (0.7)	386 (2.7)	0 (0.0)	3,933 (4.8)	0 (0.0)	23 (9.9)	2,444 (2.2)	0 (0.0)	–	0 (0.0)	21 (11.7)	0 (0.0)	396 (2.2)	0 (0.0)	0 (0.0)	–
	Project disturbance[4]	2 (0.0)	9 (0.1)	3 (0.2)	6 (0.1)	135 (0.2)	2 (0.1)	17 (0.1)	0 (0.0)	130 (0.2)	1 (0.9)	0 (0.0)	321 (0.3)	0 (0.0)	–	0 (0.0)	0 (0.0)	0 (0.0)	44 (0.2)	0 (0.0)	0 (0.0)	–
	Remaining available community	5,425 (98.6)	6,195 (92.6)	1,644 (100.0)	8,325 (98.9)	69,637 (97.7)	1,673 (99.2)	13,813 (95.6)	431 (100.0)	77,643 (95.0)	57 (99.1)	210 (0.1)	107,449 (97.5)	–	–	344 (100.0)	158 (88.3)	19 (100.0)	17,164 (97.5)	554 (100.0)	355 (100.0)	–

NOTES:
[1]Acres of available vegetation community types were determined by including all vegetation classes identified in the Southwest Regional Gap Analysis Project (GAP) database that occur within any of the 6th level hydrologic unit codes crossed by the alternative routes.
[2]Existing disturbance was calculated as a summation of all of the estimated acreages of the existing project disturbances and agricultural areas in the GAP data.
[3]Proposed/future disturbance was calculated by summing the acres of disturbance for the projects listed in Table 4-1. Projects with only point data available were buffered according to the approximate acreage of the project within the project area. Linear facility acreage was obtained by buffering proposed transmission lines by their respective right-of-ways. All point, line, and polygon areas were combined to obtain a total proposed future disturbance. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.
[4]Project disturbance was calculated by identifying the areas within the vegetation community types each Project alternative crossed. This total mileage of each vegetation community type crossed by each alternative was compared to the total disturbance acres in Table 3-2.

and residential development, wildlife habitat management, wildfire management, and projects identified in Table 4-1 also would affect fish and wildlife in the cumulative effects analysis areas.

Ground disturbance during construction of any of the alternatives may contribute cumulatively to sediment loading in streams providing habitat for fishes and other aquatic organisms throughout the cumulative effects analysis area. The incremental contribution of all Project alternatives to cumulative sedimentation impacts is expected to be minor as avoidance (spanning) of aquatic features and implementation of storm water pollution prevention measures and are included as design features of the Proposed Action.

The Project also would contribute to the cumulative impacts of human activity and anthropogenic noise on wildlife behavior within the area of potential Project effects and may result in modification of existing patterns of seasonal distribution and habitat use at some locations within the Project area. The magnitude of these cumulative effects would vary in direct proportion to the extent of Project-related construction and maintenance activities in fish and wildlife habitats and cannot be quantified. Seasonal activity restrictions have been incorporated as selective mitigation in areas where wildlife may be most vulnerable to human activity during critical periods of their life cycles, including reproduction (e.g., nesting, calving, and fawning), and where physiological stresses imposed by environmental conditions are greatest (e.g., crucial big game habitats).

Big Game

The magnitude of cumulative disturbance on big game crucial, substantial, and potentially suitable habitats for all alternatives is provided in (Table 4-6). All action alternatives would contribute to cumulative loss, fragmentation, and modification of vegetation and terrain that provides crucial and substantial mule deer and pronghorn seasonal habitats. None of the Project alternatives would contribute to the cumulative loss of elk crucial habitats; however substantial and potentially suitable elk habitats would be affected within the cumulative effects analysis area for elk (refer to Appendix E).

All Project alternatives would contribute cumulatively to modification of vegetation on crucial mule deer winter range. The quality and quantity of available winter range is considered by UDWR as the limiting factor for mule deer in the Fillmore, Beaver, and Pine Valley Wildlife Management Units within the cumulative effects analysis area (UDWR 2006b, 2006c, 2006d). Many of the crucial deer ranges in Utah are in late successional stages (UDWR 2008b) and production of forage in them is limited. Modification (clearing and reclamation of the right-of-way during Project construction) of pinyon-juniper habitats within crucial mule deer winter ranges crossed by all Project alternatives would result in establishment of early successional vegetation communities and increased forage availability for mule deer within the cumulative effects analysis area. Disturbance to shrub steppe, desert shrub, and sagebrush habitats during Project construction is not likely to result in substantial reduction in forage availability within the cumulative effects analysis area. All Project alternatives also will contribute cumulatively to disturbance to crucial year-long pronghorn habitat, much of which is shrub steppe. The availability of free water and the availability of succulent forbs and grasses on spring and summer ranges are factors that limit pronghorn throughout Utah (UDWR 2009a). The nature and extent of cumulative disturbance to year-long pronghorn habitat is not likely to result in habitat modifications that contribute to these factors, or in substantial reduction in pronghorn carrying capacity in areas that would be affected by any of the Project alternatives.

Based on consideration of the extent of available big game habitats that would be modified or lost, relative to that available, and impacts associated with the Project in combination with other present and reasonably foreseeable future actions (refer to Table 4-6), none of the Project alternatives are expected to

contribute to cumulative impacts on habitats that would be likely to result in changes in seasonal distribution or abundance of elk, mule deer, or pronghorn within the cumulative effects analysis areas for big game.

Additional analysis of cumulative effects on elk, a USFS MIS, that occur on the southern alternative routes is presented in Appendix E, as mapped habitats for this species occur mainly on the Dixie National Forest.

Northern Area – Sigurd Substation to South of the Black Mountains

All northern alternative routes would affect crucial winter and substantial summer mule deer habitats, crucial pronghorn year-long habitat, and substantial summer, winter, and year-long elk habitats (UDWR 2009a). Crucial mule deer winter habitats occurring on the northern side of the Sevier River Valley and in the Cove Fort and Mineral Mountains areas would be affected by all alternative routes. Future actions that include agricultural and residential development; and projects identified in Table 4-1 as occurring in the vicinity of Links 33, 30, 45, 64, 63, 66, 68, 75, 305, 320, 345, 450, 349, 390, and 470 would also affect mule deer crucial habitat crossed by northern alternative routes (Table 4-1). Among the northern alternatives, Alternative N1 would result in the greatest loss and modification of mule deer crucial winter habitat and pronghorn crucial year-long habitat. Alternative N4 would result in the lowest extent of modification and loss of mule deer crucial winter habitat and pronghorn crucial year-long habitat. The magnitude of crucial and substantial big game habitat modification and losses under Alternatives N1 and N4, expressed as a percentage of available habitat, do not differ significantly. The cumulative loss of pronghorn crucial year-long habitat loss under Alternative N1, expressed as a percentage of remaining available habitat, would be greater than that under Alternative N4. The cumulative loss of mule deer crucial winter habitat under these two alternatives would not differ significantly.

Southern Area – South of the Black Mountains to Red Butte Substation

All southern alternative routes would affect crucial and substantial mule deer summer and winter habitats, substantial mule deer year-long habitat and, crucial year-long pronghorn habitat. Cumulative effects of the southern alternatives on potentially suitable elk habitat are addressed in Appendix E. Crucial mule deer summer habitat occurring on the Dixie National Forest and crucial mule deer winter habitat in the vicinity of the Red Butte Substation would be affected by all routes. Future actions that include agricultural and residential development and projects identified in Table 4-1 as occurring in the vicinity of Links 260, 270, 271, 272, 275, 285, 444, and 500 would also affect mule deer crucial habitat crossed by the southern alternative routes. The extent of cumulative crucial big game habitat loss, expressed as a percentage of the available habitat, is essentially the same for all southern alternatives. Among the southern alternatives, Alternative S4 would result in the greatest loss and modification of mule deer crucial winter habitat and pronghorn crucial year-long habitat, and Alternative S2 would affect crucial mule deer to the greatest extent (Table 4-6). Alternative S2 would result in the lowest level of loss and modification of mule deer crucial summer habitat, and Alternative S6 would result in the lowest level of modification and loss of crucial mule deer winter habitat. Alternative S1 would result in the lowest level of modification and loss of pronghorn crucial year-long habitat.

TABLE 4-6
BIG GAME CUMULATIVE EFFECTS SUMMARY

Alternative	Habitats/Impacts	Mule Deer Habitat										Pronghorn		Elk					
		Crucial Summer		Substantial Summer		Crucial Winter		Substantial Winter		Substantial Year-long		Crucial Year-long		Substantial Summer		Substantial Winter		Substantial Year-long	
		Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
Alternative N1	Total available habitat[1]	16,166	100.0	180,632	100.0	173,247	100.0	0	–	0	–	383,987	100.0	117,592	100.0	64,154	100.0	32,087	100.0
	Existing disturbance[2]	19	0.1	984	0.5	2,805	1.6	0	–	0	–	13,420	3.5	530	0.5	1,009	1.6	597	1.9
	Proposed/future disturbance[3]	4,222	26.1	523	0.3	33,327	19.2	0	–	0	–	106,504	27.7	642	0.5	22,298	34.8	1,556	4.8
	Project disturbance[4]	0	0.0	109	0.1	404	0.2	0	–	0	–	843	0.2	120	0.1	181	0.3	24	0.1
	Remaining available habitat	11,926	73.8	179,017	99.1	136,710	78.9	0	–	0	–	263,220	68.5	116,300	98.9	40,666	63.4	29,910	93.2
Alternative N2	Total available habitat[1]	5,568	100.0	170,803	100.0	201,812	100.0	0	–	0	–	283,635	100.0	111,049	100.0	64,154	100.0	31,583	100.0
	Existing disturbance[2]	19	0.3	984	0.6	2,801	1.4	0	–	0	–	13,465	4.7	530	0.5	1,009	1.6	597	1.9
	Proposed/future disturbance[3]	1,124	20.2	1,854	1.1	42,650	21.1	0	–	0	–	91,316	32.2	642	0.6	22,298	34.8	4,930	15.6
	Project disturbance[4]	0	0.0	108	0.1	522	0.3	0	–	0	–	838	0.3	120	0.1	180	0.3	24	0.1
	Remaining available habitat	4,425	79.5	167,856	98.3	155,839	77.2	0	–	0	–	178,016	62.8	109,757	98.8	40,666	63.4	26,032	82.4
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	Total available habitat[1]	5,568	100.0	170,803	100.0	201,812	100.0	0	–	0	–	283,635	100.0	111,049	100.0	64,154	100.0	31,583	100.0
	Existing disturbance[2]	19	0.3	984	0.6	2,800	1.4	0	–	0	–	13,465	4.7	530	0.5	1,009	1.6	597	1.9
	Proposed/future disturbance[3]	1,124	20.2	1,854	1.1	42,650	21.1	0	–	0	–	91,316	32.2	642	0.6	22,298	34.8	4,930	15.6
	Project disturbance[4]	0	0.0	109	0.1	534	0.3	0	–	0	–	841	0.3	120	0.1	181	0.3	24	0.1
	Remaining available habitat	4,425	79.5	167,856	98.3	155,828	77.2	0	–	0	–	178,013	62.8	109,757	98.8	40,666	63.4	26,032	82.4
Alternative N3	Total available habitat[1]	0	–	167,763	100.0	267,606	100.0	0	–	0	–	304,144	100.0	117,592	100.0	64,154	100.0	17,349	100.0
	Existing disturbance[2]	0	–	677	0.4	3,376	1.3	0	–	0	–	22,337	7.3	530	0.5	1,009	1.6	597	3.4
	Proposed/future disturbance[3]	0	–	2,350	1.4	49,634	18.5	0	–	0	–	57,485	18.9	642	0.5	22,298	34.8	5,424	31.3
	Project disturbance[4]	0	–	106	0.1	653	0.2	0	–	0	–	691	0.2	118	0.1	177	0.3	24	0.1
	Remaining available habitat	0	–	164,630	98.1	213,944	79.9	0	–	0	–	223,632	73.5	116,303	98.9	40,669	63.4	11,304	65.2
Alternative N4	Total available habitat[1]	5,568	100.0	183,046	100.0	183,941	100.0	0	–	0	–	324,402	100.0	117,592	100.0	36,739	100.0	48,947	100.0
	Existing disturbance[2]	19	0.3	984	0.5	2,770	1.5	0	–	0	–	13,450	4.1	530	0.5	974	2.7	597	1.2
	Proposed/future disturbance[3]	1,124	20.2	1,854	1.0	30,628	16.7	0	–	0	–	57,501	17.7	642	0.5	8,624	23.5	8,875	18.1
	Project disturbance[4]	0	0.0	112	0.1	514	0.3	0	–	0	–	602	0.2	125	0.1	112	0.3	137	0.3
	Remaining available habitat	4,425	79.5	180,096	98.4	150,029	81.6	0	–	0	–	252,848	77.9	116,296	98.9	27,029	73.6	39,337	80.4
Alternative N5	Total available habitat[1]	0	–	167,763	100.0	244,927	100.0	0	–	0	–	222,407	100.0	117,592	100.0	36,739	100.0	34,713	100.0
	Existing disturbance[2]	0	–	677	0.4	3,340	1.4	0	–	0	–	22,131	10.0	530	0.5	974	2.7	597	1.7
	Proposed/future disturbance[3]	0	–	2,350	1.4	37,553	15.3	0	–	0	–	19,072	8.6	642	0.5	8,624	23.5	9,369	27.0
	Project disturbance[4]	0	–	110	0.1	650	0.3	0	–	0	–	455	0.2	122	0.1	110	0.3	134	0.4
	Remaining available habitat	0	–	164,626	98.1	203,384	83.0	0	–	0	–	180,749	81.3	116,298	98.9	27,031	73.6	24,612	70.9
Alternative N6 (Proponent's Preferred Alternative)	Total available habitat[1]	0	–	167,763	100.0	244,927	100.0	0	–	0	–	222,407	100.0	117,592	100.0	36,739	100.0	34,713	100.0
	Existing disturbance[2]	0	–	677	0.4	3,340	1.4	0	–	0	–	22,131	10.0	530	0.5	974	2.7	597	1.7
	Proposed/future disturbance[3]	0	–	2,350	1.4	37,553	15.3	0	–	0	–	19,072	8.6	642	0.5	8,624	23.5	9,369	27.0
	Project disturbance[4]	0	–	110	0.1	650	0.3	0	–	0	–	455	0.2	122	0.1	110	0.3	134	0.4
	Remaining available habitat	0	–	164,626	98.1	203,384	83.0	0	–	0	–	180,749	81.3	116,298	98.9	27,031	73.6	24,612	70.9
Alternative S1	Total available habitat[1]	42,620	100.0	24,296	100.0	17,511	100.0	70,301	100.0	10,731	100.0	182,453	100.0	0	–	0	–	0	–
	Existing disturbance[2]	143	0.3	130	0.5	120	0.7	311	0.4	0	0.0	1,810	1.0	0	–	0	–	0	–
	Proposed/future disturbance[3]	215	0.5	19	0.1	498	2.8	1,127	1.6	214	2.0	6,313	3.5	0	–	0	–	0	–
	Project disturbance[4]	116	0.3	42	0.2	112	0.6	170	0.2	3	0.0	280	0.2	0	–	0	–	0	–
	Remaining available habitat	42,145	98.9	24,105	99.2	16,781	95.8	68,692	97.7	10,514	98.0	174,051	95.4	0	–	0	–	0	–

TABLE 4-6
BIG GAME CUMULATIVE EFFECTS SUMMARY

Alternative	Habitats/Impacts	Mule Deer Habitat										Pronghorn		Elk					
		Crucial Summer		Substantial Summer		Crucial Winter		Substantial Winter		Substantial Year-long		Crucial Year-long		Substantial Summer		Substantial Winter		Substantial Year-long	
		Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
Alternative S2	Total available habitat[1]	36,597	100.0	15,891	100.0	10,534	100.0	45,388	100.0	8,167	100.0	183,430	100.0	0	–	0	–	0	–
	Existing disturbance[2]	143	0.4	130	0.8	125	1.2	306	0.7	0	0.0	1,951	1.1	0	–	0	–	0	–
	Proposed/future disturbance[3]	358	1.0	101	0.6	595	5.6	1,433	3.2	191	2.3	6,313	3.4	0	–	0	–	0	–
	Project disturbance[4]	74	0.2	25	0.2	142	1.3	98	0.2	11	0.1	288	0.2	0	–	0	–	0	–
	Remaining available habitat	36,022	98.4	15,635	98.4	9,673	91.8	43,550	96.0	7,965	97.5	174,878	95.3	0	–	0	–	0	–
Alternative S3	Total available habitat[1]	60,914	100.0	24,431	100.0	19,583	100.0	54,553	100.0	12,914	100.0	183,430	100.0	0	–	0	–	0	–
	Existing disturbance[2]	229	0.4	0	0.0	144	0.7	316	0.6	0	0.0	1,951	1.1	0	–	0	–	0	–
	Proposed/future disturbance[3]	297	0.5	82	0.3	490	2.5	1,502	2.8	187	1.4	6,313	3.4	0	–	0	–	0	–
	Project disturbance[4]	105	0.2	21	0.1	120	0.6	127	0.2	81	0.6	287	0.2	0	–	0	–	0	–
	Remaining available habitat	60,284	99.0	24,329	99.6	18,829	96.1	52,608	96.4	12,646	97.9	174,878	95.3	0	–	0	–	0	–
Alternative S4	Total available habitat[1]	36,597	100.0	15,891	100.0	10,534	100.0	45,388	100.0	8,167	100.0	183,430	100.0	0	–	0	–	0	–
	Existing disturbance[2]	143	0.4	130	0.8	125	1.2	306	0.7	0	0.0	1,951	1.1	0	–	0	–	0	–
	Proposed/future disturbance[3]	358	1.0	101	0.6	595	5.6	1,433	3.2	191	2.3	6,313	3.4	0	–	0	–	0	–
	Project disturbance[4]	79	0.2	27	0.2	157	1.5	113	0.2	12	0.1	309	0.2	0	–	0	–	0	–
	Remaining available habitat	36,017	98.4	15,632	98.4	9,658	91.7	43,536	95.9	7,964	97.5	174,857	95.3	0	–	0	–	0	–
Alternative S5 (Proponent's Preferred Alternative)	Total available habitat[1]	43,030	100.0	23,468	100.0	17,771	100.0	75,782	100.0	10,731	100.0	85,182	100.0	0	–	0	–	0	–
	Existing disturbance[2]	143	0.3	130	0.6	53	0.3	1,531	2.0	0	0.0	0	0.0	0	–	0	–	0	–
	Proposed/future disturbance[3]	215	0.5	19	0.1	1,982	11.2	6,383	8.4	214	2.0	3,748	4.4	0	–	0	–	0	–
	Project disturbance[4]	115	0.3	41	0.2	39	0.2	246	0.3	3	0.0	234	0.3	0	–	0	–	0	–
	Remaining available habitat	42,557	98.9	23,277	99.2	15,697	88.3	67,621	89.2	10,514	98.0	81,199	95.3	0	–	0	–	0	–
Alternative S6	Total available habitat[1]	77,815	100.0	32,550	100.0	24,658	100.0	107,868	100.0	12,914	100.0	93,173	100.0	0	–	0	–	0	–
	Existing disturbance[2]	229	0.3	0	0.0	171	0.7	1,809	1.7	0	0.0	862	0.9	0	–	0	–	0	–
	Proposed/future disturbance[3]	297	0.4	82	0.3	2,343	9.5	7,400	6.9	187	1.4	3,748	4.0	0	–	0	–	0	–
	Project disturbance[4]	102	0.1	20	0.1	25	0.1	244	0.2	79	0.6	239	0.3	0	–	0	–	0	–
	Remaining available habitat	77,187	99.2	32,448	99.7	22,119	89.7	98,416	91.2	12,648	97.9	88,324	94.8	0	–	0	–	0	–
Alternative S7	Total available habitat[1]	36,597	100.0	15,891	100.0	10,534	100.0	45,388	100.0	8,167	100.0	183,430	100.0	0	–	0	–	0	–
	Existing disturbance[2]	143	0.4	130	0.8	125	1.2	306	0.7	0	0.0	1,951	1.1	0	–	0	–	0	–
	Proposed/future disturbance[3]	358	1.0	101	0.6	595	5.6	1,433	3.2	191	2.3	6,313	3.4	0	–	0	–	0	–
	Project disturbance[4]	76	0.2	29	0.2	147	1.4	102	0.2	11	0.1	297	0.2	0	–	0	–	0	–
	Remaining available habitat	36,020	98.4	15,630	98.4	9,668	91.8	43,547	95.9	7,965	97.5	174,869	95.3	0	–	0	–	0	–
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative	Total available habitat[1]	36,597	100.0	15,891	100.0	10,534	100.0	45,388	100.0	8,167	100.0	183,430	100.0	0	–	0	–	0	–
	Existing disturbance[2]	143	0.4	130	0.8	125	1.2	306	0.7	0	0.0	1,951	1.1	0	–	0	–	0	–
	Proposed/future disturbance[3]	358	1.0	101	0.6	595	5.6	1,433	3.2	191	2.3	6,313	3.4	0	–	0	–	0	–
	Project disturbance[4]	75	0.2	28	0.2	144	1.4	100	0.2	11	0.1	291	0.2	0	–	0	–	0	–
	Remaining available habitat	36,021	98.4	15,631	98.4	9,671	91.8	43,549	95.9	7,965	97.5	174,875	95.3	0	–	0	–	0	–

NOTES:
[1]Total available habitat was calculated based on elk and, mule deer, (UDWR March 24, 2008) and pronghorn (UDWR April 29, 2010) GIS habitat layers.
[2]Existing disturbance was calculated as a summation of all of the estimated acreages of the existing project disturbances and agricultural areas in the GAP data.
[3]Proposed/future disturbance was calculated by summing the acres of disturbance for the projects listed in Table 4-1. Projects with only point data available were buffered according to the approximate acreage of the project within the project area. Linear facility acreage was obtained by buffering proposed transmission lines by their respective right-of-ways. All point, line, and polygon areas were combined to obtain a total proposed future disturbance. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.
[4]Project disturbance was calculated by identifying the areas within the vegetation community types each Project alternative crossed. This total mileage of each vegetation community type crossed by each alternative was compared to the total disturbance acres in Table 3-2.

Raptors and Other Migratory Birds

All Project alternatives would contribute cumulatively to impacts of present, proposed, or reasonably foreseeable future actions on migratory birds. The cumulative effect of all Project alternatives and other activities that result in fragmentation, modification, or removal of native vegetation will be greatest for alternatives that require clearing or modification of riparian, big-sagebrush, pinyon-juniper, and desert shrub-pinyon-juniper ecotones as these vegetation communities generally provide the highest foliage volume and support the highest density and diversity of nesting migratory songbirds. All northern Project alternatives would contribute to cumulative modification and loss of songbird habitat at similar levels. Similarly, the magnitude of contribution to cumulative migratory songbird habitat modification and loss for all southern alternatives would be essentially identical.

Potential for increased waterfowl (e.g., ducks, geese, swans and cranes) mortality due to collisions with transmission-line infrastructure (e.g., towers, guy wires, conductors, and static wires) would be greatest where alternatives are located in close proximity to open water. Among northern alternatives, Alternative N4 crosses the greatest extent of potentially suitable waterfowl habitat (perennial streams, riparian areas, lakes, and reservoirs) and would result in the greatest magnitude of potential cumulative contribution to waterfowl mortality. All other northern alternatives would have potential to contribute to cumulative effects resulting in waterfowl mortality at similar levels based on the location of these alternatives in relationship to waterbodies that provide potentially suitable waterfowl habitat. Among southern alternatives, Alternatives S1 and S5 and would result in the greatest magnitude of potential cumulative contribution to waterfowl mortality; Alternative S4 would contribute the least and all other southern alternatives would have the potential to contribute to cumulative effects resulting in waterfowl mortality at similar levels.

All Project alternatives will contribute to the effects of present, future and reasonably foreseeable future actions on raptors throughout the cumulative effects analysis area include loss and fragmentation of raptor habitat resulting in changes in the availability of the raptor prey base, loss of historical nesting territories, and changes in the species composition of nesting raptors (Romin and Muck 1999). All Project alternatives will introduce substrates for raptor nesting and perching and may contribute to increases in concentrations of nesting and foraging raptors within the cumulative effects analysis area. Transmission lines and towers added to the landscape under all alternatives could also contribute cumulatively to raptor mortality as a result of collisions with transmission infrastructure. Definitive information regarding the potential for increased raptor mortality associated with construction of new electric transmission lines and towers paralleling existing transmission facilities, relative to that associated with construction of new transmission facilities in terrain where no transmission lines exist, is not available. Consequently, there is no reliable basis for comparison of the potential increase in raptor mortality as a result of collisions with new transmission lines and towers among Project alternatives.

Project alternatives that would be constructed in proximity to wind energy generation facilities could contribute to the cumulative raptor mortality due to collisions with wind energy generation infrastructure (e.g., turbine blades, towers, and transmission lines) (FWS 2011b). Detailed information regarding raptor use and habitat is not available for all proposed, existing, and potential wind energy facilities in the cumulative impacts analysis area, and reliable conclusions regarding risk of cumulative effects on raptors at each facility cannot be drawn. The quantity of colocation of each alternative route with wind energy facilities is presented in Table 4-1. All northern area alternatives would locate transmission-line structures near existing wind energy development, proposed wind energy development, or wind-testing areas with the potential to become a wind energy development (Table 4-3). Raptors, including golden eagles, hawks, and owls, are known to forage and nest in the vicinity of at least some of these proposed and existing wind facilities (TetraTech 2008a, 2008b, and 2008c). Consequently, the potential exists for all northern alternatives to contribute to a cumulative increase in raptor mortality within the cumulative effects

analysis area. None of the southern alternative routes cross areas identified for development of wind energy resources, and none of the southern routes are expected to contribute to a cumulative increase in raptor mortality within the cumulative effects analysis area. Based on the quantity and quality of available habitat and the anticipated magnitude and extent of effects of the Project and other present and future actions, the Project alternatives are not expected to contribute to the cumulative effects of present and reasonably foreseeable future actions at a level that would result in a significant adverse effect on raptors and other migratory bird populations or species diversity within the cumulative effects analysis area.

Special Status Species

Cumulative effects of Project alternatives on federally listed threatened, endangered, and candidate species and BLM sensitive species are addressed in this section.

Analysis of cumulative effects of Project alternatives on USFS sensitive species is presented in Appendix E.

Federally Listed and Candidate Species

Utah Prairie Dog

Habitat modification under Alternative Routes N3, N5, and N6 would contribute cumulatively to potential future modification and loss of occupied Utah prairie dog habitat resulting from oil and gas leasing, and wind energy development on Links 396 and 490 (Table 4-1). Construction of transmission lines and towers could result in increased perching opportunities for raptors and ravens, which could impact Utah prairie dogs. The magnitude of potential cumulative Utah prairie dog habitat modification under northern Project alternatives is summarized in Table 4-7. None of the southern Project alternatives would affect the Utah prairie dog.

TABLE 4-7
UTAH PRAIRIE DOG CUMULATIVE EFFECTS SUMMARY

Alternative	Habitats/Impacts	Occupied Habitat	
		Acres	Percent
Alternative N1	Total available habitat[1]	303	100.0
	Existing disturbance[2]	0	0.0
	Proposed/future disturbance[3]	216	71.0
	Project disturbance[4]	0	0.0
	Remaining available habitat	87	29.0
Alternative N2	Total available habitat[1]	303	100.0
	Existing disturbance[2]	0	0.0
	Proposed/future disturbance[3]	216	71.0
	Project disturbance[4]	0	0.0
	Remaining available habitat	87	29.0
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	Total available habitat[1]	303	100.0
	Existing disturbance[2]	0	0.0
	Proposed/future disturbance[3]	216	71.0
	Project disturbance[4]	0	0.0
	Remaining available habitat	87	29.0

TABLE 4-7
UTAH PRAIRIE DOG CUMULATIVE EFFECTS SUMMARY

Alternative	Habitats/Impacts	Occupied Habitat	
		Acres	Percent
Alternative N3	Total available habitat[1]	2,838	100.0
	Existing disturbance[2]	0	0.0
	Proposed/future disturbance[3]	432	15.0
	Project disturbance[4]	17	0.6
	Remaining available habitat	2,389	84.0
Alternative N4	Total available habitat[1]	303	100.0
	Existing disturbance[2]	0	0.0
	Proposed/future disturbance[3]	216	71.0
	Project disturbance[4]	0	0.0
	Remaining available habitat	87	29.0
Alternative N5	Total available habitat[1]	2,838	100.0
	Existing disturbance[2]	0	0.0
	Proposed/future disturbance[3]	432	15.0
	Project disturbance[4]	17	0.6
	Remaining available habitat	2,389	84.0
Alternative N6 (Proponent's Preferred Alternative)	Total available habitat[1]	2,838	100.0
	Existing disturbance[2]	0	0.0
	Proposed/future disturbance[3]	432	15.0
	Project disturbance[4]	29	1.0
	Remaining available habitat	2,377	84.0
Alternative S1	Total available habitat[1]	115	100.0
	Existing disturbance[2]	0	0.0
	Proposed/future disturbance[3]	0	0.0
	Project disturbance[4]	0	0.0
	Remaining available habitat	115	100.0
Alternative S2	Total available habitat[1]	115	100.0
	Existing disturbance[2]	0	0.0
	Proposed/future disturbance[3]	0	0.0
	Project disturbance[4]	0	0.0
	Remaining available habitat	115	100.0
Alternative S3	Total available habitat[1]	115	100.0
	Existing disturbance[2]	0	0.0
	Proposed/future disturbance[3]	0	0.0
	Project disturbance[4]	0	0.0
	Remaining available habitat	115	100.0
Alternative S4	Total available habitat[1]	115	100.0
	Existing disturbance[2]	0	0.0
	Proposed/future disturbance[3]	0	0.0
	Project disturbance[4]	0	0.0
	Remaining available habitat	115	100.0
Alternative S5 (Proponent's Preferred Alternative)	Total available habitat[1]	526	100.0
	Existing disturbance[2]	15	3.0
	Proposed/future disturbance[3]	90	17.0
	Project disturbance[4]	0	0.0
	Remaining available habitat	421	80.0

TABLE 4-7
UTAH PRAIRIE DOG CUMULATIVE EFFECTS SUMMARY

Alternative	Habitats/Impacts	Occupied Habitat	
		Acres	Percent
Alternative S6	Total available habitat[1]	526	100.0
	Existing disturbance[2]	15	3.0
	Proposed/future disturbance[3]	90	17.0
	Project disturbance[4]	0	0.0
	Remaining available habitat	421	80.0
Alternative S7	Total available habitat[1]	115	100.0
	Existing disturbance[2]	0	0.0
	Proposed/future disturbance[3]	0	0.0
	Project disturbance[4]	0	0.0
	Remaining available habitat	115	100.0
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative	Total available habitat[1]	115	100.0
	Existing disturbance[2]	0	0.0
	Proposed/future disturbance[3]	0	0.0
	Project disturbance[4]	0	0.0
	Remaining available habitat	115	100.0

NOTES:
[1]Total available habitat included all Utah prairie dog identified in GIS data provided by the BLM in September 2012.
[2]Existing disturbance was calculated as a summation of all of the estimated acreages of the existing project disturbances and agricultural areas in the GAP data.
[3]Proposed/future disturbance was calculated by summing the acres of disturbance for the projects listed in Table 4-1. Projects with only point data available were buffered according to the approximate acreage of the project within the project area. Linear facility acreage was obtained by buffering proposed transmission lines by their respective right-of-ways. All point, line, and polygon areas were combined to obtain a total proposed future disturbance. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.
[4]Project disturbance was calculated by identifying the areas within the vegetation community types each Project alternative crossed. This total mileage of each vegetation community type crossed by each alternative was compared to the total disturbance acres in Table 3-2.

Southwestern Willow Flycatcher

Removal or modification of occupied breeding habitat for the Southwestern willow flycatcher on Link 245 would occur under Alternatives S1, S5, and S6 and would contribute cumulatively to potential impacts on this habitat including effects of human activity during recreational uses of Newcastle Reservoir. The magnitude of potential cumulative Southwestern willow flycatcher habitat modification under southern Project alternatives is summarized in Table 4-8. The remaining available breeding habitat would likely continue to support breeding and foraging Southwestern willow flycatchers in the cumulative effects analysis area. None of the northern Project alternatives would affect Southwestern willow flycatchers or potentially suitable habitat for this species within the cumulative effects analysis area.

TABLE 4-8
SOUTHWESTERN WILLOW FLYCATCHER CUMULATIVE EFFECTS SUMMARY

Alternative	Habitats/Impacts	Occupied Habitat	
		Acres	Percent
Alternative S1	Total available habitat[1]	134	100.0
	Existing disturbance[2]	0	0.0
	Proposed/future disturbance[3]	0	0.0
	Project disturbance[4]	2	1.5
	Remaining available habitat	132	98.5

TABLE 4-8
SOUTHWESTERN WILLOW FLYCATCHER CUMULATIVE EFFECTS SUMMARY

Alternative	Habitats/Impacts	Occupied Habitat	
		Acres	Percent
Alternative S2	Total available habitat[1]	0	–
	Existing disturbance[2]	0	–
	Proposed/future disturbance[3]	0	–
	Project disturbance[4]	0	–
	Remaining available habitat	0	–
Alternative S3	Total available habitat[1]	0	–
	Existing disturbance[2]	0	–
	Proposed/future disturbance[3]	0	–
	Project disturbance[4]	0	–
	Remaining available habitat	0	–
Alternative S4	Total available habitat[1]	0	–
	Existing disturbance[2]	0	–
	Proposed/future disturbance[3]	0	–
	Project disturbance[4]	0	–
	Remaining available habitat	0	–
Alternative S5 (Proponent's Preferred Alternative)	Total available habitat[1]	134	100.0
	Existing disturbance[2]	0	0.0
	Proposed/future disturbance[3]	0	0.0
	Project disturbance[4]	2	1.5
	Remaining available habitat	132	98.5
Alternative S6	Total available habitat[1]	134	100.0
	Existing disturbance[2]	0	0.0
	Proposed/future disturbance[3]	0	0.0
	Project disturbance[4]	2	1.5
	Remaining available habitat	132	98.5
Alternative S7	Total available habitat[1]	0	–
	Existing disturbance[2]	0	–
	Proposed/future disturbance[3]	0	–
	Project disturbance[4]	0	–
	Remaining available habitat	0	–
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative	Total available habitat[1]	0	–
	Existing disturbance[2]	0	–
	Proposed/future disturbance[3]	0	–
	Project disturbance[4]	0	–
	Remaining available habitat	0	–

NOTES:
[1]Total available habitat included riparian tree/shrub vegetation with a patch size greater than 0.8-hectare [2 acres] and 10 meters in width in areas within the U.S. Fish and Wildlife Service's accepted potential species range within 0.25 mile of the Project alternatives.
[2]Existing disturbance was calculated as a summation of all of the estimated acreages of the existing project disturbances and agricultural areas in the GAP data.
[3]Proposed/future disturbance was calculated by summing the acres of disturbance for the projects listed in Table 4-1. Projects with only point data available were buffered according to the approximate acreage of the project within the project area. Linear facility acreage was obtained by buffering proposed transmission lines by their respective right-of-ways. All point, line, and polygon areas were combined to obtain a total proposed future disturbance.
[4]Project disturbance was calculated by identifying the areas within the vegetation community types each Project alternative crossed. This total mileage of each vegetation community type crossed by each alternative was compared to the total disturbance acres in Table 3-2.

California Condor

The California condor is not likely to occur within the northern Project alternatives and is known to infrequently occur within the southern alternatives on the Dixie National Forest (refer to Appendix E). None of the Project alternatives are likely to contribute to cumulative impacts on the California condor or potential foraging habitat that exists throughout the cumulative effects analysis area.

Greater Sage-grouse

Direct and indirect effects of all action alternatives would contribute cumulatively to the effects of past and future loss, fragmentation, and modification of habitat occupied by the Bald Hills sage-grouse population resulting from anthropogenic activities and naturally occurring events, including juniper encroachment into sagebrush habitats, wildfire, severe weather, and climate change. Projects listed in Table 4.1 as occurring along Links 160, 163, 395, 396, 480, and 490 could also contribute to the incremental loss and modification of sage-grouse habitat and incremental loss of individual birds from the Bald Hills sage-grouse population. There are 40 (328,801 acres) open-grazing allotments within sage-grouse habitat occupied by the Bald Hills sage-grouse population. Grazing management systems have been implemented for the majority of the grazing allotments within the cumulative impact analysis area which will allow for short- and long-term improvements to the vegetative condition within them. Continued grazing under these management systems is not recognized as a threat to the Bald Hills Sage-grouse population by the local sage grouse working group. Construction and maintenance of fences; disturbance on leks; OHV use; clearing and maintenance of rights-of-way for mines; pipelines; energy generation and transmission facilities; and construction of transmission lines and towers within the cumulative effects analysis area could potentially contribute to adverse cumulative effects to the Bald Hills sage-grouse population (e.g., direct mortality, reduction of carrying capacity, and displacement of sage-grouse from priority habitats).

Cumulative effects of all Project alternatives on the habitat occupied by the Bald Hills sage-grouse within the cumulative effects analysis area are summarized in Table 4-9.

TABLE 4-9
GREATER SAGE-GROUSE CUMULATIVE EFFECTS SUMMARY

Alternative	Habitats/Impacts	Crucial Brood-Rearing		Crucial Winter		Occupied	
		Acres	Percent	Acres	Percent	Acres	Percent
Alternative N1	Total available habitat[1]	309,032	100.0	101,125	100.0	347,956	100.0
	Existing disturbance[2]	7,274	2.4	824	0.8	10,467	3.0
	Proposed/future disturbance[3]	40,006	12.9	11,294	11.2	41,183	11.8
	Project disturbance[4]	90	0.0	0	0.0	89	0.1
	Remaining available habitat	261,663	84.7	89,007	88.0	296,216	85.1
Alternative N2	Total available habitat[1]	309,032	100.0	101,125	100.0	347,956	100.0
	Existing disturbance[2]	7,274	2.4	824	0.8	10,467	3.0
	Proposed/future disturbance[3]	40,006	12.9	11,294	11.2	41,183	11.8
	Project disturbance[4]	89	0.0	0	0.0	89	0.1
	Remaining available habitat	261,663	84.7	89,007	88.0	296,216	85.1

TABLE 4-9
GREATER SAGE-GROUSE CUMULATIVE EFFECTS SUMMARY

Alternative	Habitats/Impacts	Crucial Brood-Rearing		Crucial Winter		Occupied	
		Acres	Percent	Acres	Percent	Acres	Percent
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	Total available habitat[1]	309,032	100.0	101,125	100.0	347,956	100.0
	Existing disturbance[2]	7,274	2.4	824	0.8	10,467	3.0
	Proposed/future disturbance[3]	40,006	12.9	11,294	11.2	41,183	11.8
	Project disturbance[4]	90	0.0	0	0.0	89	0.1
	Remaining available habitat	261,663	84.7	89,007	88.0	296,216	85.1
Alternative N3	Total available habitat[1]	309,032	100.0	101,125	100.0	347,956	100.0
	Existing disturbance[2]	7,274	2.4	824	0.8	10,467	3.0
	Proposed/future disturbance[3]	40,006	12.9	11,294	11.2	41,183	11.8
	Project disturbance[4]	239	0.1	85	0.1	290	0.1
	Remaining available habitat	261,513	84.6	88,922	87.9	296,016	85.1
Alternative N4	Total available habitat[1]	309,032	100.0	101,125	100.0	347,956	100.0
	Existing disturbance[2]	7,274	2.4	824	0.8	10,467	3.0
	Proposed/future disturbance[3]	40,006	12.9	11,294	11.2	41,183	11.8
	Project disturbance[4]	93	0.0	0	0.0	92	0.1
	Remaining available habitat	261,660	84.7	89,007	88.0	296,213	85.1
Alternative N5	Total available habitat[1]	309,032	100.0	101,125	100.0	347,956	100.0
	Existing disturbance[2]	7,274	2.4	824	0.8	10,467	3.0
	Proposed/future disturbance[3]	40,006	12.9	11,294	11.2	41,183	11.8
	Project disturbance[4]	248	0.1	88	0.1	300	0.1
	Remaining available habitat	261,505	84.6	88,919	87.9	296,006	85.1
Alternative N6 (Proponent's Preferred Alternative)	Total available habitat[1]	309,032	100.0	101,125	100.0	347,956	100.0
	Existing disturbance[2]	7,274	2.4	824	0.8	10,467	3.0
	Proposed/future disturbance[3]	40,006	12.9	11,294	11.2	41,183	11.8
	Project disturbance[4]	264	0.1	94	0.1	392	0.1
	Remaining available habitat	261,489	84.6	88,914	87.9	295,913	85.1

TABLE 4-9
GREATER SAGE-GROUSE CUMULATIVE EFFECTS SUMMARY

Alternative	Habitats/Impacts	Crucial Brood-Rearing		Crucial Winter		Occupied	
		Acres	Percent	Acres	Percent	Acres	Percent
Alternative S1	Total available habitat[1]	309,032	100.0	101,125	100.0	347,956	100.0
	Existing disturbance[2]	7,274	2.4	824	0.8	10,467	3.0
	Proposed/future disturbance[3]	40,006	12.9	11,294	11.2	41,183	11.8
	Project disturbance[4]	55	0.0	0	0.0	55	0.1
	Remaining available habitat	261,697	84.7	89,007	88.0	296,250	85.1
Alternative S2	Total available habitat[1]	309,032	100.0	101,125	100.0	347,956	100.0
	Existing disturbance[2]	7,274	2.4	824	0.8	10,467	3.0
	Proposed/future disturbance[3]	40,006	12.9	11,294	11.2	41,183	11.8
	Project disturbance[4]	57	0.0	0	0.0	57	0.1
	Remaining available habitat	261,696	84.7	89,007	88.0	296,249	85.1
Alternative S3	Total available habitat[1]	309,032	100.0	101,125	100.0	347,956	100.0
	Existing disturbance[2]	7,274	2.4	824	0.8	10,467	3.0
	Proposed/future disturbance[3]	40,006	12.9	11,294	11.2	41,183	11.8
	Project disturbance[4]	57	0.0	0	0.0	57	0.1
	Remaining available habitat	261,696	84.7	89,007	88.0	296,249	85.1
Alternative S4	Total available habitat[1]	309,032	100.0	101,125	100.0	347,956	100.0
	Existing disturbance[2]	7,274	2.4	824	0.8	10,467	3.0
	Proposed/future disturbance[3]	40,006	12.9	11,294	11.2	41,183	11.8
	Project disturbance[4]	61	0.0	0	0.0	61	0.1
	Remaining available habitat	261,692	84.7	89,007	88.0	296,244	85.1
Alternative S5 (Proponent's Preferred Alternative)	Total available habitat[1]	309,032	100.0	101,125	100.0	347,956	100.0
	Existing disturbance[2]	7,274	2.4	824	0.8	10,467	3.0
	Proposed/future disturbance[3]	40,006	12.9	11,294	11.2	41,183	11.8
	Project disturbance[4]	52	0.0	0	0.0	52	0.1
	Remaining available habitat	261,700	84.7	89,007	88.0	296,253	85.1

TABLE 4-9
GREATER SAGE-GROUSE CUMULATIVE EFFECTS SUMMARY

Alternative	Habitats/Impacts	Crucial Brood-Rearing		Crucial Winter		Occupied	
		Acres	Percent	Acres	Percent	Acres	Percent
Alternative S6	Total available habitat[1]	309,032	100.0	101,125	100.0	347,956	100.0
	Existing disturbance[2]	7,274	2.4	824	0.8	10,467	3.0
	Proposed/future disturbance[3]	40,006	12.9	11,294	11.2	41,183	11.8
	Project disturbance[4]	53	0.0	0	0.0	53	0.1
	Remaining available habitat	261,700	84.7	89,007	88.0	296,252	85.1
Alternative S7	Total available habitat[1]	309,032	100.0	101,125	100.0	347,956	100.0
	Existing disturbance[2]	7,274	2.4	824	0.8	10,467	3.0
	Proposed/future disturbance[3]	40,006	12.9	11,294	11.2	41,183	11.8
	Project disturbance[4]	58	0.0	0	0.0	59	0.1
	Remaining available habitat	261,694	84.7	89,007	88.0	296,247	85.1
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative	Total available habitat[1]	309,032	100.0	101,125	100.0	347,956	100.0
	Existing disturbance[2]	7,274	2.4	824	0.8	10,467	3.0
	Proposed/future disturbance[3]	40,006	12.9	11,294	11.2	41,183	11.8
	Project disturbance[4]	57	0.0	0	0.0	58	0.1
	Remaining available habitat	261,695	84.7	89,007	88.0	296,248	85.1

NOTES:
[1]Total available habitat was calculated based on greater sage-grouse GIS habitat layers (UDWR September 22, 2011).
[2]Existing disturbance was calculated as a summation of all of the estimated acreages of the existing project disturbances and agricultural areas in the GAP data.
[3]Proposed/future disturbance was calculated by summing the acres of disturbance for the projects listed in Table 4-1. Projects with only point data available were buffered according to the approximate acreage of the project within the project area. Linear facility acreage was obtained by buffering proposed transmission lines by their respective right-of-ways. All point, line, and polygon areas were combined to obtain a total proposed future disturbance. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.
[4]Project disturbance was calculated by identifying the areas within the vegetation community types each Project alternative crossed. This total mileage of each vegetation community type crossed by each alternative was compared to the total disturbance acres in Table 3-2.

Northern Area – Sigurd Substation to South of the Black Mountains

Alternatives N1, N2, N2-A, and N4 t cross less occupied sage-grouse habitat, are located farther from active leks (Table 3-44), and would result in less direct habitat loss and fragmentation and predation by raptors and ravens than other northern alternative routes. Similarly, alternative routes that parallel existing rights-of-way in occupied sage-grouse habitat (Alternatives N1 N2, N2-A, and N4 parallel the IPP) and are located farther from active leks would contribute less to cumulative effects on the sage-grouse population. Alternatives N3, N5, and N6 parallel the Kern River Pipeline, would contribute more

extensively to losses and fragmentation of occupied sage-grouse habitat within the Bald Hills sage-grouse population than other northern alternatives (refer to Table 4-9). These three alternatives would also contribute to potential increases in raptor nesting and predation in sage-grouse habitat as a result of the introduction of transmission towers in areas where none currently exist.

Southern Area – South of the Black Mountains to Red Butte Substation

All southern alternative routes cross the southern limit of habitat occupied by the Bald Hills sage-grouse population. The potential contribution of each southern alternative route to cumulative sage-grouse habitat impacts is essentially similar (Table 4-9).

Greater Sage-grouse Mitigation

In accordance with BLM WO IM 2012-043 compensatory mitigation for any Project-related impacts on sage-grouse or sage-grouse habitats would be provided by the applicant. BLM, UDWR, and FWS have evaluated the effects of the Agency Preferred Alternative on sage-grouse to reach a determination as to whether these effects could adversely affect the sustainability of the Bald Hills sage-grouse population (Appendix F).

For the selected route (i.e., the Agency Preferred Alternative) for the Project, the BLM, UDWR, and FWS will determine the amount, type, and location of off-site mitigation required to avoid or minimize short- and long-term impacts of the Project on sage-grouse.

The analysis of cumulative effects on sage-grouse assumes that off-site mitigation required for the selected route and other future Projects authorized by BLM that may affect the Bald Hills sage-grouse population will be sufficient and effective in maintaining or enhancing habitat for the Bald Hills sage-grouse population as required under BLM WO IM 2012-043. Consequently, the cumulative effects of the Project, in addition to past, present, and reasonably foreseeable future actions, are not expected to result in diminished sage-grouse habitat quality or quantity or result in a decrease in Bald Hills the sage-grouse population.

BLM, USFS, and State Sensitive Species

Pygmy Rabbit

All action alternatives would contribute cumulatively to the effects of past and future loss and fragmentation, and modification of vegetation communities identified as potentially suitable pygmy rabbit habitat within the cumulative effects analysis area. None of the Project alternatives are expected to contribute to the cumulative effects of present and reasonably foreseeable future actions at a level that would result in a substantial adverse effect on pygmy rabbits within the cumulative effects analysis area. All northern alternatives would contribute to cumulative modification and loss of potentially suitable pygmy rabbit habitat at a similar level. Similarly, all southern alternatives would contribute to the cumulative modification and loss of potential pygmy rabbit habitat at a similar level (Table 4-10).

TABLE 4-10
PYGMY RABBIT CUMULATIVE EFFECTS SUMMARY

Alternative	Habitats/Impacts	Potentially Suitable Habitat	
		Acres	Percent
Alternative N1	Total available habitat[1]	59,017	100.0
	Existing disturbance[2]	650	1.1
	Proposed/future disturbance[3]	13,626	23.1
	Project disturbance[4]	315	0.5
	Remaining available habitat	44,426	75.3
Alternative N2	Total available habitat[1]	74,347	100.0
	Existing disturbance[2]	650	0.9
	Proposed/future disturbance[3]	15,985	21.5
	Project disturbance[4]	427	0.6
	Remaining available habitat	57,285	77.1
Alternative N2-A (route variation of Alternative N2) (Agency Preferred Alternative)	Total available habitat[1]	74,159	100.0
	Existing disturbance[2]	650	0.9
	Proposed/future disturbance[3]	15,990	21.6
	Project disturbance[4]	415	0.6
	Remaining available habitat	57,105	77.0
Alternative N3	Total available habitat[1]	95,217	100.0
	Existing disturbance[2]	425	0.4
	Proposed/future disturbance[3]	16,357	17.2
	Project disturbance[4]	639	0.7
	Remaining available habitat	77,797	81.7
Alternative N4	Total available habitat[1]	43,326	100.0
	Existing disturbance[2]	698	1.6
	Proposed/future disturbance[3]	5,248	12.1
	Project disturbance[4]	239	0.6
	Remaining available habitat	37,140	85.7
Alternative N5	Total available habitat[1]	64,125	100.0
	Existing disturbance[2]	473	0.7
	Proposed/future disturbance[3]	5,607	8.7
	Project disturbance[4]	463	0.7
	Remaining available habitat	57,581	89.8
Alternative N6 (Proponent's Preferred Alternative)	Total available habitat[1]	62,879	100.0
	Existing disturbance[2]	473	0.8
	Proposed/future disturbance[3]	5,330	8.5
	Project disturbance[4]	475	0.8
	Remaining available habitat	56,601	90.0
Alternative S1	Total available habitat[1]	18,528	100.0
	Existing disturbance[2]	22	0.1
	Proposed/future disturbance[3]	745	4.0
	Project disturbance[4]	205	1.1
	Remaining available habitat	17,557	94.8
Alternative S2	Total available habitat[1]	21,700	100.0
	Existing disturbance[2]	80	0.4
	Proposed/future disturbance[3]	869	4.0
	Project disturbance[4]	270	1.2
	Remaining available habitat	20,480	94.4

TABLE 4-10
PYGMY RABBIT CUMULATIVE EFFECTS SUMMARY

Alternative	Habitats/Impacts	Potentially Suitable Habitat	
		Acres	Percent
Alternative S3	Total available habitat[1]	23,656	100.0
	Existing disturbance[2]	143	0.6
	Proposed/future disturbance[3]	776	3.3
	Project disturbance[4]	262	1.1
	Remaining available habitat	22,475	95.0
Alternative S4	Total available habitat[1]	20,397	100.0
	Existing disturbance[2]	80	0.4
	Proposed/future disturbance[3]	869	4.3
	Project disturbance[4]	205	1.0
	Remaining available habitat	19,243	94.3
Alternative S5 (Proponent's Preferred Alternative)	Total available habitat[1]	33,233	100.0
	Existing disturbance[2]	316	1.0
	Proposed/future disturbance[3]	1,410	4.2
	Project disturbance[4]	242	0.7
	Remaining available habitat	29,055	87.4
Alternative S6	Total available habitat[1]	41,087	100.0
	Existing disturbance[2]	435	1.1
	Proposed/future disturbance[3]	1,443	3.5
	Project disturbance[4]	303	0.7
	Remaining available habitat	38,905	94.7
Alternative S7	Total available habitat[1]	21,471	100.0
	Existing disturbance[2]	80	0.4
	Proposed/future disturbance[3]	869	4.0
	Project disturbance[4]	263	1.2
	Remaining available habitat	20,258	94.4
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative	Total available habitat[1]	21,551	100.0
	Existing disturbance[2]	80	0.4
	Proposed/future disturbance[3]	869	4.0
	Project disturbance[4]	256	1.2
	Remaining available habitat	20,346	94.4

NOTES:
[1]Total available potentially suitable pygmy rabbit habitat includes all sagebrush habitats identified in the U.S. Geological Survey Sagebrush and Grassland Ecosystem Map Assessment Project (SAGEMAP) database that were located on slopes of 20 percent or less and within 1.8 miles of the alternative routes.
[2]Existing disturbance was calculated as a summation of all of the estimated acreages of the existing project disturbances and agricultural areas in the GAP data.
[3]Proposed/future disturbance was calculated by summing the acres of disturbance for the projects listed in Table 4-1. Projects with only point data available were buffered according to the approximate acreage of the project within the project area. Linear facility acreage was obtained by buffering proposed transmission lines by their respective right-of-ways. All point, line, and polygon areas were combined to obtain a total proposed future disturbance. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.
[4]Project disturbance was calculated by identifying the areas within the vegetation community types each Project alternative crossed. This total mileage of each vegetation community type crossed by each alternative was compared to the total disturbance acres in Table 3-2.

Ward's Beardtongue and Elsinore Buckwheat

All northern alternatives would contribute to the incremental loss, modification, and degradation of suitable habitat for Ward's beardtongue and Elsinore buckwheat and could contribute to the incremental losses of individuals from populations of these plants that have occurred as a result of past and present actions. Future actions that may contribute to cumulative loss of individual Ward's beardtongue and Elsinore buckwheat plants include OHV use, the Zephyr HVDC Transmission Project, and the Green Solutions Pozzolan Mine. Selective mitigation measures would be implemented to minimize Project impacts on these plants in locations where they occur and are crossed by northern alternatives to minimize Project-related loss of habitat and individuals. The cumulative effects of the northern alternative routes and other past, present, and reasonably foreseeable future actions are not anticipated to result in a loss of Ward's beardtongue or Elsinore buckwheat populations.

Pinyon Penstemon

Alternative S4 would contribute cumulatively to modification of potentially suitable habitat and loss of individual pinyon penstemon plants resulting from consumption by herbivores, fence post and firewood cutting, OHV use, and current and future projects (Table 4-1) in the vicinity of Links 222 and 225 on the Dixie National Forest.

Alternatives S5 and S6 would contribute cumulatively to modification of potentially suitable habitat and loss of individual pinyon penstemon plants resulting from continued fence post and firewood cutting, OHV use, and current and future projects in the vicinity of Link 438 in the Antelope Mountains.

In addition to past, present, and reasonably foreseeable actions that may affect pinyon penstemon, the cumulative effects of Alternatives S4, S5, and S6 could include incremental local reductions in habitat quantity and quality and the number of individual plants. Large areas of habitat adjacent to locations where these effects may occur would remain undisturbed. Therefore, the cumulative effects of these actions are not anticipated to result in a loss of pinyon penstemon populations.

Wild Horses

All southern alternative routes would affect wild horses within the Chloride Canyon HMA and would contribute to the cumulative effects of current and future actions on wild horse habitat quality and patterns of wild horse range use within the HMA. Current and future actions that include agricultural and residential development and projects occurring and planned in the vicinity of Links 220 and 438 would contribute to cumulative effects on wild horses within the cumulative effects analysis area.

The magnitude of cumulative effects of all southern alternatives on wild horse habitat would be similar (Table 4-11); however, the incremental cumulative effect of routes that parallel existing transmission lines and roads (Alternatives S1, S2, S4, S7, and S7-A) on wild horse habitat and distribution are less likely to affect wild horses than southern alternative routes that do not parallel existing linear developments (Alternatives S3, S5, S6).

TABLE 4-11
WILD HORSES CUMULATIVE EFFECTS SUMMARY

Alternative	Habitats/Impacts	Herd Management Areas	
		Acres	Percent
Alternative S1	Total available habitat[1]	63,684	100.0
	Existing disturbance[2]	470	0.7
	Proposed/future disturbance[3]	4,433	7.0
	Project disturbance[4]	122	0.2
	Remaining available habitat	58,659	92.1
Alternative S2	Total available habitat[1]	63,684	100.0
	Existing disturbance[2]	470	0.7
	Proposed/future disturbance[3]	4,433	7.0
	Project disturbance[4]	125	0.2
	Remaining available habitat	58,656	92.1
Alternative S3	Total available habitat[1]	63,684	100.0
	Existing disturbance[2]	470	0.7
	Proposed/future disturbance[3]	4,433	7.0
	Project disturbance[4]	125	0.2
	Remaining available habitat	58,656	92.1
Alternative S4	Total available habitat[1]	63,684	100.0
	Existing disturbance[2]	470	0.7
	Proposed/future disturbance[3]	4,433	7.0
	Project disturbance[4]	134	0.2
	Remaining available habitat	58,646	92.1
Alternative S5 (Proponent's Preferred Alternative)	Total available habitat[1]	63,684	100.0
	Existing disturbance[2]	470	0.7
	Proposed/future disturbance[3]	4,433	7.0
	Project disturbance[4]	106	0.2
	Remaining available habitat	58,675	92.1
Alternative S6	Total available habitat[1]	63,684	100.0
	Existing disturbance[2]	470	0.7
	Proposed/future disturbance[3]	4,433	7.0
	Project disturbance[4]	107	0.2
	Remaining available habitat	58,673	92.1
Alternative S7	Total available habitat[1]	63,684	100.0
	Existing disturbance[2]	470	0.7
	Proposed/future disturbance[3]	4,433	7.0
	Project disturbance[4]	129	0.2
	Remaining available habitat	58,652	92.1
Alternative S7-A (route variation of Alternative S7) (Agency Preferred Alternative	Total available habitat[1]	63,684	100.0
	Existing disturbance[2]	470	0.7
	Proposed/future disturbance[3]	4,433	7.0
	Project disturbance[4]	127	0.2
	Remaining available habitat	58,654	92.1

NOTES:
[1]Total available habitat was limited to BLM-designated wild horse management areas (BLM May 25, 2011) that occur within the 6th Level hydrologic unit code watersheds crossed by the alternative routes.
[2]Existing disturbance was calculated as a summation of all of the estimated acreages of the existing project disturbances and agricultural areas in the GAP data.
[3]Proposed/future disturbance was calculated by summing the acres of disturbance for the projects listed in Table 4-1. Projects with only point data available were buffered according to the approximate acreage of the project within the project area. Linear facility acreage was obtained by buffering proposed transmission lines by their respective right-of-ways. All point, line, and polygon areas were combined to obtain a total proposed future disturbance. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.
[4]Project disturbance was calculated by identifying the areas within the vegetation community types each Project alternative crossed. This total mileage of each vegetation community type crossed by each alternative was compared to the total disturbance acres in Table 3-2.

These actions would contribute to the incremental loss and modification of rangeland used by wild horses and direct and indirect effects of human activity on wild horse behavior and habitat use in the cumulative effects analysis area.

The incremental contribution of the southern Project alternatives on wild horses in the Chloride Canyon HMA is not expected to affect existing wild horse population trends or limit the ability of federal agencies to manage the Chloride Canyon HMA for the benefit of wild horses.

4.3.5 Cultural Resources

Over time, cultural resources are subject to attrition as cultures change and archaeological and historical sites weather and erode. In addition, prior development in the region has either degraded or resulted in the loss of some cultural resources. The addition of the Project to past and reasonably foreseeable future actions would result in the greater potential for effects on cultural resources throughout the Project area.

4.3.5.1 Geographic and Temporal Scope of Analysis

The geographic scope of analysis for cultural resources is defined as a 4-mile-wide corridor centered on the reference centerlines (similar to the methodology identified in Section 3.2.5). Cumulative effects on cultural resources would occur over the life of the Project and other current and future projects, including direct effects during construction and indirect effects during operation and maintenance activities. Disturbances from future developments and surface-disturbing activities could uncover or destroy unrecorded cultural resource sites. Despite the potential for adverse effects on some sites, future actions proposed on federal and/or state lands would require cultural resource evaluations and mitigation of affected significant historic properties prior to implementation. The resulting cultural resource documentation would increase the cultural resources knowledge base for the region; however, developments solely on private land are largely exempt from this requirement. Reasonably foreseeable future actions in the analysis include those projects listed in Tables 4-1 and 4-2 (and summarized by alternative in Table 4-3). Cumulative effects were analyzed over the duration of the life of the Project.

4.3.5.2 Cumulative Effects

Other current and future projects that could have cumulative effects on cultural resources along the Sigurd Substation to south of the Black Mountains route (Table 4-3) include the TransWest Express transmission project, the Zephyr HVDC Transmission Project, Thermo North to First Wind transmission corridor project, UNEV Pipeline Project, Mormon Mesa Power Partners Wind Testing Project Area, and future development of various geothermal leases. Other current and future projects that could have cumulative effects on cultural resources along the South Black Mountains to the Sigurd Substation route (Table 4-3) include the TransWest Express transmission project, UNEV Pipeline Project, and planned or proposed expansion of Milford Wind facilities.

Cumulative effects from direct impacts associated with the construction and operation phase of the Project would be similar for any of the alternatives. Cultural resources could be destroyed by construction activities, such as clearing, grading, drilling, and substation development. Development of new access corridors and rights-of-way could increase access to previously inaccessible areas, leading to potential vandalism of cultural resource sites. There also could be cumulative effects from indirect impacts in the form of visual impacts to visually sensitive cultural resource sites. The introduction of additional

development could alter the setting and feeling of historic properties such as the Mountain Meadows Massacre Site NHL and the Old Spanish NHT.

The extent of cumulative effects on cultural resources could be reduced significantly through avoidance and the implementation of mitigation measures. Potential impacts on cultural resources in the area would be incremental and the potential to mitigate impacts on archaeological and historical sites is good. The indirect cumulative effects on cultural resources, as a result of increased public access, would be expected to be low.

4.3.6 Native American Concerns

The BLM is engaged in ongoing consultations with tribes within the Project area, as described in Section 5.2.2.3. The addition of the Project to past and reasonably foreseeable future actions would result in the greater potential for cumulative effect on TCPs throughout the Project area.

4.3.6.1 Geographic and Temporal Scope of Analysis

The geographic scope of analysis for Native American concerns is defined as a 4-mile-wide corridor centered on the reference centerline for each alternative. Cumulative effects on TCPs would occur over the life of the Project and other current and future projects, including direct cumulative effects during construction and indirect cumulative effects during operation and maintenance activities. Reasonably foreseeable future actions in the analysis include those projects listed in Tables 4-1 and 4-2. Cumulative effects were analyzed over the duration of the life of the Project.

4.3.6.2 Cumulative Effects

Other current and future projects that could have effects on TCPs along the Sigurd Substation to south of the Black Mountains route (Table 4-3) include the TransWest Express Transmission Project, Thermo North to First Wind Transmission Corridor Project, UNEV Pipeline Project, Mormon Mesa Power Partners Wind Testing Project Area, and future development of various geothermal leases. Other current and future projects that could have effects on TCPs along the South Black Mountains to Red Butte Substation route (Table 4-3) include the TransWest Express Transmission Project and UNEV Pipeline Project.

Cumulative effects on TCPs from impacts associated with the construction and operation phase of the Project and other current and future projects would be similar for any of the alternatives. TCPs could be affected by construction activities, such as clearing, grading, drilling, and substation development. Development of new access corridors and rights-of-way for the Project cumulatively could increase access to previously inaccessible areas, leading to potential vandalism of TCPs. There also could be cumulative effects from indirect impacts in the form of visual impacts on TCPs. The introduction of additional development could alter the setting and feeling of TCPs.

The extent of cumulative effects on TCPs could be reduced significantly through avoidance and the implementation of mitigation measures. Impacts on TCPs in the area would be incremental; as a result, major impacts on TCPs would be unlikely. The potential to mitigate impacts on TCPs is high, and indirect cumulative effects on TCPs, as a result of increased public access to this area, would be expected to be low.

4.3.7 Paleontological Resources

The addition of the Project to past, present, and reasonably foreseeable future actions would result in the greater potential for effect on fossils, resulting in the loss of important scientific information. Ground disturbance associated with construction of the Project (e.g., grading and cutting of access roads, auguring for tower footings and anchors, or creating staging areas) could contribute to the destruction of important paleontological resources. Improved access and increased visibility indirectly could result in unauthorized collection or vandalism. Also, accelerated soil erosion resulting from construction activities cumulatively could increase the potential for destruction of fossils.

4.3.7.1 Geographic and Temporal Scope of Analysis

The geographic scope of analysis for paleontological resources is based on the extent of the geological formation. Geological formations are of variable geographic extent, and cumulative effects on associated paleontological resources are somewhat correlated with the geographic extent of the formations (reflecting how many other ground disturbing projects could be located in the outcrop "footprints" of the respective formations). Examples of widely exposed formations include the Green River Formation and the Mancos Shale, which are present in several states, including Utah. Other formations (e.g., the Ox Valley Tuff) crop out in much smaller areas. Therefore, a particular geological formation and the paleontological resources occurring within could or could not be affected by different projects in the same region. Also, not all geological formations contain paleontological resources. Formations composed mostly of volcanic rocks typically do not contain fossils. In addition, paleontological resources typically are not found throughout a fossil-bearing geological formation.

The temporal scope of analysis for cumulative effects on paleontological resources includes 2 years of direct effects during construction and 50 years of indirect effects during the life of the Project.

Reasonably foreseeable future actions in the analysis include those projects listed in Tables 4-1 and 4-2 and summarized by alternative in Table 4-3. Cumulative effects were analyzed over the duration of the life of the Project.

4.3.7.2 Cumulative Effects

Northern Area – Sigurd Substation to South of the Black Mountains

Alternatives N1 to N6 share the same route segment between Sigurd Substation and Cove Fort. For this route segment, there are no other current or future projects planned or proposed that cumulatively impact paleontological resources. The following discussion of cumulative effects associated with Alternatives N1 through N6 focuses on the route segments located west of Cove Fort.

Impacts from implementation of the Project combined with impact from future construction of other projects proposed in proximity or parallel cumulatively would increase the potential for effects on paleontological resources because they could cross the same geological formations.

If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative N1 – Black Rock Road to IPP North of Milford Wind Farm

Other current and future projects that could have effects on paleontological resources along Alternative N1 are shown in Table 4-3. Cumulative effects on paleontological resources occurring west of the Cove Fort area associated with the alternative route would be anticipated to be low, as no significant fossil localities exist within 1 mile of the centerline and no geological formations with a high PFYC are present. Furthermore, this area consists mostly of Quaternary alluvium and volcanic rocks with a few exposures of Permian and Cretaceous rocks.

Alternative N2 – Black Rock Road to IPP South of Milford Wind Farm

Other current and future projects that could have effects on paleontological resources along Alternative N2 are shown in Table 4-3. Cumulative effects on paleontological resources occurring west of the Cove Fort area associated with this alternative route would be anticipated to be low, as no significant fossil localities exist within 1 mile of the centerline and no geological formations with a high PFYC are present. Furthermore, this area consists mostly of Quaternary alluvium and volcanic rocks with a few exposures of Permian and Cretaceous rocks.

Alternative N2-A (Route Variation of Alternative N2) – Black Rock Road to IPP South of Milford Wind Farm 1,500 Feet East of Kern River Pipeline (Agency Preferred Alternative)

The cumulative effects anticipated would be the same as Alternative N2.

Alternative N3 – Black Rock Road Parallel to Kern River Pipeline

Other current and future projects that could have effects on paleontological resources along Alternative N3 are shown in Table 4-3. Cumulative effects on paleontological resources occurring west of the Cove Fort area associated with this alternative route would be anticipated to be low, as no significant fossil localities exist within 1 mile of the centerline and no geological formations with a high PFYC are present. This area consists mostly of Quaternary alluvium and volcanic rocks with a few exposures of Permian and Cretaceous rocks. However, the Sevier River Formation is present in the southern portion of Alternative N3 along Links 396 and 490, which has a high potential for paleontological resources. A portion of the Mormon Mesa Power Partners Wind Testing Project Area is located adjacent to these links. Therefore, in this area, implementation of the Project could contribute to cumulative effects on paleontological resources if appropriate mitigation was not applied.

Alternative N4 – Mineral Mountains to IPP South of Milford Wind Farm

Other current and future projects that could have effects on paleontological resources along Alternative N4 are shown in Table 4-3. Cumulative effects on paleontological resources occurring west of the Cove Fort area associated with this alternative route would be anticipated to be low, as no significant fossil localities exist within 1 mile of the centerline and no geological formations with a high PFYC are present. Furthermore, this area consists mostly of Quaternary alluvium and volcanic rocks with a few exposures of Permian and Cretaceous rocks.

Alternative N5 – Mineral Mountains Parallel to Kern River Pipeline

Other current and future projects that could have effects on paleontological resources along Alternative N5 are shown in Table 4-3. Cumulative effects on paleontological resources occurring west of the Cove Fort area associated with this alternative route would be anticipated to be low, as no significant fossil localities exist within 1 mile of the centerline and no geological formations with a high PFYC are present. This area consists mostly of Quaternary alluvium and volcanic rocks with a few exposures of Permian and Cretaceous rocks. However, the Sevier River Formation is present in the southern portion of the N5 Alternative along Links 396 and 490, which has a high potential for paleontological resources. A portion of the Mormon Mesa Power Partners Wind Testing Project Area is located adjacent to these links. Therefore, in this area, implementation of the Project could contribute to cumulative effects on paleontological resources if appropriate mitigation was not applied.

Alternative N6 – Mineral Mountains 1,500 Feet East of Kern River Pipeline (Proponent's Preferred Alternative)

The cumulative effects anticipated would be the same as Alternative N5.

Southern Area – South of the Black Mountains to Red Butte Substation

Impacts from implementation of the Project combined with impact from future construction of other projects proposed in proximity or parallel cumulatively would increase the potential for effects on paleontological resources. In general, the northern portions of Alternatives S1 through S6 consist mostly of Quaternary alluvium and volcanic rocks that have a low potential for paleontological resources. The southern portions of these alternative routes cross several geological formations that have a moderate-to-high potential for paleontological resources. If not all future projects were constructed, cumulative impacts would be lower than if all future projects currently proposed (as of June 2012) are implemented.

Alternative S1 – Pinto Creek

Other current and future projects that could have effects on paleontological resources along Alternative S1 are shown in Table 4-3. These projects could cross the same geological formations the alternative route would cross. One fossil vertebrate locality is present along the Alternative S1. Therefore, in this area, implementation of the Project could contribute to cumulative effects on paleontological resources if appropriate mitigation was not applied.

Alternative S2 – IPP West

Other current and future projects that could have effects on paleontological resources along Alternative S2 are shown in Table 4-3. Four fossil vertebrate localities exist within 1 mile of Alternative S2. These fossil localities exist in Quaternary alluvium, which has a low PFYC. It is possible that Quaternary alluvium in this area could produce additional fossils in the future. Therefore, implementation of the Project could contribute to cumulative effects on paleontological resources in this area if appropriate mitigation was not applied.

Alternative S3 – Ox Valley

Other current and future projects that could have effects on paleontological resources along Alternative S3 are shown in Table 4-3. One invertebrate locality is within 1 mile of Alternative S3. This locality produced marine invertebrates from a formation that has a high potential for paleontological resources. Therefore, implementation of the Project could contribute to cumulative effects on paleontological resources in this area if appropriate mitigation was not applied.

Alternative S4 – IPP East

The cumulative effects anticipated would be the similar as Alternative S2. Because of the proximity of the two alternative routes, the routes share the same geology, PFYC, and relative distance to the same fossil localities.

Alternative S5 – Iron Springs and Pinto Creek (Proponent's Preferred Alternative)

The current and future projects that could have effects on paleontological resources along Alternative S5 are shown in Table 4-3. One fossil vertebrate locality is present along Alternative S5. Therefore, in this area, implementation of the Project could contribute to cumulative effects on paleontological resources if appropriate mitigation was not applied.

Alternative S6 – Iron Springs and Ox Valley

The current and future projects that could have effects on paleontological resources along Alternative S6 are shown in Table 4-3. One fossil vertebrate locality is present along Alternative S6. Therefore, in this area, implementation of the Project could contribute to cumulative effects on paleontological resources if appropriate mitigation was not applied.

Alternative S7 – Middle Hybrid Route

The current and future projects that could have effects on paleontological resources along Alternative S7 are shown in Table 4-3. Four fossil vertebrate localities are present along Alternative S7. Therefore, implementation of the Project in this area could contribute to cumulative effects on paleontological resources if appropriate mitigation measures were not applied.

Alternative S7-A (Route Variation of Alternative S7) – Middle Hybrid Route 300 Feet East of Sigurd to Red Butte No. 1 Transmission Line Adjacent to Atchinson IRA (Agency Preferred Alternative)

The current and future projects that could have effects on paleontological resources along Alternative S7-A are shown in Table 4-3. Four fossil vertebrate localities are present along Alternative S7-A. Therefore, implementation of the Project in this area could contribute to cumulative effects on paleontological resources if appropriate mitigation measures were not applied.

4.3.8 Visual Resources

Cumulative visual effects could result from the incremental modification of the inherent character of affected landscapes and the disruption of sensitive viewer viewsheds resulting from the construction, operation, and maintenance of the Project and other past and reasonable foreseeable future actions. Cumulative impacts common to all alternatives (at varying degrees) would be the industrialization of natural appearing landscapes resulting from the construction of multiple projects, including associated vegetation clearing, in forested and arid environments.

4.3.8.1 Geographic and Temporal Scope of Analysis

The geographic scope for analysis of potential cumulative effects on visual resources was defined as a 6-mile-wide corridor centered on the reference centerline (i.e., same as the analysis area described in Section 3.2.8). Cumulative effects on visual resources would occur over the life of the Project and could include impacts on landscape scenery and the viewsheds of sensitive viewers.

Reasonably foreseeable future actions in the analysis include projects listed in Tables 4-1 and 4-2. Cumulative effects were analyzed over the duration of the life of the Project.

4.3.8.2 Cumulative Effects

Northern Area – Sigurd Substation to South of the Black Mountains

Alternative N1 – Black Rock Road to IPP North of Milford Wind Farm

In the vicinity of the Sigurd Substation, the landscape would be modified and exhibit an industrial landscape character as a result of the Project, the Sevier Power Company Power Plant, Zephyr HVDC Transmission Project, and existing transmission lines. Residences adjacent to the substation, between 0.25 and 1 mile away, would have a compromised viewshed based on the potential for numerous industrial vertical elements to be introduced into the landscape.

Within the Fishlake National Forest, impacts associated with the implementation of the Project and the projects identified in Table 4-3 (e.g., oil and gas development, transmission line, and two geothermal plants) would result in the construction of networks of access roads and large areas of vegetation clearing. These modifications would produce a patchwork of vegetation, which would differ from natural patterns in the existing landscape and would be visible from less than 0.25 mile away by viewers associated with Fremont Indian State Park, the Kimberly/Big John Road Scenic Backway, Fish Creek, and I-70.

Potentially affected lands located adjacent to the Mineral Mountains currently exhibit a comparatively natural landscape character with minimal deviations that would become industrialized with implementation of the Project and the projects identified in Table 4-3 (e.g., potential geothermal development and further wind turbine construction). Viewers related to the Escalante Trail and SR 257 would have a compromised viewshed due to the introduction of multiple strong vertically dominated projects within 0.25 mile of these viewers in a flat to slightly rolling landscape.

The utility corridor located west of Milford has modified the existing landscape through the construction and operation of existing utility development, creating an industrial landscape. With the introduction of the Project and projects identified in Table 4-3 (e.g., UNEV Pipeline Project, TransWest Express Transmission Project, Zephyr HVDC Transmission Project, Thermo North to First Wind Transmission

Corridor Project, and planned and proposed expansion of wind facilities) into this previously modified landscape, the character would be further industrialized and the viewshed from residential viewers located approximately 2 miles away in Milford would be further compromised.

Alternative N2 – Black Rock Road to IPP South of Milford Wind Farm

From the Sigurd Substation to the northern range of the Mineral Mountains, this alternative would have similar cumulative effects as Alternative N1. The landscape along the west side of the Mineral Mountains would be further industrialized through additional utility development. The introduction of multiple strong vertical dominated projects in this flat and expansive landscape would further modify views from the Escalante Trail and SR 257. From Milford to the Black Mountains, the cumulative effects would be similar to Alternative N1.

Alternative N2-A (Route Variation of Alternative N2) – Black Rock Road to IPP South of Milford Wind Farm 1,500 Feet East of Kern River Pipeline (Agency Preferred Alternative)

The cumulative effects anticipated would be similar to Alternative N2.

Alternative N3 – Black Rock Road Parallel to Kern River Pipeline

Cumulative effects would be similar to Alternative N2, except this alternative route does not follow the utility corridor west of Milford. The landscapes between the Mineral Mountains and the Black Mountains, as well as the Black Mountains themselves, have minimal disturbances except for the existing Kern River Pipeline. The addition of the Project and projects identified in Table 4-3 (including potential solar and wind development) would produce a landscape with strong disturbances associated with energy production that would modify the existing scenic quality. Residential viewers associated with Minersville, located approximately 2 miles away, would have a compromised viewshed based on the potential development of additional structural elements, access roads, and areas of cleared vegetation during the construction and operation of these multiple projects.

Alternative N4 – Mineral Mountains to IPP South of Milford Wind Farm

Cumulative effects would be similar to Alternative N1 from Sigurd to Cove Fort. This alternative route crosses the Mineral Mountains landscape, which has limited deviations in the existing character of the landscape. With the introduction of the Project and projects identified in Table 4-3 (including potential geothermal development and wind turbine construction), the resulting landscape would be industrialized due to the multiple, strong vertical elements proposed in steeply sloping terrain. The network of access roads and associated vegetation clearing from the construction of these potential projects would further increase contrast in the landscape and viewers located within 0.25 mile (e.g., SR 257 and the Escalante Trail) would have a further compromised viewshed. Cumulative effects from the Milford area south along the IPP line corridor would be similar to Alternative N2.

Alternative N5 – Mineral Mountains Parallel to Kern River Pipeline

Cumulative effects would be similar to Alternative N4 from Sigurd to Blundell Geothermal plant. The landscapes from the Mineral Mountains to the Black Mountains have few modifications, with the

exception of the Kern River Pipeline. The construction and operation of the Project and projects identified in Table 4-3 would modify the existing landscape character into an industrial landscape dominated by utility projects with linear, man-made elements. Residential viewers located approximately 2 miles away in Minersville would have a viewshed modified from the development of these multiple energy projects.

Alternative N6 – Mineral Mountains 1,500 Feet East of Kern River Pipeline (Proponent's Preferred Alternative)

The cumulative effects anticipated would be the same as Alternative N5.

Southern Area – South of the Black Mountains to Red Butte Substation

Alternative S1 – Pinto Creek

From the Black Mountains to Newcastle, the existing utility corridor has modified the landscape, and exhibits an industrial characterized viewshed from sensitive viewers, including the Old Spanish NHT located less than 0.5 mile away. With implementation of the Project and the projects identified in Table 4-3 (e.g., UNEV Pipeline Project, TransWest Express Transmission Project, Zephyr HVDC Transmission Project, and potential oil and gas development), the landscape would be further modified and would have a character defined by energy development.

Landscapes between Newcastle and Central areas generally are intact, including few modifications with an agrarian character. With the introduction of the Project and potential projects listed in Table 4-3, this landscape would become industrialized and views from residences in Pinto and Pine Valley between 0.25 mile and 2 miles away, as well as the Pine Valley Wilderness, would be compromised due to the increase in vegetation clearing and the network of access roads.

Alternative S2 – IPP West

Cumulative effects would be similar to Alternative S1 between the Black Mountains and Newcastle, south of Newcastle to Central. The landscape has been modified heavily from the multiple linear utility projects and exhibits an industrial landscape character. With implementation of the Project and the projects identified in Table 4-3, the influence of industrial development into the existing character of this landscape would expand. The viewshed from the Mountain Meadows Massacre Site NHL and the Old Spanish NHT, located within 0.5 mile, would be further compromised and the experience associated with these locations would be diminished. Because of the existing character of the landscape, if not all future projects were constructed, cumulative visual impacts would be similar to cumulative impacts anticipated if all future projects currently proposed (as of June 2012) are implemented.

Alternative S3 – Ox Valley

Cumulative effects would be similar to Alternative S1 between the Black Mountains and Newcastle. The construction of the Project and potential oil and gas development between Enterprise and the area south of Ox Valley would modify a natural appearing landscape through the construction of access roads and associated vegetation clearing.

Along the utility corridor west of Central to the Red Butte Substation, the existing utility projects have modified the landscape, which exhibits an industrial landscape character. With implementation of the Project and the projects identified in Table 4-3 into this modified landscape, the character of this landscape would be further characterized as a major utility corridor. Residential viewers in Central located between 0.5 and 1 mile away would have a heavily modified viewshed as a result of the multiple potential major utility projects that would clear vegetation and construct access roads on moderate-to-steep terrain.

Alternative S4 – IPP East

The cumulative effects anticipated would be similar to Alternative S2 except the influence of industrial development would be less dominant within the viewsheds from the Mountain Meadows Massacre Site NHL and segments of the Old Spanish Trail. The experience associated with these locations would be diminished, but to a lesser degree than Alternative S2. The IRAs within the Dixie National Forest would have their character modified through the implementation of the Project and other projects identified in Tables 4-1 and 4-3.

Alternative S5 – Iron Springs and Pinto Creek (Proponent's Preferred Alternative)

Cumulative effects would be similar to Alternative S1, except for the area between the Black Mountains and Newcastle. These landscapes have few modifications and contain areas of dense pinyon-juniper vegetation on moderate-to-steep slopes. The introduction of the Project and potential oil and gas development would modify this landscape and develop an industrial character. Vegetation clearing and access road construction associated with these potential utility projects would each increase visual contrast in the landscape from viewers associated with the Three Peaks SRMA, which is located more than 2 miles away.

Alternative S6 – Iron Springs and Ox Valley

Cumulative effects would be similar to Alternative S3 except for the area between the Black Mountains and Newcastle, which would be similar to Alternative S5.

Alternative S7 – Middle Hybrid Route

The cumulative effects anticipated to viewers would be similar to Alternative S4 since these alternative routes share the same alignment adjacent to the Mountain Meadows Massacre Site NHL and segments of the Old Spanish NHT. There would be fewer landscape character modifications in the Dixie National Forest IRAs since fewer miles of this alternative cross these areas than Alternative S4.

Alternative S7-A (Route Variation of Alternative S7) – Middle Hybrid Route 300 Feet East of Sigurd to Red Butte No. 1 Transmission Line Adjacent to Atchinson IRA (Agency Preferred Alternative)

The cumulative effects would be similar to Alternative S4 since this alternative route shares the same alignment as Alternative S7, except where the route would be adjacent to the Mountain Meadows Massacre Site NHL and the Old Spanish NHT. In this area, on Link 272, the visible width of the utility

corridor would be reduced by siting the Project in proximity to the existing transmission lines; however, by increasing the density of the utility development, the industrialization of the designated utility corridor would be increased. There would be fewer landscape character modifications in the Dixie National Forest IRAs since fewer miles of this alternative cross the IRA than Alternative S7 and the disturbances would be consolidated in a narrower corridor.

4.3.9 Land Use and Recreation Resources

Most cumulative impacts on land uses are expected to be minimal with the addition of the Project. FLPMA mandates that, to the extent practical, utility projects should be consolidated within established utility corridors, thereby limiting cumulative impacts. The BLM and USFS recognize existing utility lines as corridors, and both agencies have designated corridors (or utility windows) in their RMPs and LRMPs, respectively. Several of the alternative routes follow existing corridors, making cumulative impacts relatively minimal on those alternatives. In some cases, a decision in a designated utility corridor due to management constraints could make it more challenging for future utility projects to place linearstructures in the same corridor. Predicting cumulative effects associated such displacement would require that a number of variables and assumptions would have to be made for such analysis. Any resulting impact prediction would be highly speculative.

Impacts associated with the implementation of the Project in addition to impacts from past and reasonably foreseeable future actions would result in the permanent loss of grazing opportunities where permanent facilities (e.g., access roads and structure foundations) were located. Because new access roads would be constructed for the Project and other reasonably foreseeable future actions, OHV use could increase in areas that previously were secluded and inaccessible, or may not be suitable for motorized access (e.g., primitive and semi-primitive nonmotorized ROS classifications).

Impacts on grazing could be minimized by using existing access and overland travel, where feasible, and locating the Project near existing linear facilities (e.g., transmission lines and pipelines). Access to areas not suitable to OHV use could be minimized by reclaiming temporary access roads or limiting access to new permanent access roads. Any disturbance associated with construction in the IRAs would be reclaimed.

4.3.9.1 Geographic and Temporal Scope of Analysis

The geographic scope for analysis of cumulative effects on land use and recreation resources was defined as a 6-mile-wide study corridor (i.e., 3 miles each side of the reference centerline of each alternative route). The study corridor was widened from the land use analysis inventory study corridor identified in Section 3.2.8 to include reasonably foreseeable future actions that could have cumulative effects on land use and recreation resources. Reasonably foreseeable actions in this analysis include those projects listed in Tables 4-1 and 4-2. The cumulative effects were analyzed over the duration of the life of the Project.

4.3.9.2 Cumulative Effects

Northern Area – Sigurd Substation to South of the Black Mountains

Cumulative Effects Common to All Northern Alternative Routes

Impacts associated with the implementation of the Project, in addition to the existing facilities and current and future projects identified in Table 4-3, would result in a cumulative loss of grazing opportunities. The impacts in the northern alternative areas would be greater than those to the southern alternatives since a larger number of future projects are identified in the northern area. Cumulative effects on dispersed recreation on BLM-administered lands also would be similar to all southern alternatives.

Alternative N1 – Black Rock Road to IPP North of Milford Wind Farm

In the vicinity of the Sigurd Substation, agricultural land uses would be lost permanently with the addition of the Project and the future projects identified in Table 4-3. The anticipated loss would be minimal when compared to the surrounding agricultural land uses in the Sevier Valley, which is dominated by irrigated agricultural uses.

Opportunities for grazing (livestock) west of the Tushar and Pahvant mountains would be reduced permanently as more projects, especially wind and solar farms occupying vast tracts of land, are constructed in addition to existing facilities (e.g., Milford Wind Farm, Phases I and II). However, grazing would remain the dominant land use and would continue, considering the context and composition of western Utah's existing agricultural land uses., Overall cumulative impacts on grazing from the Project would be minimal. New access roads constructed for the Project on the Fishlake National Forest between the Sigurd Substation and the Cove Fort area, in addition to the existing access road for the 138kV transmission line and those potentially built for the projects identified in Table 4-3 could increase OHV and motorized access into semi-primitive motorized and nonmotorized areas. These new and existing access roads would reduce opportunities for solitude and primitive recreation.

The wilderness qualities of USFS unroaded/undeveloped areas on the Fishlake National Forest would be diminished as more human developments and prescribed burns are permitted or implemented within these areas. The cumulative effects would reduce the natural and undeveloped characters of these areas, limit opportunities for solitude and primitive recreation, and permanently compromise the overall manageability of these areas as wilderness. However, the wilderness qualities of these areas could increase as burned areas recover overtime and if other developments (e.g., oil and gas leases) are not constructed.

Similar impacts would occur on BLM-administered lands where the Project and other current and future projects could either increase access to popular destination points (e.g., rock-hounding sites), in turn hastening the degradation of these areas, or could hinder access, in turn compromising the recreational enjoyment of the area by future generations.

The Project would be located east of the IPP in the WWEC. Several other projects may be located in this utility corridor in the future (refer to Table 4-3). Cumulative effects in this area of the Project could involve major location and operational conflicts with turbines and arrays of the permitted Milford Wind Corridor, LLC Phase III project. Safety and operational conflicts between the two projects likely would result in making one or both of the projects non-viable in this area.

From the Milford area to the Black Mountains, the cumulative effects to land use and recreation resources are minimal since the Project is located in the WWEC and land use in this segment of the Project is open rangeland.

Alternative N2 – Black Rock Road to IPP South of Milford Wind Farm

From Sigurd Substation to the northern range of the Mineral Mountains, this alternative would have similar cumulative effects as Alternative N1. Along the west side of the Mineral Mountains, the Project would increase access to the foothills of mountain range, along with the future projects outlined in Table 4-3. Once the route rejoins the IPP line in the WWEC south of the Milford Wind Corridor, LLC Phase III project, the cumulative effects of the project are similar to Alternative N1 between the Milford area and the Black Mountains.

Alternative N2-A (Route Variation of Alternative N2) – Black Rock Road to IPP South of Milford Wind Farm 1,500 Feet East of Kern River Pipeline (Agency Preferred Alternative)

The cumulative effects anticipated would be the same as Alternative N2.

Alternative N3 – Black Rock Road Parallel to Kern River Pipeline

From Sigurd Substation to the Blundell Geothermal Plant, this alternative would have similar cumulative effects as Alternative N2. From the Blundell Plant to the Black Mountains, the cumulative effects of the Project would involve increased access to the foothills of the Mineral Mountains and in the Black Mountains. Several other projects may be located in this segment of the Project in the future (refer to Table 4-3).

Alternative N4 – Mineral Mountains to IPP South of Milford Wind Farm

From Sigurd Substation to Cove Fort, this alternative would have similar cumulative effects as Alternative N1. From Cove Fort to the WWEC, the alternative could increase OHV and motorized access in the Mineral Mountains due to the addition of new access roads constructed for the Project and potential improvements of existing roads for the future 46kV line upgrade to 138kV. These new and existing access roads would increase human use of the area.

The double circuit tower design option for this alternative route would consolidate access road impacts of the two transmission lines and limit future ground disturbance if and when the 46kV line is upgraded.

Alternative N5 – Mineral Mountains Parallel to Kern River Pipeline

Cumulative effects would be similar to Alternative N4 from Sigurd to Blundell Geothermal plant. From the Blundell Plant to the Black Mountains, cumulative effects of the Project would be similar to Alternative N3.

Alternative N6 – Mineral Mountains 1,500 Feet East of Kern River Pipeline (Proponent's Preferred Alternative)

The cumulative effects anticipated would be the same as Alternative N5.

Southern Area – South of the Black Mountains to Red Butte Substation

Cumulative Effects Common to All Alternative Routes

Impacts associated with the implementation of the Project, in addition to the existing facilities and current and future projects identified in Table 4-3, would result in a cumulative loss of grazing opportunities. However, the impacts would be less in the southern alternative areas than the northern alternative areas because there are fewer future projects identified in the southern area. Cumulative effects on dispersed recreation on BLM-administered lands also would be similar to all northern alternatives.

Alternative S1 – Pinto Creek

The wilderness qualities of USFS unroaded/undeveloped areas would be diminished as opportunities for semi-primitive nonmotorized recreation and solitude would be reduced or lost permanently as new access roads are constructed. Opportunities for semi-primitive motorized recreation would increase due to the new access roads constructed for the Project. The cumulative effects on USFS unroaded/undeveloped areas and semi-primitive nonmotorized areas would be similar to the northern alternative routes, except the impacts generally would be less because there are fewer proposed projects on the Dixie National Forest.

Alternative S2 – IPP West

Cumulative effects on semi-primitive nonmotorized areas and USFS unroaded/undeveloped areas would be less on this route because the alternative parallels the Kern River Pipeline and other transmission lines in WWEC. The alternative route also parallels future projects identified in Table 4-3. The colocation of these existing and future facilities would avoid the establishment of new access roads into areas not suitable for OHV and other motorized travel, minimizing the cumulative effects on USFS unroaded/undeveloped areas, IRAs (where construction of access roads is prohibited), and semi-primitive motorized and nonmotorized areas.

Alternative S3 – Ox Valley

The wilderness qualities of USFS unroaded/undeveloped areas would be diminished as opportunities for semi-primitive nonmotorized recreation and solitude would be reduced or lost permanently as new access roads are constructed. Opportunities for semi-primitive motorized recreation would increase due to the new access roads constructed for the Project. The cumulative effects on USFS unroaded/undeveloped areas and semi-primitive nonmotorized areas would be similar to the northern alternative routes, except the impacts generally would be less because there are fewer proposed projects on the Dixie National Forest. However, this alternative could include the TransWest Express transmission line project. By constructing both projects, a major utility corridor would be established, possibly resulting in significant changes to the ROS classifications, recreational uses and opportunities for solitude and primitive settings on this portion of the Dixie National Forest.

Alternative S4 – IPP East

Cumulative effects on semi-primitive nonmotorized areas and USFS unroaded/undeveloped areas would increase on this route because the route is located east of the existing transmission lines in WWEC and crosses more distance through the IRAs. The Project would increase the establishment of permanent and temporary access roads into areas not suitable for OHV and other motorized travel, increasing the cumulative effects on USFS unroaded/undeveloped areas and semi-primitive nonmotorized areas. Opportunities for semi-primitive nonmotorized recreation and solitude in IRAs would be reduced due to the presence of additional transmission line structures and by increased human use of the areas.

Cumulative effects on the Mountain Meadows NHL and land uses within the Mountain Meadows Historic Site would be avoided by this alternative. Visual resource effects are addressed in Section 4.3.8.2.

Alternative S5 – Iron Springs and Pinto Creek (Proponent's Preferred Alternative)

The cumulative effects anticipated would be similar to Alternative S1.

Alternative S6 – Iron Springs and Ox Valley

The cumulative effects anticipated would be similar to Alternative S3.

Alternative S7 – Middle Hybrid Route

The cumulative effects anticipated would be similar to Alternative S2 for the northern segment of this alternative; south of the utility corridor crossing, the cumulative effects would be similar to Alternative S4. Cumulative effects on semi-primitive nonmotorized areas and USFS unroaded/undeveloped areas would increase on this route because a portion is located east of the existing transmission lines in the WWEC and crosses through an IRA.

The Project would increase the establishment of permanent and temporary access roads into areas not suitable for OHV and other motorized travel, increasing the cumulative effects on USFS unroaded/undeveloped areas and semi-primitive nonmotorized areas. Opportunities for semi-primitive nonmotorized recreation and solitude in IRAs would be reduced due to the presence of additional transmission line structures and by increased human use of the areas.

Cumulative effects on the Mountain Meadows NHL and land uses within the Mountain Meadows Historic Site would be lower under this alternative than under Alternative S2. Visual resource effects are addressed in Section 4.3.8.2.

Alternative S7-A (Route Variation of Alternative S7) – Middle Hybrid Route 300 Feet East of Sigurd to Red Butte No. 1 Transmission Line Adjacent to Atchinson IRA (Agency Preferred Alternative)

The cumulative effects anticipated would be similar to Alternative S2 for the northern segment of this alternative; south of the utility corridor crossing, the cumulative effects would be similar to Alternative S4. Cumulative effects on semi-primitive nonmotorized areas and USFS unroaded/undeveloped areas

would increase on this route compared to Alternative S7 because a portion is located east of the existing transmission lines in the WWEC and crosses through an IRA.

The Project would increase the establishment of permanent and temporary access roads into areas not suitable for OHV and other motorized travel, increasing the cumulative effects on USFS unroaded/undeveloped areas and semi-primitive nonmotorized areas. Opportunities for semi-primitive nonmotorized recreation and solitude in IRAs would be reduced due to the presence of additional transmission line structures and by increased human use of the areas.

Cumulative effects on the Mountain Meadows Massacre Site NHL and land uses within the National Register Historic District would be lower under this alternative than under Alternative S2. Visual resource effects are addressed in Section 4.3.8.2.

4.3.10 Special Designations

Cumulative effects on special designations (e.g., scenic byways, national trails, wild and scenic rivers, and wilderness) are associated primarily with visual resource concerns as described in Section 4.3.8. New access roads constructed for the Project in addition to existing access roads for the existing transmission lines and pipelines, and those potentially built for the projects identified in Table 4-3, could increase OHV and motorized access into currently remote areas and semi-primitive nonmotorized areas. These new and existing access roads could reduce opportunities for solitude and primitive recreation in the vicinity of the special designation areas, but would not have major cumulative effect on these areas.

4.3.11 Wildland and Fire Ecology Management

Cumulative effects on wildland fire ecology and management from implementation of the Project and other reasonably foreseeable future actions include an increase in (1) fuels loading and the spread of cheatgrass, which has the potential to alter significantly natural fire regimes by increasing fire frequency and size, and (2) the complexity of fire suppression operations.

New access roads, combined with new disturbance in the right-of-way and staging areas, could lead to an increased potential for proliferation of invasive species such as cheatgrass. In areas where previous disturbance has been invaded by cheatgrass, the risk of wildfire from implementation of the Project cumulatively increases. Increased access along access roads and rights-of-way established for the Project and other projects could lead to increases in the number of human-caused ignitions in the Project area. In the short-term, these cumulative impacts would be mitigated during construction of the Project, as prescribed in the weed management plan and fire protection plan that would be approved by the BLM and USFS and included in the POD. Long-term cumulative impacts could be mitigated by limiting the number of new access roads constructed and prohibiting access along permanent access roads, especially during periods of high fire danger.

The addition of linear features and developments in the Project area would further fragment the landscape and increase the complexity of fire suppression operations. However, access roads also could be used as fire breaks and access for fire fighting vehicles. The proposed and future transmission line projects, pipelines, and other projects (e.g., renewable energy sites) could affect areas by limiting opportunities for prescribed fire where the restoration of natural fire processes is desired. Additional features and structures on the landscape would increase the complexity of fire suppression operations by increasing the number of structures that need protection, posing safety hazards to firefighters and the public.

4.3.11.1 Geographic and Temporal Scope of Analysis

The wildfire study area includes a 2-mile-wide corridor of the centerline (i.e., 1 mile each side) for each alternative. The temporal scope of analysis for cumulative effects on wildland and fire ecology includes a 2-year direct-impact window during construction and a 50-year indirect impact window for the life of the Project. Reasonably foreseeable future actions in the analysis include those projects listed in Tables 4-1 and 4-2. Cumulative effects were analyzed over the duration of the life of the Project.

4.3.11.2 Cumulative Effects

Northern Area – Sigurd Substation to South of the Black Mountains

Alternative N1 – Black Rock Road to IPP North of Milford Wind Farm

Alternative N1 is colocated with existing and future projects as outlined in Table 4-3. Fragmentation of the landscape would be minimized and most sensitive areas avoided within this corridor down I-70, across Black Rock Road, then down the WWEC to the west of Milford. Colocation along the I-70 corridor, Black Rock Road, and the WWEC would minimize fragmentation. However, additive impacts of the Project and multiple projects along Alternative N1 cumulatively could result in an increased rate where new disturbance areas are repopulated by species such as cheatgrass. Proximity to existing or future roads also could increase risk from wildfire due to public access. Overall, the cumulative effects to fire ecology and management would be minimal.

Alternative N2 – Black Rock Road to IPP South of Milford Wind Farm

Alternative N2 is colocated with existing and future projects as outlined in Table 4-3. Alternative N2 separates from the Black Rock Road and drops south along the west flank of the Mineral Mountains for 11 miles, then turns west for 10 miles back to the WWEC. This area along the Mineral Mountains was burned in the Milford Flat Fire. Efforts are underway to restore the area, but it is still prone to invasion of cheatgrass where there is new disturbance. Cumulative effects to fire ecology and management would be minimal.

Alternative N2-A (Route Variation of Alternative N2) – Black Rock Road to IPP South of Milford Wind Farm 1,500 Feet East of Kern River Pipeline (Agency Preferred Alternative)

Cumulative effects for this route would be similar to Alternative N2.

Alternative N3 – Black Rock Road Parallel to Kern River Pipeline

Alternative N3 is colocated with existing and future projects as outlined in Table 4-3. The cumulative effects on the area between Sigurd and the northern range of the Mineral Mountains would be the same as in Alternative N1. Alternative N3 separates from Black Rock Road and drops south along the west flank of the Mineral Mountains for more than 30 miles, past Minersville following the Kern River Pipeline corridor. The cumulative effects anticipated in the area of the northern Mineral Mountains would be the same as for Alternative N2. The southern portion of this alternative route also would be prone to cumulative effects on wildfire resulting from potential increased human use in the Horse Valley and the spread of cheatgrass.

Alternative N4 – Mineral Mountains to IPP South of Milford Wind Farm

Alternative N4 is colocated with existing and future projects as outlined in Table 4-3. Alternative N4 separates from I-70 near Cove Fort and crosses through 15 miles of the Mineral Mountains before it crosses 8 miles of the Milford Flat, then back to the WWEC. The cumulative effects on the area along I-70 to Cove Fort would be the same as in Alternative N1. Cumulative effects across the Mineral Mountains and Milford Flat could include greater potential for wildfires due to increased human use and the spread of cheatgrass. Fire management operations in the Mineral Mountains could be complicated by the addition of the project and the Mineral Mountain Wind Farm, although an increase in construction of access roads may help to offset this situation by using roads as fire breaks and for vehicle access.

Alternative N5 – Mineral Mountains Parallel to Kern River Pipeline

Cumulative effects anticipated for this route from Sigurd to the Mineral Mountains are the same as Alternative N4. The route segment from the south Mineral Mountains to the Black Mountains would have the same anticipated cumulative effects as Alternative N3.

Alternative N6 – Mineral Mountains 1,500 Feet East of Kern River Pipeline (Proponent's Preferred Alternative)

The cumulative effects anticipated for this route are similar to Alternative N5.

Southern Area – South of the Black Mountains to Red Butte Substation

Alternative S1 – Pinto Creek

Alternative S1 is colocated with existing and future projects as outlined in Table 4-3. Colocation along the WWEC minimizes habitat fragmentation. Alternative S1 exits the WWEC at Newcastle and turns due south towards the Pinto area. Alternative S1 could lead to a cumulative increase in the rate at which new disturbance areas are repopulated by species such as cheatgrass. An increase in roads due to construction could increase risk from wildfire due to increased public access and human use. Fire management operations of the transmission line in this area would be complicated by rugged terrain and relatively limited access.

Alternative S2 – IPP West

Alternative S2 is colocated with existing and future projects as outlined in Table 4-3. Colocation along the WWEC would minimize habitat fragmentation and reduce the potential for cumulative effects on fire ecology from implementation of the Project. Fire management at the transmission line in this area likely would be more manageable due to existing right-of-way clearings and available access roads.

Alternative S3 – Ox Valley

Alternative S3 is colocated with existing and future projects as outlined in Table 4-3. Colocation along the WWEC would minimize habitat fragmentation and reduce the potential for cumulative effects on fire ecology from implementation of the Project in this area. Alternative S3 exits the WWEC east of

Enterprise and turns west towards Ox Valley. Fire management operations of the transmission line in this area would be complicated by very rugged terrain and limited access.

Alternative S4 – IPP East

The cumulative effects for this route are similar to Alternative S2.

Alternative S5 – Iron Springs and Pinto Creek (Proponent's Preferred Alternative)

Alternative S5 is colocated with existing and future projects as outlined in Table 4-3. However, the colocation with WWEC is only for the first 3 miles of the alternative route. Alternative S1 is similar to Alternative S5 as: (1) it leaves the WWEC at the Lund Road and turns due south and (2) impacts from implementing the Project would add to the potential for cumulative effects in non-colocated areas.

Alternative S6 – Iron Springs and Ox Valley

Cumulative effects for this route from the north to Newcastle are the same as Alternative S5 from Ox Valley to Red Butte.

Alternative S7 – Middle Hybrid Route

Cumulative effects for Alternative S7 are similar to Alternatives S2 and S4. Fire management of the transmission line in this area likely would be more manageable due to existing right-of-way clearings and available access.

Alternative S7-A (Route Variation of Alternative S7) – Middle Hybrid Route 300 Feet East of Sigurd to Red Butte No. 1 Transmission Line Adjacent to Atchinson IRA (Agency Preferred Alternative)

Cumulative effects for Alternative S7-A are similar to Alternatives S2 and S4. Fire management of the transmission line in this area likely would be more manageable due to existing right-of-way clearings and available access.

4.3.12 Social and Economic Conditions

The potential for cumulative socioeconomic impacts from implementing the Project exists where there are multiple projects proposed in an area that have overlapping construction schedules and/or project operations that could affect similar resources. Concurrent and similar projects could result in a demand for labor that cannot be met by the region's labor pool, which could lead to an influx of nonlocal workers. This population increase could affect socioeconomic resources.

4.3.12.1 Geographic and Temporal Scope of Analysis

Cumulative effect on social and economic conditions would be expected to occur within the five-county study area as defined previously. However, some beneficial impacts could occur throughout Utah. Cumulative effects would be short- and long-term. Reasonably foreseeable future actions in the analysis include those projects listed in Tables 4-1 and 4-2. Cumulative effects were analyzed over the duration of the life of the Project.

4.3.12.2 Cumulative Effects

There are five additional projects in the Project area with similar schedules:

- Milford Wind Farm Phases III and IV
- Palladon Pipelines
- Sevier Power Company Power Plant
- Milford to Cameron 138kV Line
- TransWest Express Transmission Project

These projects in particular have similar construction schedules. As a result, the construction schedules of the Project, when added to these schedules, could lead to cumulative effects. If there is some overlap in construction schedules among the Project and the other projects, all would be expected to draw on the regional construction workforce in southwestern Utah where there is a supply of qualified workers. The cumulative demand for skilled laborers in construction and operation likely would require additional workers temporarily, or permanently, relocate from outside the Project area to fill these positions. This would result in a slight increase in population and an increased demand on housing, public services, and infrastructure.

If the Project is built, the cumulative beneficial impact on the social and economic conditions within the Project area could be significant, including operational revenues, employment revenues, and increased availability of electricity. It is reasonable to assume a future transmission line would have similar beneficial cumulative effects. In addition, indirect cumulative effects range from increases in housing stock to job growth. If current trends continue, Utah's economy would continue to grow, the population and housing stock would increase, and government services would expand. This Project would not induce this growth, but would accommodate the increased demand that would be placed on the current electrical system.

4.3.13 Public Health and Safety

Past, present, and reasonably foreseeable future actions that could affect EMF levels near residences were considered in this cumulative effects analysis. Additionally, other potential impacts on occupational and public safety were considered. Reasonably foreseeable future actions in the analysis include those projects listed in Tables 4-1 and 4-2. Cumulative effects were analyzed over the duration of the life of the Project.

Several public health and scientific organizations have reviewed the research on EMF and health and considered the strengths and limitations of the epidemiologic and laboratory studies. These reviewers have concluded the overall body of research does not indicate any disease or adverse health effect caused by EMF exposure at levels below the guideline limits. The audible noise levels at the edges of the right-of-way are estimated to be less than 55 dBA, the annual average level outdoor target value published by the EPA. While the proposed transmission line would produce EMF, as do all sources of electricity, EMF

at intensity levels that would be produced at the edge of the right-of-way also can be found in the ordinary environment. EMF exposure resulting from the proposed transmission line would be well below exposure limits. With the addition of any future transmission line(s), cumulative effects of audible noise levels and EMF exposures could be additive. If additional transmission lines were built in the same right-of-way, estimates of EMF exposure would have to be reevaluated.

Potential effects on occupational health and safety from construction and operation of reasonably foreseeable future actions would be limited. Nevertheless, with the unique occupational hazards associated with heavy construction (including the use, storage, and transport of hazardous materials) and the electric power industry, fatalities and injuries from on-the-job accidents could occur.

4.4 Irreversible and Irretrievable Commitment of Resources

Resources committed to the proposed Project would be material and nonmaterial, including financial resources. Irreversible commitment of resources for the purposes of this section has been interpreted to mean that those resources once committed to the proposed Project would continue to be committed throughout the 50-year life of the Project. Irretrievable commitment of resources has been interpreted to mean that those resources used, consumed, destroyed, or degraded during construction, operation, maintenance of the proposed Project could not be retrieved or replaced for future use. Irreversible and irretrievable commitments of resources for the Project are summarized in Table 4-12.

TABLE 4-12
IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Resource	Type of Commitment/ Reason for Commitment	Irreversible	Irretrievable
Air quality	▪ Degradation of air quality ▪ Construction activities	No	Construction phase
Soils	▪ Soil loss and erosion ▪ Construction activities	Yes	Yes
Water	▪ None (refer to construction materials section)	–	–
Biological	▪ Disturbance to and/or loss of vegetation, habitat, and wildlife species ▪ Construction and operation	Yes	Project life
Archaeological and historical sites	▪ Disturbance or removal of sites ▪ Construction, operation, and maintenance	Yes	Yes
Important cultural sites	▪ Disturbance or removal of sites, interference with visual setting ▪ Construction, operation, and maintenance	Yes	Project life
Traditional cultural properties	▪ Disturbance or removal of sites, interference with visual setting, aural disturbance ▪ Construction, operation, and maintenance	Yes	Project life Construction phase
Paleontological resources	▪ Disturbance or removal of fossils ▪ Construction activities	Yes	Yes
Visual resources	▪ Degradation of natural scenic quality, viewshed intrusion ▪ Construction and operation	Yes	Project life

TABLE 4-12
IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Resource	Type of Commitment/ Reason for Commitment	Irreversible	Irretrievable
Land use and recreation resources	▪ Disturbance to agriculture and grazing ▪ Exclusion of residential, institutional, and industrial uses ▪ Increased recreational use along new access roads ▪ Increased access construction ▪ Construction and operation	Yes	Project life
Public health	▪ Potential adverse electrical effects ▪ Operation	Unknown	Unknown
Noise	▪ Noise exceeding ambient levels ▪ Construction and operation	Yes No	Construction phase
Social and economic conditions	▪ Increased regional and local employment and revenues ▪ Construction and operation	Yes	Project life
Construction materials and fuels	▪ Use of: o Aggregate o Water o Steel o Aluminum o Concrete o Wood o Fossil fuels	 Yes Yes Yes Yes Yes Yes Yes	 Yes Yes No No Yes No Yes

Chapter 5 – Consultation and Coordination

CHAPTER 5 – CONSULTATION AND COORDINATION

5.1 Introduction

Integrated with the planning, analysis, and review activities of EIS preparation, the BLM is conducting a comprehensive program of agency coordination and public participation, commencing with scoping early on and continuing throughout the environmental process. The intent of the program is to proactively encourage interaction between the BLM and other federal, state, and local agencies and the public to keep them informed about the Project through dissemination of information and to solicit information that assists in analysis and decision-making.

Throughout the preparation of the EIS, formal and informal efforts have been made by the BLM to involve, consult, and coordinate with other federal agencies, state and local governments, American Indian tribes, and the public. Such communication is important (1) to ensure the most appropriate data have been gathered and employed for analysis and (2) to ensure agency policy and public sentiment and values are considered and incorporated into decision-making.

This chapter provides a brief description of the methods employed for communication and interaction, which includes consultation and coordination with agencies, tribes, and stakeholders; the scoping process; Proponent-initiated activities; and public review of the Draft EIS.

5.1.1 Summary of Changes from the Draft EIS

Chapter 5 was updated to include information on the public review of the Draft EIS.

Substantive changes made between the Draft EIS and the Final EIS are demarcated in the left margin of this chapter by a vertical black line.

5.2 Consultation and Coordination

Agencies and organizations having jurisdiction and/or specific interest in the Project were contacted at the beginning of scoping, during the resource inventory, and prior to the publication of the EIS to inform them of the Project, verify the status and availability of existing environmental data, request data and comments, and solicit their input about the Project. Additional contacts were made throughout the process to clarify or update information. All conversations with agency personnel have been documented, were distributed to the appropriate Project personnel, and are maintained in the Project administrative record. Specific concerns and recommendations have been discussed and documented for further action. This section describes the consultation and coordination activities that have taken place throughout the EIS process.

5.2.1 Cooperating Agencies

In late July and early August 2009, the BLM sent formal letters inviting 19 federal and state agencies and local governmental entities to participate in the EIS as cooperating agencies. Of the 19 invited (refer to the following list), 12 responded positively (cooperating agencies are marked with an “*”):

Federal Agencies

- USFS*
  - Dixie National Forest
  - Fishlake National Forest
- USACE*
- NPS*

Utah State Agencies

- PLPCO*
- SITLA*

Local Governments

- Counties: Sevier*, Millard*, Beaver*, Washington*, and Iron*
- Municipalities: Aurora, Beaver, Elsinore, Enterprise*, Joseph, Milford, Minersville, Richfield, St. George*

In addition, after the initial invitation had been sent, it appeared Garfield and Piute counties could be crossed by the proposed transmission line. In mid-December 2009, these two counties were invited but declined to participate in the process as cooperating agencies.

Conference calls of the Agency ID Team, including the cooperating agencies, have been conducted twice each month to discuss the status of the Project and EIS and development of the POD. In addition, five in-person meetings were held at key milestones of the NEPA process. The five meetings held and the purpose of each meeting is as follows:

- **October 14, 2009.** BLM introducing the Project to the Agency ID Team, including outlining the purpose of and need for the Project, the Project description, scoping, the EIS schedule, future coordination, agency actions and decisions, alternative routes to be considered, and issues to be addressed in the EIS.

- **March 25, 2010.** Reviewing resource inventory data and discussing the approach for impact assessment and mitigation planning.

- **July 15, 2010.** Reviewing the impact assessment and discussing the screening and comparison of the alternative routes.

- **November 9, 2010.** Reviewing and discussing comments on the administrative Draft EIS prior to its completion and release for public review.

- **April 27, 2011.** Reviewing and discussing the draft POD (Section 2.3.5.1).

Coordination with the Agency ID Team will continue through the completion of the EIS and POD.

5.2.2 Consultation

The BLM is required to prepare EISs in coordination with any studies or analyses required by the Fish and Wildlife Conservation Act (16 U.S.C. 661 et seq.), ESA (16 U.S.C. 1531 et seq.), and the NHPA, as amended (16 U.S.C. 470 et seq.). Also, in accordance with Executive Order 13175, BLM must consult, government to government, with American Indians, to ensure the tribes are informed about actions that may affect them.

5.2.2.1 Biological Resources

Under provisions of Section 7(a)(2) of the ESA, a federal agency that carries out, permits, licenses, funds, or otherwise authorizes an activity must consult with the FWS as appropriate to ensure the action is not likely to jeopardize the continued existence of any species listed as threatened or endangered. The BLM initiated informal consultation with the FWS in September 2009 by requesting a list of federally threatened, endangered, and candidate species that may occur in the Project area. On November 2, 2009, the FWS attended an interagency meeting with the BLM, USFS, and UDWR to identify and discuss concerns regarding the potential effects of the Proposed Action on wildlife resources, including federally listed species.

At the direction of FWS, BLM obtained lists of federally threatened, endangered, and candidate species with the potential to occur in Sevier, Millard, Beaver, Iron, and Washington counties from the FWS Region 6 website in September 2009. The BLM requested a list of any federally listed, sensitive, endangered, and/or threatened species that may occur in the Project area. The species lists have been updated as new lists become available to reflect the current listing status of all federally listed and candidate species occurring in Utah counties potentially crossed by the Project.

The BLM formed the BRTG composed of the biologists from the BLM, USFS, FWS, and UDWR. The group meets via conference call once a month to discuss status of the Project, issues, and approach.

BLM has coordinated with FWS through the BRTG to determine the potential need for formal consultation under Section 7 of the ESA for the various action alternatives. FWS has indicated that formal consultation, including preparation of a Biological Assessment, would not be required if the selected route would not adversely affect listed species. The Agency Preferred Alternative would avoid occupied habitat for federally listed species that may occur in the Project area, including Utah prairie dog and southwestern willow flycatcher. BLM is preparing a letter to FWS documenting the occurrence of threatened, endangered, and candidate species along the Agency Preferred Alternative route and potential effects on each species, as well as requesting concurrence on the information presented from FWS. If FWS concurs with the BLM findings for each species, informal Section 7 consultation will be complete, and the concurrence letter will be included in the Project Record. If FWS does not concur with the findings, BLM will prepare and submit a Biological Assessment for the Project to FWS to initiate formal Section 7 consultation.

5.2.2.2 Cultural Resources

Section 106 (16 U.S.C. 470f) of the NHPA requires federal agencies to take into account the effect of their undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP, historic properties, including those listed on, or eligible for, the NRHP. Regulations for the implementation of Section 106 are defined in 36 CFR Part 800 – Protection of Historic Properties. These regulations define how federal agencies meet their statutory responsibilities as required under the law. The Section 106 process seeks to accommodate historic preservation concerns with the needs of federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking on historic properties (36 CFR 800.1). These parties include the ACHP, SHPOs, American Indian tribes, Tribal Historic Preservation Offices, state and other federal agencies, and individuals or organizations with a demonstrated interest in the undertaking due to their legal or economic relation to the undertaking or affected properties, or their concern with the effects of undertakings on historic properties (36 CFR 800.2).

As lead federal agency for compliance with Section 106 of the NHPA, BLM initiated Section 106 consultation with the SHPO, PLPCO, SITLA, USFS, NPS and the ACHP pursuant to 36 CFR Part 800.6 and 800.14 (b) of the ACHP's regulations implementing Section 106 of the NHPA in April 2010. The Section 106 process is separate from but often conducted parallel with the preparation of an EIS. Consultation under Section 106 of the NHPA is ongoing and will continue during post-EIS phases of Project implementation.

The BLM in consultation with the SHPO agreed to develop a Programmatic Agreement among the various state and federal agencies and consulting parties with an interest in the Project. A Programmatic Agreement outlines the stipulations that will be followed concerning the identification, assessment, and treatment of cultural resources for the Project in accordance with 36 CFR 800.15(b). Signatories agree that the Project will be administered in accordance with stipulations and measures set forth in the Programmatic Agreement. The following parties have been participating in development of the Programmatic Agreement:

- Signatory Parties
  - BLM Color Country District
  - USFS Dixie National Forest
  - Utah SHPO
  - ACHP
  - NPS
  - SITLA
  - Utah Department of Transportation
- Invited Signatory Parties
  - PacifiCorp (Rocky Mountain Power) (Proponent)
- Concurring Parties
  - PLPCO
  - Paiute Indian Tribe of Utah
  - Church of Jesus Christ of Latter-Day Saints
  - Milford Archaeological Research Institute
  - Mountain Meadows Association
  - Mountain Meadows Massacre Descendents
  - Mountain Meadows Monument Foundation
  - National Trust for Historic Preservation
  - Old Spanish Trail Association
  - Oregon California Trails Association
  - Utah Rock Art Research Association
  - We Nooch Society

Through the development of a Programmatic Agreement, BLM and cooperating agencies have outlined a phased approach to fulfill the four requirements of Section 106: initiate consultation, identify historic properties, assess adverse effects, and resolve adverse effects. The first step (initiate consultation) requires BLM to establish the undertaking, identify the appropriate SHPO or Tribal Historic Preservation Office, plan to involve the public, and identify other consulting parties. This step is generally scheduled concurrently with the NEPA scoping efforts. The second step (identify historic properties) requires BLM to determine the scope of the efforts (e.g., the methodologies for each type of cultural resource study, the Project Area of Potential Effects for each study), identify historic properties (Class III intensive pedestrian inventories) and evaluate historic significance (i.e., apply the four NRHP criteria). During the third step, BLM assesses adverse effects on historic properties identified during the previous step. The second and third steps parallel the NEPA processes of drafting the EIS, conducting public hearings/workshops, and finalizing the EIS. The final step in the Section 106 process is the resolution of

adverse effects, which will be documented in the HPTP. A copy of the Programmatic Agreement is presented in Appendix G. The Section 106 process will be complete prior to issuance of the Record of Decision.

In addition, pursuant to 36 CFR Part 800.2, the lead federal agency must consult with American Indian tribes that attach religious and cultural significance to historic properties that may be affected by an undertaking. This requirement applies regardless of the location of the historic property. In such cases, the federal agency must notify the tribes potentially affected by the undertaking and give those tribes the opportunity to participate in the Project as a concurring party should they wish to do so.

Early in the environmental process, BLM initiated contact with several American Indian tribes in accordance with various environmental laws and Executive Orders[1]. While no American Indian reservations or lands owned in fee by tribes are within the Project area, the BLM identified several American Indian tribes whose traditional territories are within the Project area.

BLM initiated consultation meetings with the tribes in October 2009, meeting with the Navajo Nation, Hopi Tribe, Moapa Band of Paiute Indians, Paiute Indian Tribe of Utah, Northwestern Band of Shoshone Nation, and Confederated Tribes of the Goshute Nation. The tribes did not express specific concerns or objections to the Project. All requested to be kept informed of Project developments and updated on the EIS process.

As part of scoping, the BLM mailed letters, dated December 17, 2009, to the Navajo Utah Commission and the following 13 American Indian tribes to inform them of and determine their interest in the Project:

- Confederated Tribes of Goshute Nation
- Fallon Paiute-Shoshone Tribe
- Hopi Tribe
- Kaibab Band of Paiute Indians
- Moapa Band of Paiute Indians
- Navajo Nation
- Northwestern Band of Shoshone Nation
- Paiute Indian Tribe of Utah
- San Juan Southern Paiute Tribe
- Southern Ute Tribe
- Ute Indian Tribe
- Ute Mountain Ute Tribe
- White Mesa Ute Tribe (Band of the Ute Mountain Ute)

The tribes also were asked to determine the need for further study related to the identification of TCPs in the Project area that may be affected by the Project.

Through BLM's ongoing consultation, one tribe contacted, the Paiute Indian Tribe of Utah, agreed to participate in development of the Programmatic Agreement as concurring party.

BLM continued meeting with tribes in spring and summer of 2010. The Paiute Indian Tribe of Utah expressed an interest in participating in the Project. On August 2, 2010, the BLM met with the Council of the Paiute Indian Tribe to update them on the status of the Project and discuss the tribe's concerns. On

[1] NEPA; NHPA, as amended; American Indian Religious Freedom Act of 1978; NAGPRA, as amended; FLPMA, ARPA of 1979; Executive Order 11593 – Protection and Enhancement of the Cultural Environment; Executive Order 12898 – Environmental Justice; Executive Order 13007 – Indian Sacred Sites; Executive Order 13175 – Consultation and Coordination with Indian tribal Governments

November 16, 2010, the BLM sent a letter to the Paiute Indian Tribe of Utah offering field visits of all alternative routes. The tribe requested visits to three areas of importance to them in the Project area. BLM conducted multiple field visits with tribal representatives to specific areas of concern between April 2011 and November 2011. BLM also met with the tribal council on April 26, 2011; September 16, 2011; and March 2, 2012, to update them on the status of the Project.

Contacts and consultation efforts to date are listed in Table 3-49, and results of the consultation efforts will be documented in the Project administrative record.

5.2.2.3 Government-to-Government Tribal Consultation

The United States has a unique legal relationship with American Indian tribal governments as set forth in the Constitution of the United States, treaties, Executive Orders (e.g., Executive Order 13175), federal statutes, federal policy, and tribal requirements, which establish the interaction that must take place between federal and tribal governments. An important basis for this relationship is the trust responsibility of the United States to protect tribal sovereignty, self-determination, tribal lands, tribal assets and resources, and treaty and other federally recognized and reserved rights. Government-to-government consultation is the process of seeking, discussing, and considering views on policy, and/or, in the case of this Project, environmental and cultural resource management issues. As part of the BLM's ongoing government-to-government consultation, tribal officials were informed of the Project and those who expressed interest in the Project were updated periodically on the status of the Project. For efficiency, government-to-government consultation activities (e.g., updates to the Paiute Tribal Council) often were combined with Section 106 tribal consultation activities described in Section 5.2.2.2. Consultation efforts to date are listed in Table 3-49 and results of the consultation efforts will be documented in the Project administrative record.

5.2.3 Other Coordination

Several federal and state agencies and local governments were engaged during the course of the environmental studies to request data and solicit information and comments. A list of all agency and stakeholder meetings is presented in Appendix B. In addition, information provided by the Proponent on Proponent-initiated public outreach activities is included in Appendix B.

5.3 Scoping Process

The scoping process is purposefully conducted early in the EIS process and is open to all interested agencies and public. The intent is to solicit comments and identify issues that help direct the approach and depth of the environmental studies and analysis needed to prepare the EIS. Objectives to meet this goal include the following:

- Identifying and inviting agencies with jurisdiction and/or special expertise relevant to the Project to participate in the preparation of the EIS as cooperating agencies
- Identifying other interested parties and inviting them to participate in the EIS process
- Identifying other environmental review and consultation requirements
- Identifying the relevant and substantive issues that need to be addressed during the studies and in the EIS
- Determining the range of alternatives to be evaluated

- Developing the environmental analysis criteria and systematic process, allocating EIS assignments among agencies, as appropriate

The scoping process is summarized in this section and documented in the *Sigurd to Red Butte No. 2 – 345kV Transmission Line Project EIS Scoping Report* (BLM 2010a), which is available for viewing at the BLM field offices and on the BLM Project website (refer to the following section for its address). The issues derived from scoping comments are listed in Chapter 1, Table 1-1.

5.3.1 Approach

The range of issues summarized in this EIS has been derived from the scoping process and ongoing public involvement. Some of the activities implemented early in the Project are listed below.

- Agency, interagency, and stakeholder meetings (listed in Appendix B) were held to discuss the Project and to solicit comments.

- Announcements to inform the public of the Project, EIS preparation, and public scoping meetings included the *Federal Register* NOI, media releases to local newspapers and radio stations, legal notices, and the Environmental Notification Bulletin Board (ENBB).

- A newsletter was distributed to interested parties on the Project mailing list, which includes federal, state, and local government agencies, special interest groups, and individuals—a total of 5,322 parties (3,885 landowners and 1,437 individuals on BLM's EIS mailing list). The newsletter introduced the Project, solicited input for the environmental analysis, and announced upcoming public scoping meetings.

- A telephone voice message information line (801-349-2893 and 888-666-6470) was established to provide opportunity for the public to learn about the Project status and/or request information.

- The BLM-established Project website, **http://www.blm.gov/ut/st/en/fo/cedar_city/planning/sigurd_to_red_butte.html**, contains a brief description of the Project, the purpose of and need for the Project, an EIS timeline, the Draft EIS, newsletters, right-of-way information, geotechnical investigations, scoping reports, maps, and a schedule. A link was provided for the public to submit comments via email at utsrbproj@blm.gov.

- Project information was posted on the BLM ENBB https://www.blm.gov/ut/enbb/index.php, NEPA Log Number C010-2009-0048.

- Four formal scoping meetings were held in February 2010, one each in St. George, Enterprise, Milford, and Richfield, Utah, to introduce the Project, explain the purpose of and need for the Project, describe the Project, explain the planning and permitting process, and solicit comments useful for the environmental analysis.

In addition, the Proponent assembled two CWGs (a northern and southern group) representing diverse interests associated with the Project area. To date, each CWG has met four times at key points in the process to provide input to the Proponent on the Project.

5.3.1.1 Notification

A NOI was published in the *Federal Register* on January 5, 2010, announcing the preparation of the EIS for the proposed Project and the opportunity for the public to participate in the process and provide input. While the publication of the NOI initiated a 45-day public scoping period, scoping comments were accepted until March 15, 2010, 15 days after the last public scoping meeting.

The first in a series of newsletters was mailed by the BLM on January 27, 2010, to approximately 1,400 individuals, agencies, and interested organizations on the Project mailing list. In addition, the Applicant prepared a list of the landowners within a 2-mile-wide corridor along the alternative routes (1 mile on either side of the reference centerline and approximately 3,900 landowners), sent a letter introducing the Project, and encouraged the landowners to participate in the federal scoping process. Advertisements and paid legal notices were placed in local newspapers (refer to Table 5-1). Also, Project information was posted on the Project website and a notice was posted on the ENBB.

TABLE 5-1
PRESS RELEASES AND LEGAL NOTICES

Newspaper	Advertisement Publication Dates	Legal Notice Publication Dates
St. George Spectrum	January 27, 2010 February 10, 2010	January 9, 2010
Beaver Press	January 28, 2010	January 13, 2010
Millard County Chronicle Progress	January 27, 2010	January 13, 2010
Richfield Reaper	January 27, 2010	January 13, 2010
Iron County Today	January 28, 2010	No legal notice was published

Scoping Meetings

Four scoping meetings were held in February 2010 to inform the public about the Project and the EIS process and to solicit input on the scope of the Project and potential issues. An open-house format was used for the meetings. Information was presented on the purpose of and need for the Project, a description of the Project, and the planning and permitting process. Representatives from the BLM, the Proponent, and the third-party environmental consulting team assisting the BLM, EPG, were present and available to explain the displays and answer questions. A total of 77 members of the public attended the scoping meetings. The four scoping meetings were held at the locations and dates listed below:

St. George, Utah
Tuesday, February 16, 2010
6:00–8:00 p.m.
Best Western Abbey Inn

Enterprise, Utah
Wednesday, February 17, 2010
6:00–8:00 p.m.
Enterprise High School

Milford, Utah
Wednesday, February 17, 2010
6:00–8:00 p.m.
Oak Tree Inn

Richfield, Utah
Thursday, February 18, 2010
6:00–8:00 p.m.
Sevier Valley Center Snow Valley College

Verbal comments provided during the scoping meetings were documented in meeting notes to include in the scoping report. Written comments were accepted at the public scoping meetings, via electronic mail, and via United States mail at the BLM Cedar City Field Office.

5.3.2 Scoping Results

The results of scoping efforts early in the process are documented in the *Sigurd to Red Butte No. 2 – 345kV Transmission Line Project EIS Scoping Report* (BLM 2010a). Issues derived from comments received are listed in Chapter 1, Table 1-1.

5.4 Information Dissemination

Mailing lists maintained by the Cedar City, St. George, Kanab, Fillmore, and Richfield BLM Field Offices; and the Dixie and Fishlake National Forests were compiled along with a list of federal, state, and local agency representatives, community leaders, and potential stakeholders. Ranchers with grazing allotments on lands administered by the BLM and/or USFS and current BLM lease holders, whose contact information was extracted from the LR 2000 database, also were added to the Project mailing list. Other additions included interested organizations and individuals who commented on the Project or requested information. The mailing list is used to distribute Project information.

As explained in Section 5.2, information about the Project was disseminated early in the environmental process. The publication of the NOI in the *Federal Register* marked the beginning of the EIS and scoping. Additional notifications included press releases and paid legal notices, newsletters distributed to those on the Project mailing list, public scoping meetings, the Scoping Report, stakeholder meetings, posting the Project on the BLM's ENBB, and the Proponent's community leader briefings and CWG meetings.

The availability of the Draft EIS and Final EIS was announced through a *Federal Register* NOA, press releases, paid legal notices, Project newsletters, the BLM Project website, and the ENBB. Also, newsletters announcing the availability of the Draft and Final EIS were sent to those on the mailing list.

5.5 Public Review of the EIS

The EPA published a NOA of the Draft EIS for public review and comment in the *Federal Register* on June 3, 2011, which initiated a 45-day public comment period. The availability of the Draft EIS; deadline for public comments; and locations, dates, and times of public meetings on the Draft EIS were announced in paid newspaper legal notices, paid newspaper advertisements, and project newsletters that were mailed to affected property owners, agencies, and stakeholders. Eighty-nine hard copies and 133 electronic copies of the Draft EIS were sent to federal, state, and local government agencies; institutions; organizations; and individuals for review and comment. During the comment period, the BLM conducted four open-house meetings to provide the public with an opportunity to view informational displays on the Project, discuss the Project individually with BLM staff and representatives, and provide comments on the Draft EIS. The public open houses were held on four consecutive days from June 27 through June 30, 2011. The open houses were held in Richfield, Milford, Enterprise, and St. George, Utah, respectively. A total of 81 people attended the public open houses.

During the comment period, 41 submittals offering comments on the Draft EIS were received from various federal, state, and local agencies; various special interest groups; and individuals, including 17 emails, 7 letters, 10 comment forms with comments submitted at the public open house meetings, and 7 comment forms with comments mailed to the BLM. A list of agencies, organizations, and individuals who commented on the Draft EIS is presented in Appendix M, Table M-1.

The EPA's publication of the NOA of the Final EIS in the *Federal Register* will initiate a 30-day review period. While not a formal comment period, comments received during the 30-day period will be considered prior to a decision on the Proposed Action. The availability of the Final EIS also is announced in paid newspaper legal notices, paid newspaper advertisements, and project newsletters mailed to affected property owners, agencies, and stakeholders.

5.6 Proponent-Initiated Activities

The two CWGs, created to provide a forum for input into the transmission line siting studies, consisted of representatives from cities, counties, and stakeholders in the northern and southern portions of the Project area. While the CWGs were not decision-making entities, members were asked to provide feedback on the Project and consider the views of the group, as well as the views of their respective organizations and/or communities. To date, the CWGs have met at key points of the Project, as follows:

- The first meetings were held in October 2009 in Cedar City and Richfield, Utah. The purpose was to (1) introduce the proposed Project, (2) gather input regarding the scope of the Project and alternative routes, and (3) identify issues that would help the Proponent in developing the transmission line.
- The second meetings were held in April 2010 in Fillmore and St. George, Utah. The purpose was to provide the CWGs with new Project information (scoping results, alternative route information, resource inventory data, etc.)
- The third meetings were held in January 2011 in Richfield and Beaver, Utah. The purpose was to gather feedback from the CWGs about the Proponent's efforts to address issues identified in the public scoping process.
- The fourth meetings were held in June 2011 in Fillmore and Cedar City, Utah. The purpose was to update the CWGs with new Project information, such as the availability of the Draft EIS for public review and to discuss next steps in local permitting and right-of-way acquisition on private lands.

In addition, the Proponent posted a basic description of the Project on their communications website (www.pacificorp.com/transmission) and conducted briefings of community leaders to introduce and keep them informed about the Project. A list of additional community outreach meetings is included in Appendix B.

The Proponent provided updates and information regarding the Project with all the counties and cities that required conditional use permits and general plan amendments, beginning in 2010. The application for the general plan amendment for Millard County was approved in February 2012 and all required conditional use permits have been approved. A summary of the applications and public meetings associated with the conditional use permits and the general plan amendment is presented in Appendix B.

5.7 Preparers and Contributors

Preparers, contributors, and consultants involved throughout the Project (including BLM and USFS staff), are listed in Tables 5-2, 5-3, and 5-4.

TABLE 5-2
BUREAU OF LAND MANAGEMENT PREPARERS AND CONTRIBUTORS

Name	Title	Involvement
Cedar City Field Office		
Elizabeth Burghard	Field Manager	Areas of critical environmental concern, Bureau of Land Management natural areas, recreation, visual resources
Craig Egerton	Natural Resource Specialist	Farmlands (Prime and Unique), floodplains, hydrology, invasive species and noxious weeds, soils, water resources (drinking, ground, surface)
Dan Fletcher	Rangeland Management Specialist	Rangeland health standards, vegetation, livestock grazing
Molly Galbraith	Rangeland Management Specialist	Soils, hydrology
Gina Ginouves	National Environmental Policy Act (NEPA)/Planning	NEPA compliance review
Chris Hite	Geologist	Geology, mineral resources, energy production, paleontology
Brandon Johnson	Realty Specialist	Lands and realty, land use
David Kiel	Recreation Specialist	Recreation, visual resources, wilderness qualities or attributes
Melanie Mendenhall	Fuels Specialist	Fuels and fire management
Randy Peterson	Safety Officer	Wastes (hazardous or solid)
Christine Pontarolo	Lead Project Biologist	U.S. Fish and Wildlife Service consultation; migratory birds; threatened, endangered, candidate, and sensitive plant and wildlife species
Nathan Thomas	Archaeologist	Cultural resources
Randy Trujillo	Associate District Manager	Areas of critical environmental concern, lands and realty
Sheri Whitfield	Wildlife Biologist	Fish and wildlife excluding FWS-designated species; migratory birds; threatened, endangered, candidate or sensitive plant and wildlife species
Rob Wilson	Realty Specialist	Environmental justice, socioeconomics
Kevin Wright	Rangeland Management Specialist	Wetlands/riparian zones
Richfield Field Office		
Stanley Adams	Safety/Hazmat Officer	Hazardous or solid waste
Bob Bate	Fuels Specialist	Fuels, woodland/forestry
Nancy DeMille	Realty Specialist	Environmental justice, lands, access, socio-economics
Larry Greenwood	Wildlife Biologist	Wildlife biology, threatened and endangered species, vegetation, wetlands, fish, riparian
Craig Harmon	Archaeologist	Tribal consultation
Brant Hollows	Rangeland Management Specialist	Soils, watershed, farmland, floodplains
Myron Jeffs	Outdoor Recreation Planner	Recreation, wilderness/wilderness study areas, wild and scenic rivers
Francis Rakow	Geologist, Paleontologist	Paleontology, geology
Mike Utley	Realty Specialist	Lands and realty, land use
Wayne Wetzel	Associate Field Office Manager	Project management
Burke Williams	Rangeland Management Specialist	Livestock grazing, invasive species
Phil Zeig	Soil Conservationist	Air quality, water resources

TABLE 5-2
BUREAU OF LAND MANAGEMENT PREPARERS AND CONTRIBUTORS

Name	Title	Involvement
Fillmore Field Office		
Steve Bonar	Outdoor Recreation Planner	Areas of critical environmental concern, recreation, visual resources, wild and scenic rivers, wilderness/wilderness study areas, wilderness qualities or attributes
Paul Caso	Rangeland Management Specialist	Water resources/quality (drinking, ground, surface)
Brent Crosland	Range Technician	Solid and hazardous waste, woodland/ forestry
George Cruz	Natural Resource Specialist	Hydrology floodplains, geology, mineral resources, energy production
Teresa Frampton	Realty Specialist	Project management, lands, access
Justin Johnson	Fire Management Specialist	Fuels, fire management
Jerry Mansfield	Geologist	Paleontology
Joelle McCarthy	Archaeologist	Cultural resources, Native American religious concerns
James Priest	Wildlife Biologist	Fish and wildlife including special status species other than FWS candidate or listed species (e.g., migratory birds and threatened, endangered, or candidate wildlife species)
R.B. Probert	Weeds Specialist	Invasive species and noxious weeds
Erin Rajala	Outdoor Recreation Planner	Recreation, wilderness, wilderness qualities or attributes, visual resources, wild and scenic rivers, areas of critical environmental concern
Matt Rajala	Natural Resource Specialist	Air quality, environmental justice, farmlands (Prime and Unique), soils, socioeconomics, NEPA coordination
Eric Reid	Rangeland Management Specialist	Wild horses and burros
Bill Thompson	Rangeland Management Specialist	Livestock grazing, range management, wetland/riparian zones
David Whitaker	Rangeland Management Specialist	Threatened, endangered, or candidate plant species; vegetation including special status plant species other than FWS candidate or listed species
Utah Bureau of Land Management State Office		
Tyler Ashcroft	Planning and Environmental Coordinator	NEPA compliance review
Rob Sweeten	Visual Resource Program Lead	Visual resources
Project Management		
Tamara Gertsch	National Project Manager	Project management

TABLE 5-3
U.S. FOREST SERVICE PREPARERS AND CONTRIBUTORS

Name	Title	Involvement
Kelsha Anderson	Natural Resources Specialist	Geology, soils
Kenton Call	Public Affairs Officer	Project management; inventoried roadless areas

TABLE 5-3
U.S. FOREST SERVICE PREPARERS AND CONTRIBUTORS

Name	Title	Involvement
Kevin Draper	Recreation Specialist, Landscape Architect	Visual resources
Rick Dustin	Landscape Architect	Visual resources
Mike Fracasso	Paleontologist	Paleontological resources
Chad Hermandorfer	Hydrologist	Water resources
Marian Jacklin	Archaeologist	Cultural resources
Pam Jarnecke	Forest Environmental Coordinator	National Environmental Policy Act compliance review
Jenna Jorgensen	Biologist	Project management, biological resources
Nate Lewis	Natural Resources Specialist	Recreation, lands, and special uses
Janel McCurdy	TEAMS Lead	Project management
Chris Mease	Fisheries Biologist	Biological resources
Gretchen Merrill	Public Service Group Officer	Project management
Terry Miller	Botanist	Biological resources
Kathy Slack	Realty Specialist	Project coordination
Lucretia Smith	Geographic Information Systems Specialist	Geographic Information Systems and rangeland
Michael D. Smith	Soil Scientist	Soils
Kathy Twitchell	Realty Specialist	Project coordination

TABLE 5-4
CONSULTANT PREPARERS AND CONTRIBUTORS

Name	Education	Involvement
ENVIRONMENTAL PLANNING GROUP (EPG)		
Keith Albury	MA, Geography BA, Natural Science	Geographic Information Systems
Timothy G. Baumann, CWB	MS, Wildlife Biology BS, Biology	Vegetation resources, wildlife biology
Drew Brown	MA, English BA, English	Document management/technical editor
Louise Brown	BS, Administrative Systems	Document management/technical editor
Jennifer Christiansen	MS, Geography BS, Geography	Geographic Information Systems
Kelleigh Cole	MA, Anthropology BA, Communications	Public involvement
Joe Donaldson	MLA, Landscape Architecture and Environmental Planning BLA, Landscape Architecture	Technical review, Land use
Brian Doubek	BS, Earth Science (Geography)	Geographic Information Systems
Michael Doyle	MLA, Landscape Architecture BS, Environmental Design	Principal-in-charge, senior technical review
Megan Dunford	MLA, Landscape Architecture BA, Advertising and Interpersonal Communications	Land use and recreation
Lani Kai Eggertsen-Goff	MS, Environmental Science BA, Liberal Arts	Land use and recreation
Chris Gaughan	MS, Wildlife Conservation BS, Earth Science	Wildlife and fisheries biology and vegetation resources, water resources
Naia George	MS, Anthropology BS, Anthropology	Cultural and historical resources

TABLE 5-4
CONSULTANT PREPARERS AND CONTRIBUTORS

Name	Education	Involvement
Angie Green	BA, English	Document management/technical editor
Emily Hadlock	BS, History	Geographic Information Systems
Heather Hedden	BA, Biology	Wildlife biology and vegetation resources, water resources
Gena Huffman	MS, Anthropology BA, Political Science and Anthropology	Cultural and historical resources
Kristofer Johnson	MLA, Landscape Architecture BS, Botany	Project coordinator
Michael Kirby, PhD	PhD, Geology MS, Geology BS, Geology	Earth and water resources, paleontology
Jonathan Knight	BS, Geography	Geographic Information Systems
Mike McConnell	BS, Wildlife Resources	Water resources, wildlife and fisheries biology
Amanda O'Connor	MS, Conservation Studies BA, Environmental Biology	Senior technical review, National Environmental Policy Act coordination
Mike Pasenko	MS, Quaternary Sciences Program BA, Anthropology	Earth and water resources, paleontology
Mary E. Pendergast, PhD	PhD, Ecology and Biology BS, Chemistry and Biology	Vegetation resources, wildlife biology
Reid Persing	BA, Chemistry and Biochemistry	Vegetation resources, wildlife biology
Scott C. Peters	BLA, Landscape Architecture	Access roads and disturbance
Justin M. Peterson	BS, Urban Planning	Land use and recreation, project coordinator
Kevin Rauhe	BLA, Landscape Architecture	Visual resources
Rhianna Riggs	BS, Mass Communications/Public Relations	Public involvement
Matt Sauter	MS, Paleontology BA, Geology	Earth and water resources, paleontology
Marc Schwartz	BS, Forestry/Ecosystem Management	Visual resources
Cindy Smith	BS, Liberal Arts and Sciences	Project management
Linwood Smith, PhD	PhD, Zoology MS, Zoology BA, Zoology	Wildlife biology and vegetation resources
Marty Thomas	BA, English BA, Anthropology	Cultural and historical resources
Bobby Tuttle	MS, Biology BS, Urban and Regional Planning (minor in Biology)	Wildlife biology and vegetation resources
Heather Weymouth	MS, American Studies (Anthropology) BIS, Anthropology	Cultural and historical resources
Andrew T. Yentsch	MS, Anthropology (Archaeology/Human Evolutionary Ecology) BA, History	Cultural and historical resources

TABLE 5-4
CONSULTANT PREPARERS AND CONTRIBUTORS

Name	Education	Involvement
SUBCONSULTANTS		
Louis Berger Group		
Lisa McDonald, PhD	PhD, Mineral Economics MS, Mineral Economics BS, Earth Science	Socioeconomics and environmental justice
Wind River Environmental Group, LLC		
Martha Hyder, PhD	PhD, Earth Science/Bioclimatology MS, Earth Science/Bioclimatology BS, Biology	Air quality and Clean Water Act conformity analysis
Exponent		
Joshua Phinney, PhD	PhD, Electrical Engineering SM, Electrical Engineering BS, Electrical Engineering	Electric and magnetic fields, noise
ASM Affiliates		
Molly Molenaar	MA, Anthropology	Native American consultation/ethnography

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Glossary

GLOSSARY

A

A-Weighted Sound Level – Sound that is measured with a sound-level meter using the A-weighted response filter built into the meter circuitry. The A-weighted filter simulates the frequency response to the human ear.

Access (road) – Road used for passage to and along transmission line for purposes of construction and maintenance.

Advisory Council on Historic Preservation (ACHP) – An independent federal agency that advises the President and Congress on historic preservation matters and oversees the review of projects under Section 106 of the National Historic Preservation Act.

Affected Environment – (1) A geographic area and the associated natural, human, and cultural resources that could be influenced by a proposed action. (2) The chapter in an environmental impact statement that describes the existing condition of the environment.

Aggregate – A group or mass of distinct things gathered into, or considered as, a total or a whole.

Albedo – A measure of a material's ability to reflect sunlight (including the visible, infrared, and ultraviolet wavelengths) on a scale of 0 to 1. An albedo value of 0.0 indicates the surface absorbs all solar radiation, and a 1.0 albedo value represents total reflectivity. The *ENERGY STAR Reflective Roof Products* criteria specify an albedo of 0.65 or higher for low-slope roof applications and 0.25 for sloped roofs.

Alignment – The specific, surveyed route of a transmission line.

Alluvium – A general term for clay, silt, sand, gravel, or similar consolidated material deposited during a comparatively recent geologic time by a stream or other body of running water in the bed of a stream, river, or floodplain, or as a cone or fan at the base of a mountain slope.

Alternative (action) – An option for meeting the stated need.

Alternative (route) – An optional path or direction for a transmission line.

Ambient Air – Any unconfined portion of the atmosphere: open air, surrounding air.

American Indian tribe – A legal term meaning an American Indian or Alaska Native tribal entity that is recognized as having a government-to-government relationship with the United States, with the responsibilities, powers, limitations, and obligations attached to that designation. A federally recognized tribe is eligible for funding and services from the Bureau of Indian Affairs, is given certain inherent rights of self-government (i.e., tribal sovereignty), and is entitled to receive certain federal benefits, services, and protections because of their special relationship with the United States.

Annual (ecology) – A plant that completes its development in one year or one season and then dies.

Antimony – A brittle, metallic element used in flame retardant.

Aquifer – A stratum of permeable rock, sand, etc., that contains water. Water source for a well.

Archaeology – The science that investigates the history of peoples by studying the material remains of past societies.

Area of Critical Environmental Concern (ACEC) – A Bureau of Land Management (BLM) designation for an area within 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 life from natural hazards.

Artifact – Any object showing human workmanship or modification, especially from a prehistoric or historic culture.

Assessment (environment) – An evaluation of existing resources and potential impacts to those resources from a proposed act or change to the environment.

Attainment Area – An area considered to have air quality as good as or better than the National Ambient Air Quality Standards, as defined in the Clean Air Act. An area may be an attainment area for one pollutant and a nonattainment area for others.

B

Background – The portion of the visual landscape lying from the outer limit of the middleground to infinity. Color and texture are subdued in this area, and visual sensitivity analysis is primarily concerned with the two-dimensional shape of landforms against the sky.

Background Concentrations – Background concentrations are an essential part of the total air quality concentration to be considered when determining source impacts. Background air quality includes pollutant concentrations due to (1) natural sources, (2) nearby sources other than those currently under consideration, and (3) unidentified sources.

Batch Plant – An area used for concrete mixing, temporary field office facility, material storage, and stations for equipment maintenance during construction of a transmission line. The area usually covers approximately 2 acres.

Beryllium – A steel-gray, lightweight metallic element that is found in beryl gemstones, such as aquamarine and emerald.

Bismuth – A silvery metallic element used in cosmetics, medicines, and medical procedures.

Board Feet – A lumber unit of measure. Each board foot is the volume of a 1-foot length of a board 1 foot wide and 1 inch thick.

Bowen Ratio – The ratio of energy available for sensible heating to energy available for latent heating.

C

Candidate Species – Any species included in the *Federal Register*'s Notice of Review being considered for listing as threatened or endangered by the U.S. Fish and Wildlife Service.

Capability – The ability to generate or transmit power.

Capacity – The maximum load that can be generated or transmitted by generation or transmission facilities for a given period of time without exceeding approved limits of temperature or stress.

Carbon Monoxide (CO) – A colorless, odorless, poisonous gas produced by incomplete fossil fuel combustion. One of the six criteria pollutants.

Cenozoic – An era of geologic time from the beginning of the Tertiary period (65 million years ago) to the present.

Centerline – A line along the approximate middle of a transmission line right-of-way.

Circuit – A complete, closed conducting path over which electric current may flow.

Clean Air Act (CAA) – A federal law defining the Environmental Protection Agency's (EPA's) responsibilities for protecting and improving the nation's air quality and the stratospheric ozone layer. The last major changes in the law, the CAA Amendments of 1990, were enacted by Congress in 1990. Legislation passed since then has made several minor changes. The CAA was incorporated into the United States Code as Title 42, Chapter 85.

Colluvium – Soil and rock detritus accumulated at the bottom of a slope.

Conductor – The wire cable strung between transmission line towers through which the electrical current flows.

Contrast – The effect of a striking difference in the form, line, color, or texture of an area being viewed.

Contrast Rating – A method of determining the extent of visual impact for an existing or proposed activity that would modify any landscape feature (land and water form, vegetation, and structures).

Corona – The discharge of energy from an energized transmission line that occurs when the voltage gradient exceeds the breakdown strength of air.

Corridor – A continuous strip of land, of defined width, through which a linear utility route (or routes) passes.

Council on Environmental Quality (CEQ) – An advisory council to the President of the United States established by the National Environmental Policy Act of 1969. This council reviews federal programs for their effect on the environment, conducts environmental studies, and advises the President on environmental matters.

Counterpoise – Conductive cable buried in the ground at a transmission line tower to lower the resistance of the ground to conduct electricity.

Cretaceous – The final period of the Mesozoic era spanning the time between 145 and 65 million years ago.

Criteria Pollutant – The 1970 amendments to the Clean Air Act required the EPA to set National Ambient Air Quality Standards for certain pollutants known to be hazardous to human health. The EPA has identified and set standards to protect human health and welfare for six pollutants: ozone, carbon monoxide, total suspended particulates, sulfur dioxide, lead, and nitrogen oxide. The term "criteria

pollutants" derives from the requirement that the EPA must describe the characteristics and potential health and welfare effects of these pollutants. It is on the basis of these criteria that standards are set or revised.

Cultural Resource – Any resource associated with the human cultural environment; examples include artifacts and historic objects, archaeological sites, historic sites, historic properties, and traditional cultural properties.

Cumulative Effect – The effect on the environment that results from the incremental impact of an action when added to other past, present, or reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time (40 Code of Federal Regulations [CFR] 1508.7).

D

Deadend Structure – Transmission line tower structures that are more robust than tangent structures, used (1) to add longitudinal strength to the line; (2) at turning points (angles); (3) for added safety at crossings of other utilities (e.g., other transmission lines and roads); and (4) to interrupt long distances of suspension structures that would otherwise provide more exposure to catastrophic line failure over long distances.

Degradation – The wearing down, or away, and general lowering or reduction of the earth's surface by the processes of weathering and erosion.

Design features of the Proposed Action – Standard corporate practices and procedures for environmental protection and design features addressing specific environmental policies and regulatory requirements incorporated by the Proponent as part of the Proposed Action that are applied/used generally to the entire Project to reduce adverse impacts on a non-specific basis.

Devonian – A geologic period during the Paleozoic Era, spanning in time between 410 and 360 million years ago, marked by an abundance of fish and the appearance of the first land plants and amphibians.

Diagenetically Altered – Chemical, physical, or biologic changes to a sediment or rock as a result of burial, such as compaction or mineralization.

Direct Effect – Effects caused by the action (i.e., construction) and occur at the same time and place (see Indirect Effect).

Distance Zone – A visibility threshold distance where visual perception changes. The zones are usually defined as foreground, middleground, and background.

Distributed Generation – A method of generating electricity from multiple small energy sources very near to where the electricity is actually used.

E

Ecology – The relationship between living organisms and their environment.

Economic Base – An area's economic base comprises industries that are primarily responsible for bringing outside income into the local economy. Economic base analysis measures the relative importance of industries for a particular area by comparing employment and income levels to a reference area (e.g., the United States).

Ecosystem – A complex system composed of a community of plants and animals and includes the system's chemical and physical environment.

Effects – In this realm, considered the cause and effect of an action, or the projected degree of change caused by a process (see also Impact).

Electric and Magnetic Field (EMF) – A space or region within which magnetic forces are present around an electrical current (also referred to as electromagnetic field).

Electric Field – Electric effect resulting from the voltage on a transmission line. Measured as volts per meter or kilovolts per meter.

Emergent (vegetation) – Vegetation with all or part of their vegetative and reproductive parts above the water.

Endangered Species – A plant or animal species whose prospects for survival and reproduction are in immediate jeopardy, as designated by the Secretary of the Interior. It is further defined by the Endangered Species Act of 1973, as amended.

Endemic – Plants or animals native to a particular region or country.

Environment – The surrounding conditions, influences, or forces that affect or modify an organism or an ecological community and ultimately determine its form and survival.

Environmental Impact Statement (EIS) – A detailed written statement, as required by Section 102(2)(C) of the National Environmental Policy Act, when an agency proposes a major federal action significantly affecting the quality of the human environment.

Environmental Justice – The pursuit of equal justice and equal protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, and /or socioeconomic status. Federal agencies must incorporate environmental justice as part of their mission by identifying and addressing the effects of programs, policies, and activities to ensure the opportunity for full and fair participation by affected communities in the decision-making process; and avoid, minimize, or mitigate disproportionately high and adverse health and environmental effects on minority and low-income populations.

Eocene – The epoch of the Tertiary period spanning the time between 55.5 and 33.7 million years ago.

Eolian – Wind-blown sand or silt material, which when deposited forms dunes or small sandy ridges.

Ephemeral – Present only during a portion of the year. Generally refers to water courses.

Equestrian – Anything having to do with horses.

Erosion – The group of processes whereby earth or rock material is loosened or dissolved and removed from any part of the earth's surface.

Escarpment – A steep slope or cliff formed by erosion or, less often, by faulting.

Ethnography – The study and systematic recording of human cultures. Also the descriptive body of work produced from such research.

Extirpate – To destroy completely.

Extraction – The act of extracting or drawing a substance out of the earth (e.g., mining).

F

Fault – A fracture or fracture zone in the earth's surface along where there has been displacement of the sides, relative to one another and parallel to the fracture.

Fauna – The wildlife or animals of a specified region or time.

Federal Energy Regulatory Commission (FERC) – The agency primarily responsible for ensuring adequate energy supplies at just and reasonable rates and providing regulatory incentives for increased productivity, efficiency, and competition.

Federal Land Policy and Management Act of 1976 (FLPMA) – Public Law 94-579 of October 21, 1976. This law is often referred to as the BLM's Organic Act, which provides the majority of the BLM's legislated authority, direction, policy, and basic management guidance.

Floodplain – The portion of a river or stream valley, adjacent to the river channel, which is built of sediments and inundated with water when the stream overflows its banks.

Foliage – Leaves of a plant or tree.

Foreground – The visible area from a viewpoint or use area out to a distance of 0.5 mile. The ability to perceive detail in a landscape is greatest in this zone.

Foreground-Middleground – The area visible from a travel route, residence, or other use area to a distance of 3 to 5 miles. The outer boundary of this zone is defined as the point where texture and form of individual plants are no longer apparent in the landscape. Vegetation is apparent only in patterns or outline.

Fossil – The remains or traces of an organism or assemblage of organisms preserved by natural processes in the earth's crust; exclusive of organisms buried since the beginning of historical time.

Fugitive Emissions – Fugitive emissions are air pollutant emissions from facilities or activities that could not reasonably pass through a stack, chimney, vent, or other equivalent opening.

Fugitive Dust – Dust put into the atmosphere by the wind blowing over plowed fields, dirt roads, or desert or sandy areas with little or no vegetation. Also caused by mechanically generated particulate matter emissions put into the air by reason of vehicles or equipment moving soil or driving over unpaved roads (or dirty paved roads) and dusty areas.

G

Gauss – Measurement of the magnetic flux intensity (intensity of magnetic field attraction per unit area).

Generation source – A facility generating electrical power.

Genus – One of the major taxonomic groups used to scientifically identify plants or animals. Several closely related species, or one species, make up one genus, while several genera, or one genus, make up a family.

Geologic Formations – A rock unit distinguished from adjacent deposits by some common character, such as its composition, origin, or the type of fossil associated with the unit.

Geology – The science that relates to the earth, the rocks of which it is composed, and the changes the earth has undergone or is undergoing.

Geothermal Resource – Heat found in rocks and fluids at various depths that can be extracted by drilling or pumping for use as an energy source. This heat may be residual heat, friction heat, or a result of radioactive decay.

Ground Wire – Two wires installed along the transmission line at the top of the tower structures to protect the conductors from lightning strikes by transferring the energy from the lightning through the ground wires and structures into the ground below.

H

Habitat – The region where a plant or animal naturally grows or lives. A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and home range.

Habitat Fragmentation – A reduction in area of undisturbed, continuous habitat. Often affects interior forest species that depend on unbroken expanses of mature coniferous forest.

Hazardous Air Pollutants – Air pollutants not covered by ambient air quality standards, but that, as defined in the Clean Air Act, may present a threat of adverse human health effects or adverse environmental effects.

Herbaceous – Of, or having the nature of, an herb or herbs, as distinguished from woody plants.

Historic property – Any district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (maintained by the Secretary of the Interior [36 CFR 800]).

Holocene – The second geologic epoch of the Quaternary period, commencing with the end of the last glacial period (the Pleistocene epoch). This era was marked by the establishment of modern climatic and environmental conditions and spans from roughly 9000 BC to present.

I

Igneous Rock – Rocks solidified from molten magma occurring as intensive or extrusive (volcanic), at or below the surface of the earth.

Impact – Modification in the status of the environment brought about by a proposed action.

Indian tribe – Sovereign entities with which the federal government has government-to-government relationships and which are granted special rights under federal law.

Indirect Effects – Caused by the action later in time or farther removed in distance, but still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth-rate, and related effects on air and water and other natural systems, including ecosystems.

Indirect Impact – Effects caused by the action and occur later in time or are farther removed, but are still reasonably foreseeable (see Direct Impact).

Insulator – A device resistant to electrical conduction used for isolating and supporting conductors.

Intermittent – A river or stream that flows for a period of time, usually seasonally during rainy periods, and stops during dry periods. In arid regions, dry periods may be interrupted by occasional flash floods from brief but intense rain storms.

Inventoried Roadless Area – An area identified by the USFS as undeveloped, typically exceeding 5,000 acres, that meets minimum criteria for wilderness consideration under the Wilderness Act and has been inventoried during the USFS Roadless Area Review and Evaluation (RARE II) process, subsequent assessments, or forest planning. These areas can overlap with unroaded/undeveloped areas.

J

Jurassic – The middle period of the Mesozoic era spanning the time between 213 and 145 million years ago, characterized by the dominance of dinosaurs and the appearance of flying reptiles and birds.

Jurisdictions – The limits or territory within which authority may be exercised.

K

Kilovolt (kV) – 1,000 volts.

Kilovolts per Meter (kV/m) – A unit measure of electric field strength.

L

Lacustrine – Lakes and ponds that have more than 2 acres in surface area.

Landform – A term used to describe the many types of land surfaces that exist as a result of geologic activity and weathering (e.g., plateaus, mountains, plains, and valleys).

Link – A segment of a route alternative sharing common endpoints with adjacent links. Endpoints of a link are determined by the location of intersections with other segments (links) of other routes.

Lithology – The structure and composition of a rock formation, and the study of rocks with the unaided eye, or with little magnification.

M

Manganese – A silvery, metallic element used in the production of steel.

Megawatt (MW) – 1,000 kilowatts or 1 million watts.

Magnetic Field – Electric effect resulting from an electric current flowing in a conductor. Unit of measurement is a Gauss.

Mercury – A heavy, metallic element that is liquid at room temperature and is used in thermometers and barometers.

Mesozoic – An era of geologic time between the Paleozoic and the Cenozoic eras, spanning the time between 248 and 65 million years ago.

Metamorphic – A rock formed through metamorphism. Metamorphism is the change in the mineralogical, structural, or textural composition of rocks under intense heat and pressure (e.g., turning limestone into marble).

Migratory – Birds, animals, or people that migrate or move from one region or country to another.

Mineral Resources – Any inorganic or organic substance occurring naturally in the earth that has a consistent and distinctive set of physical properties. Examples of mineral resources include coal, nickel, gold, silver, and copper.

Miocene – The epoch of the Tertiary period spanning the time between 23.8 and 5.3 million years ago.

Mitigate – To alleviate, reduce, or render less intense or severe.

Molybdenum – A silvery metallic element used in pigments and catalysts.

Mudstone – A hardened sedimentary rock consisting of clay that is similar to shale, but does not occur in distinct, bonded layers.

N

National Ambient Air Quality Standards (NAAQS) – The Clean Air Act requires the EPA to set NAAQS (40 CFR part 50) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. *Primary standards* set limits to protect public health, including the health of “sensitive” populations such as asthmatics, children, and the

elderly. *Secondary standards* set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. The EPA Office of Air Quality Planning and Standards has set National Ambient Air Quality Standards for six principal pollutants, which are called "criteria" pollutants.

National Emissions Standards for Hazardous Air Pollutants – Emission standards set by the EPA for an air pollutant not covered by National Ambient Air Quality Standards.

National Environmental Policy Act of 1969 (NEPA) – Public Law 91-190. An Act that encourages productive and enjoyable harmony between man and his environment, promotes efforts to prevent or eliminate damage to the environment and biosphere, stimulates the health and welfare of man, enriches the understanding or the ecological systems and natural resources important to the nation, and establishes the CEQ.

National Historic Preservation Act of 1966 (NHPA) – Public Law 89-665; 16 U.S.C. 470 et seq. A law authorizing the Secretary of the Interior to expand and maintain a National Register of Historic Places and directing federal agencies to take into account the effects of their actions on historic properties and provide the ACHP a reasonable opportunity to comment.

National Register of Historic Places (NRHP) – A list of districts, sites, buildings, structures, and objects maintained by the National Park Service (NPS), each determined by NPS to be of historic, cultural, architectural, archaeological, or engineering significance at the local, state, or national level, established by the Historic Preservation Act of 1966.

Native American – All native peoples of the United States and its territories, including American Indians, Alaska Natives, Native Hawaiians, Chamorros, and American Samoans.

Native Vegetation – Natural vegetation originating in a certain region or country.

Nitrogen Dioxide (NO_2) – The result of nitric oxide (a gas formed by combustion and a precursor of ground-level ozone pollution, also known as smog) combining with oxygen in the atmosphere and a major component of photochemical smog. One of the six criteria pollutants.

Nitrogen Oxides (NO_x) – Product of combustion from transportation and stationary sources consisting of a mixture of nitrogen and oxygen compounds, including nitric oxide and nitrogen dioxide.

Nonattainment Area – Area that does not meet one or more of the National Ambient Air Quality Standards for the criteria pollutants designated in the Clean Air Act.

Nonspecular Conductors – Conductors treated to reduce reflection, rendering the conductor less shiny and noticeable.

O

Oligocene – The epoch of the Tertiary period spanning the time between 33.7 and 23.8 million years ago.

100-year Flood – A flood with a magnitude that may occur once every 100 years. A 1-in-100 chance of a certain area being inundated during any year.

Ozone (O_3) – A form of oxygen produced when an electric spark is passed through oxygen or air. One of six criteria pollutants.

P

Paleontology – The science that deals with the life of past geological ages through the study of the fossil remains of organisms.

Paleozoic – The geologic era between the Precambrian and Mesozoic eras covering the time between 570 million and 225 million years ago. The era was characterized by the development of the first fish, amphibians, reptiles, and land plants.

Palustrine – A marsh or marsh-like environment.

Particulate Matter – Minute, separate particles, such as dust or other air pollutants. PM_{10} is a measure of particles in the atmosphere with a diameter of less than, or equal to, a nominal 10 micrometers aerodynamic equivalent diameter. $PM_{2.5}$ is a measure of particles in the atmosphere with a diameter of less than, or equal to, a nominal 2.5 micrometers aerodynamic equivalent diameter. These are criteria pollutants.

Pennsylvanian – The period of the Paleozoic era spanning the time between 325 and 286 million years ago.

Per capita income – Calculated by dividing total income in a specified area (e.g., county) by the area's population.

Perennial – Lasting or active through the whole year. May refer to rivers, streams, or plants.

Permian – The final period of the Paleozoic era, spanning the time between 286 and 248 million years ago, characterized by increased reptile life and major mountain-building in North America.

Physiographic Province – An area characterized by distinctive topography, geologic structure, climate, drainage patterns, and other features and phenomena of nature.

Plateau – An elevated tract of relatively level land, such as a tableland or mesa.

Playa – The shallow central basin of a desert plain where water gathers after a rain and is evaporated.

Pleistocene – The first geologic epoch during the Quaternary period, spanning from 1.8 million years ago to about 9000 Before Present, characterized by extensive continental glaciations in the Northern Hemisphere.

Pliocene – The final epoch of the Tertiary period, spanning the time between 5.3 and 2.6 million years ago

Policy – A guiding principle on which a specific decision or set of decisions is based.

Precambrian – The earliest geologic era covering all time from the formation of the earth and ending at the Paleozoic Era, which began about 570 million years ago.

Primitive – An area that is not developed; a pristine natural area.

Proterozoic – The final era of the Precambrian spanning the time between 2.5 billion and 544 million years ago.

Q

Quaternary – The second period of the Cenozoic era spanning 1.8 (recently refined to 2.6) million years ago to the present. This is the period of glaciations in the northern hemisphere.

Quaternary Fault – A fault that has been active or has had displacement during the Quaternary Period, between 1.8 million years ago and the present.

R

Raptor – A bird of prey.

Reclamation – Returning disturbed lands to a form and productivity that will be ecologically balanced.

Reconnaissance – Preliminary examination or survey of a territory.

Recontouring – Returning a surface to, or near to, its original form through some type of action, such as grading.

Record of Decision (ROD) – A document separate from, but associated with, an environmental impact statement that publicly and officially discloses the responsible official's decision on the proposed action.

Recreation Opportunity Spectrum (ROS) – A formal U.S. Forest Service process designed to delineate, define, and integrate outdoor recreation opportunities in land and resource management planning.

Reference Centerline – For purposes of assessing impacts and recommending mitigation, a centerline is assigned that may be slightly adjusted during engineering design.

Region – A large tract of land generally recognized as having similar character types and physiographic types.

Renewable Resource – Any natural resource that can replenish itself naturally over time.

Residual Impact – The impact of an action remaining after application of mitigation.

Revegetation – The reestablishment and development of self-sustaining plant cover. On disturbed sites, this normally requires human assistance, such as reseeding.

Right-of-way – A strip of land acquired by legal means, over which the power line and access roads would pass.

Riparian – An aquatic or terrestrial ecosystem associated with bodies of water, such as streams, lakes, or wetlands, or is dependent on the existence of perennial, intermittent, or ephemeral surface or subsurface

water drainage. Riparian areas are usually characterized by dense vegetation and an abundance and diversity of wildlife.

Route – A transmission route is the general path of a transmission line and associated facilities.

S

Sandstone – A common sedimentary rock primarily composed of sand grains, mainly quartz cemented together by other minerals.

Scenery Management System (SMS) – System of land management based on meeting visual resource goals (Forest Service).

Scenic Attractiveness Class – The designation (A, B, or C) assigned a scenic attractiveness unit to indicate the visual importance or quality of a unit relative to other units within the same physiographic province (Forest Service designation). For more information, see Appendix F, Section F.1.1.1.

Scenic Backway – A paved or dirt road reaching secluded areas of natural beauty.

Scenic Byway – A specially designated road that travels through an area of natural beauty.

Scenic Integrity – The designation assigned to landscape areas to indicate the intactness of the existing landscape character (U.S. Forest Service designation).

Scenic Integrity Objective (SIO) – Classification of landscape areas, according to the types of structures and changes that are acceptable to meet established visual goals (U.S. Forest Service designation).

Scenic Quality Class – The designation (A, B, or C) assigned a scenic quality rating unit to indicate the visual importance or quality of a unit relative to other units within the same physiographic province (BLM designation).

Scenic Quality Rating Unit (SQRU) – A portion of the landscape that displays primarily homogeneous visual characteristics of the basic landscape features (landform, water, vegetation, and structures and modifications), which separate it from the surrounding landscape.

Sediment – Solid fragmental material, either mineral or organic, transported or deposited by air, water, gravity, or ice.

Seismicity – The likelihood of an area being subject to earthquakes. The phenomenon of earth movements.

Seldom-seen Area – Areas either beyond the farthest extent of the background zone (of the area or travel routes), or seen from areas or travel routes of low-use volume.

Selective Mitigation – Measures or techniques developed to reduce adverse impacts on a case-by-case or selective basis.

Semi-arid – A climate or region characterized by little yearly rainfall and the growth of a number of short grasses and shrubs.

Sensitivity – The state of being readily affected by the actions of external influence.

Sensitivity Level Rating Unit (SLRU) – The designation (high, medium, or low) assigned to a landscape area to indicate the concern of the public to changes in the landscape (BLM designation).

Shield Wire – (see Ground Wire)

Shoofly – A conductor or conductors strung as a temporary substitute for a more permanent installation; can be in a substation as a substitute for a section of bus or a short section of transmission line.

Significant (Impact) – "Significant" has been used in this document to describe any impact that would cause a substantial adverse change or stress to one or more environmental resources. In general, all potential high impacts were considered to be significant.

Simulations – The use of a computer to calculate the effect of a given physical process.

Site – In archaeology, any locale showing evidence of human activity.

Species – A group of individuals of common ancestry that closely resemble each other structurally and physiologically and in nature interbreed, producing fertile offspring.

Solar Energy – Energy derived from the sun in the form of solar radiation.

Spanning – Placing tower structures so the transmission line extends across a sensitive area or resource

Spring – A place where groundwater flows naturally onto the land surface, often the source of a stream.

Staging Area – A designated area where vehicles, supplies, and construction equipment are positioned for use and access to a construction site.

Study Area – A given geographical area delineated for specific research.

Subspecies – Any natural subdivision of a species that exhibits small, but persistent morphological variations from other subdivisions of the same species living in different geographical regions or times.

Substation – An assemblage of equipment, enclosed by a fence, occurring at points along a transmission line. A facility in an electrical transmission system with the capability to route and control electrical power and to transform power to a higher or lower voltage. Equipment includes transformers, circuit breakers, and other equipment for switching, changing, or regulating the voltage of electricity.

Substrates – Sediment that lies beneath the surface of the earth.

Sulfur Dioxide (SO_2) – A pungent, colorless, gas formed primarily by the combustion of fossil fuels. One of the six criteria pollutants.

T

Talus – A pile of rock debris at the foot of a cliff or steep slope.

Tangent Structure – Typical transmission line structure. Can be one of several types placed four to five per mile in linear position.

Taxon – A taxonomic unit or family, as a species or family.

Taxonomy – A system of arranging animals and plants into natural, related groups based on some factor common to each, such as structure or biochemistry.

Technical Report – Documentation of detailed studies summarized in the Draft Environmental Impact Statement.

Tertiary – The first period of the Cenozoic era (after the Mesozoic era and before the Quaternary period), spanning the time period between 65 and 2.6 million years ago.

Thorium – A natural radioactive element used as a fuel in nuclear reactors.

Threatened Species ('I' or LT) – Any plant or animal species defined under the Endangered Species Act as likely to become endangered within the foreseeable future throughout a significant portion or all of its range; listings are published in the *Federal Register*.

Traditional Cultural Property (TCP) – Any built or natural locations, areas, or features considered sacred or culturally significant by a group or people because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community.

Tributary – A stream or river that flows into a larger stream or river.

Tungsten – A hard, metallic element that has a high melting point and is used in many alloys.

U

Unemployment – Persons are classified as unemployed if they do not have a job, have actively looked for work in the prior 4 weeks, and are currently available for work. Persons who were not working and were waiting to be recalled to a job from which they had been temporarily laid off are also included as unemployed. The unemployment rate represents the number unemployed as a percent of the labor force.

Unroaded/Undeveloped Area – An area identified by the USFS containing wilderness qualities or attributes and roadless qualities pursuant to the National Forest System Land Resource Management Planning Rule of 1982. These areas can overlap with inventoried roadless areas.

Uranium – A very hard, heavy, silvery, metallic, chemical element that is crucial to the research and development of atomic energy.

V

Vanadium – A bright white, soft, ductile metallic element found in several minerals, such as vanadinite and carnotile.

Vegetation Communities – A combination of dominant plant species that live together in the same region or on the same landform.

Viewshed – Visible portion of the specific landscape seen from a specific viewpoint, normally limited by landform, vegetation, distance, and existing cultural modifications.

Visual Management Objectives – The term used in this study to generally define Visual Resource Management (BLM) or Scenic Integrity Objective levels (USFS).

Visual Resource Inventory (VRI) Classes – Classification of landscape areas composed of scenic quality, sensitivity level rating units (SLRU), and distance zones for inventory purposes (BLM).

Visual Resource Management (VRM) Classes – Classification of landscapes according to the kinds of structures and changes acceptable to meet established visual goals (BLM).

Volatile Organic Compound (VOC) – Any organic compound that participates in atmospheric photochemical reactions except those designated by the EPA as having negligible photochemical reactivity.

Volcanics – Rocks or deposits formed from a volcanic eruption or volcanism.

Volt – A measure of electrical potential difference that would cause a current of ampere to flow through a conductor whose resistance is 1 ohm.

Volts Per Meter – A unit of measurement of an electric field.

W

Waters of the United States – All waters currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including adjacent wetlands and tributaries to waters of the United States, and all waters by which the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce.

Watt – A unit of electrical power equal to 1/756 horsepower.

Wetlands – Those areas inundated by surface or groundwater with a frequency sufficient to support vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

Wilderness Study Area – A roadless area or island of undeveloped federal land inventoried and found to possess wilderness qualities or attributes described under Title VI, Section 603 of the Federal Land Policy and Management Act and Section 2C of the Wilderness Act of 1964. These characteristics include the following:

(1) generally appears to have been affected mainly by the forces of nature, with human imprints substantially unnoticeable

(2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation

(3) has at least 5,000 acres or is large enough to make practicable its preservation and use in an unimpaired condition

(4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historic value

Wilderness – A congressionally designated area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation that is protected and managed to preserve its natural conditions, as described in Section 2A of the Wilderness Act of 1964.

Wilderness Qualities or Attributes – Key qualities or attributes of wilderness listed in section 2(c) of the Wilderness Act of 1964 and used by BLM in conducting wilderness inventories. These characteristics are features of the land associated with the concept of wilderness that specifically deals with naturalness and opportunities for solitude and primitive and unconfined recreation. These characteristics may be considered in land use planning when BLM determines those characteristics are reasonably present, of sufficient value (condition, uniqueness, relevance, importance), need (trend, risk), and practical to manage (from IM-2003-275, Change 1, Considerations of Wilderness Characteristics in Land Use Plan, Attachment 1).

Wind Energy – Form of energy conversion in which turbines convert the kinetic energy of wind into mechanical or electrical energy that can be used for power.

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